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Ready Reference

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How to use the MICROPAEDIA

The 12 volumes of the MICROPAEDIA contain tens of thousands of shorter articles on specific persons, places, things, and ideas, arranged in alphabetical order. The MICROPAEDIA can be used as an information resource on its own; and it can function as support for the longer articles in the MACROPAEDIA (to which it refers whenever appropriate). The MICROPAEDIA in turn is supported by references in the INDEX and by the lists of suggested readings in the PROPAEDIA. Finally, the MICROPAEDIA is the portion of the *Encyclopædia Britannica* best suited for the reader who wishes to browse among the countless subjects in all fields of human learning and history in all times and places.

Alphabetization

Entry titles are alphabetized according to the English alphabet, A to Z. All diacritical marks (such as in ö, ł, or ñ) and foreign letters without parallels in English (such as ayin [ʿ] and hamza [ʾ]) are ignored in the alphabetization. Apostrophes likewise are ignored. Titles beginning with numbers, such as **1812, War of**, are alphabetized as if the numbers were written out (**Eighteen-twelve, War of**).

Alphabetization proceeds according to the "word-by-word" principle. Thus, **Mount Vernon** precedes **mountain**; any **John** entry precedes **John Henry**, which in turn precedes **Johne's disease**. Any character or string of characters preceding a space, hyphen, or dash is treated as a word and alphabetized accordingly. Thus, **De Broglie** precedes **debenture**, and **jack-o'-lantern** precedes **jackal**. Titles with identical spellings are arranged in the following order: (1) persons, (2) places, (3) things.

For many rulers and titled nobility, chronological order, as well as alphabetical order, governs placement. Rulers of the same given name (*e.g.*, William) may be grouped together, separate from other entries, and indicated by the symbol •. They may be subgrouped alphabetically by country and, within each country, arranged chronologically (**William I, William II**, etc.). Nobility or peers of the same titled name (*e.g.*, **Essex, EARLS OF**) are similarly grouped together, separate from other entries; they are indicated by the symbol • and arranged chronologically.

Places with identical names are arranged in the alphabetical order of the countries where they are located. Identical place-names in the same country are alphabetized according to the alphabetical order of the state, province, or other political subdivision where they are found.

Entry arrangement

The titles of entries are arranged according to the forms commonly found in indexes and dictionaries, with some special conventions.

Entry titles for certain physical features, institutions, structures, events, and concepts are ordinarily inverted to place the substantive word first. Thus, the Bay of Bengal is entered as **Bengal, Bay of**; the Bank of England as **England, Bank of**; the Tower of London as **London, Tower of**; the Siege of Vienna as **Vienna, Siege of**; and the balance of power as **power, balance of**. If the name of a physical feature, institution, structure, event, or concept has two or more descriptors, it is entered under the descriptor appearing first. Thus, the Episcopal Church in Scotland is entered as **Episcopal Church in Scotland** (not **Scotland, Episcopal Church in**); the Leaning Tower of Pisa as **Leaning Tower of Pisa**; and the kinetic theory of gases as **kinetic theory of gases**.

The entries for most Western persons are arranged so that one can read a name in correct order by beginning after the first comma, proceeding to the end of the boldface type, returning to the beginning word or words, and proceeding forward to the first comma. Thus, the entry **March, Patrick Dunbar, 2nd Earl of**, is read "Patrick Dunbar, 2nd Earl of March"; the entry **Orléans, Louis, duc d'**, is read "Louis, duc d'Orléans." Names of Far Eastern origin are given in Oriental order, with the surname preceding the personal name (*e.g.*, **Tōjō Hideki, Deng Xiaoping, Nguyen Cao Ky**).

Cross-references

Some cross-reference entries appear in the MICROPAEDIA for the purpose of leading a reader from names that are familiar to alternate names that may not be. Cross-references also appear frequently within or at the ends of standard entries, where they are identified by *see, see also, see under, q.v.* (*quod vide,* "which see"), or *qq.v.* (*quae vide,* "which see," plural).

Certain entries serve both as relatively brief essays on general subjects and as cross-references to the same subjects treated at greater length and in greater depth in the MACROPAEDIA. Such an entry (*e.g.*, **igneous rock**) begins with a definition of the subject and then provides the following cross-reference: "A brief treatment of igneous rocks follows. For full treatment, *see* MACROPAEDIA: Minerals and Rocks.

Entries on certain broad subjects (*e.g.*, **music**) direct the reader to several relevant articles in the MACROPAEDIA and also to the PROPAEDIA for listings of related articles in the MICROPAEDIA.

Abbreviations

Abbreviations used in the MICROPAEDIA are given in a list that appears at the end of every MICROPAEDIA volume.

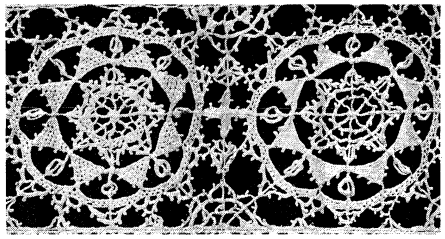
Territorial boundaries

In articles and maps indicating disputed geopolitical boundaries and territories, the attribution of sovereignty or administrative subordination to any specific area does not imply recognition of the status claimed by an administering power.

Réti, Richard (b. May 28, 1889, Pezinok, Hung.—d. June 6, 1929, Prague, Czech.), Hungarian chess master, writer, and theoretician who was one of the chief exponents of the hypermodern school.

Réti was an exception among grand masters, being keenly interested in composing chess problems and studies. His start in chess in Vienna, however, was so inauspicious that he came in last in a 1908 tournament, but by 1912 he was recognized as a brilliant player. In 1920 he switched from playing to writing and became, with his *Modern Ideas in Chess* (1923) and his columns, a revered writer. Returning to the board, he won the "brilliancy prize" in New York in 1924, awarded for the most brilliant game in the tournament of that year. His *Die Meister des Schachbretts* (1930; *Masters of the Chessboard*) was published posthumously.

reticella (Italian: "little net"), Renaissance fabric, akin to lace, with an open, gridlike pattern. The grid base for the pattern is formed



Reticella from Italy, late 16th century; in the Institut Royal du Patrimoine Artistique, Brussels

By courtesy of the Institut Royal du Patrimoine Artistique, Brussels; photograph, © A.C.L., Brussels

either by threads remaining after warps and wefts have been drawn out of a fabric at regular intervals or by threads thrown across a space cut out of a fabric. Reticella is frequently cited as the immediate forerunner of *punto in aria* (*q.v.*), the first true lace.

reticular fibre, in anatomy, fine fibrous connective tissue occurring in networks to make up the supporting tissue of many organs. The reticular fibres are composed of randomly oriented collagenous fibrils lying in an amorphous matrix substance. The fibrils are not oriented in orderly bundles, as are collagenous fibres; hence they show slightly different chemical responses. Reticular fibres, for example, readily accept a stain of silver salts that collagenous fibres reject, and, when boiled, the fibres do not form gelatin as do collagenous fibres. *See also* collagen.

reticulated work, also called OPUS RETICULATUM, type of facing used on ancient Roman concrete or mortared rubblework walls. It appeared during the late Roman Republic and became widespread by the reign of Augustus. It succeeded the earliest type of facing, an irregular patchwork called *opus incertum*. Reticulated work looks like a diagonal checkerboard with its square stones set lozenge fashion, separated by relatively fine joints. The stones are about 4 inches (10 cm) square and extend into the wall for 8 to 10 inches (20 to 25 cm). The name is derived from the Latin *rēte,* "net," because the wall surface had the appearance of a fishing net.

Examples of *opus reticulatum* may be seen at Ostia, in the Piazzale of the Corporations where tufa reticulate masonry forms the wall of a Roman guild office; at Rome in the wall of the Mausoleum of Augustus; and on the terraces of the country villa built by Herod the Great (d. 4 BC) at Jericho, Jordan. Reticulated work was replaced by a type of brick wall-facing called *opus testaceum,* which became the most common method in the imperial era.

reticuloendothelial system, also called MACROPHAGE SYSTEM, or MONONUCLEAR PHAGOCYTE SYSTEM, class of cells that occur in widely separated parts of the human body and that take up particular substances. These cells are part of the body's defense mechanisms.

Reticuloendothelial cells are phagocytic; *i.e.,* they can engulf and destroy bacteria, viruses, and other foreign substances. They also can ingest worn-out or abnormal body cells. Reticuloendothelial cells are derived from precursor cells in the bone marrow. These precursors develop into monocytes, phagocytic cells that are released into the bloodstream. Some monocytes remain in the general blood circulation, but most of them enter body tissues, where they develop into much larger phagocytic cells called macrophages. The great majority of macrophages remain as stationary cells within tissue, where they filter out and destroy foreign particles. Some of them break away, however, and wander through the circulation and within the intercellular spaces.

Tissue macrophages differ in appearance and name because of their various locations. For example, reticulum cells line the sinuses of the lymph nodes, spleen, and bone narrow, while histiocytes are found in numerous subcutaneous tissues. Microglia occur in nervous tissue, alveolar macrophages in the air spaces of the lungs, and Kupffer cells in the liver.

A single reticuloendothelial cell can phagocytize (engulf and destroy) microorganisms, cells, and even tiny fragments of foreign objects, such as bits of splinters and suture materials. Several mobile macrophages can surround larger foreign objects and coalesce into a single phagocytic cell. By their phagocytosis of foreign substances, macrophages form an important first line of defense against harmful particles that have reached the body's interior.

The reticuloendothelial cells also participate in body defense through immune reactions, a complex set of events targeted at a specific foreign substance. The reaction is directed by white blood cells known as lymphocytes. One class of lymphocytes (B cells) can synthesize and secrete antibodies with the help of another class of lymphocytes (T cells). T cells are also capable of other immunological reactions not involving antibody production. Macrophages often appear to be a required factor in an immune reaction. It is believed that phagocytosis of the foreign substance by macrophages helps reveal the surface molecules (antigens) on the foreign substance that stimulate lymphocyte responses. The production of antibodies, in turn, greatly stimulates the phagocytic activity of the macrophages.

Another important function of the reticuloendothelial cells is the destruction of worn-out or abnormal cells and tissues. The reticulum cells of the spleen in particular play a major role in the destruction of worn-out red blood cells and the recycling of hemoglobin, the oxygen-carrying pigment of the red blood cells. The reticulum cells break down old red blood cells and metabolize the hemoglobin to create hemosiderin, a pigment used to form new red blood cells.

Disorders associated with the reticuloendothelial system include anemia caused by excessive destruction of red blood cells by reticulum cells. There are also malignant tumours related to reticuloendothelial cells that can be either localized or widespread throughout the body; reticulum-cell sarcoma is the most common such neoplasm and is usually located in the lymph nodes. Another condition, histiocytic medullary reticulosis, results from the diffuse proliferation of phagocytic cells. Niemann-Pick and Gauche's diseases are hereditary disorders characterized by abnormal products of lipid metabolism within the reticuloendothelial cells.

reticulum cell sarcoma of bone, uncommon malignant tumour of bone marrow that may occur at any age and in any bone, affecting males twice as frequently as females. Symptoms include mild pain and swelling. The tumour grows slowly and metastasizes late, but bone destruction is severe. Irradiation therapy is the preferred treatment.

Retief, Piet (b. Nov. 12, 1780, near Wellington, Cape Colony [now in South Africa]—d. Feb. 6, 1838, Natal), one of the Boer leaders of the Great Trek, the migration of independence-minded Boers from British rule in Cape Colony to uncolonized lands in the interior of South Africa.

Better educated than most Boers, he combined farming with business, mainly as a building contractor. In 1814 Retief moved to the eastern frontier of the Cape Colony, where he soon gained a reputation as a field commandant fighting in frontier wars. He also acted as a spokesman for the Boer settlers, expressing their grievances over the native question to the British authorities. When the government appeared to sympathize with the tribesmen, the Boers decided to migrate, or trek. Retief issued a historic proclamation in February 1837 explaining the trekkers' reasons for leaving the colony.

North of the Orange River his party merged with other trekkers, and he was elected governor and head commandant. Under Retief they crossed the Drakensberg into the "promised land" of Natal (October 1837). To establish their right to the land, Retief negotiated with Dingane, the Zulu king, who insisted that before an agreement could be made the Boers would have to assist him in recovering some stolen cattle. The task accomplished, Retief and his party returned to Dingane's kraal, and, while partaking of the king's hospitality, they were murdered.

retina, layer of nervous tissue, covering the back two-thirds of the eyeball, in which stimulation by light occurs, initiating the sensation of vision. The rest of the eyeball serves essentially as a supporting shell for this light-sensitive tissue, providing it with nutrition and focusing light onto the appropriate portion of the retina. The retina is actually an extension of the brain, forming embryonically from brain tissue and connected to the brain proper by the optic nerve.

The retina is a complex tissue consisting of several layers, only one of which contains light-sensitive cells; light must pass through the covering layers to reach this layer. The light-sensitive cells are of two types, rods and cones, which are differentiated structurally by their distinctive shapes and functionally by their sensitivity to different kinds of light. Rods predominate in nocturnal animals and are most sensitive to reduced light intensities; in humans they provide night vision and aid in visual orientation. Cones are more prominent in animals that are active during the day, including humans, and provide detailed vision, as for reading, and colour perception. In general, the more cones per unit area of retina, the finer the detail that can be discriminated by that area. Rods are fairly well distributed over the entire retina, but cones tend to concentrate in two sites: the fovea centralis, a pit at the rear of the retina, which contains no rods and has the densest concentration of cones in the eye, and the surrounding macula lutea, a circular patch of yellow-pigmented tissue about one centimetre in diameter.

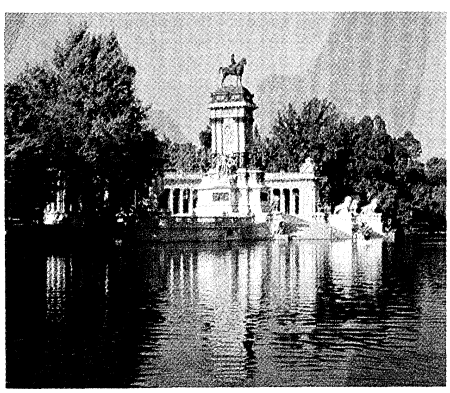
When light enters the eye, it passes through the lens and is refracted, focusing an image onto the retina. Light-sensitive chemicals in the rods and cones react to specific wavelengths of light and trigger nerve impulses. Complex interconnections (synapses) among retinal nerves assemble these impulses into a coherent pattern, which, in turn, is carried through the optic nerve to the visual centres of the brain, where they are interpreted.

retinitis pigmentosa, hereditary eye disease in which progressive degeneration of the retinal pigments leads to impairment of vision and, ultimately, to blindness. In the course of the disease the light-sensitive structures called rods—which are the visual receptors used in dim light—are destroyed early, causing night blindness in youth. Over time, further atrophy of the retina proper and of the layer of pigmented cells known as the pigment epithelium progressively constricts the field of vision until the affected person sees objects as if he were looking through a gun barrel. This stage is followed by complete blindness, usually by the age of 50. Deafness caused by a degeneration of the auditory nerve may accompany the visual loss. There are several hereditary patterns, but in most cases the disease is transmitted between generations as a recessive trait.

retinol: *see* vitamin A.

retinospora, a condition common in horticultural varieties of conifers, especially arborvitae, junipers, cypresses, and false cypresses, in which needlelike, spreading juvenile leaves persist on adult trees that normally have small, scalelike leaves, pressed against the stem. These intermediate plants were once thought to comprise a separate genus, *Retinospora.*

Retiro Park, Spanish EL RETIRO, OF PARQUE DE MADRID, the main park of Madrid, Spain. Originally called the Parque del Buen Retiro,



The equestrian statue of King Alfonso XII in Retiro Park, Madrid, Spain
A.F. Kersting

or "pleasant retreat," and today covering approximately 350 ac (142 ha), it was planned in the 1550s and redesigned on the instructions of Gaspar de Guzmán, conde-duque de Olivares (chief minister to King Philip IV), who added a palace and a theatre (where comedies of Lope de Vega, the most prolific of Spanish playwrights, were produced). Both buildings burned in 1734. King Ferdinand VI ordered the palace rebuilt, but it was razed during the Peninsular War; a remnant now serves as the Museo de Ejército (War Museum).

The park contains zoological gardens, the Palacio de Cristal (a glass building used for art exhibits), a lake, numerous statues of royalty, and the Roselada (rose gardens).

retort, vessel used for distillation of substances that are placed inside and subjected to heat. The simple form of retort, used in some laboratories, is a glass or metal bulb having a long, curved spout through which the distillate may pass to enter a receiving vessel. The design dates back to the cucurbit (flask) used by medieval alchemists.

Large retorts are widely used in industry in separating gold from mercury in amalgams, in separating zinc-metal vapour from the smelted ore mixture, and in obtaining coke or gas from coal. Industrial retorts may be tall and thin or short and wide; some are of clay and some of iron.

retraining program, occupational training program designed to aid workers in obtaining new employment. Formal retraining programs were first developed in Europe around the end of World War II as part of the effort to return military personnel to civilian life, to reduce unemployment, and to fill the shortages in certain occupations that had developed during the war. Later, with the attainment of full employment, retraining programs were used as a means of rectifying critical labour shortages in specific occupations. They have also been put forward as at least a partial solution to the problem of structural unemployment in declining industries or industries severely affected by competition from imports.

Retraining programs, which are perhaps most fully developed in western Europe, may include monetary allowances during training, relocation expenses, and family allowances. In several countries, refusal to participate in a retraining program disqualifies a worker from eligibility for unemployment compensation benefits. In the United States the Area Redevelopment Act of 1961 and the Manpower Development and Training Act of 1962 established worker retraining as part of the nation's effort to alleviate poverty.

Two schools of thought have developed regarding the cost-effectiveness of publicly sponsored retraining programs. Critics argue that, when the economy is depressed, tax dollars are wasted on retraining workers for nonexistent jobs. In addition, many of the new jobs created by technological developments are beyond the scope of most labourer's skills; for example, it is usually futile to try to retrain a laid-off drill press operator to become a computer programmer. In this view, the responsibility for retraining should rest with employers, and the critics point to several employer-sponsored programs that have been quite successful. A number of large corporations have been able to shift employees to new jobs after careful occupational retraining. However, this task is considerably more difficult for smaller companies that lack the variety of occupations found in their larger counterparts.

Proponents of publicly sponsored retraining programs argue that the policy is cost-efficient for two reasons. First, by retraining workers for reemployment, the overall burden of welfare support is reduced. Second, the tax revenue generated from increased employment more than offsets the cost of retraining.

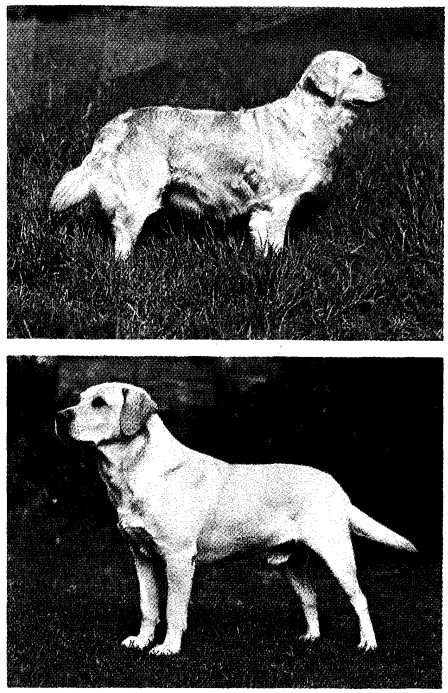
There are no substantive statistics that irrefutably support either set of arguments. However, while the two sides differ on where the responsibility for retraining should lie, they agree that the policy of worker retraining should be maintained.

retrieval (memory): *see* recall.

retriever, any of several sporting dogs bred and trained to retrieve game. Retrievers are characterized by water-resistant coats, a keen sense of smell, and "soft" mouths that do not damage game.

The golden retriever, typically a strong and hardy all-around dog and an excellent swimmer, stands 22 to 24 inches (55 to 61 centimetres) and weighs 60 to 75 pounds (27 to 34 kilograms). Its thick coat is long on the neck, thighs, tail, and back of the legs and may be any shade of golden brown. The golden retriever is noted for gentleness, intelligence, and willingness to work. It has been trained as a guide dog for the blind.

The Labrador retriever originated in Newfoundland, not Labrador, and was brought to England by fishermen around 1800. Standing 22 to 24 inches (55 to 62 centimetres) and weighing 55 to 75 pounds (25 to 34 kilograms), it is more solidly built than other retrievers and has shorter legs. Distinctive features include its otter-like tail, thick at the base and tapered toward the end, and its short, dense coat of black, dark brown, or yellow brown. The Labrador retriever is characteristically rugged, even-tempered, and gentle. In England it has been used in military work and is now used in police work and as a guide dog for the blind.



(Top) Golden retriever; (bottom) Labrador retriever
Sally Anne Thompson—EB Inc.

Other breeds of retrievers include the Chesapeake Bay retriever, a relatively stocky, brown dog; the curly-coated retriever, a strong dog with a tightly curled, black or liver-coloured coat; and the flat-coated retriever, a powerful, deep-chested, black or liver-coloured dog.

retroflex, in phonetics, a consonant sound produced with the tip of the tongue curled back toward the hard palate. In Russian the sounds *sh, zh* (like the English *s* sound in "pleasure"), and *shch* are retroflex; there are also many retroflex consonants in the languages of India.

retrograde motion, in astronomy, actual or apparent motion of a body in a direction opposite to that of the (direct) motions of most members of the solar system or of other astronomical systems with a preferred direction of motion. As viewed from a position in space north of the solar system (from some great distance above the Earth's North Pole), all the planets revolve counterclockwise around the Sun, and all except Venus and Uranus rotate counterclockwise on their own axes; the two, therefore, have retrograde motion. Of the more than 40 known satellites of the planets, only six display retrograde revolution. These include the four outermost moons of Jupiter; Phoebe, the outermost moon of Saturn; and Triton, the more massive of Neptune's moons. The orbital planes of the five satellites of Uranus are tilted so greatly that the description of these bodies' motion as either retrograde or direct has little meaning. The revolutions around the Sun of all known asteroids are direct; of the known periodic comets, only Halley's Comet moves in a retrograde orbit.

Planets farther from the Sun than the Earth display brief apparent retrograde motion, as seen from Earth, each time the faster moving Earth overtakes them.

retrolental fibroplasia, disease of the retinal blood vessels in the eyes of premature

infants, resulting from administration of excessive amounts of oxygen in the attempt to prevent respiratory disease. Until the role of oxygen was established in 1954, the disease was a major cause of blindness. It became extremely rare when oxygen therapy was modified and monitored more closely, although it still occurs in a few infants.

The immature blood vessels of the infant retina are very sensitive to oxygen; concentrations in excess of 40 percent cause the vessels to constrict, shutting off blood flow. When the oxygen is stopped, the vessels expand and become twisted, proliferating through the retina and the vitreous body, the transparent jellylike substance filling most of the eyeball. Damage in these early stages is reversible, and the recovery rate is about 50 percent. If the disease progresses, however, the blood vessels become fibrotic, and the retina detaches from the eyeball, causing permanent, irreversible blindness.

retrovirus, any of a group of viruses that, unlike most other viruses and all cellular organisms, carry their genetic blueprint in the form of ribonucleic acid (RNA). Retroviruses are responsible for certain cancers and slow virus infections of animals and cause at least one type of human cancer. They have also been identified as the cause of acquired immune deficiency syndrome (AIDS) in humans, and they have been linked to one form of human hepatitis.

Retroviruses are so named because, by means of a special enzyme called reverse transcriptase, they use RNA to synthesize deoxyribonucleic acid (DNA). This constitutes a reversal of the usual cellular processes of transcription of DNA into RNA. The action of reverse transcriptase makes it possible for genetic material from a retrovirus to become permanently incorporated into the DNA genome of an infected cell.

Rett syndrome, also called CEREBROATROPHIC HYPERAMMONEMIA, rare progressive neurological disorder that causes mental retardation, compulsive hand movements, difficulties in walking, and other symptoms. It is a sex-linked hereditary disorder that exclusively affects girls and occurs in about one of every 15,000 female births. Rett syndrome causes progressive disabilities in intellectual and motor development after about the first year of life. Autism, decreased body weight, failure of the head to grow with age, and a mild hyperammonemia are among the other symptoms. The disorder was first described in 1965. There is no effective treatment for it.

retting, process employing the action of bacteria and moisture on plants to dissolve or rot away much of the cellular tissues and gummy substances surrounding bast-fibre bundles, thus facilitating separation of the fibre from the stem. Basic methods include dew retting and water retting.

Dew retting, which is common in areas having limited water resources, is most effective in climates with heavy nighttime dews and warm daytime temperatures. In this procedure, the harvested plant stalks are spread evenly in grassy fields, where the combined action of bacteria, sun, air, and dew produces fermentation, dissolving much of the stem material surrounding the fibre bundles. Within two to three weeks, depending upon climatic conditions, the fibre can be separated. Dew-retted fibre is generally darker in colour and of poorer quality than water-retted fibre.

In water retting, the most widely practiced method, bundles of stalks are submerged in water. The water, penetrating to the central stalk portion, swells the inner cells, bursting the outermost layer, thus increasing absorption of both moisture and decay-producing bacteria. Retting time must be carefully judged; under-retting makes separation difficult, and over-retting weakens the fibre. In double retting, a gentle process producing excellent fibre, the stalks are removed from the water before retting is completed, dried for several months, then retted again.

Natural water retting employs stagnant or slow-moving waters, such as ponds, bogs, and slow streams and rivers. The stalk bundles are weighted down, usually with stones or wood, for about 8 to 14 days, depending upon water temperature and mineral content.

Tank retting, an increasingly important method, allows greater control and produces more uniform quality. The process, usually employing concrete vats, requires about four to six days and is feasible in any season. In the first six to eight hours, called the leaching period, much of the dirt and colouring matter is removed by the water, which is usually changed to assure clean fibre. Waste retting water, which requires treatment to reduce harmful toxic elements before its release, is rich in chemicals and is sometimes used as liquid fertilizer.

The retted stalks, called straw, are dried in open air or by mechanical means and are frequently stored for a short period to allow curing to occur, facilitating fibre removal. Final separation of the fibre is accomplished by a breaking process in which the brittle woody portion of the straw is broken, either by hand or by passing through rollers, followed by the scutching operation, which removes the broken woody pieces (shives) by beating or scraping. Some machines combine breaking and scutching operations. Waste material from the first scutching, consisting of shives and short fibres, is usually treated a second time. The short fibre (tow) thus obtained is frequently used in paper manufacture, and the shives may serve as fuel to heat the retting water or may be made into wallboard.

Retz, Gilles de: *see* Rais, Gilles de.

Retz, Jean-François-Paul de Gondi, cardinal de (b. September 1613, Montmirail, Fr.—d. Aug. 24, 1679, Paris), one of the leaders of the aristocratic rebellion known as the Fronde (1648–53), whose memoirs remain a classic of 17th-century French literature.

Of Florentine origin, the family into which Gondi was born had risen to prominence in the French court in the 16th century. Destined



Retz, portrait by Robert Nanteuil
Giraudon—Art Resource/EB Inc.

by his family for an ecclesiastical career, he received his early education under the Jesuits and completed his theological studies at the Sorbonne in 1638. While still a student, he sympathized with the opposition to the Cardinal de Richelieu, chief minister of Louis XIII from 1624 to 1642, who sought to weaken the power of the nobility. In 1643 Gondi was ordained a priest and was appointed coadjutor (acting deputy and successor-designate) to his uncle, Jean-François de Gondi, who was the archbishop of Paris.

Gondi received the opportunity to play a major political role with the outbreak of the Fronde, a rebellion against the government of Anne of Austria (who was regent for her son, Louis XIV) and her chief minister, the Italian-born Cardinal Mazarin. Throughout the Fronde, Gondi worked primarily to advance his own interests, shifting his allegiance between the rebels and the government. During an interlude in the civil war he was persuaded to support the government's arrest of the powerful Prince de Condé in January 1650. But reversing his position and that of his followers, he helped obtain the release of Condé and the temporary exile of Mazarin (February 1651). In an attempt to win his support, Anne nominated Gondi to the cardinalate on Sept. 22, 1651. His nomination was accepted by Pope Innocent IV on Feb. 19, 1652, and from that time Gondi styled himself cardinal de Retz. But his political maneuvering cost him his popularity in Paris, while the government mistrusted him and waited for revenge.

With the government victorious over the rebels, Retz was arrested on Dec. 19, 1652, and taken to the prison at Vincennes. Upon his uncle's death in March 1654, Retz was immediately appointed archbishop of Paris but was pressured to resign this office a few days later. Pope Innocent, however, refused to accept Retz's resignation, and Retz, who had escaped from prison in August 1654, waged a battle for control of the diocese from exile. After Mazarin's death in 1661, Retz returned to France and in February 1662 agreed to resign the archbishopric of Paris in return for the abbacy of Saint-Denis and a substantial income.

Unable to gain favour with King Louis XIV, Retz lived away from court, on his estates or in his French abbeys. Claiming a religious conversion, he lived his last years in penance.

Retz's *Mémoires,* written during his retirement, is an account of his life to 1655 and contains a description of his role in the events of the Fronde, portraits of contemporaries, and maxims drawn from his experiences.

A biography of him is J.H.M. Salmon's *Cardinal de Retz* (1969).

Retzius, Magnus Gustaf (b. Oct. 17, 1842, Stockholm—d. July 21, 1919, Stockholm), Swedish anatomist and anthropologist best-known for his studies of the histology of the nervous system.

Retzius' *Das Menschenhirn,* 2 vol. (1896; "The Human Brain") was perhaps the most important work written on the gross anatomy of the brain during the 19th century. He served as a professor of histology at the Karolinska Mediko-Kirurgiska Institutet, Stockholm (1877–1900), where he made important contributions to anatomical descriptions of the muscles of the eardrum, the bones of the middle ear, and the Eustachian tube. Retzius also made a useful study of ancient Swedish and Finnish skulls.

Retzské, Jan (singer): *see* Reszke, Jean de.

Reuben, one of the 12 tribes of Israel that in biblical times comprised the people of Israel who later became the Jewish people. The tribe was named after the oldest of Jacob's sons born of Leah, his first wife.

After the Exodus out of Egypt, Joshua led the Israelites into the Promised Land and divided the territory among the 12 tribes. The tribe of Reuben apparently settled east of the Dead Sea in the same general area occupied by the tribe of Gad and played a secondary role in the history of the Jewish people. After the death of King Solomon (922 BC), the 10 northern tribes formed the Kingdom of Israel under Jeroboam I that in 721 BC fell to Assyrian conquerors. In time these northern tribes lost their identity through assimilation with

other peoples, and thus the tribe of Reuben became known in legend as one of the Ten Lost Tribes of Israel.

Reubeni, David (d. after 1532), Jewish adventurer whose grandiose plans inspired the messianic visions of the martyr Solomon Molcho (*q.v.*; died 1532). Reubeni claimed to be a prince descended from the tribe of Reuben (hence his name) of a Jewish state in Arabia. He gained the favour and protection of Pope Clement VII and King John III of Portugal with his forcefully stated plan to lead a Jewish army against the Turks in Palestine.

Under the influence of Reubeni's charismatic personality, a young Portuguese Marrano (a Jew forced to espouse Christianity), Solomon Molcho, openly adopted Judaism; his subsequent sermons inflamed the smoldering messianic hopes of many Jews. Reubeni rebuffed Molcho for his rashness; in turn, Reubeni aroused the displeasure of King John and was forced to leave Portugal.

Reubeni eventually went to Italy, only to find that Solomon Molcho had preceded him and was gaining a high reputation as an eloquent preacher of messianic visions. Joining forces, they left for Ratisbon (now Regensburg, W. Ger.), to see the Holy Roman emperor Charles V, who had convened Parliament there. The two visionaries tried to persuade Charles to arm the Jews to fight the Turks; instead, they were imprisoned, fettered, and sent to Mantua, Italy, to face the Inquisition. Molcho was burned at the stake, while Reubeni was sent to a Spanish prison, where he died a few years later, probably by poisoning.

Reuchlin, Johannes (b. Feb. 22, 1455, Pforzheim, Württemberg—d. June 6, 1522, Bad Liebenzell, Ger.), German Humanist, political consultant, and one of the foremost classics scholars of his time, who wrote the celebrated *De Rudimentis Hebraicis* (1506; "On the Fundamentals of Hebrew"), a grammar and lexicon that revolutionized Hebrew studies and significantly advanced Old Testament research. Collaborating in editing and commenting on classic literature and philosophy with the leading Humanists of the day (among them Desiderius Erasmus, Marsilio Ficino, and Pico della Mirandola), he became a pioneer in the scientific study of classical Greek and the German representative of Renaissance Platonism, which he fused with Cabalistic (Jewish occult) teaching.

In a famous controversy he defended the study and preservation of Hebrew literature against the Inquisition censors led by the Cologne Dominican friar Johannes Pfefferkorn. The dispute aligned the entire European liberal and Humanist community against the speculative doctrine of university Scholastics, and it occasioned Reuchlin's noted satire *Epistolae obscurorum virorum* (1515–17; "Letters of the Obscure Men"). Although he enjoyed popular support and was at first acquitted of heresy (1516), he and his writings were eventually condemned by Pope Leo X (1520). Church Reformers utilized the anti-institutional feeling generated by the controversy, but Reuchlin repudiated Philip Melanchthon, his nephew, and Martin Luther in their separation from Roman Catholicism.

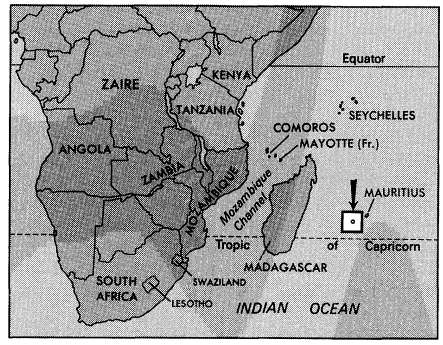
Reuel (biblical priest): *see* Jethro.

Reumert, Poul (Hagen) (b. March 26, 1883, Copenhagen—d. April 24, 1968, Copenhagen) Danish stage and film star, regarded for more than 50 years as one of the most important character actors in Denmark.

After studying at the Kongelige Teater (Royal Theatre), Reumert began his professional career at the Copenhagen Folketeater in 1902. In 1911 he moved to the Kongelige Teater, where he spent most of his career and developed a lifelong stage partnership with the actress Bodil Ipsen.

A consummate character actor, Reumert was known for his subtle style and clear delineation of personality, talents that proved equally adaptable to the diverse works of Ludvig Holberg, George Bernard Shaw, Henrik Ibsen, and others; his most celebrated parts, however, were Molière's Tartuffe and several roles in the plays of Shakespeare and the modern Swedish dramatist August Strindberg. He appeared several times with the Comédie-Française, where he delighted audiences with his perfect French. He also made a number of films in the 1930s and '40s.

Réunion, island of the Mascarene Islands and a French overseas *département* in the western Indian Ocean. It is located about 450 mi (720 km) east of Madagascar and 110 mi southwest of Mauritius. Réunion is almost elliptical in shape, about 40 mi long and 30 mi wide, and has an area of 970 sq mi (2,512 sq km). The capital is Saint-Denis on the northern coast. Réunion's population in 1984 was 531,000.

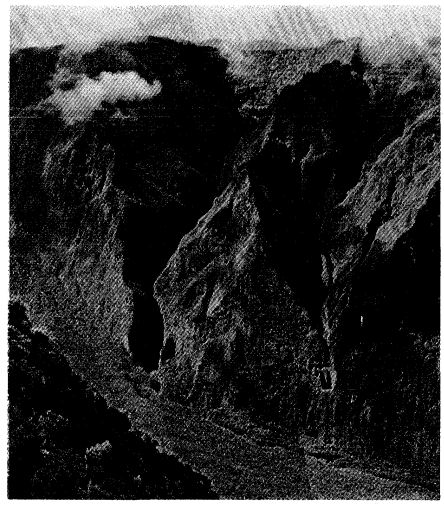


Réunion

The article that follows is a summary of significant detail about Réunion. For information about regional aspects of Réunion, *see* MACROPAEDIA: Indian Ocean Islands.

For current history and for statistics on society and economy, *see* the article "World Affairs" and BRITANNICA WORLD DATA, respectively, in the *Britannica Book of the Year.*

The land. Réunion is volcanic in origin, volcanoes having developed along a northwest–southeast fault. The volcanic activity of the central massif ceased in the Pliocene Epoch


Section of the dormant volcanic massif, known as the Plaine des Ramparts, on Réunion
Gerald Cubitt

(2,500,000 to 7,000,000 years ago). Cones, rising to about 10,000 ft (3,000 m), dominate the landscape. In the eastern part of the island, volcanic activity includes one crater, Piton de la Fournaise, which erupts irregularly every few years.

The Southeast Trade Winds, from April to October, cause abundant annual rainfall (160–315 in. [4,000–8,000 mm]) in the south and east of the island; the north and west sides, however, have as little as 25 in. of rain a year. Temperatures tend to be cool, especially at higher elevations, but in summer Réunion lies within the doldrums, and the lowlands are humid. Tropical cyclones occur frequently.

The people. Réunion was first settled in the 17th century by colonists from France. Slave labourers were brought in from East Africa to work on plantations, and later Malays, Annamites, Chinese, and Malabar Indians were imported as indentured labourers. Today most of the population is of mixed descent (Creole). The limited amount of land has induced substantial emigration, largely to France but also to Madagascar. Even so, the population continues to mount. Population density is estimated at about 547 per sq mi (211 per sq km), including large areas that are too mountainous to be habitable. Saint-Denis, the capital and largest urban area on the island, had a population in 1982 (prelim.) of 109,066. The language in common use on the island is Creole; French, however, is the official language. Nearly all of the population is Roman Catholic. The birth rate per 1,000 population in 1981 was 23.4; the death rate was 6.3. Almost 40 percent of the population is of less than 15 years of age.

The economy. Réunion's economy has been based almost entirely on sugar for more than a century. Cane is grown on most cultivable land, though vanilla bean and some fruits and vegetables, tobacco, and geraniums (for perfume) are produced. About a dozen big estates controlled by half as many associations, with milling facilities, produce the bulk of the cane crop. Sugar represents about 85 percent of Réunion's exports, and such sugar by-products as rum and molasses account for much of the rest. Imports are manufactured goods, including road vehicles, petroleum products, and nonelectric machinery and a substantial amount of foodstuffs, namely meat and rice. More than 60 percent of Réunion's total trade is with France, with much of the rest going to Madagascar and South Africa. Unemployment continues to be a major problem.

A paved road around Réunion connects Saint-Denis with the main shipping port, Le Port, and with important towns. Another road crosses the island southwest–northeast to link the towns of Saint-Pierre and Saint-Benoît. Le Port can handle large ships through artificial port facilities. An international airport is located near Saint-Denis.

Administrative and social conditions. As an overseas *département* of France, Réunion elects three deputies to the French National Assembly and two to the Senate. The *département* is administered by an appointed prefect and a general council composed of 36 elected members. There is also a regional council (created 1974) for Réunion that coordinates social and economic development policies. The Réunionese are full citizens of the French Republic. The judiciary comprises a Court of Appeal at Saint-Denis and several higher courts (*grande instance*). Réunion has several hospitals and a health services network. Many children, however, suffer from malnutrition, and much of the population carries parasites. Classes in the *département*'s primary and secondary schools are conducted in French. Réunion also has a teacher training college.

History. Uninhabited when first visited by Portuguese navigators in the early 1500s, Réunion was settled in the mid-1600s, when the French East India Company established a layover station for ships rounding the Cape of Good Hope en route to India. African slaves were imported first to work coffee and then sugar plantations; with the abolition of slavery in 1848, indentured labourers from In-

dochina, India, and East Africa were brought in. Réunion was ruled by France as a colony until 1946, when it became an overseas *département* of France. The headquarters of the French military forces in the Indian Ocean was established on Réunion in 1973, with the arrival of personnel withdrawn from Madagascar. In the early 1980s the major political issues in Réunion were those of greater autonomy and of better working conditions and higher wages for the island's labour force.

Reus, city, Tarragona province, in the autonomous community (region) of Catalonia, northeastern Spain, on a coastal plain, just west-northwest of Tarragona city. The city was first mentioned in the 13th century, but its commercial life dates from 1750 when an English settlement was established there. Reus gained the status of a city in the 1840s. In its oldest section is the Gothic priory church of San Pedro, with a belfry 200 ft (60 m) high. Reus has a municipal museum (Museo Prim-Rull) that houses a prehistoric collection; and numerous educational, cultural, sporting, and recreational centres. Salou Beach, a Mediterranean resort, is 5½ mi (9 km) south. Reus is the site of an important textile industry, and its position in the centre of a wine-growing district accounts for what is said to be a large trade in counterfeit French wines. Much horticultural produce is grown.

Reus was the birthplace of the general and statesman Juan Prim, of the painter Mariano Fortuny, and of the architect Antonio Gaudí. Pop. (1981) 80,710.

Reuss, two former German principalities, merged into Thuringia in 1920. In their final years they comprised two blocks, separated by part of Saxe-Weimar-Eisenach. The southern and larger block, or Oberland, with Schleiz and Greiz as chief towns, was bounded east by the kingdom of Saxony, south by Bavaria, west by Saxe-Meiningen and part of Schwarzburg-Rudolstadt, northwest by an exclave of Prussian Saxony. The other block, Unterland, around Gera, was bounded east and west by Saxe-Altenburg, north by Prussian Saxony.

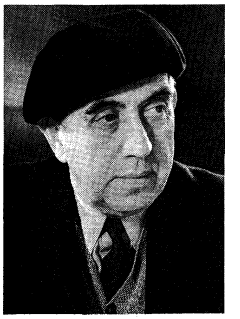
The ruling house of the Reuss is traceable to the 12th century. All its male descendants have borne the name Henry from the early 13th century, necessitating complex numeration. Its Plauen line was subdivided in 1306 between a senior branch (extinct 1572) and a junior. The latter took the name Reuss from its head, Henry the Ruthenian (so designated, it seems, after marriage with a Ruthenian princess). It became Lutheran and split itself in 1564 into three lines, Elder Reuss, Middle Reuss (extinct 1616), and Younger Reuss.

The heads of the Elder and Younger Reuss both acquired the rank of count of the Holy Roman Empire in 1673; Elder that of prince in 1778; and branches of Younger Reuss that of prince in 1806. Both lines entered the German Confederation in 1815 and became members of the German Empire in 1871.

The two territories, which became free states in 1918, merged themselves into a People's State of Reuss on April 4, 1919. This was absorbed into the new Thuringia on May 1, 1920.

Reuter, Ernst (b. July 29, 1889, Apenrade, Ger.—d. Sept. 30, 1953, Berlin), German Communist and leader of the Sozialdemokratische Partei Deutschlands (German Social Democrats), mayor of post-World War II West Berlin, whose leadership helped that city survive the Soviet blockade.

Reuter joined the German Social Democratic Party in 1912. Drafted during World War I, he became a Russian prisoner of war in 1916. He joined the Bolsheviks and served as commissar of the Volga German autonomous workers' commune in 1918. Returning to Germany after the revolution, he was appointed Communist Party secretary for Berlin but rejoined the



Ernst Reuter, 1951
Archiv fur Kunst und Geschichte, West Berlin

Social Democrats in 1922. Reuter was elected to the Berlin city assembly (1926), served as mayor of Magdeburg (1931), and entered the Reichstag (federal lower house) the next year. After being arrested following Hitler's advent to power, he went to England (1935), and from 1939 to 1945 lived in Turkey, serving as professor of public administration at the University of Ankara.

Returning to Berlin in 1946, Reuter reorganized the Social Democratic Party and was elected mayor (1947), but was not approved because of Soviet opposition. He did not take office, as mayor of West Berlin, until after the division of the city in 1948 into a western and eastern sector. After 1951, Reuter also presided over the Deutsche Städtetages (German City Diéts). His political and moral leadership, which extended far beyond Berlin itself, helped the people of Berlin to withstand the Soviet blockade of 1948–49 and to face the grave effects of the division and isolation of Germany's former capital.

Reuter, Fritz (b. Nov. 7, 1810, Stavenhagen, Mecklenburg-Schwerin—d. July 12, 1874, Eisenach, Ger.), German novelist who helped to initiate the development of regional dialect literature in Germany. His best works, which mirrored the provincial life of Mecklenburg, are written in Plattdeutsch, a north German dialect.

As a youthful member of a student political club, Reuter was sentenced to death in 1833, but the sentence was later commuted to 30 years' imprisonment. Released under the amnesty of Frederick William IV after seven years' imprisonment, he never fully regained his health. The success of his early Plattdeutsch poems and stories led him to attempt more ambitious works in his native dialect. *Ut de Franzosentid* (1859; "During the Time of the French Conquest") presents, with a mixture of seriousness and humour, life in a Mecklenburg country town during the War of Liberation against Napoleon. *Ut mine Festungstid* (1862; "During the Time of My Incarceration") is an account of his last few years in prison told without bitterness. *Ut mine Stromtid* (1862–64; "During My Apprenticeship") is considered his masterpiece. In this work, originally issued in three volumes, Reuter's resemblance to Dickens as a great storyteller and as a creator of characters is most apparent; its humorous hero, Entspektor Bräsig, is as memorable as Mr. Pickwick.

Reuter, Paul Julius, Freiherr von (baron of), original name ISRAEL BEER JOSAPHAT (b. July 21, 1816, Kassel, Electorate of Hesse—d. Feb. 25, 1899, Nice, Fr.), German-born founder of one of the first news agencies, which still bears his name. Of Jewish parentage, he became a Christian in 1844 and adopted the name of Reuter.

As a clerk in his uncle's bank in Göttingen, Ger., Reuter made the acquaintance of the eminent mathematician and physicist Carl Friedrich Gauss, who was at that time experimenting with the electric telegraph that was to become important in news dissemination.

In the early 1840s, he joined a small publishing concern in Berlin. After publishing a number of political pamphlets that aroused the hostility of the authorities, he moved to Paris in 1848, a year of revolution throughout Europe. He began translating extracts from articles and commercial news and sending them to papers in Germany. In 1850 he set up a carrier pigeon service between Aachen and Brussels, the terminal points of the German and the French–Belgian telegraph lines.

Moving to England in 1851, Reuter opened a telegraphic office near the London stock exchange. At first his business was confined mostly to commercial telegrams, but with daily newspapers flourishing, he persuaded several publishers to subscribe to his service. His first spectacular success came in 1859 when he transmitted to London the text of



Freiherr von Reuter
BBC Hulton Picture Library

a speech by Napoleon III foreshadowing the Austro-French Piedmontese war in Italy.

The spread of undersea cables helped Reuter extend his service to other continents. After several years of competition, Reuter and two rival services, Havas of France and Wolff of Germany, agreed on a geographic division, leaving Havas and Wolff their respective countries, parts of Europe, and South America. The three held a virtual monopoly on world press services for many years.

Reuter was created a baron by the duke of Saxe-Coburg-Gotha in 1871 and later was given the privileges of this rank in England. He retired as managing director of Reuters in 1878.

Reuters, British cooperative news agency founded in 1851, one of the leading news wire services in the world. It was established by Paul Julius Reuter, a bank clerk who became a partner in a book-publishing firm. He initiated a prototype news service in Paris in 1849, using electric telegraphy as well as carrier pigeons in his network. Upon moving to England, he launched Reuter's Telegram Company two years later. The company was concerned with commercial news service at its inception and had headquarters in London serving banks, brokerage houses, and leading business firms. The agency expanded steadily, and in 1858 its first newspaper client, the London *Morning Advertiser,* subscribed. Newspapers bulked ever larger in the Reuters clientele thereafter.

Reuter saw the possibilities of the telegraph for news reporting and built up an organization that maintained correspondents throughout the world. The Reuters agency remained in private hands until 1925, when the Press Association (PA) acquired major control of it, gaining full control in 1941. PA later in 1941 sold half of Reuters to the Newspaper Proprietors' Association, representing London newspapers, and in 1947 membership was extended to associations representing the daily newspapers of Australia and New Zealand.

As a cooperative, Reuters draws from the provincial news coverage of the PA, the resources of its London newspaper members, and its Australasian partners. Its correspondents have access to the news files of agencies with which it exchanges copy. Reuters exchanges the Press Association's U.K. report with the Associated Press (AP) for its coverage of U.S. news, but each retains the right to market its world report in the other's territory. Directly or through national news agencies, Reuters provided services to most countries, reaching virtually all the world's leading newspapers and many thousands of others, as well as hundreds of radio and television stations around the world.

Reuther, Walter (Philip) (b. Sept. 1, 1907, Wheeling, W.Va., U.S.—d. May 9, 1970, Pellston, Mich.), leading U.S. labour leader who was president of the United Automobile Workers (UAW) and of the Congress of Industrial Organizations (CIO) and was active in national and international affairs. An effective negotiator of wages-and-hours improvements for the UAW, he led in winning various bargaining gains for them, such as annual wage improvements based on productivity advance, cost-of-living increases, supplementary unemployment benefits, early retirement, and health and welfare benefits.

Born the son of a trade-union and Socialist activist, Reuther became an apprentice tool and die maker in Wheeling at the age of 16 and, upon moving to Detroit at 19, became a tool and die craftsman and was soon promoted to a foreman's post; in his free time he finished high school and completed three years of college. For three years during the 1930s, Reuther, with his brother Victor, travelled around the world, working for almost two years in an automobile factory in the Soviet Union. Thereafter he was highly critical of the lack of freedom in Communist society and fought the Communist elements in the UAW and CIO.

As president of his local union on the west side of Detroit, Reuther was one of the leaders of the sit-down strikes that established the UAW as a power in the automotive industry. He became director of the General Motors Department of the UAW in 1939 and was president of the union from 1946 until his death. In 1952 Reuther succeeded Philip Murray as president of the CIO, in that position becoming an architect of the AFL-CIO merger in 1955. Elected a vice-president of the merged federation and president of its Industrial Union Department, he held positions making him second only to George Meany, president of the combined AFL-CIO. At the same time, Reuther served as vice president of the International Confederation of Free Trade Unions, a counterforce to the Communist-controlled World Federation of Trade Unions.

In the meantime Reuther's relations with Meany, whom he criticized for dictatorial control, conservatism, and inaction, had deteriorated. In 1968 Reuther led the UAW out of the federation, in the following year launching the Alliance for Labor Action in cooperation with the Teamsters, a union that had been expelled earlier from the labour federation for corruption.

In 1970 Reuther and his wife were killed when their chartered plane crashed in fog and rain near Pellston, Mich.

Reutlingen, city, Baden-Württemberg *Land* (state), southwestern Germany, on the Echaz River below the Achalm height in the Schwäbische Alb (Swabian Alps), south of Stuttgart. Founded by Frederick II, it was chartered in the early 13th century and later became a free imperial city (until 1802). It was the scene of the Swabian League's decisive victory over Count Ulrich of Württemberg in 1377. The Tübinger (13th century) and Garden (14th century) gates remain of the old fortifications, and there are numerous high-gabled, half-timbered houses and several Gothic churches including the Marienkirche (begun in 1247) with 14th-century frescoes, an octagonal font of 1499, and a Holy Sepulchre of 1500. The economist Friedrich List was born in Reutlingen (1789). Textile manufacturing and leather tanning are the principal industries, and there are technical schools with research institutes in these trades. Pop. (1989 est.) 100,400.

Reuveran Stage, major division of geologic time and deposits in The Netherlands. The Reuveran Stage, named for a clay deposit of the same name, is Pliocene in age (between 1,600,000 and 5,300,000 years old). The Reuveran underlies undoubted Pleistocene deposits and has been correlated with the Coralline Crag of Great Britain and the Kaolin Sands of northern European regions.

Reval, also spelled REVEL (Estonian S.S.R.): *see* Tallinn.

Revda, city, Sverdlovsk *oblast* (administrative region), western Russian Soviet Federated Socialist Republic, in the mid-Urals on the Revda River, at the confluence of the Chusovaya River. Founded in 1734, when a metallurgical factory was built, it became a city in 1935. In 1940 the Sredneuralsk copper-smelting plant began operation based on ore from the copper-mining centre of Degtyarsk. Ferrous metallurgy and fertilizers are also important. Pop. (1983 est.) 64,000.

revelation, in religion, disclosure of divine or sacred reality or purpose to man. Revelation in this sense is an essential aspect of all religions, although the specific forms it takes in particular traditions vary widely.

A brief treatment of revelation follows. For full treatment, *see* MACROPAEDIA: Doctrines and Dogmas, Religious.

The forms of revelation can generally be portrayed as lying somewhere along a spectrum between two contrasting types. On the one hand, in religious traditions that posit a high degree of conformity between temporal and transcendent reality, the cosmos itself is viewed as the primary medium through which the transcendent is disclosed. In religions of this general type, revealed reality is usually conceived of as more or less nonpersonal. Revelation in this context may be characterized as "cosmic."

On the other hand, in traditions emphasizing the discontinuity between the profane realm and the sacred, revelation occurs as historical event, signifying the transmission of divine will through a human receiver. Such revelation, in which the divine is perceived as a personal entity, is generally termed "prophetic."

A notable example of the first type is the inspired poetry of the ancient Indian Vedas, which portray the natural world as a system of interconnecting powers that ultimately express the single underlying divine power, Brahman. Buddhist enlightenment and many of the forms of "hierophany," or manifestations of the sacred, that characterize the archaic religions described by the religious historian Mircea Eliade also constitute cosmic revelation.

The religion of ancient Israel, by contrast, was founded on revelation of the prophetic type, wherein the prophet bears personal witness to the acts and will of a sovereign deity standing in distinction from the world as its creator and judge. On the basis of this tradition, all of Judaic and subsequent Christian biblical literature is regarded as, to a greater or lesser extent, revealed. Oracular pronouncements and the teachings of Zoroaster and Muḥammad are other examples of prophetic revelation.

Such a typology is useful for indicating the degree of diversity to be found among world religions, but it can also lead to misunderstanding if applied as a norm rather than as a heuristic device. Although the Vedas, for example, were cited above as an example of cosmic revelation, the texts also contain elements of prophetic disclosure, namely a discourse that does not merely describe the cosmos but enjoins transformative action within it. Conversely, the Scriptures of the ancient Hebrews include cosmic elements, as evinced most notably in the so-called wisdom literature.

A similar contrast of types is reflected in the terms "general" and "special" revelation, roughly equivalent to the "cosmic" and "prophetic," respectively.

Revelation to John, also called BOOK OF REVELATION, or APOCALYPSE OF JOHN, last book of the New Testament. It is the only book of the New Testament classified as apocalyptic literature rather than didactic or historical, indicating thereby its extensive use of visions, symbols, and allegory, especially in connection with future events. Revelation to John appears to be a collection of separate units composed by unknown authors who lived during the last quarter of the 1st century, though it purports to have been written by John, "the beloved disciple" of Jesus, at Patmos, in the Aegean Sea.

The book comprises two main parts, the first of which (chapters 2–3) contains moral admonitions (but no visions or symbolism) in individual letters addressed to the seven Christian churches of Asia Minor. In the second part (chapters 4–22:5), visions, allegories, and symbols (to a great extent unexplained) so pervade the text that exegetes necessarily differ in their interpretations. Many scholars, however, agree that Revelation is not simply an abstract spiritual allegory divorced from historical events, nor merely a prophecy concerning the final upheaval at the end of the world, couched in obscure language. Rather, it deals with a contemporary crisis of faith, probably brought on by Roman persecutions. Christians are consequently exhorted to remain steadfast in their faith and to hold firmly to the hope that God will ultimately be victorious over his (and their) enemies. Because such a view presents current problems in an eschatological context, the message of Revelation also becomes relevant to future generations of Christians who, Christ forewarned, would likewise suffer persecution. The victory of God over Satan (in this case, the perseverance of Christians in the face of Roman persecution) typifies similar victories over evil in ages still to come and God's final victory at the end of time.

Although Christ is clearly the central figure of Revelation, an understanding of the text presupposes familiarity with Old Testament language and concepts, especially those taken from the books of Daniel and Ezekiel. The author uses the number seven, for example, in a symbolic sense to signify "totality" or "perfection." References to "a thousand years" (chapter 20) have led some to expect that the final victory over evil will come after the completion of some millennium.

Revell, Viljo (b. Jan. 25, 1910, Vaasa, Fin.—d. Nov. 8, 1964, Helsinki), Finnish architect, one of the foremost exponents of Functionalism in Finnish architecture.

He became an assistant to the Finnish architect and designer Alvar Aalto while he was still a student. Before his studies were completed in 1937, he had participated in the design of a Helsinki department store called the Glass Palace. Early works emphasizing simple precise forms with smooth unbroken surfaces include the Teollisuuskeskus Hotel



Revell, *c.* 1961

By courtesy of the Embassy of Finland, Washington, D.C.

and offices in Helsinki (1952; in collaboration with Keijo Petäjä) and a hosiery factory for Kudeneule Ltd., at Hanko (1954–56). An increased freedom of form characterizes his four-tower apartment buildings in Tapiola (1959–60), which are rhomboid in plan; the cemetery chapel at Vitiala, near Tampere (1960–61), actually a group of buildings the most prominent of which is a large chapel with a parabolic shell roof; an apartment house in Helsinki-Munkkiniemi (1961–62), notable for balconies or verandas giving a view of the Gulf of Finland; and particularly the Toronto (Canada) City Hall (1965), a combination of two gracefully curved, semicircular tower office buildings and a low-domed central structure.

Revels, Hiram R(hoades) (b. Sept. 1, 1822, Fayetteville, N.C., U.S.—d. Jan. 16, 1901, Aberdeen, Miss.), U.S. clergyman and educator who became the first black citizen to be elected to the U.S. Senate (1870–71).



Revels

By courtesy of the Library of Congress, Washington, D.C.

Born of free parents, young Revels travelled to Indiana and Illinois to receive the education that was denied him in the South. Ordained a minister in the African Methodist Episcopal Church in 1845, he worked among blacks in the Midwest and in Kentucky and Tennessee for a few years before settling in Baltimore, where he served as a church pastor and principal of a school for blacks. Soon after the Civil War began (1861), he helped organize two volunteer regiments of blacks for service in the Union Army. Two years later he organized a school for freedmen in St. Louis, Mo., and then joined the Federal forces to serve as a chaplain to a black regiment stationed in Mississippi.

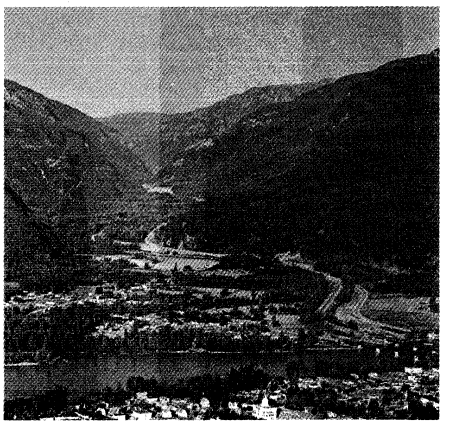
After the war Revels settled in Natchez, Miss., to preach to a large congregation. Despite some misgivings about entering politics, he accepted appointment by the military governor as alderman (1868) and was later (1869) elected to the state senate. Although Revels was a Republican, he was anxious not to encourage race friction with white Southerners; he therefore supported legislation that would have restored the power to vote and to hold office to disenfranchised members of the former Confederacy. In January 1870 he was elected to the U.S. Senate to fill the unexpired term of the former Confederate president, Jefferson Davis. He performed competently in office, advocating desegregation in the schools and on the railroads. He acknowledged that he received fair treatment in Washington, D.C., even in patronage matters.

On leaving the Senate, Revels became president of Alcorn Agricultural and Mechanical College, a recently opened institution of higher education for blacks, near Lorman, Miss. In 1873 he served briefly as interim secretary of state in Mississippi but the next year was dismissed from the college presidency. In 1875 he helped overturn the Republican (Carpetbag) government of the state, defending his action on the grounds that too many politicians in that party were corrupt. He was rewarded by the Democratic administration, which returned him to the chief post at Alcorn in 1876, where he remained until his retirement.

Revels, Master of the, English court official, who, from Tudor times up until the Licensing Act of 1737, supervised the production and financing of often elaborate court entertainments. He later was the official issuer of licenses to theatres and theatrical companies and the censor of publicly performed plays.

A Master of the Revels was first appointed *c.* 1495, and the Revels office soon developed a complicated system for building and painting spectacular scenery. Not until 1545, however, did Sir Thomas Cawarden become master for life. Thereafter, the office assumed importance. Decrees in 1581 and 1603 gave the Master of Revels licensing, censorship, and fee-collecting powers. The prestige of the office reached its high point during the mastership of Sir Henry Herbert (1623–42), after which theatres were closed during the Puritan interregnum. After the Restoration (1660), Herbert was reinstalled as master until his death in 1673, but the office was gradually stripped of its power. The Licensing Act of 1737 abolished it entirely, granting the power of censorship directly to the Lord Chamberlain. Although the Revels office did not exclusively control all court entertainment, the accounts and detailed records of the office are a valuable source for information on the elaborate court productions of the 15th century through the 18th.

Revelstoke, city, southeastern British Columbia, Canada, on the Columbia River between the Monashee and Selkirk mountains, 392 mi (631 km) northeast of Vancouver. Originally called Second Crossing, the site (overlooked by Mt. Revelstoke [6,375



Revelstoke on the Columbia River, British Columbia, at the edge of Mount Revelstoke National Park

Tourism Canada; photograph, P. Gaudard

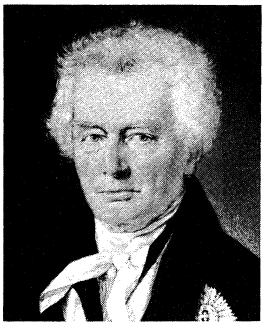
ft; 1,943 m]) was claimed in 1898 by A.S. Farwell, a government surveyor. Attempts to build the Canadian Pacific Railway through nearby Rogers Pass were abandoned because of snowslides and the 5-mi- (8-km-) long Connaught Tunnel was built through Mt. McDonald in 1916. In 1962, however, the spectacular 92-mi Rogers Pass Highway, with avalanche defenses, to Golden was completed. The city was named for Lord Revelstoke, head of a British banking firm that helped finance the railroad. Located in a mining, lumbering, and farming area, it is also a base for winter sports, hunting, and fishing. Transportation, brewing, and sawmilling are major economic activities. To the northeast lie Mt. Revelstoke and Glacier national parks. Inc. 1899. Pop. (1981) 5,544.

revendication (law): *see* replevin.

revenge tragedy, drama in which the dominant motive is revenge for a real or imagined injury; it was a favourite form of English tragedy in the Elizabethan and Jacobean eras and found its highest expression in Shakespeare's *Hamlet.* The revenge drama derived originally from the Roman tragedies of Seneca but was established on the English stage by Thomas Kyd with *The Spanish Tragedie* (*c.* 1590). This work, which opens with the Ghost of Andrea and Revenge, deals with Hieronimo, a Spanish gentleman who is driven to melancholy by the murder of his son. Between spells of madness, he discovers who the murderers are and plans his ingenious revenge. He stages a play in which the murderers take part, and, while enacting his role, Hieronimo actually kills them, then kills himself. The influence of this play, so apparent in *Hamlet* (*c.* 1600), is also evident in other plays of the period. In John Marston's *Antonios Revenge* (1602), the ghost of Antonio's slain father urges Antonio to avenge his murder, which Antonio does during a court masque. In George Chapman's *Revenge of Bussy d'Ambois* (*c.* 1610), Bussy's ghost begs his introspective brother Clermont to avenge his murder. Clermont hesitates and vacillates but at last complies, then kills himself. Most revenge tragedies end with a scene of carnage that disposes of the avenger as well as his victims. Other examples are Shakespeare's *Titus Andronicus* (1594), Henry Chettle's *Tragedy of Hoffman* (1602), and Cyril Tourneur's *Revengers Tragaedie* (1607).

Consult the INDEX *first*

Reventlow, Christian Ditlev Frederik, Lensgreve (Count) (b. March 11, 1748, Copenhagen—d. Oct. 11, 1827, Lolland, Den.), Danish state official whose agrarian reforms led to the abolition of serfdom in Denmark.



Reventlow, detail from an oil painting by C.A. Jensen, 1833

By courtesy of the Nationalhistoriske Museum paa Frederiksborg, Denmark

Reventlow travelled to several western European countries in the 1760s to study economic conditions. He returned to Denmark in 1770 and entered state service in 1773. He experimented with agrarian reform on the Lolland estates, which he inherited in 1775. In 1784 he

was named head of the Rentekammeret (Exchequer), with responsibility for agriculture.

On the basis of four earlier experiments he had conducted, Reventlow took measures to ease the lot of crown serfs. In 1786 he persuaded Crown Prince Frederick (later Frederick VI) to create an agrarian commission to study the conditions of the peasantry as a whole. Resulting reforms in 1787 and 1788 put an end to Danish serfdom. Later measures of Reventlow led to clearly defined terms of voluntary peasant service on the large estates. Reventlow retired from public service in 1813 after being dismissed from his post.

revenue bond, also called LIMITED OBLIGATION BOND, bond issued by a municipality, state, or public agency authorized to build, acquire, or improve a revenue-producing property such as a waterworks, an electric generating plant, a port authority, or a railroad. Unlike general obligation bonds, which carry the full faith and credit of the issuing agency and are repaid through a variety of tax revenues, revenue bonds are payable from specified revenues only, usually the revenues from the facility for which the bond was originally issued.

This separation of the revenue bond obligation from a municipality's direct and general bond obligations allows the municipality to circumvent legislated debt limits. Viewed in this light, revenue bonds can be considered as a municipality's corporate bonds, since they are free of ceilings, pay interest rates (generally higher than general obligation bonds), and are paid only from the profits of a revenue-producing property. In exchange for this convenient freedom from debt limitation, municipalities undergo careful scrutiny in the use of revenues generated from sale of the bonds.

reverberatory furnace, in copper, tin, and nickel production, a furnace used for smelting or refining in which the fuel is not in direct contact with the ore but heats it by a flame blown over it from another chamber. In steelmaking, this process, now largely obsolete, is called the open-hearth process. The heat passes over the hearth, in which the ore is placed, and then reverberates back. The roof is arched, with the highest point over the firebox. It slopes downward toward a bridge of flues that deflect the flame so that it reverberates. The hearth is made dense and impervious so that the heavy matte, or molten impure metal, cannot penetrate into and through it, and the walls are made of a material that resists chemical attack by the slag. The process is continuous in the reverberatory furnace: ore concentrate is charged through openings in the roof; slag, which rises to the top, overflows continuously at one end; and the matte is tapped at intervals from the deepest part of the ore bath for transfer to a converter, where it is further refined.

Numerous technical innovations have improved the production capacity of this furnace, although its basic construction has remained the same. Roofs are made of refractory brick rather than the ordinary brick used earlier, and this has permitted higher temperatures and thus faster refining. Reverberatory smelting has recently been giving way to such newer processes as continuous smelting and the use of electric or flash furnaces.

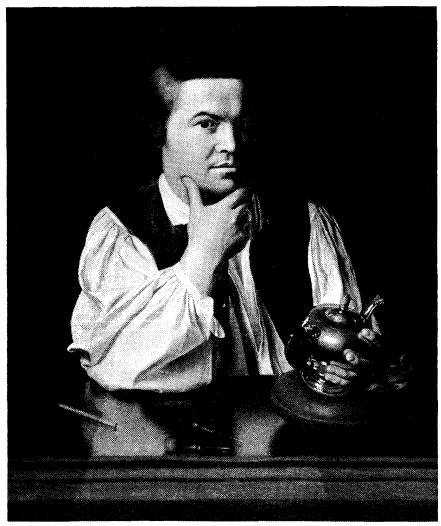
Reverdy, Pierre (b. Sept. 13, 1889, Narbonne, Fr.—d. June 17, 1960, Solesmes), French poet and moralist who first reflected Cubist and then Surrealist influence.

The difficulty of Reverdy's poems limited his audience. He founded a short-lived review, *Nord-Sud* (1916; "North–South"), to promote Cubism. After turning to Surrealism in the 1920s, he returned to Cubist-inspired poetic techniques. Reverdy published *Étoiles peintes* (1921; "Painted Stars"), *Les Épaves du ciel* (1924; "Shipwrecks from Heaven"), and *Flaques de verre* (1929; "Glass Puddles"). In 1926 he retired to the Abbaye de Solesmes, remaining there until his death. In solitude he dedicated himself to a search for the spiritual meaning of the physical world, expressing this vocation in the disciplined maxims of *Le Gant de crin* (1927; "The Horsehair Glove") and *Le Livre de mon bord* (1948; "The Book Beside Me").

Revere, city, Suffolk County, Massachusetts, U.S. It lies along Massachusetts Bay, just northeast of Boston. First known as Rumney Marsh, it was settled in 1626 and was part of Boston from 1632 until 1739, when it became part of Chelsea. During the Revolutionary War, the British schooner *Diana,* seeking food supplies, was destroyed in the locality by Chelsea patriots led by Israel Putnam at the so-called Battle of Chelsea Creek (May 27, 1775). Separately incorporated as the town of North Chelsea in 1846, it was renamed in 1871 to honour Paul Revere. Although a summer resort since its founding, its development was slow because of extensive marsh areas. Now the "Coney Island of Boston" (with 3 miles [5 km] of beaches, a dog track, and entertainment facilities), Revere remains primarily residential with few light industries. Inc. city, 1915. Pop. (1984 est.) 43,141.

Revere, Paul (b. Jan. 1, 1735, Boston—d. May 10, 1818, Boston), folk hero of the American Revolution whose dramatic horseback ride on the night of April 18, 1775, warning Boston-area residents that the British were coming, was immortalized in a ballad by Henry Wadsworth Longfellow.

His father, Apollos De Revoire (later changed to Revere), was a Huguenot refugee who had come to Boston as a child and had been apprenticed to a silversmith. This craft he taught his son Paul Revere, who became one



Revere, portrait by John Singleton Copley; in the Museum of Fine Arts, Boston

By courtesy of the Museum of Fine Arts, Boston, gift of Joseph W., William B., and Edward H.R. Revere

of America's greatest artists in silver. As a boy Revere received sufficient education to enable him later to read the difficult metallurgical books of his period. Although it was in metal that Revere did most of his work, his energy and skill (and the necessity of supporting an ever-growing family) turned him in many directions. He not only made silver but also made surgical instruments, sold spectacles, replaced missing teeth, and engraved copper plates, the most famous of which portrayed his version of the Boston Massacre.

In the 1770s Revere enthusiastically supported the patriot cause; as acknowledged leader of Boston's mechanic class, he provided an invaluable link between artisan and intellectual. In 1773 he donned Indian garb and joined 50 other patriots in the Boston Tea Party protest against parliamentary taxation without representation. Although many have questioned the historical liberties taken in Longfellow's narrative poem "Paul Revere's Ride" (1863), the fact is that Revere served for years as the principal rider for Boston's Committee of Safety, making journeys to New York and Philadelphia in its service. On April 16, 1775, he rode to nearby Concord to urge the patriots to move their military stores, which were endangered by pending British troop movements. Finally, two days later, he set out on his most famous journey to alert his countrymen that British troops were on the march, particularly in search of Revolutionary leaders John Hancock and Samuel Adams. Because of his warning, the Minutemen were ready the next morning on Lexington green for the historic battle that launched the War of Independence.

With the outbreak of hostilities, Revere turned industrialist and constructed a much-needed powder mill to supply colonial arms. In 1776 he was put in command of Boston Harbour's principal defense at Castle William, but his war record as a lieutenant colonel was largely undistinguished. He resumed his stride as a successful industrialist after the war, however, and set up a rolling mill for the manufacture of sheet copper at Canton, Mass. From this factory came sheathing for many U.S. ships, including the *Constitution,* and for the dome of the Massachusetts statehouse.

A colourful biography is Esther Forbes's *Paul Revere and the World He Lived In* (1942).

reverend, the ordinary English prefix of written address to the names of ministers of most Christian denominations. In the 15th century it was used as a general term of respectful address, but it has been habitually used as a title prefixed to the names of ordained clergymen since the 17th century. In the Church of England and in most other denominations in English-speaking countries, prefects apostolic who are not in episcopal orders (*e.g.,* deans, provosts, cathedral canons, rectors of seminaries and colleges, and priors and prioresses) are addressed as "very reverend." Bishops, abbots, abbesses, and vicars-general are addressed as "right reverend," and archbishops and (in Roman Catholicism) cardinals are addressed as "most reverend." The moderator of the Church of Scotland is also styled "right reverend." Carthusians use the title "reverend" only for their prior-general; all other Carthusian priests are styled "venerable father."

reversibility, in thermodynamics, a characteristic of certain processes (changes of a system from an initial state to a final state spontaneously or as a result of interactions with other systems) that can be reversed, and the system restored to its initial state, without leaving net effects in any of the systems involved. An example of a reversible process would be a single swing of a frictionless pendulum from one of its extreme positions to the other. The swing of a real pendulum is irreversible because a small amount of the mechanical energy of the pendulum would be expended in performing work against frictional forces, and restoration of the pendulum to its exact starting position would require the supply of an equivalent amount of energy from a second system, such as a compressed spring in which an irreversible change of state would occur.

reversion, in Anglo-American law, interest held by a prior owner in property given to another, which, upon the happening of some future event, will return to that prior owner. A reversion is itself specific property, and it can be sold or disposed of as property by

the reversion owner. One who holds property subject to a reversion interest held by another is under certain obligations as to the use of that property. Generally, such an owner must reasonably protect the property from spoilage or diminution in value, for the sake of the future owner.

In present usage there are two general methods of creating a reversion. One retains a reversion when he gives his property to another for that person's use during his life only, and at his death the property reverts to the prior owner; or one may give his property to another to possess and use as his own only until the operation of a certain condition. The majority of U.S. states limit this conditional reversion to a specified length of a time, usually not longer than 50 years.

revetment: *see* retaining wall.

Revillagigedo Islands, archipelago in the Pacific Ocean, approximately 300 mi (500 km) south-southwest of the tip of the Baja California peninsula and 370 mi west-southwest of Cape Corrientes on the Mexican mainland. The islands are administered by Colima state, Mexico. Covering a total land area of 320 sq mi (830 sq km), the archipelago consists of numerous volcanic islands. The largest, Socorro, which rises to an elevation of 3,707 ft (1,130 m), is 24 mi long and 9 mi wide. San Benedicto, 40 mi north of Socorro, and Clarión, 250 mi west of Socorro, are the two other large islands; small islands include Roca Partida, 60 mi west of Socorro, and Roca Oneal, just off the northwestern coast of Socorro. In 1957 an outpost was established on long-uninhabited Socorro, and trees were planted for timber and fruit. The expedition found about 8,000 sheep on the island, the residue of a temporary Australian settlement of the mid-1800s. The Revillagigedo Islands are rich in sulfur, fish, and guano.

revisionism, in Marxist thought, originally the late 19th-century effort of Eduard Bernstein to revise Marxist doctrine. Rejecting the labour theory of value, economic determinism, and the significance of the class struggle, Bernstein argued that by that time German society had disproved some of Marx's predictions, that capitalism was not on the verge of collapse, capital was not being amassed by fewer and fewer persons, the middle class was not disappearing, and the working class was not afflicted by "increasing misery."

The revisionism of Bernstein aroused considerable controversy among the German Social Democrats of his day. Led by Karl Kautsky (*q.v.*), they officially rejected it (Hanover Congress, 1889). Nevertheless, revisionism had a great impact on the party's practical policies.

After the Bolshevik Revolution, the term revisionism came to be used by Communists as a label for certain types of deviation from established views. Thus, for example, the independent ideas and policies of the Yugoslav Communists were attacked as "modern revisionism" by Soviet critics, who themselves were accused of revisionism by Chinese Communists.

revitalization movement, an organized attempt by some members of a society to construct a more satisfying culture. Nativistic, revivalistic, messianic, millenarian, and utopian movements are all varieties of revitalization movements, according to anthropologist Anthony F.C. Wallace, who introduced the term. Any given movement may contain elements of several of these varieties.

Revitalization movements are responses to excessive stress and distortion within a society. Several theories have been proposed to explain the generation of a revitalization movement: the absolute deprivation theory, in which dissatisfaction with a low standard of living is presumed to lead to the adoption of a revolutionary ideology; the acculturation theory, which holds that cultural shock, caused by the impact on a culture of a more powerful alien culture, may generate a utopian social movement; and the social evolutionary theory, which views such movements as expressions of disadvantaged classes or groups. The most widely accepted theory, one that subsumes many aspects of the other theories, is the relative deprivation theory. By this theory, the rise of a revitalization movement is contingent upon the disillusionment of a group or of a significant number in a society with the way of life currently available to them in comparison with their own past, with the life of another group, or with some idealized way of living.

Revitalization movements usually have at their head a prophet—or a prophet-like secular leader—who makes the call for the transformation of the society. Instances of revitalization movements are the Ghost Dance among the North American Plains Indians (1888–96), John Wesley and early Methodism (1738–1800), the Sudanese Mahdists (from the late 19th century), the Boxer Movement (China, 1898–1900), and the Mau Mau Movement (Kenya, 1950s).

Revius, Jacobus (Latin), Dutch JACOB VAN REEFSEN (b. November 1586, Deventer, Neth.—d. Nov. 15, 1658, Leiden), Dutch Calvinist poet long esteemed only as a theologian but later acknowledged as the greatest Christian lyricist of his period.

A Reformed Church minister, Revius was a vigorous supporter of Protestantism, and his poetry is invariably scriptural or moralistic. His collection *Over-IJsselsche sangen en dichten* (1630; "Over-IJssel Songs and Poems") shows the influence of the French Renaissance poet Ronsard in style as well as Revius' affinities with the English metaphysical poets in his prolific use of stark metaphor and the profusion of four-line epigrams. The best known sonnet from the collection is "Hy droech onse smerten" ("He Bore Our Sorrows"), a moving profession of guilt at Christ's death.

revivalism, generally, renewed religious fervour within a Christian group, church, or community, but primarily a movement in some Protestant churches to revitalize the spiritual ardour of their members and win new adherents. Revivalism in its modern form can be attributed to that shared emphasis in Anabaptism, Puritanism, German Pietism, and Methodism in the 16th, 17th, and 18th centuries on personal religious experience, the priesthood of all believers, and holy living, in protest against established church systems that seemed excessively sacramental, priestly, and worldly.

Of the groups that contributed to the revival tradition, the Anabaptists were severely persecuted, and only a few survived the 16th-century Reformation. In England, however, the Puritans protested against the sacramentalism and ritualism of the Church of England in the 17th century, and many migrated to America, where they continued their fervour for experiential religion and devout living. The Puritan fervour waned toward the end of the 17th century, but the Great Awakening (*q.v.*; *c.* 1720–50), America's first great revival, under the leadership of Jonathan Edwards, George Whitefield, and others, revitalized religion in the North American colonies. The Great Awakening was a part of a larger religious revival that was also influential in Europe and Great Britain. In Germany and Scandinavia, Lutheranism was revitalized by the movement known as Pietism, and the British revival led by John Wesley and others eventually resulted in the Methodist Church.

Toward the end of the 18th century another revival, known as the Second Great Awakening (*c.* 1795–1835), began in the United States. During this revival, meetings were held in small towns and the large cities throughout the country, and the unique frontier institution known as the camp meeting (*q.v.*) began. The Second Great Awakening produced a great increase in church membership, made soul winning the primary function of the ministry, and stimulated several moral and philanthropic reforms, including temperance, emancipation of women, and foreign missions.

After 1835 several professional revivalists travelled through the towns and cities of the United States and Great Britain, organizing annual revival meetings at the invitation of local pastors who wanted to reinvigorate their churches. In 1857–58 a "prayer meeting revival" swept U.S. cities following a financial panic. It indirectly instigated a revival in Northern Ireland and England in 1859–61.

The preaching tour of the U.S. lay evangelist Dwight L. Moody through the British Isles in 1873–75 marked the beginning of a new surge of Anglo-U.S. revivalism. In his subsequent revival activity, Moody perfected the highly businesslike techniques that characterized the urban mass evangelistic campaigns of early 20th-century professional revivalists such as Reuben A. Torrey, Billy Sunday, and others. The interdenominationally supported revivalism of Moody and his imitators in 1875–1915 constituted, in part, a conscious cooperative effort by the Protestant churches to alleviate the unrest of urban industrial society by evangelizing the masses and, in part, an unconscious effort to counter the challenge to Protestant orthodoxy brought on by the new critical methods of studying the Bible and by the ideas concerning the evolution of man.

In the first half of the 20th century most educated Protestant churchmen lost interest in revivalism. After World War II, however, a renewed interest in mass evangelism appeared and was especially evident in the widespread support given to the revival "crusades" of the American Southern Baptist evangelist Billy Graham and various regional revivalists.

revolution, a significant, relatively rapid transformation of society. This can take the form of an overthrow of government, or it can be social or economic in origin, as in the Industrial Revolution. Historically, "revolution" was a term describing the cycles of types of government. After the American and French revolutions of the 18th century, revolution began to imply a radical departure from any previous historical pattern. The major European revolutions involved substantial alteration, not just of the form of government, but also of the economic system, the social structure, and the cultural values of the societies.

Historically, the concept of revolution was seen as a very destructive force, from ancient Greece right through to the Middle Ages. The ancient Greeks saw revolution as a possibility only after the decay of the fundamental moral and religious tenets of society. Plato believed that a constant, firmly entrenched code of beliefs could prevent revolution. Aristotle elaborated on this concept, concluding that if a culture's basic value system is tenuous, the society will be vulnerable to revolution.

During the Middle Ages, the maintenance of the established beliefs and forms of government remained the priority. Much attention was given to finding means of combatting revolution and stifling changes in society. Religious authority was so strong and its belief in the maintenance of order so fundamental that the church directed people to accept the inequities of power, instead of upsetting the stability of society.

Only after the emergence of secular Humanism during the Renaissance did this concept of revolution, as a cause of the desecration of society, change to embrace a more mod-

ern perspective. The 16th-century Italian writer Niccolò Machiavelli recognized the importance of creating a state that could endure the threat of revolution; but, at the same time, his detailed analysis of power led to a new belief in the necessity of changes in the structure of government on certain occasions. This new acceptance of change placed Machiavelli at the forefront of modern revolutionary thought, even though he never used the word revolution in his texts, and he was primarily concerned with the creation of a truly stable state.

The 17th-century English writer John Milton was an early believer in revolution's inherent ability to help a society realize its potential. He also saw revolution as the right of society to defend itself against abusive tyrants, creating a new order that reflected the needs of the people. To Milton, revolution was the means of accomplishing freedom. Later, in the 18th century, the French and American revolutions were attempts to secure freedom from oppressive leadership. Modern revolutions have frequently incorporated utopian ideals as a basis for change.

Immanuel Kant, the 18th-century German philosopher, believed in revolution as a force for the advancement of mankind. Kant's belief was that revolution was a "natural" step in the realization of a higher ethical foundation for society. This idea helped serve as a basis for the American and French revolutions.

The 19th-century German philosopher G.W.F. Hegel was a crucial catalyst in the formation of 20th-century revolutionary thought. He saw revolutions as the fulfillment of human destiny, and he saw revolutionary leaders as those necessary to instigate and implement reforms. Hegel's theories served as the foundation for the most influential revolutionary thinker, Karl Marx. Marx used Hegel's abstractions as the basis for a plan of class struggle, centred on a fight for the control of the economic processes of society. Marx believed in progressive stages of human history, culminating in the working-class overthrow of the property-owning class. For society to advance, the working class, or proletariat, must take over the means of production. Marx viewed this eventuality as the conclusion of the human struggle for freedom and a classless society, thus eliminating the need for further political change. Communist revolutions led by Marxists took place in Russia, Yugoslavia, China, Vietnam, and Cuba, among other countries, in the 20th century.

One modern historian, Crane Brinton, analyzed the tendencies of a society prior to a major revolution. He saw a prerevolutionary society as having a combination of social and political tensions, caused by a gradual breakdown of the values of a society. This leads to a fracture of political authority, as the governing body must rely upon an increasingly desperate use of force to remain in power. Commensurate with this is the emergence of reform elements that serve to emphasize the corruption of the political authority. As the existing political order begins to lose its grasp on authority, momentum builds among the diverse forces of the opposition. As the government becomes more precarious, the splinter groups that form the threat to the existing order band together to topple the authority.

Brinton also observed the different stages of a major revolution. After the government is overthrown, there is usually a period of optimistic idealism, which subsides as the realities of running a country take hold. Factions begin to struggle for power, often leading to civil wars. For one faction to prevail and maintain its authority, the use of force is almost inevitable. The goals of the revolution fade, as a totalitarian regime takes command. Some of the basic tenets of the original revolutionary movement, however, are eventually incorporated in the end. The French and Russian revolutions followed this course of development, as did the Islāmic revolution in Iran in the late 20th century.

A strictly political revolution, independent of social transformation, does not possess the same pattern of prerevolutionary and postrevolutionary events. It may be merely a change in political authority (as in many coups d'état) or a somewhat broader transformation of the structures of power (as in the American and Mexican revolutions).

Revolution of ——— : *see under* substantive word or date (*e.g.,* 1688, Revolution of; 1830, Revolutions of; 1848, Revolutions of).

Revolution Peak, Russian PIK REVOLYUTSI, mountain in the northwestern Pamirs range in Gorno-Badakhshan autonomous *oblast* (province), Tadzhik Soviet Socialist Republic. At 22,880 feet (6,974 m), it is the highest point in the eastern part of the Yazgulem Mountains. An enormous mass with three summits covered with snow and ice, it is the source of the Fedchenko Glacier, which rises on its northwestern face.

revolutionary syndicalism: *see* syndicalism.

Revolutionary Tribunal, French TRIBUNAL RÉVOLUTIONNAIRE, court that was instituted in Paris by the National Convention during the French Revolution for the trial of political offenders. It became one of the most powerful engines of the Reign of Terror.

The news of the failure of the French arms in Belgium gave rise in Paris to popular movements on March 9–10, 1793; and on March 10, on the proposal of Georges Danton, the Convention decreed that there should be established in Paris an extraordinary criminal tribunal, which received the official name of the Revolutionary Tribunal by a decree of Oct. 29, 1793. It was composed of a jury, a public prosecutor, and two substitutes, all nominated by the Convention; and from its judgments there was no appeal. With M.J.A. Hermann as president and A.-Q. Fouquier-Tinville as public prosecutor, the tribunal terrorized the royalists, refractory priests, and all the other participants in the counterrevolution. Soon, too, it came to be used for personal ends, particularly by Maximilien Robespierre, who employed it for the condemnation of his adversaries.

The excesses of the Revolutionary Tribunal increased with the growth of Robespierre's ascendancy in the Committee of Public Safety. On June 10, 1794, there was promulgated, at his instigation, the Law of 22 Prairial, which forbade prisoners to employ counsel for their defense, suppressed the hearing of witnesses, and made death the sole penalty. Before 22 Prairial the Revolutionary Tribunal had pronounced 1,220 death sentences in 13 months; during the 49 days between the passing of the law and the fall of Robespierre, 1,376 persons were condemned, including many innocent victims.

The lists of prisoners to be sent before the tribunal were prepared by a popular commission and signed, after revision, by the Committee of General Security and the Committee of Public Safety jointly. Robespierre was the principal purveyor of the tribunal. The Revolutionary Tribunal was suppressed on May 31, 1795. Among its most celebrated victims were Marie-Antoinette, the Dantonists, and several of the Girondists. Similar tribunals operated in the provinces.

Revolutionary War, American: *see* United States War of Independence.

revolver, pistol (*q.v.*) whose multi-shot action depends on a revolving cylinder. Some early versions had several barrels, but as early as the 17th century pistols were manufactured with a revolving chamber to load the cartridges successively into a single barrel. The principle was not used successfully to produce a practical weapon until 1835–36, when Samuel Colt patented his version.

As in all subsequent revolvers, Colt's cylinder contained several bored ammunition chambers, equidistant from each other and from the axis about which the chamber revolved. Each chamber successively locked in position behind the barrel and discharged by pressure on the trigger, bringing the next chamber into line. Most early revolvers were single-action, in which the hammer is cocked manually before the trigger is pulled, and used percussion caps; double-action revolvers, in which the hammer is cocked as the trigger is pulled, and metal cartridges were developed in the mid-1800s. Despite the slight escape of propellant gas through the junction between the cylinder and the barrel, the revolver has remained a competitor of the automatic pistol.

revolving credit, system of retail credit in which the buyer makes periodic payments to an account to which his purchases and service charges have been debited. The service charge is based on the outstanding balance; if the buyer pays his entire balance, no service charge accrues.

The total credit allowed the customer may be some multiple of a fixed monthly payment, or there may be no credit limit—the monthly payment varying with the amount of the outstanding balance. Revolving-credit plans are provided by many department stores and are an important feature of bank credit-card systems (*see* credit card).

revolving stage, theatrical device for scene changes, or shifts, by which three or more



Woodcut illustrating a revolving Kabuki stage with three settings

By courtesy of the International Society for Educational Information, Tokyo

settings are constructed on a turntable around a central pivot and revolved before the audience. It was invented for the Kabuki theatre in Japan in the 18th century and was introduced into Western theatre at the Residenztheater in Munich in 1896. The revolving stage was widely adopted and has remained a popular mechanical feature in major theatres around the world.

Revson, Charles H(askell) (b. Oct. 11, 1906, Boston—d. Aug. 24, 1975, New York City), American businessman who turned a $300 investment into the largest retail cosmetics and fragrance manufacturing firm in the United States, with more than 3,000 products and annual sales at his death of $605,000,000.

The son of a cigar maker, Revson's first job was in a dress store as a salesman. He soon joined a cosmetics firm and sold nail polish, but he quit in 1932 when he was passed over for the position of national distributor. That same year, during the depths of the Great Depression, Revson joined with his brother Joseph and a chemist, Charles Lachman, and started Revlon with $300 as capital. Their nail polishes were thick and smooth and were offered in more shades than any other company had. Revson concentrated his early sales in beauty salons and then later turned to drug and department stores. Revson was also the first to introduce matching lipsticks and polishes. He was a strong believer in advertising and developed exotic and romantic names for his products, such as Fire and Ice, Plum Lightning, Moon Drops, and Ultima II.

Revson had a reputation as a demanding perfectionist, and his firm had a high turnover in executives. Both of his original partners had resigned by 1965, and his other brother, Martin, who had joined the company in 1935, resigned in 1958. Revson diversified in 1966 into the pharmaceutical industry. At the time of Revson's death from cancer, Revlon products were sold in 85 countries.

Consult the INDEX *first*

revue, light form of theatrical entertainment consisting of unrelated acts (songs, dances, skits, and monologues) that portray and sometimes satirize contemporary persons and events. Originally derived from the French street fairs of the Middle Ages, at which events of the year were passed in comic review, French revue in its present form dates from the early 19th century. It was first developed at the Théâtre de la Porte-Saint-Martin in Paris by C.-T. and J.-H. Cogniard with their *Folies Marigny;* later at the Folies-Bergère and other places of entertainment the revue was the vehicle of such stars as Yvette Guilbert and Maurice Chevalier.

The English revue developed on one hand into a costume display and spectacle with little topical material, reaching its peak in the Court Theatre productions of the 1890s. On the other hand, the *André Charlot Revues* of the 1920s, the handsome shows at the London Hippodrome, and especially the performances at Sir Charles Cochran's Ambassadors' Theatre were more intimate and emphasized clever repartee and topicality. Revues of the intimate club type, such as those at the Gate Theatre and the famous *Revuedeville* of the Windmill Theatre, played an important part in keeping up the morale of Londoners during the German bombings of 1940.

In the United States, *The Passing Show,* first produced in New York in 1894, inspired the producer Florenz Ziegfeld in 1907 to initiate the 24 annual *Ziegfeld Follies,* usually built around a star personality. George White and his annual *Scandals* put more emphasis



Scene from the English revue *Hullo Ragtime* at the London Hippodrome, from a drawing by Christopher Clark, 1912

By courtesy of the Mander and Mitchenson Theatre Collection, London

on comedians and girls and less on spectacle for its own sake. More modest revues have been the *Music Box Revues;* the *Little Shows* of Dwight Wiman; *The Garrick Gaities; The Chocolate Dandies* of Noble Sissle and Eubie Blake; the Depression *Pins and Needles* of 1937, produced by the International Ladies Garment Workers Union with a cast of union members; *Hellzapoppin* (1938); and the post-World War II show staged by returning soldiers, *Call Me Mister.*

Revues commanded enthusiastic support until the mid-20th century, when the competition of radio, motion pictures, and television consigned the topical wit, sketches, and monologues of revue primarily to small nightclubs and improvisational theatres.

Revue des Deux Mondes, fortnightly journal of criticism of and commentary on literature and other arts, published in Paris in 1829 and from 1831 to 1944. It was one of a number of journals set up in France following the suspension of censorship in 1828, and it attained a critical influence in that country comparable to the great Scottish and English journals of the day. *Revue des Deux Mondes,* however, did not concern itself with politics, and its influence was confined to the arts. François Buloz was its editor from 1831 to 1877 and established a tradition of excellence that attracted contributions from such literary eminences as Charles-Augustin Sainte-Beuve, Honoré de Balzac, Victor Hugo, Hippolyte Taine, and Ernest Renan. One of its contributors was Ferdinand Brunetière, who became its editor from 1893 to 1906. The journal suspended publication in 1944 but was brought out again from 1948 under the title *La Revue de Littérature, Histoire, Arts et Sciences des Deux Mondes.*

Revueltas, José (b. Nov. 20, 1914, Durango, Mex.—d. April 14, 1976, Mexico City), Mexican novelist, short-story writer, and political activist who was one of the originators of the new Mexican novel.

Revueltas was a member of a family of prominent artists. His brother Silvestre Revueltas was a noted composer. Revueltas, politically active at 14, joined the Mexican Communist Party in 1932 and was twice imprisoned at the penitentiary at Islas Marías. *Los muros de agua* (1941; "Walls of Water"), his first novel, is based on incidents that occurred during his confinement.

El luto humano (1943; "Human Mourning"; Eng. trans. *The Stone Knife*) is a powerful novel that uses flashbacks and interior monologues to present the plight of rural Mexicans from the pre-Columbian period up to the 1930s. In 1943 Revueltas was expelled from the Communist Party after a membership extending back many years and took part in founding the Spartacus Leninist League, although he soon left that as well. The novel *Los errores* (1964) is a denunciation of the purges of Communism. He was arrested for his role in the student disturbances of 1968 and was briefly imprisoned at the penitentiary at Lecumberri. He also published two short-story collections, *Dios en la tierra* (1944; "God in the Land") and *Dormir en tierra* (1960; "To Sleep in the Land").

Revueltas, Silvestre (b. Dec. 31, 1899, Santiago Papasquiaro, Mex.—d. Oct. 5, 1940, Mexico City), Mexican composer and violinist, best known for his colourfully orchestrated music of distinctive rhythmic vitality.

Revueltas studied the violin and composition in Mexico City, in Austin, Texas, and in Chicago and conducted an orchestra in Mobile, Ala., before becoming assistant conductor (1929–35) of the Mexico Symphony Orchestra. Revueltas suggested folk derivations in his works without quoting actual Mexican folk songs, often achieving a powerful rhythmic drive that ends fortissimo after a hammering crescendo. His major works are symphonic poems on Mexican subjects, but he also wrote chamber music, songs, and film scores.

Rewa, also spelled REWAH, or RIWA, town, northeastern Madhya Pradesh state, central India. The town was chosen as the capital of the former Rewa princely state in 1597 and served also as capital of the British Baghelkhand Agency (1871–1931) and of Vindhya Pradesh state (1948–56). It is connected by road with other towns and is a trade centre for grain, building stone, and timber. Cloth weaving and wood carving are important cottage industries. The town is the seat of Awadesh Pratap Singh University (established 1968), with several affiliated colleges, including a medical school, in the town.

Rewa is situated on a wide alluvial plain that is part of the great Vindhyan plateau and is watered by the Tons River and its tributaries. Rice, wheat, oilseeds, millet, and corn (maize) are the major crops in the area, a significant portion of which is forested, yielding valuable timber and lac. The former Rewa princely state was founded *c.* 1400 by Baghel Rājputs (warrior caste) and entered into treaty agreements with the British in 1812. Pop. (1981) 100,641.

Rewa River, longest and most important stream of the Fijian islands, in the South Pacific. It rises on the flanks of Tomanivi, in north-central Viti Levu, the principal island of Fiji, and flows southeast for 90 miles (145 km) to its mouth at Lauthala (Laucala) Bay on the southeast coast, near Suva (the national capital). The river drains one-third of the island, and its valley and fertile deltas support rice and dairy production. Small steamers are able to navigate upstream for 50 miles (80 km).

Rewāri, also called RIWARI, city, southern Haryāna state, northwestern India. It is connected by rail to Delhi (northeast). A historic centre of trade between Delhi and Rājasthān, Rewāri is said to have been built by Raja Rāo (or Rewat), who named it after his daughter Rewati. It is a major commercial and transport centre and an agricultural market. There is some light industry. Constituted a municipality in 1867, it has five colleges affiliated with Kurukshetra University. Pop. (1981) 51,-562.

Rex cat, curly-coated breed of domestic cat that has a dense, soft coat lacking any projecting guard hairs, or outer coat. Except on the head, legs, and paws, the coat forms fairly deep waves, or crimps. The eyebrows and whiskers of the Rex cat are crinkled, the eyes are almond-shaped, and the ears are large and high set. The adult Rex cat is slender and usually has long legs, a long neck and head, and a long, tapering tail. Show cats may be any of the colours or patterns that are accepted for domestic cats.

Rexroth, Kenneth (b. Dec. 22, 1905, South Bend, Ind., U.S.—d. June 6, 1982, Santa Barbara, Calif.), American painter, essayist, poet, and translator, an early champion of the Beat movement.

Largely self-educated, Rexroth spent much of his youth traveling in the western United States, organizing and speaking for unions. His early poetry was experimental, influenced by Surrealism; his later work was praised for its tight form and its wit and humanistic passion. His *Complete Collected Shorter Poems* appeared in 1966 and *Complete Collected Longer Poems* in 1962. *New Poems* was published in 1974. His essays include *Bird in the Bush* (1959), *Assays* (1962), *The Alternative Society* (1970), *With Eye and Ear* (1970), and *American Poetry in the Twentieth Century* (1971). He was also a prolific translator of Japanese, Chinese, Greek, Latin, and Spanish poetry. *An Autobiographical Novel* was published in 1966.

Rey (Iran): *see* Rayy.

Rey, Jacobus Hercules de la: *see* De la Rey, Jacobus Hercules.

Reyes, Alfonso (b. May 17, 1889, Monterrey, Mex.—d. Dec. 27, 1959, Mexico City), poet, short-story writer, essayist, literary scholar and critic, educator, and diplomat, generally considered one of the most distinguished Mexican men of letters of the 20th century.

While still a student, Reyes established himself as an original scholar and an elegant stylist with the publication of *Cuestiones estéticas* (1911; "Aesthetic Questions"). After receiving his degree in law in 1913, he interrupted his diplomatic career, begun in Paris (1913), by studying and teaching in Madrid at the Centro de Estudios Históricos (1914–19). He served in the Mexican diplomatic service in Spain (1920–27) and as ambassador to Argentina (1927, 1936–37) and to Brazil (1930–36, 1938–39), and was also frequently a cultural representative of Mexico at various international conferences. During these years he published both scholarly and creative works, distinguishing himself equally in poetry and prose. The poetry of *Visión de Anáhuac* (1917; "Vision of Anáhuac"), the dialogues and sketches of *El plano oblicuo* (1920; "The Oblique Plane"), and the essays of *Reloj de sol* (1926; "Sundial") reveal the diversity of Reyes' forms and themes. In scholarship and criticism he was equally versatile, specializing in classical Greek literature and Spanish literature of the Golden Age. He also translated English and French works into Spanish and wrote such general works as *La experiencia literaria* (1942; "The Literary Experience").

By the time Reyes returned permanently to Mexico in 1939, on his retirement from the diplomatic service, his position as the master of Mexican letters was virtually unchallenged. He continued to be active in public life and in education while maintaining a vast literary output until his death.

Reyes (Prieto), Rafael (b. 1850, Santa Rosa, New Granada—d. Feb. 19, 1921, Bogotá), explorer and statesman who was president and dictator of Colombia from 1904 to 1909. He attempted to give his nation a strong one-man rule that would attract foreign investment and foster domestic industrialization.

With little formal education, Reyes engaged in commerce with his brothers, and in 1874 they began an extraordinary adventure of exploration and occupation of the unknown area of the Amazon Basin in Colombia. One brother died of fever and another was eaten by cannibals, but Reyes survived in the jungle for 10 years. The prosperous business he had established collapsed in a financial panic, and he returned to civilization a ruined man.

Reyes soon aligned himself with the Conservative military forces of Colombia and was rewarded for his services to the dictator Rafael Núñez with various political offices: secretary of the interior, ambassador to France, and delegate to the Pan-American Conference in Mexico (1901–02). Returning to Colombia after an unsuccessful attempt to negotiate compensation from the United States for the loss of Panama, he was elected president in 1904.

Soon after his inauguration Reyes assumed dictatorial powers—dismissing the Congress, jailing some of its members, and appointing his own puppet assembly. He then set about to restore the nation's international credit, increase coffee production, and encourage the building of railroads and public facilities. All in all, he provided an efficient administration. Colombians, however, were growing restive under his dictatorship, and when he tried to conclude a treaty calling for U.S. payment of only $2,500,000 for the loss of Panama, he was forced to resign (1909). After 10 years of travel he returned to Colombia in 1919.

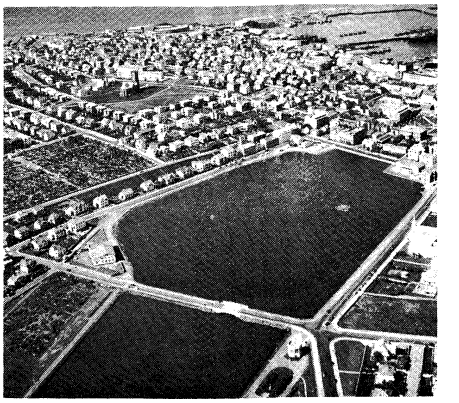
Reyes Basoalto, Neftalí Ricardo (writer): *see* Neruda, Pablo.

Reye's syndrome, acute neurologic illness that develops in children following a minor episode of influenza, chicken pox, or other viral infections and which may, in its most serious form, result in fatty degeneration of the liver and potentially fatal swelling of the brain. It was first reported by the Australian pathologist R.D.K. Reye in 1963, after 12 years of research. Whether it is a new disease of the second half of the 20th century or an old disease previously misdiagnosed is uncertain.

The disease affects people under 18 years of age, usually very young children. The affected child appears to be recovering from the viral illness when such symptoms as nausea, vomiting, lethargy, and confusion begin. Within a few hours or days the child exhibits drowsiness, disorientation, seizures, respiratory arrest, and coma. The precise cause of the syndrome is unknown but is thought to be related to viral damage to the cerebral mitochondria (the subcellular structures responsible for energy metabolism). Reye's syndrome can occur following aflatoxin or warfarin poisoning and has also been associated with the use of aspirin or other salicylates during a viral illness. A decline in the incidence of the syndrome during the 1980s was attributed to the reduced use of these drugs in the treatment of viral infections in children.

Although there is no specific cure, careful monitoring of the patient's vital functions and prompt correction of any imbalances—employing antibiotics, insulin, corticosteroids, glucose, diuretics, blood serum, and other aids—can help stay the progress of the disease. More than 70 percent of patients now survive. Some recover completely, whereas others suffer some degree of brain damage.

Reykjavík, capital and largest town of Iceland. It is located on the northern side of the Seltjarnar Peninsula, at the southeastern corner of Faxa Bay, in southwestern Iceland. According to tradition, Reykjavík (Bay of Smokes) was founded in 874 by the Norseman Ingólfur Arnarson. Until the 20th century it



Reykjavík, Ice.
By courtesy of the Icelandic Tourist Information Bureau

was a small fishing village, ruled and largely inhabited by Danes. It was granted municipal powers and was designated the administrative centre of the Danish-ruled island in 1786. The seat of the Althing (parliament) since 1843, it became the capital of a self-governing Iceland under the Danish king in 1918 and of the independent Republic of Iceland in 1944. Reykjavík is also the commercial, industrial, and cultural centre of the island. It is a major fishing port and the site of nearly half of the nation's industries. An international airport is at Keflavík, 20 miles (32 km) westsouthwest. Reykjavík's manufactures include processed fish and food products, ships, and textiles. Strikingly modern and clean in appearance, the town is largely built of concrete and is heated by hot water piped from nearby springs. Noteworthy buildings include the Parliament Building, the Lutheran Cathedral (1975), the National Library of Iceland (founded 1818), the University of Iceland (founded 1911), the National Museum, the National Theatre, a state hospital, and a navigation school. Bessastadhir, the residence of the president of Iceland, is outside the town. Pop. (1983 est.) 87,309.

Reymont, Władysław Stanisław, Reymont also spelled REJMENT (b. May 7, 1867, Kobiele Wielkie, near Radom, Pol., Russian Empire [now in Poland]—d. Dec. 5, 1925, Warsaw), Polish writer and novelist.

Reymont never completed his schooling but was at various times in his youth a shop apprentice, a lay brother in a monastery, a railway official, and an actor. His early writing includes *Ziemia obiecana* (1899; "The Promised Land"), a story set in the rapidly expanding industrial town of Łódź and depicting the lives and psychology of the owners of the textile mills there. His short stories and novels, including *Spotkanie* (1897; "The Meeting") and *Komediantka* (1896; "The Comedienne"), are written in a naturalistic, factual style with short sentences. The novel *Chłopi,* 4 vol. (1904–09; *The Peasants*) is a chronicle of peasant life during the four seasons of a year; written almost entirely in peasant dialect, it has been translated into many languages and won for Reymont the Nobel Prize for Literature (1924). His later work was less expressive but reflected the variety of his interests, including his view of the spiritualist movement in *Wampir* (1911) and his interpretation of Polish political and social life at the close of the 18th century in *Rok 1794,* 3 vol. (1913–18; "The Year 1794").

Reynald OF CHÂTILLON (French crusader): *see* Reginald of Châtillon.

Reynard THE FOX, hero of several medieval European cycles of versified animal tales that satirize contemporary human society. Though Reynard is sly, amoral, cowardly, and self-seeking, he is still a sympathetic hero, whose cunning is a necessity for survival. He

symbolizes the triumph of craft over brute strength, usually personified by Isengrim, the greedy and dull-witted wolf. Some of the cyclic stories collected around him, such as the wolf or bear fishing with his tail through a hole in the ice, are found all over the world; others, like the sick lion cured by the wolf's skin, derive by oral transmission from Greco-Roman sources. The cycle arose in the area between Flanders and Germany in the 10th and 11th centuries, when clerks began to forge Latin beast epics out of popular tales. *Ysengrimus* was used as the title of a poem in Latin elegiac couplets by Nivard of Ghent in 1152; some of the stories were soon recounted in French octosyllabic couplets. The Middle High German poem "Fuchs Reinhard" (*c.* 1180) by Heinrich (der Glîchesaere?), a masterpiece of 2,000 lines, freely adapted from a lost French original, is another early version.

The main literary tradition of Reynard the Fox descends from the extant French "branches" of the *Roman de Renart* (about 30 in number, nearly 40,000 lines of verse). These French branches are probably elaborations of the same kernel poem used by Heinrich in the earlier German version. The facetious portrayal of rustic life, the camel as a papal legate speaking broken French, the animals riding on horses and recounting elaborate dreams, suggest the atmosphere of 13th-century France and foreshadow the more sophisticated "Nun's Priest's Tale" of Chaucer. Because of the popularity of these tales the nickname *renard* has replaced the old word *goupil* ("fox") throughout France. The Flemish adaptations of these French tales by Aenout and Willem (*c.* 1250) were the sources of the Dutch and Low German prose manuscripts and chapbooks, which in turn were used by the English printer William Caxton and subsequent imitators down to Goethe's *Reineke Fuchs* (1794).

Reynaud, Paul (b. Oct. 15, 1878, Barcelonnette, Fr.—d. Sept. 21, 1966, Paris), conservative French politician and statesman who, as premier in June 1940, unsuccessfully attempted to save France from German occupation in World War II.

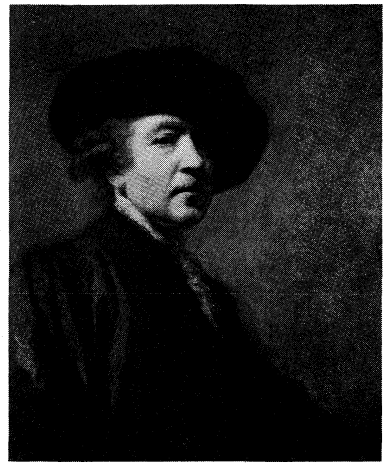
A lawyer, Reynaud joined the army in World War I. Afterward he represented his home district (1919–24) and then a Paris constituency (from 1928) in the Chamber of Deputies and was minister of finance, of colonies, and of justice between 1930 and 1932. Out of office until 1938, he was almost alone in advocating resistance to Nazi Germany and preparation for combined tank–air warfare, as recommended by Col. (later Gen.) Charles de Gaulle. Appointed minister of justice (April 1938) Reynaud protested the appeasement of Germany by England and France and resigned from the Alliance Démocratique when its leader congratulated Hitler after the Munich Conference (which allowed Germany to occupy large sections of Czechoslovakia). From November 1938 to March 1940 Reynaud was minister of finance.

In World War II Reynaud became premier (March 1940). He made de Gaulle undersecretary of state for war and, as France was collapsing under the German onslaught, urged resistance and maintenance of the British alliance. But Marshal Philippe Pétain, a World War I hero whom Reynaud had made vice premier to strengthen his Cabinet, and other ministers preferred armistice with Germany. Unwilling to be party to an armistice, Reynaud resigned on June 16; arrested shortly thereafter, he was kept in captivity for the duration of the war.

After the liberation Reynaud was a member of the Chamber of Deputies (1946–62), held office in two governments (1948, 1950), and twice tried to form cabinets of his own (1952, 1953). He presided over the Consultative Committee on the drafting of the constitution of the Fifth Republic. In 1962, however, he denounced de Gaulle for trying to circumvent that constitution by inaugurating a presidential regime elected by direct vote.

Reynaud's major publications are *La France a sauvé l'Europe* (1947; revised as *Au coeur de la mêlée, 1930–45,* 1951; Eng. trans., *In the Thick of the Fight, 1930–45,* 1955) and *Mémoires* (2 vol., 1960–63).

Reynolds, Sir Joshua (b. July 16, 1723, Plympton, Devon, Eng.—d. Feb. 23, 1792, London), portrait painter and aesthetician who dominated English artistic life in the middle and late 18th century. Through his art and teaching, he attempted to lead British painting away from the indigenous anecdotal pictures of the early 18th century toward the formal rhetoric of the continental Grand Style. With the founding of the Royal Academy in 1768, Reynolds was elected its first president and knighted by the King.



Sir Joshua Reynolds, detail of a self-portrait, oil painting, 1773; in the Royal Academy of Arts, London

By courtesy of the Royal Academy of Arts, London

Early life. Reynolds was educated at the Plympton grammar school of which his father, a clergyman, was master. The young Reynolds became well read in the writings of classical antiquity and throughout his life was to be much interested in literature, counting many of the finest British authors of the 18th century among his closest friends. Influenced by the essays of the prominent English portrait painter Jonathan Richardson, Reynolds early aspired to become an artist, and in 1740 he was apprenticed for four years in London to Richardson's pupil and son-in-law, a conventional portraitist named Thomas Hudson. In 1743 he returned to Devon and began painting at Plymouth naval portraits that reveal his inexperience. Returning to London for two years in 1744, he began to acquire a knowledge of the old masters and an independent style characterized by bold brushwork and the use of impasto, a thick surface texture of paint, such as in his portrait of "Captain the Honourable John Hamilton."

Back in Devon in 1746, he painted a large group portrait of the "Eliot Family" (*c.* 1746/47; Earl of St. Germans, Port Eliot, Cornwall), which clearly indicates that he had studied the large-scale portrait of the "Pembroke Family" (1634–35; Wilton House, Wiltshire) by the Flemish Baroque painter Sir Anthony Van Dyck (1599–1641), whose style of portrait painting influenced English portraiture throughout the 18th century. In 1749 he sailed with a friend to Minorca, one of the Balearic Islands off the Mediterranean coast of Spain. A fall from a horse detained him for five months and permanently scarred his lip—the scar being a prominent feature in his subsequent self-portraits. From Minorca he went to Rome, where he remained for two years, devoting himself to studying Italian art from ancient to his own times. Returning to England via Florence, Bologna, and Venice, he became absorbed by the compositions and colour of the great Renaissance Venetian painters of the 16th century: Titian, Jacopo Tintoretto, and Paolo Veronese. The Venetian tradition of atmospheric painting with its emphasis on colour and the effect of light and shading had a lasting influence on Reynolds, and, although all his life he preached the need for young artists to study the sculptural definition of form characteristic of Florentine and Roman painters, his own works are redolent of the Venetian style.

Later years. In 1753 Reynolds settled in London, where he was to live for the rest of his life. His success was assured from the first, and by 1755 he was employing studio assistants to help him execute the numerous portrait commissions he received. The early London portraits have a vigour and naturalness about them that is perhaps best exemplified in a likeness of "Honourable Augustus Keppel." The pose is not original, being a reversal of the "Apollo Belvedere," an ancient Roman copy of a mid-4th-century-BC Hellenistic statue he had seen in the Vatican. But the fact that the subject is shown striding along the seashore introduces a new kind of vigour into the tradition of English portraiture. In these first years in London, his knowledge of Venetian painting is very apparent in such works as the portraits of "Lord Cathcart" (1753/54; Trustees of Earl Cathcart, on loan to Manchester City Art Gallery, Lancashire) and "Lord Ludlow" (1755; Woburn Abbey, Bedfordshire). Of his domestic portraits, those of "Nelly O'Brien" and of "Georgiana, Countess Spencer, and Her Daughter" (1761; Earl Spencer, Althorp, Northamptonshire) are especially notable for their tender charm and careful observation.

After 1760 Reynolds' style became increasingly classical and self-conscious. As he fell under the influence of the classical Baroque painters of the Bolognese school of the 17th century and the archaeological interest in Greco-Roman antiquity that was sweeping Europe at the time, the pose and clothes of his sitters took on a more rigidly antique pattern, in consequence losing much of the sympathy and understanding of his earlier works.

There were no public exhibitions of contemporary artists in London before 1760, when Reynolds helped found the Society of Artists and the first of many successful exhibitions was held. The patronage of King George III was sought, and in 1768 the Royal Academy was founded. Although Reynolds' painting had found no favour at court, he was the obvious candidate for the presidency, and the King confirmed his election and knighted him. Reynolds guided the policy of the academy with such skill that the pattern he set has been followed with little variation ever since. His yearly *Discourses* clearly mirrored many of his own thoughts and aspirations, as well as his own problems of line versus colour and public and private portraiture, and gave advice to those beginning their artistic careers.

From 1769 nearly all of Reynolds' most important works appeared in the academy. In certain exhibitions he included historical pieces, such as "Ugolino" (1773; Knole House, Kent), which were perhaps his least successful works. Many of his child studies are tender and even amusing, though now and again the sentiment tends to be excessive. Two of the most enchanting are "Master Crewe as Henry VIII" (1775–76; Lord O'Neil, London) and "Lady Caroline Scott as 'Winter' " (1778; Duke of Buccleuch, London). His most ambitious portrait commission was the "Family of

the Duke of Marlborough" (1777; Blenheim Palace, Oxfordshire).

In 1781 Reynolds visited Flanders and Holland, where he studied the work of the great Flemish painter of the Baroque style Peter Paul Rubens. This seems to have affected his own style, for in the manner of Rubens' later works the texture of his picture surface becomes far richer. This is particularly true of his portrait of the "Duchess of Devonshire and Her Daughter" (1786; Chatsworth House, Derbyshire). Reynolds was never a mere society painter or flatterer. It has been suggested that his deafness gave him a clearer insight into the character of his sitters, the lack of one faculty sharpening the use of his eyes. His vast learning allowed him continually to vary his poses and style. In 1782 Reynolds had a paralytic stroke, and about the same time he was saddened by bickerings within the Royal Academy. Seven years later his eyesight began to fail, and he delivered his last *Discourse* at the academy in 1790. He died in 1792 and was buried in St. Paul's Cathedral.

Personality and criticism. Reynolds preferred the company of men of letters to that of his fellow artists. Although his 14th *Discourse* (1788) is a tender and moving appreciation of his rival, the painter Thomas Gainsborough, who stood for so much that he himself disliked in painting, it was in the company of the lexicographer and author Samuel Johnson, the statesman and philosopher Edmund Burke, and the dramatist, novelist, and poet Oliver Goldsmith that Reynolds was happiest. When Goldsmith died, Reynolds could not bring himself to paint for a whole day, and a moving essay he wrote on his friend showed that he could write a portrait as well as he could paint one. Reynolds and his friends were members of The Club, which he established in 1764. He never married, and his house was kept for him by his sister Frances.

Reynolds' state portraits of the King and Queen were never considered a success, and he seldom painted for them; but the Prince of Wales patronized him extensively, and there were few distinguished families or individuals who did not sit for him. Nonetheless, some of his finest portraits are those of his intimate friends and of fashionable women of questionable reputation.

Unfortunately, Reynolds' technique was not always entirely sound, and many of his paintings have suffered as a result. After his visit to Italy, he tried to produce the effects of Tintoretto and Titian by using transparent glazes over a monochrome underpainting, but the pigment he used for his flesh tones was not permanent and even in his lifetime began to fade, causing the overpale faces of many surviving portraits. An example of this can be seen in the "Roffey Family" (1765; City of Birmingham Museum and Art Gallery). This paleness often has been increased by injudicious cleaning. In the 1760s Reynolds began to use more extensively bitumen or coal substances added to pigments. This practice proved to be detrimental to the paint surface. Though a keen collector of old-master drawings, Reynolds himself was never a draftsman, and indeed few of his drawings have any merit whatsoever.

His *Discourses Delivered at the Royal Academy* is among the most important art criticism of the time. In it he outlined the essence of grandeur in art and suggested the means of achieving it through rigorous academic training and study of the old masters of art. (J.Wo.)

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Reynolds, Mary Ellen: *see* Miller, Marilyn.

Reynolds, Osborne (b. Aug. 23, 1842, Belfast, Ire.—d. Feb. 21, 1912, Watchet, Somerset, Eng.), British engineer, physicist, and educator best known for his work in hydraulics and hydrodynamics.

Reynolds was born into a family of Anglican clerics. He gained early workshop experience by apprenticing with a mechanical engineer, and he graduated at Queens' College, Cambridge, in mathematics in 1867. In 1868 he became the first professor of engineering at Owens College, Manchester, a position he held until his retirement in 1905. He became a fellow of the Royal Society in 1877 and received a Royal Medal in 1888.

Though his earliest professional research dealt with such properties as magnetism, electricity, and heavenly bodies, Reynolds soon began to concentrate on the area of fluid mechanics. In this area he made a number of significant contributions. His studies of condensation and heat transfer between solids and fluids brought radical revision in boiler and condenser design, while his work on turbine pumps permitted their rapid development. He formulated the theory of lubrication (1886) and in 1889 developed the standard mathematical framework used in turbulence work. He also studied wave engineering and tidal motions in rivers and made pioneering contributions to the concept of group velocity. Among his other contributions were the explanation of the radiometer and an early absolute determination of the mechanical equivalent of heat. His paper on the law of resistance in parallel channels (1883) is a classic. The "Reynolds stress" in fluids with turbulent motion and the "Reynolds number" used for modeling in fluid flow experiments are named for him.

Reynolds, Walter (d. Nov. 16, 1327), archbishop of Canterbury best known for his political involvement with Edward II.

Reynolds was the son of a Windsor baker. Sometime in the late 13th century he became a clerk, or chaplain, in the service of Edward I. He may have been a tutor to Edward, prince of Wales (later Edward II), with whom he became a favourite. When Prince Edward ascended the throne in 1307, he appointed Reynolds treasurer of England, and in 1308 Reynolds also became bishop of Worcester. When Robert Winchelsey, archbishop of Canterbury, died in May 1313, Edward II prevailed upon Pope Clement V (and, it is believed, bribed him) to appoint Reynolds to the vacant archbishopric; Reynolds was enthroned at Canterbury in February 1314. In this role he continued the historical struggle for precedence between the archbishops of Canterbury and of York. For a number of reasons, not the least of which was the pope's granting of extraordinary power to Reynolds, the king and the archbishop of Canterbury began to differ. By about 1323 the bond between Reynolds and Edward II had all but dissolved. Reynolds openly opposed the king in defense of the bishop of Hereford, Adam of Orlton. In the events that concluded Edward's life and reign, the archbishop played a contemptible part. Eager to be on the winning side in the struggle between the king and the British barons for ascendency and having fled for safety into Kent, Reynolds returned to London after the imprisonment of Edward II and declared for Edward III, whom he crowned in February 1327.

Reynolds number, in fluid mechanics, a criterion of whether fluid (liquid or gas) flow is absolutely steady (streamlined, or laminar) or on the average steady with small unsteady fluctuations (turbulent). Whenever the Reynolds number is less than about 2,000, flow in a pipe is generally laminar, whereas, at values greater than 2,000, flow is usually turbulent. Actually, the transition between laminar and turbulent flow occurs not at a specific value of the Reynolds number but in a range usually beginning between 1,000 to 2,000 and extending upward to between 3,000 and 5,000.

In 1883 Osborne Reynolds, a British engineer and physicist, demonstrated that the transition from laminar to turbulent flow in a pipe depends upon the value of a mathematical quantity equal to the average velocity of flow times the diameter of the tube times the mass density of the fluid divided by its absolute viscosity. This mathematical quantity, a pure number without dimensions, became known as the Reynolds number and was subsequently applied to other types of flow that are completely enclosed or that involve a moving object completely immersed in a fluid.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Reynolds number, magnetic: *see* magnetic Reynolds number.

Reynolds Tobacco Company, in full R.J. REYNOLDS TOBACCO COMPANY, American manufacturer of tobacco products.

The origins of the R.J. Reynolds Tobacco Company date to the post-Civil War era, when Richard Joshua Reynolds (1850–1918) began trading in tobacco, first in his native Virginia and then in Winston, N.C., where in 1875 he established his first plug factory. In 1899 the R.J. Reynolds Tobacco Company was incorporated, with Reynolds as president. The following year it entered the giant tobacco trust that came to be called the American Tobacco Company. In 1911 the trust was dissolved by the U.S. Court of Appeals, and Reynolds Tobacco Company again became independent. In 1906 the company had introduced the popular Prince Albert pipe tobacco. In 1913 it introduced a new cigarette, a blend of American and Turkish tobaccos, called Camel. Winston filter tips went on sale in 1954, and Salem, the first filter-tipped menthol cigarette, was introduced in 1956.

The company began to diversify in the 1960s, acquiring chiefly food and oil concerns, and the tobacco concern became a subsidiary of R.J. Reynolds Industries, Inc., in 1970 (since 1986 RJR Nabisco, Inc.).

Reynosa, city, north-central Tamaulipas state, northeastern Mexico. Just across the Rio Grande (Río Bravo del Norte) from Hidalgo, Texas, U.S., Reynosa was founded in 1749 as part of a program to develop the Mexican interior. Subject to repeated floods, it was moved to higher ground, 300 feet (90 m) above sea level, in 1802. Its inhabitants were among the first to rebel in 1810; they also participated in the Revolution of 1910. The state congress declared Reynosa a city in 1926.

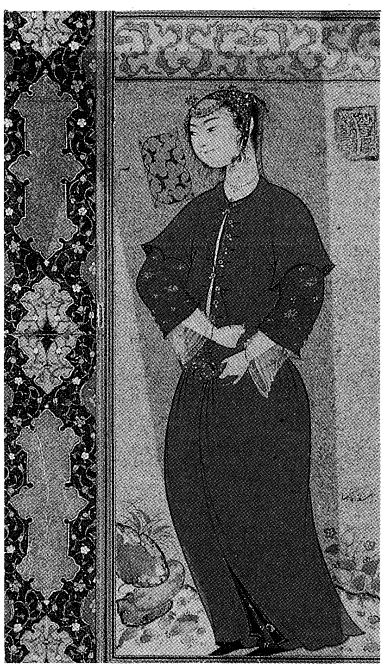
Its economy, based principally on cattle raising, was improved considerably with the introduction of irrigation in 1935, improving pasturage and greatly expanding production

of cotton, sugarcane, corn (maize), and other crops. The city's oil refineries and petrochemical plants serve the nearby fields, and pipelines carry natural gas to the U.S. and to Monterrey, 140 mi (225 km) to the southwest. It also has cotton mills, distilleries, sawmills, brick plants, and other industries. Reynosa is also a port of entry and a transportation centre, accessible by highway, railroad, and air from major cities in southern Texas and northeastern Mexico. Pop. (1980) 240,000.

Rezā, Persian in full ĀQĀ REZĀ REZĀ-E ʿABBĀSĪ (b. *c.* 1570, Meshhed, Ṣafavid Iran—d. 1635?, Isfahan), the major Persian painter of the Isfahan school (*q.v.*) and the favourite painter of Shāh ʿAbbās I the Great.

He was the son of ʿAlī Asghar of Kashān, who painted at the court of Prince Ibrāhīm Mīrzā, the Ṣafavid viceroy at Meshhed, which was then (1556–77) the leading Iranian centre of the cultivation of the arts. While Rezā was still young, his virtuosity brought him to the attention of Shāh ʿAbbās at Isfahan, and by 1596 he was regarded as having no rival. Soon after this he fell into low company, spending much of his time with athletes and wrestlers, and paid little attention to his art. Despite the kindness and favour of the Shāh, he is said to have been always in financial distress. He no longer executed royal commissions, and his principal work consisted of drawings and paintings that were apparently sold in the bazaar to keep him in funds.

He was able to recover somewhat and to produce originally and energetically until his death in 1635. His highly mannered style features plump, effete figures in artificial poses, but drawn with a wonderfully fluid line and coloured in an expressionist, nonrealistic way. It still manages to be fresh and remarkable,



"Girl with a Fan," painting on paper by Rezā, *c.* 1590; in the Freer Gallery of Art, Washington, D.C.

By courtesy of the Smithsonian Institution, Freer Gallery of Art, Washington, D.C.

but the paintings of the second period (after 1605) are undeniably coarser and more affected.

Rezā was the last great Persian painter of originality. His style had an indelible influence on the Isfahan school (1597–1722).

Reza Shah Pahlavi, also spelled RIZA SHAH PAHLEVI, original name REZA KHAN (b. March 16, 1878, Alasht, Mazanderan province, Iran—d. July 26, 1944, Johannesburg), Iranian army officer who rose through army ranks to become shah of Iran (1925–41) and began the regeneration of his country.



Reza Shah Pahlavi

Keystone

Early career. Reza Khan was of a family of chiefs of a clan named Pahlevan. After the death of his father, Col. Abbas Ali Khan, Reza's mother took him to Tehrān, where he eventually enlisted as a private in an Iranian military unit under Russian instructors. Tall and powerfully built, the young soldier, from the beginning, showed an uncommonly strong will, remarkable intelligence, and a capacity for leadership. He was highly regarded by his seniors.

Coup of 1921. After centuries of misrule by its former rulers and the ravages of the war waged by foreign belligerents on its soil from 1914 to 1919, Iran in 1921 was prostrate, ruined, and on the verge of disintegration. The last of the shahs of the Qājār dynasty, Aḥmad Shāh, was young and incompetent, and the Cabinet was weak and corrupt. Patriotic and nationalist elements had long been outraged at the domination of Iran by foreign powers, especially Great Britain and Russia, both of which had strong commercial and strategic interest in the country. This situation led Reza Khan to decide on an attempt at putting an end to the chaos by taking over power and forming a strong government, bolstered by an effective and disciplined military force. He contacted some young, progressive elements and on Feb. 21, 1921, occupied Tehrān at the head of 1,200 men. A young journalist, Sayyid Zia od-Din Tabataba'i, became prime minister, while Reza Khan took command of all the military forces and was appointed minister of war a few weeks after.

Reza Khan cherished the idea of regenerating the Iranian nation and leading it on the path of progress. Many had imagined that Reza Khan, whom they took to be an unsophisticated regimental officer, would be content with a high-sounding title and a sword of honour given by the Shah. But he was not about to step aside to allow a mixed group of inexperienced though sincere idealists and foreign-influenced opportunists to rule the country. His progress toward supreme power was extraordinarily rapid. Of a forbidding appearance, he talked very little and never revealed his intentions. Displaying great political talent against his opponents, he divided and weakened them. He also understood that to reach his ultimate objective he had to have complete control over a military force and that that required money. Able to levy some taxes, he built up the army with the proceeds and then used the army to collect more taxes, until finally he had gained control over the entire country. As war minister, he was the real power behind several prime ministers in succession until 1923, when he became prime minister himself.

The sovereign, Aḥmad Shāh, was ill and undergoing a lengthy cure in Europe. In spite of the entreaties of Reza Khan and the speaker of the Majles (Iranian parliament), the Shah refused to return to Iran. Reza Khan then considered proclaiming a republic but was dissuaded by the strong opposition to the idea by the majority of the people. In 1925 the Majles deposed the absentee monarch, and a constituent assembly elected Reza Khan as shah, vesting sovereignty in the new Pahlavi dynasty.

Policies as shah. After his coronation in April 1926, Reza Shah continued the radical reforms he had embarked on while prime minister. He broke the power of the tribes, which had been a turbulent element in the nation, disarming and partly settling them. In 1928 he put an end to the one-sided agreements and treaties with foreign powers, abolishing all special privileges. He built the Trans-Iranian Railway and started branch lines toward the principal cities (1927–38). He emancipated women and required them to discard their veils (1935). He took control of the country's finances and communications, which up to then had been virtually in foreign hands. He built roads, schools, and hospitals and opened the first university (1934). His measures were directed at the same time toward the democratization of the country and its emancipation from foreign interference.

His foreign policy, which had consisted essentially of playing the Soviet Union off against Great Britain, failed when those two powers joined in 1941 to fight the Germans. To supply the Soviet forces with war material through Iran, the two allies jointly occupied the country in August 1941.

Reza Shah then decided to abdicate, to allow his son and heir, Mohammad Reza Pahlavi, to adopt a policy appropriate to the new situation, and to preserve his dynasty. He wanted to go to Canada, but the British government sent him first to Mauritius and then to Johannesburg, where he died in July 1944.

(H.Ar.)

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Reẓā'īyeh (Iran): *see* Orūmīyeh.

Rezanov, Nikolay Petrovich (b. April 8 [March 28, old style], 1764, St. Petersburg, Russia—d. March 13 [March 1, O.S.], 1807, Krasnoyarsk, Siberia), Russian trader, diplomat, and administrator who was a founder of the Russian-American Company, which played a major part in the history of Alaska and of the North Pacific. He wished to annex the western coast of North America to Russia and to encourage large-scale emigration of Russians into that area. After his early death, the Russian government did little to realize his plans, a failure that led indirectly to the sale of Alaska by Russia to the United States in 1867.

Rezanov became a partner and in 1795 chief executive of the Shelekhov-Golikov Fur Company, trading in the Russian settlements on the northwestern coast of North America. By 1799 he and Grigory I. Shelekhov's heirs persuaded Emperor Paul to charter the Russian-

American Company (*q.v.*) and to grant it a monopoly for 20 years on the American coast north of latitude 55° and in the Aleutian and Kuril islands. This trust was at first a source of great profit to Rezanov and the other stockholders, including members of the imperial family.

Rezanov helped to promote the first Russian circumnavigation of the Earth (1803–06) and sailed from Kronstadt with the expedition, commanded by Adam Johann Krusenstern, westward around Cape Horn to Kamchatka. After visiting Japan in 1804 on an unsuccessful mission as Emperor Alexander I's ambassador, he remained in the North Pacific with imperial orders to correct abuses within the company.

After spending the winter of 1805–06 in Sitka (Novo-Arkhangelsk, or New Archangel), Alaska, centre of the company's colonial administration, he sailed for the Spanish settlements in California to trade furs for foodstuffs and to arrange a treaty for the regular provisioning of the company's colonies from New Spain. Reaching San Francisco in April 1806, he was told that Spanish colonies were forbidden by law to enter into foreign trade. Rezanov, however, gained the support of the Spanish clergy and became affianced to the San Francisco *commandante*'s daughter, said to be the most beautiful girl in California. Rezanov returned to Sitka with a shipload of food, and with the promise of the Spanish governor, Don José Argüello, to forward a copy of the proposed treaty to Spain.

Operating from Kamchatka, Rezanov sent ships to wrest Sakhalin Island from the Japanese. He then started overland for St. Petersburg to obtain Alexander I's signature to the treaty with Spain, but died of fever and exhaustion in an obscure Siberian town. His treaty was never formalized.

Rezzonico, Carlo (pope): *see* Clement XIII.

RFC (United States): *see* Reconstruction Finance Corporation.

RGS: *see* Royal Geographical Society.

Rh blood-group system, a system for classifying blood according to the presence or absence of the Rh antigen, often called the Rh factor, in the cell membranes of the red blood cells. The Rh antigen poses a danger for the Rh-negative person, who lacks the antigen, if Rh-positive blood is given in transfusion. No adverse effects occur the first time Rh-incompatible blood is given, but the immune system responds to the foreign Rh antigen by producing anti-Rh antibodies. If Rh-positive blood is given again after the antibodies form, they will attack the foreign red blood cells, causing them to clump together, or agglutinate. The resulting hemolysis, or destruction of the red blood cells, causes serious illness and sometimes death.

A similar hazard exists during pregnancy for the Rh-positive offspring of Rh-incompatible parents, when the mother is Rh-negative and the father is Rh-positive. The first child of such parents is usually in no danger unless the mother has acquired anti-Rh antibodies by virtue of incompatible blood transfusion. During labour, however, a small amount of the fetus's blood may enter the mother's bloodstream. The mother will then produce anti-Rh antibodies, which will attack any Rh-incompatible fetus in subsequent pregnancies. This disease, called erythroblastosis fetalis (*q.v.*), or hemolytic disease of the newborn, can be fatal to the fetus or to the infant shortly after birth.

Treatment of erythroblastosis fetalis usually entails one or more exchange transfusions. The disease can be avoided by vaccinating the mother with anti-Rh gamma globulin after delivery of her firstborn if there is Rh-incompatibility. The Rh vaccine destroys any fetal blood cells before the mother's immune system can develop antibodies.

Although the Rh-negative trait is rare in most parts of the world, it occurs in about 15 percent of Caucasians in Europe, Canada, and the United States. The trait's highest incidence is among the Basques of the Pyrenees (from 25 to 35 percent), and the Berbers of Africa and the Bedouins of the Sinai (from 18 to 30 percent).

The Rh blood group system was discovered independently in 1939 by Philip Levine and R.E. Stetson and in 1940 by Karl Landsteiner and A.S. Weiner. Since that time a number of distinct Rh antigens have been identified, but the first, and most common one, called Rh 1 (also Rh_0 or D), causes the most severe immune reaction and is the primary determinant of the Rh trait. All Rh antigens apparently are produced by three sets of closely linked genes that are located near the end of the short arm on chromosome 1.

rhabdite, meteoritic mineral, rodlike variety of schreibersite (*q.v.*).

rhabdovirus, any of a group of viruses constituting the family Rhabdoviridae, responsible for rabies and vesicular stomatitis of cattle and horses. The virus particle is enveloped in a fatty membrane; is bullet-shaped, 70 by 180 nanometres (nm; 1 nm = 10^{-9} metre); and contains a single helical strand of ribonucleic acid (RNA). *See also* rabies; vesicular stomatitis.

Rhaetia (ancient Roman province): *see* Raetia.

Rhaetian Alps, Italian ALPI RETICHE, German RÄTISCHE ALPEN, French ALPES RHÉTIQUES, segment of the Central Alps extending along the Italian–Swiss and Austrian–Swiss borders but lying mainly in Graubünden canton, Switzerland. The mountains are bounded by the Lepontine Alps and Splügen Pass (*qq.v.*; west-southwest), the Hinterrhein River (west), the Lechtaler Alpen (northeast), the Ötztal Alps (*q.v.*) and Resia Pass (*q.v.*; east-northeast), and the Valtellina (valley of the upper Adda River; south). Piz Bernina (13,284 ft [4,049 m]), on the Italian border, is the highest point. Included within the Rhaetian Alps are the subranges of Silvretta, Rhätikon, and the Albula and Bernina Alps (*qq.v.*). The Engadin (valley of the Upper Inn River) cuts northeast to southwest among these subranges. In the eastern part (between the Inn River and Ofen Pass) is the Swiss National Park (founded 1914; area 53 sq mi [137 sq km]), which is noted for its rugged Alpine scenery and its wildlife. Many health resorts and winter sports centres lie within the range.

Rhaetian dialects, also called RAETO-ROMANCE, group of Romance dialects spoken in Switzerland and northern Italy. The most important Rhaetian dialects are Sursilvan and Sutsilvan, which together make up the Romansh language (*q.v.*). Other Rhaetian dialects are Engadine, spoken in Switzerland in the Inn River valley; Ladin, spoken in the Alto Adige and Dolomites regions of northern Italy; and Friulian, spoken north of Venice to the Austrian border and east to the Yugoslavian border.

The Swiss Rhaetian dialects seem to resemble French more than any other Romance language, whereas Ladin and Friulian are more similar to Italian. The two groups are not closely related and appear to have developed independently of one another.

Rhaetian Stage, division of Triassic rocks and time that is recognized as a worldwide standard to which other rocks are compared (the Triassic Period began about 225,000,000 years ago and lasted about 35,000,000 years). The Rhaetian Stage was recognized in the Rhaetian Alps of northwestern Europe, where it consists predominantly of marine rocks that overlie those of the Norian Stage. The Rhaetian is a transitional series and, in some regions, is placed in the Early Jurassic Period (the Jurassic period began about 190,000,000 years ago and lasted about 54,000,000 years). In Britain, the Rhaetian consists of lagoonal deposits, limestones, shales, and marls as well as bone beds that contain the fragmental remains of amphibians and reptiles. Elsewhere, on the European continent, Rhaetian rocks consist of shales that contain fossil ammonoid cephalopods and limestones with characteristic brachiopods.

Rhagae (Iran): *see* Rayy.

Rhamnales, buckthorn order of flowering plants, belonging to the class called dicotyledon (*q.v.*; characterized by two seed leaves). It is comprised of 58 genera and 1,550 species in three families and is distributed worldwide in the tropics and subtropics, with significant extensions into temperate regions. Members of Rhamnales yield wood, medicine, fruit (especially grapes), and ornamental plants. Several genera, such as grapes and buckthorn, are represented in both the Old and New Worlds.

A brief treatment of Rhamnales follows. For full treatment, *see* MACROPAEDIA: Angiosperms.

Many members of the Rhamnales thrive best in rich soil with adequate moisture and a mild climate, but some species survive in less favourable environments. The shrubby *Colletia paradoxa* of South America is planted as a curiosity for its spiny, green twigs that are flattened into thorns; it is nearly leafless. Another member of the Rhamnaceae, the fruit-bearing jujube (*Ziziphus jujuba*) of China, grows in dry, alkaline soil. The shrubby *Colubrina asiatica* populates beaches of the South Pacific. Its seeds float unharmed in sea water for months to germinate on other islands.

The Rhamnales are characterized by woodiness, stamens (male) alternating with sepals (opposite petals, when present), a disk of tissue developing under or around the ovary, and joined bases of flower parts that form a cup (hypanthium) surrounding the ovary.

The Rhamnaceae (buckthorn family) is characterized by simple (blade is one unit) leaves, well-developed sepals, stamens opposite petals, a prominent hypanthium, and a two- to four-chambered ovary in which ovules arise basally. Most fruits are either berry-like (with an inner hard layer) or dry capsules that shed their seeds.

Valuable timber is derived from several buckthorn genera, including *Maesopsis eminii, Ziziphus mauritiana, Z. jujuba, Z. Spina-christi,* and *Pomaderris apetala.* Most of the 45 genera and 850 species, however, are not large enough to supply lumber. They yield various products, such as cascara sagrada (a cathartic made from the bark of *Rhamnus purshiana,* the California bearberry) and the green dye, lokao, the only natural dye that colours cotton a true green.

Other members of Rhamnaceae are components of chaparral—a plant association essential to erosion and flood control. *R. californica* and *R. crocea,* the redberry evergreen shrubs, are used for ornamental plantings.

Distinctive features of Vitaceae, the other major family of the Rhamnales, include terminal buds that develop into tendrils lateral to the stem, inflorescences (flower clusters) that arise opposite a leaf, small sepals (or none), and stamens positioned opposite the petals. Ovules arise centrally in the two-chambered ovary, which matures into a juicy berry.

Of the 12 genera and 600 species in this family, none is more important than *Vitis,* the grape genus. Large, lobed leaves and shreddy bark are characteristic of species that inhabit wooded areas in warmer regions of the Northern Hemisphere. Many hybrids and selected

cultivars are grown in central Europe, New York, California, and other regions where culture of table grapes is a major commercial enterprise.

From antiquity, winemaking has been based on the Caucausian wine grape (*Vitis vinifera*). Its derivatives are adapted to the European climate and to California. The fox grape of the eastern United States, with its purple-black berry, is the dominant parent of the *Concord* and many other cultivars. The muscadine grape (*V. rotundifolia*) is the ancestor of the scuppernong grape, a fruit with musk-flavoured pulp. Its derivatives are cultivated in the Cotton Belt of the United States.

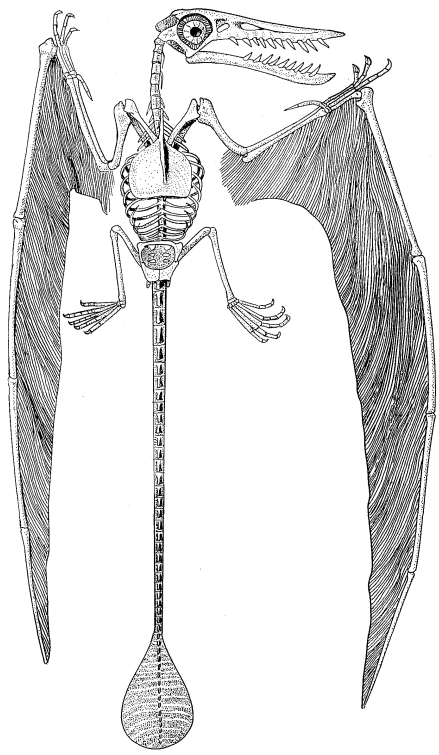
At least five genera of the Vitaceae, including *Parthenocissus*—the genus of both the Virginia creeper, (*P. quinquefolia*) and the Japanese, or Boston, ivy (*P. tricuspidata*)—are ornamentally important.

Many species of the Rhamnales produce root sprouts to form extensive colonies. The cape grape produces globose tubers (short underground stems). Nearly all species produce abundant seed.

Flower parts arise in fours or fives depending upon the family. Perfect flowers, in which both male and female reproductive organs are present, are typical of many genera. The Asiatic *Tetrastigma,* however, produces male and female flowers on separate plants. In the grape genus, flowers are functionally unisexual. In the Vitaceae stamens arise from the disk, which is nectar-producing. Petals are united at their apex and fall as one unit when the flower opens.

Two carpels constitute the pistil, which is differentiated into the basal ovary, a style, and the pollen-receptive stigmas. No more than two ovules arise in each ovary chamber, and some of these may abort. Insects are the pollinators.

Rhamphorhynchus, genus of extinct primitive flying reptiles found as fossils in Late Jurassic deposits in Europe and East Africa (the Jurassic Period began 190,000,000 years ago and lasted 54,000,000 years). *Rhamphorhynchus* was about 0.5 metre (1.5 feet) long, with a long skull and large eyes. The nostrils were set back on the beak. The teeth slanted forward and interlocked; the animal was probably a fish eater. The trunk was short, and the front limbs adapted into winglike structures; each thin wing membrane stretched from a long, strong finger and probably attached near the hind limbs. The other three fingers had claws at their ends. The upper arms were strong and provided attachment for well-developed breast muscles that supported the wings in flight. The tail was very long, almost twice the length of the body, and had a rudderlike piece of skin at its end; it probably helped balance and perhaps even steer the animal while in flight. Many of the bones were hollow, an obvious advantage to a flying animal.



Rhamphorhynchus

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The hind limbs were not well developed, and *Rhamphorhynchus* must have been awkward on the ground and inefficient in flight because the soft wing membrane was capable of only full flapping movement. Some well-preserved specimens found in fine-grained sediments show the impressions of hairlike structures, but there is no evidence of scales or feathers. How *Rhamphorhynchus* reproduced is uncertain; it probably laid eggs, but it is uncertain whether nesting behaviour was developed. *See also* pterosaur.

rhapsodist, Greek RHAPSOIDOS, plural RHAPSOIDOI, any of the dramatic reciters of ancient Greece, dating from the 6th century BC. In the oral epic tradition, rhapsodists were preceded by Homeric singers (*aoidoi*) of their own epic songs and, like them, were musically accompanied on the lyre and aulos. To heighten dramatic effect, rhapsodists used a staff for symbolic gesturing. Their intonation of poetry probably involved a simple chant rather than a recognizable tune.

Rhapsodists recited Homeric poems, but Plato implies in the *Ion* that their repertory may have included works by Hesiod and Archilochus. Rhapsodists became a chief feature of the annual Panathenaea festival in Athens. By the 3rd century BC they were incorporated with actors in the union of the Dionysiac artists. The Homerids (*q.v.*), who perpetuated Homer's works, were at one period rhapsodists.

Rharb, also called GHARB, coastal lowland of northwestern Morocco. Crossed from east to west by the Oued (river) Sebou, the Rharb extends about 50 mi (80 km) along the coast and reaches about 70 mi (113 km) inland. The plain, bordered by the Rif Mountains to the northeast, has gradually been silted up by alluvial deposits from a seasonal watercourse, leaving a surface suitable for agriculture centred on the town of Souk el Arba du Rharb. It is a major citrus fruit-growing region.

Rhäticus, Georg Joachim (astronomer): *see* Rheticus, Georg Joachim.

Rhätikon, mountain group of the Rhaetian Alps, straddling eastern Switzerland (Graubünden canton), western Austria (Vorarlberg), and southern Liechtenstein. It divides the valleys of Montafon (northeast) and Prätigau (southwest). The group's highest peak is Schesaplana (9,724 ft [2,964 m]) on the Austrian–Swiss border, east-northeast of Maienfeld, Switz. Tourism is the main economic base of the region.

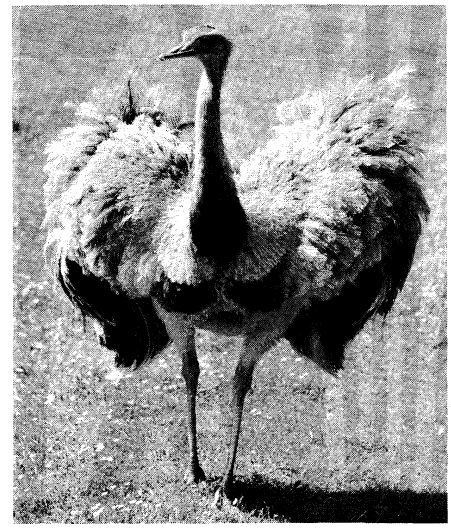
Rhazes (physician): *see* Rāzī, ar-.

Rhea, in Greek religion, ancient goddess, probably pre-Hellenic in origin, worshiped sporadically throughout the Greek world. She was associated with fruitfulness and had affinities with Gaea (Earth) and the Great Mother of the God. A daughter of Uranus (Heaven) and Gaea, she married her brother Cronus, who, warned that one of his children would be fated to overthrow him, swallowed his children Hestia, Demeter, Hera, Hades, and Poseidon soon after they were born. Rhea concealed the birth of Zeus in a cave on Mt. Dicte in Crete and gave Cronus a stone wrapped in swaddling clothes. This he swallowed in the belief that it was Zeus. Subsequently, Cronus was vanquished by Zeus and was forced to disgorge the swallowed children.

Rhea, one of the eight large, regular satellites of Saturn. It has a diameter of 1,530 kilometres (949 miles) and orbits Saturn in a prograde, nearly circular orbit at a mean distance of 527,040 km (326,765 mi). Rhea's density is 1.3 times that of water, and so the satellite is assumed to be composed mostly of water ice. Infrared spectra also show a surface composed mainly of water frost. The reflectivity of Rhea's surface is comparatively high, but large regional variations are apparent. Like most of the other satellites of Saturn, Rhea is locked in a rotational commensurability, keeping the same hemisphere toward the planet. Like that of Dione, another Saturn satellite, the hemisphere that points in the direction of orbital motion is bright and heavily cratered, whereas the trailing hemisphere is darker with bright wispy streaks, a paucity of craters, and indications of resurfacing.

In spite of the fact that Rhea's surface is icy rather than rocky, the cratered side of the satellite strongly resembles the extensively cratered highlands of Mercury or of the Moon. Its surface is the most heavily cratered in the Saturn system. Ice apparently has mechanical properties similar to rock under the very low equilibrium temperatures at Saturn's orbit (about 90 K). The bright, linear, polygonal streaks observed on the trailing hemisphere of Rhea may be the result of major resurfacing and the escape of volatiles such as water or methane gas through fissures. Bright patches in craters may also be attributed to the transport of volatiles.

rhea, either of two species of giant South American flightless, ostrichlike birds in the family Rheidae, order Rheiformes. Considerably smaller than the ostrich, about 120 centimetres (4 feet) tall, rheas are further distinguished by having three toes (the ostrich has two), lacking fine plumes, and being generally brownish. Up to 50 eggs—about 13 cm (5 in.) long—are laid in a shallow, grass-lined nest in the ground. The male incubates the eggs. Chicks hatch in about 6 weeks and are herded about by the male for another 6 weeks. Rheas frequently associate with deer or guanacos, forming mixed herds like those of ostriches, zebras, and antelopes.



Common rhea (*Rhea americana*)

Toni Angermayer—Photo Researchers

Rheden, *gemeente* (commune), Gelderland *provincie* ("province"), east-central Netherlands. It lies between the IJssel River and the Veluwe hills, along the road from Arnhem to Zutphen. Rheden encompasses the villages of Velp, Rheden, De Steeg, Elleckom, Dieren, Spankeren, and Laag Soeren. In the locality are several medieval churches, the 16th-century castles of Biljoen (Velp) and Middachten (De Steeg), and the 12th-century Gelderse Tower. The villages are primarily residential with some light manufacturing. Tourism is important; much of the municipality is in the Veluwezoom National Park. Pop. (1987 est.) 46,762.

Rhee, Syngman (b. March 26, 1875, Whanghae, Korea—d. July 19, 1965, Honolulu, Hawaii, U.S.), first president of the Republic of Korea (South Korea).

Rhee completed a traditional classical Confucian education and then entered a Methodist school, where he learned English. He became an ardent nationalist and ultimately a Christian and in 1896 joined with other Korean leaders to form the Independence Club, a group dedicated to asserting Korean independence. When right-wing elements destroyed the club in 1898, Rhee was arrested and imprisoned until 1904. On his release he went to the United States, where in 1910 he received a Ph.D. from Princeton, becoming the first Korean to earn a Ph.D. from an American university. He returned home in 1910, the year in which Korea was annexed by Japan. Rhee found it impossible to hide his hostility toward Japanese rule, and after working briefly in a YMCA and as a high school principal he returned to the United States in 1912.

He spent the next 30 years as a spokesman for Korean independence, trying in vain to win international support for his cause. In 1919 he was elected president of the Korean Provisional Government in exile. He held that post for 20 years and then was pushed out of the leadership by younger Korean nationalists centred in China. Rhee, however, remained in Washington, D.C., and spent the war years trying to secure Allied promises of Korean independence. Since Rhee was the only Korean leader well known to Americans, he was returned to Korea ahead of the other members of the Provisional Government after the war. He campaigned for a policy of immediate independence and unification of the country. He soon built up a mass political organization supported by strong-arm squads and a following among the police. With the assassination of the major moderate leaders, Rhee's new party won the elections in South Korea, and he became president of the Republic of Korea in 1948, a post to which he was reelected in 1952, 1956, and 1960.

As president, Rhee assumed dictatorial powers, tolerating little domestic opposition to his program. Rhee purged the National Assembly and outlawed the opposition Progressive Party, whose leader was executed for treason. He controlled the appointment of mayors, village headmen, and chiefs of police. He even defied the United Nations (UN) during the Korean War. Hoping that UN forces would continue to fight, eventually uniting North and South Korea under one government, Rhee hindered the truce talks by ordering the release of the North Korean anti-Communist prisoners he held. (Under the agreed-upon truce settlement these men were to have gone back to North Korea.) Stunned, the Communists broke off the negotiations and renewed their attack, largely ignoring the UN forces and concentrating their fire on Rhee's South Korean troops. Having made their point, the Communists then resumed negotiations, and a truce settlement was speedily signed.

In spite of his authoritarian policies, Rhee failed to prevent the election of an opposition vice president in 1956. Government claims that the March 1960 elections gave Rhee more than 90 percent of the popular vote (55 percent in 1956) provoked student-led demonstrations resulting in heavy casualties and demands for his resignation. These demands were supported by the unanimous vote of the National Assembly. Hence, Rhee resigned on April 27, 1960, and went into exile in Hawaii.

Rheims (France): *see* Reims.

Rheims-Douay Bible: *see* Douai-Reims Bible.

Rheinberger, Joseph (Gabriel) (b. March 17, 1839, Vaduz, Liechtenstein—d. Nov. 25, 1901, Munich, Ger.), German composer and teacher whose organ sonatas are among the finest 19th-century works for that instrument.

Rheinberger studied organ at Vaduz and became organist at the parish church when he was only seven years old. He later studied at Feldkirch and Munich and in 1867 became professor of organ and composition at the Munich Conservatory. Among his pupils were Engelbert Humperdinck, Ermanno Wolf-Ferrari, Wilhelm Furtwängler, and the American composers George W. Chadwick and Horatio Parker. Besides 20 organ sonatas, he wrote four operas and much church and chamber music. He received a title of nobility in 1894.

Rheine, city, Nordrhein-Westfalen *Land* (state), northwestern Germany, on the Ems River. First mentioned in 838 and chartered in 1327, it suffered in the Thirty Years' War and was severely damaged in World War II, but it has been rebuilt. It lies in a picturesque hilly setting and is the site of the Gottesgabe Bath, a small but popular saline spa. St. Dionysius' Church (1484; restored 1957), Bentlage Castle (1437), the Falkenhof (with museum), and the main square with its Rococo houses are of interest. A rail junction with a secondary airport, the city has an important textile industry and manufactures machinery. Pop. (1989 est.) 69,324.

Rheinfall (Switzerland): *see* Rhine Falls.

Rheinhausen, former town, Nordrhein-Westfalen *Land* (state), northwestern Germany, on the left bank of the Rhine. In 1975 it became part of the city of Duisburg. The town was developed to house workers at a large iron and steel plant, established by Friedrich A. Krupp in 1898. Formed in 1928 by the amalgamation of Friemersheim and Hochemmerich, Rheinhausen was chartered in 1934. Neither the town nor the plant suffered serious damage in World War II, and the steel works, still in the possession of the Krupp family, have been fully restored. There are docks to handle imported iron ore, fuel, and limestone. Other industries include brewing and distilling, and the manufacture of mining and chemical equipment, cement goods, and textiles.

Rheinhessen-Pfalz, English RHINEHESSE PALATINATE, *Regierungsbezirk* (administrative district), southeastern Rheinland-Pfalz *Land* (state), southwestern Germany. Rheinhessen-Pfalz is bordered by France to the south, Saarland *Land* to the west, Koblenz *Regierungsbezirk* to the northwest, and the *Länder* of Hessen (Hesse) and Baden-Württemberg to the east. The district occupies an area of 2,637 square miles (6,829 square km) and is coextensive with two historic regions bordering the Rhine River, Palatinate and southern Hesse (*qq.v.*), from which its name is derived. The contemporary *Regierungsbezirk* was created by an administrative reform in 1969 merging the former districts of Rheinhessen and Pfalz.

The Rhine River forms the district's northern and eastern borders with Hessen and Baden-Württemberg. The river flows from south to north across the Upper Rhine Plain, a depression 20 to 25 miles (32 to 40 km) wide that is overlain in fertile alluvial and loess soils and favoured by a warm, dry climate. The plain is a rich agricultural region supporting many specialty crops including tobacco, sugar beets, hops, and vegetables, most notably asparagus. The plain is also an important transportation and industrial corridor. The Rhein-Hesse Plateau forms the northern termination of the Upper Rhine Plain. Its rich loess soils are almost completely devoted to open arable fields planted mainly in sugar beets, and its valley slopes are dominated by vineyards. The Pfälzer Forest, one of Germany's largest continuous woodlands, lies in south-central Rheinhessen-Pfalz atop a sandstone plateau. Protected as a nature preserve, the plateau is almost completely forested by pine with some beech. Its highest points, found along the uptilted eastern edge known as the Haardt, rise to about 2,000 feet (600 m). Picturesque castles are situated on the steep eastern slope of the Haardt overlooking the Rhine valley and approximately 80 square miles (200 square km) of vineyards lining the foot of the escarpment. The famous Deutsche Weinstrasse ("German Wine Highway") tours the small towns of Germany's leading wine-producing area, which maintains more than 150 million vines. An east-west depression separates the Pfälzer Forest from the Nordpfälzer Mountains, which are an eastern continuation of the Saar-Nahe Mountains paralleling the district's northeastern border.

Population densities in the district range from fewer than 50 persons per square mile (20 per square km) in the Pfälzer Forest region to densities averaging more than 500 persons per square mile (200 per square km) along the course of the Rhine. Mainz, situated on the west bank of the Rhine opposite the mouth of the Main River, is the capital and largest city of Rheinland-Pfalz *Land* and the administrative seat of the district. The city is an important transportation junction, a leading manufacturer of chemical products, and the centre of the Rhine wine trade. Other principal cities in the Rhine valley include Ludwigshafen, noted for its large chemical industries, and Worms, famous for its Romanesque cathedral. Kaiserslautern, often referred to as "Frederick Redbeard's city," for the emperor Frederick I Barbarossa, is the cultural and economic centre of the Pfälzer Forest region, and Pirmasens is Germany's leading manufacturer of boots and shoes.

The majority of the population of Rheinhessen-Pfalz are of Frankish descent and speak the Rhenish Franconian dialect. Roman Catholics and Protestants are about equally represented in the district. The rural settlement pattern in the agricultural regions of the Upper Rhine Plain and the Rhein-Hesse Plateau is one of old, irregularly structured villages, while small villages and hamlets are predominant in the Pfälzer highlands. The district's leading university is Johannes Gutenberg University, located in Mainz. Pop. (1989 est.) 1,823,808.

Rheinland: *see* Rhineland.

Rheinland-Pfalz, English RHINELAND-PALATINATE, ninth largest *Land* (state) of Germany, situated in the southwestern portion of the country and bordered by France, Luxembourg, and Belgium (south and west) and by the *Länder* (states) of Nordrhein-Westfalen (north), Hessen and Baden-Württemberg (east), and Saarland (southwest). It has had a long history of division and possession by foreign powers. The modern state was created only after World War II and is therefore still reworking its economy. Industry has overtaken agriculture as the primary wage earner, and trade links with the rest of Germany have

been forged and strengthened. It covers 7,663 sq mi (19,848 sq km), an area about the size of Israel. Its capital is Mainz, one of the oldest German cities.

History. The oldest archaeological remains of the region are tools from the Stone Age that are at least 100,000, and may be as much as 300,000, years old. During the Neolithic Period between 3000 and 1800 BC, large areas along the Rhine were settled by Celtic and Germanic peoples. Incorporated into the Roman Empire in the 1st century BC, the Rhineland formed the northeastern border region of the Gallic Provinces for about 500 years. The cities of Moguntiacum (Mainz), Augusta Treverorum (Trier), and Colonia Agrippinensis (Cologne) were founded during the Roman period. From the 5th to the 9th century AD, the Rhineland belonged to the Frankish kingdom of the Merovingians and later the Carolingians. In 843 the kingdom was divided in half, and the Rhineland became the western border region of the East Frankish, or German, kingdom. During this period, the region was fractured into a large number of small independent states with temporal and religious governments. The most powerful of these states were the archdioceses of Trier, Cologne, and Mainz and the Rhenish Palatinate, which was ruled from the 13th century by the Bavarian Wittelsbach dynasty.

The Reformation of the 16th and 17th centuries saw further territorial division that originated in the conflicts of Protestantism, Catholicism, and Calvinism and led to the Thirty Years' War (1618–48). Foreign nations—particularly Bayern (Bavaria), Spain, Austria, Sweden, and France—determined the political development of the Rhineland. In the 17th and 18th centuries the Palatinate had close political and cultural ties with France. According to the Treaty of Campo Formio on Oct. 17, 1797, the lands to the west of the Rhine were incorporated into the French territories, the individual states were dissolved, and religious holdings were secularized. In 1815 the Rhineland became a part of the newly founded German Confederation, and the region was divided by the Congress of Vienna among Prussia, Bavaria, Hesse-Darmstadt, and Nassau. After World War II, the region was again divided by order of the U.S., French, and British military governments, and Rheinland-Pfalz was created.

The land. The northern portion of the state consists of woodlands and cultivated fields that are crossed by deeply eroded river valleys. Part of the Rhine Massif, its average elevation lies between 1,300 and 1,900 ft (400 and 600 m). The Rhine River crosses the region from the southeast to the northwest and receives the Moselle from the southwest and the Lahn from the northeast. The rivers effectively create four distinct regions—the Hunsrück, Eifel, Westerwald, and Taunus.

The southwestern region, bordered on the north by the Nahe River, is broken by the Saar-Nahe Mountains and the escarpments of the Pfälzer Wald, a national forest. Open cultivated areas of heavy clay and marl (loose clay containing calcium carbonate) soils alternate with large wooded areas of porphyry (dark-red, mineral-bearing rocks) and sandstone. In contrast, the southeast contains the treeless Rhein-Hesse Plateau and the Rhine River Valley. The plateau is composed of limestone that is covered by loess (a brownish mixture of clay, silt, and sand deposited by the wind), while the valley contains fertile alluvial soils.

At Mainz the average annual temperature is 50° F (10° C) and the average yearly rainfall is 20 in. (508 mm). Regional variations occur, however: the northwestern part of the Eifel has an average annual temperature of 42° F (6° C) and an average yearly rainfall of 31 in.

The settlement pattern is characterized by very old, irregularly structured villages with mostly consolidated fields in the regions of favourable soil and climate, and by villages and hamlets in the mountains. In the mid-20th century, the function of the rural settlements changed from that of purely agrarian communities to dormitory towns containing a large number of commuters. The most important cities are Mainz, Ludwigshafen, Koblenz, Trier, Kaiserslautern, Worms, Pirmasens, and Neustadt an der Weinstrasse.

The people. Although the majority of the population is of Frankish descent, the turbulent history of the Rhineland has produced a complex social structure that has also been influenced by Romanic (*i.e.,* French and Italian) origins. The latest influence has been that of several hundred thousand refugees who have migrated from middle and eastern Germany since 1945. The majority of the people are Roman Catholic and the remainder are Protestant. The immigrants are primarily foreign workers from Italy, France, Turkey, Spain, Yugoslavia, and Greece who enter Rheinland-Pfalz through the surrounding German states. The average population density is considerably lower than that for the entire nation; the greatest is in the large river valleys where the main cities are located, while the sparsely populated highlands support the smallest population density. There is a constant emigration from the rural areas to the urban regions, but this rural exodus is on a much smaller scale than in the rest of Germany.

The economy. For much of the postwar period Rheinland-Pfalz was one of the poorest West German states. In the late 20th century, however, the rate of economic growth was higher than that of the rest of the country. The total gross domestic product (GDP) of the state is derived from several sources. Manufacturing is the largest source, followed by services, commerce, transportation, and agriculture.

In the late 20th century less than one-fifteenth of the employed population was engaged in agriculture. The number of farm workers and of small farms was constantly decreasing, while the number of large farms was growing steadily. In the most fertile agricultural regions of the Neuwied Basin, Bitburg, Rheinhessen, and the eastern Palatinate, potatoes, cereals, and sugar beets are the primary crops. In the less fertile highlands, however, stock farming is more important. The state is known for the many specialized crops of the river valleys. Besides the growing of fruit and tobacco, viticulture occupies a predominant place in the agriculture of the state, and the famous vineyards along the Rhine, Moselle, and Nahe rivers produce most of Germany's wines.

The pumice quarries of the Neuwied Basin represent the state's only important natural resource. The largest activities are the chemical industry in Ludwigshafen, Ingelheim am Rhein, and Mainz and the engineering industry in Bad Kreuznach, Frankenthal, and Kaiserslautern. The largest proportion of the nation's shoes are produced in Pirmasens, and most of Germany's trade in precious stones is carried on in the town of Idar-Oberstein. An important tourist industry has developed in the middle Rhine area.

Late in the 20th century about a third of the GDP derived from commerce and services, and a similar proportion of the employed population was thus engaged. The centres of industry and administration are also the most important places for such activities.

The most important transportation routes are the navigable waterways of the Rhine and the Moselle. The main railways follow the Rhine Valley, and the primary highways also run from north to south. Roads from Ludwigshafen to Saarbrücken, from Koblenz to Trier, and the Hunsrück Highway all join the primary routes.

Administrative and social conditions. The state is divided into the three *Regierungsbezirke* (administrative districts) of Koblenz, Trier, and Rheinhessen-Pfalz. The legislative body, the Landtag, is composed of 100 deputies elected by the people every four years. The Landtag appoints a prime minister, who in turn appoints seven ministers. Under the state's judicial system, civil and criminal cases are tried by the provincial court of appeal and the county courts. There are also special courts for social, financial, and administrative problems, while the constitutional court deals with the legality of laws and administrative measures. Education is also subject to the sovereignty of the state. All children from six years of age are obliged to attend grammar school for four years. The student may then choose to attend five more years of *Hauptschule,* or common school; six years of *Realschule,* which qualifies him to enter technical schools; or nine years of *Gymnasium,* where a classical and scientific education are offered. Only from this last school is entrance to the University possible. There are universities at Mainz (Johannes Gutenberg-Universität; founded 1477, closed 1816, reopened 1946), Trier (Universität Trier; founded 1970), and Kaiserslautern (Universität Kaiserslautern; founded 1970). Teachers for the primary schools are educated in the departments of special education universities. There are several technical schools, a university for the science of administration at Speyer (Hochschule für Verwaltungswissenschaften), and academies for arts and sports that are a part of the university in Mainz. There are several hundred public and private hospitals in the state.

Cultural life. The state's rich cultural tradition is reflected in the cathedrals at Speyer, Worms, and Mainz. The many museums include the Historische Museum der Pfalz ("Historical Museum of the Palatinate") in Speyer, the Rheinisches Landesmuseum ("State Museum of the Rhine") in Trier, and the Römisch-Germanisches Zentralmuseum ("Roman-Germanic Central Museum") and the World Museum of the Art of Printing (Gutenberg-Museum) in Mainz. National traditional festivals take place annually, highlighted by the pre-Lenten carnival in Mainz. There are theatres in Mainz, Trier, Koblenz, and Kaiserslautern. The academy of sciences and the Rheinisch-Naturforschende Gesellschaft ("Natural Research Society of the Rhine") promote scientific research. The large cities contain printing offices for numerous daily papers. Mainz is the seat of a studio of the Southwestern German Broadcasting and the Second German Television networks. Pop. (1989 est.) 3,653,155.

Rhenanus, Beatus: *see* Beatus Rhenanus.

Rhenish Slate Mountains (Germany): *see* Middle Rhine Highlands.

rhenium (Re), chemical element, very rare metal of Group VIIb of the periodic table, one of the densest elements. Predicted by the Russian chemist Dmitry Ivanovich Mendeleyev (1869) as chemically related to manganese, rhenium was discovered (1925) by the German chemists Ida and Walter Noddack and Otto Carl Berg. The metal and its alloys have found limited application as fountain pen points, high-temperature thermocouples (with platinum), catalysts, electrical contact points, instrument-bearing points, and in electrical components.

Rhenium is widely distributed in a variety of minerals but usually in concentrations averaging about 0.001 parts per million. It occurs up to about 20 parts per million in molybdenite and to a lesser extent in sulfidic copper ores. The recovery of rhenium is aided by the concentration of its volatile heptoxide (Re_2O_7) in the flue dust during the

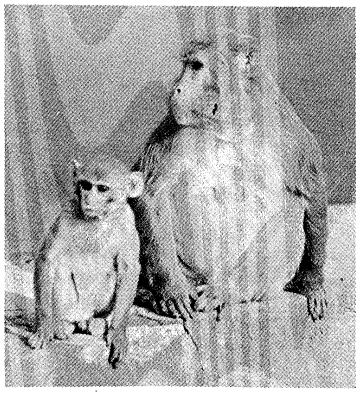
smelting of molybdenite ore or from its concentration with the platinum metals in the anode sludge during electrolytic copper refining. The black metal powder is prepared by the hydrogen reduction of ammonium perrhenate (NH_4ReO_4). The powder may be compressed and sintered into bars in hydrogen at elevated temperatures. Cold-working and annealing permit the fabrication of wire or foil.

Silvery-white, rhenium metal is extremely hard; it resists wear and corrosion very well and has one of the highest melting points of the elements. The metal powder slowly oxidizes in air above 150° C (300° F) and rapidly at higher temperatures to form the yellow tetroxide. The metal is not soluble in hydrochloric acid and dissolves only slowly in other acids. There is evidence for the existence of rhenium in each of the oxidation states from 0 to +7; the commonest states are +3, +4, +5, and especially +7. Perrhenic acid ($HReO_4$) and its anhydride, the heptoxide, and the perrhenates are common stable rhenium(VII) compounds. Natural rhenium is a mixture of the stable isotope rhenium-185 (37.07 percent) and the radioactive rhenium-187 (62.93 percent, 7×10^{10}-year half-life).

atomic number	75
atomic weight	186.2
melting point	3,180° C (5,756° F)
boiling point	5,627° C (10,161° F)
specific gravity	20.5 (20° C)
valence	1, 2, 3, 4, 5, 6, 7
electronic config.	2-8-18-32-13-2 or $(Xe)4f^{14}5d^{5}6s^{2}$

rheostat, adjustable resistor used in applications that require the adjustment of current or the varying of resistance in an electric circuit. The rheostat can adjust generator characteristics, dim lights, and start or control the speed of motors. Its resistance element can be a metal wire or ribbon, carbon, or a conducting liquid, depending on the application. For average currents, the metallic type is most common; for very small currents, the carbon type is used; and for large currents the electrolytic type, in which electrodes are placed in a conducting fluid, is most suitable. A special type of rheostat is the potentiometer, an instrument that measures an unknown voltage or potential difference by balancing it, wholly or in part, by a known potential difference. A more common potentiometer is simply a resistor with two fixed terminals and a third terminal connected to a variable contact arm; it is used for such purposes as a volume control in audio equipment.

rhesus monkey (*Macaca mulatta*), sand-coloured macaque native to forests of Southeastern Asia. The rhesus monkey, held sacred in some parts of India, is about 47–64 centimetres (17–25 inches) long, excluding the furry, 20–30 cm tail, and it weighs about 4.5–11 kilograms (10–14 pounds). Hardy in captivity, the rhesus monkey is a highly intelligent, lively animal that makes a good pet when young but that may become bad tempered as an adult. It is also an important experimental animal. The Rh (from rhesus) factor in human blood involves reaction with the blood of this monkey; a rhesus was the first monkey to be rocketed into the stratosphere.



Rhesus monkeys (*Macaca mulatta*)
Ylla—Rapho/Photo Researchers

Where the same name may denote a person, place, or thing, the articles will be found in that order

Rheticus, Georg Joachim, Rheticus also spelled RHÄTICUS or RHETIKUS, original name GEORG JOACHIM DE PORRIS, or VON LAUCHEN (b. Feb. 16, 1514, Feldkirch, Austria—d. Dec. 5, 1576, Kassa, Hung.), Austrian-born astronomer and mathematician who was among the first to adopt and spread the heliocentric theory of Copernicus.

In 1536 Rheticus was appointed to a chair of mathematics and astronomy at the University of Wittenberg. Intrigued by the news of the Copernican theory that the Earth revolves around the Sun, he went to Frombork, Pol., in 1539, where he studied for two years with Copernicus. Rheticus published the first account of the new views in his *De libris revolutionum . . . Nic. Copernici . . . narratio prima . . .* (1540; "The First Account of the Book on the Revolutions by Nicolaus Copernicus"). He persuaded Copernicus to complete his great work and took it to Nürnberg for publication, though in 1542, before it was actually printed, he moved to Leipzig to take up a new appointment.

From his stay at Wittenberg until his death, Rheticus also worked on his great treatise, which was completed and published after his death by his pupil Valentin Otto as *Opus Palatinum de triangulis* (1596; "The Palatine Work on Triangles"). The treatise contains tables of values for the trigonometric functions (of an arc or angle) computed in intervals of 10 seconds of arc and calculated to 10 decimal places.

Rhétiques, Alpes (Europe): *see* Rhaetian Alps.

rhetoric, the principles of training communicators, whether speakers, writers, auditors, or readers. In its original form, rhetoric was the systematic study of oratory and applied to the training of orators for debate and other forms of public speaking in classical Greece and Rome. It was, in Aristotle's words, the art of persuasion. Attempts were made to carry rhetoric over to written language in the centuries after Rome's decline and the disappearance of public forums. It continued to decline in influence as a tool of knowledge, especially after the 16th century, but became entrenched in many school systems, where vestiges of classical rhetoric still remain.

A brief treatment of rhetoric follows. For full treatment, *see* MACROPAEDIA: Rhetoric.

Classical rhetoric was a dual matter of practical application and philosophy. Most historians of rhetoric attribute its invention to the development of democracy in Syracuse in the 460s BC, when dispossessed landowners were given a chance under the new egalitarian government to argue their claims before a group of fellow citizens. So important was the ability to speak well and persuasively that shrewd speakers sought help from teachers of oratory, called rhetors, who in turn developed theories for successful speechmaking, or rhetoric.

The use of language in this way was of interest to philosophers as well because the oratorical arguments called into question the relationships among language, truth, and morality. Plato and Aristotle wrote important works touching on the nature of language and its effects, and both shared a similar theory of knowledge in which truth was something preconceived. It was accepted from conventional wisdom, passed from generation to generation, without question, and the role of language was primarily to present it. Language, then, was basically decoration for fixed ideas, and rhetoric was the method of arranging these ideas in appealing ways and elaborating on them. Plato preferred that philosophers manage rhetoric because he felt that they could better use truth to improve humanity. Aristotle, however, felt that rhetoric was a skill that any educated person could use, and he wrote works that were basically educational in spirit.

The uses of rhetoric, according to Aristotle, were divided into three areas. Deliberative speeches were made to advise political assemblies; forensic speeches were made in law courts; and epideictic speeches were made during ceremonies to praise and sometimes to blame others for current situations. In each of these areas there was a suasive element, an attempt to persuade listeners of something or to produce an intended effect. Related fields of discourse using language were logic and dialectic, which belonged more to philosophy than to rhetoric.

Rome adopted most of this theory for similar purposes. It had a legislative and judicial system in which oratory was equally important, and the educated class was trained in rhetoric to produce effective legislators and statesmen. The two most prominent rhetoricians of the empire were Cicero, of the 1st century BC, and Quintillian, of a century later. By elaborating Greek practices, Roman rhetoric developed a process of speech composition broken into five categories: first came invention, the choice of ideas suited to the purpose, and then disposition, their arrangement; style was essentially the felicitous phrasing in language, which was then memorized and finally delivered.

This compartmentalizing of process gave rhetoric a mechanical quality that became more pronounced as the times changed. With the decline of Rome came the disappearance of public forums. Rhetoric was practiced by theologians, whose style of preaching somewhat resembled the Roman orators but whose speech content was firmly dictated by church doctrine. By the 16th century rhetoric was being applied to letter writing. Through the influence of French rhetorician Petrus Ramus, rhetoric was reduced to matters of style mainly and became a collection of tropes, or figures of speech, like metaphor, simile, and personification. At this point it gained a reputation for being flowery ornamentation without substance. Its use was relegated chiefly to grammar schools where it stayed for three centuries without changing substantially.

What has occurred in rhetoric recently is due to the changes in the theories of knowledge after the Renaissance. Beginning with René Descartes and John Locke through Friedrich Nietzsche to such contemporary philosophers as Thomas Kuhn, the relationship of language to reality has changed. The classical idea that language reflected some absolute truth or reality has given way to the idea that language largely determines what reality means to us.

Given these changes in epistemology, classical rhetoric provides a misleading model for those interested in language as communication or as transmitter of knowledge. Truth is no longer a fixed idea that language presents in appealing ways but an idea relative to the perspective that language provides. Progressive thinkers of the post-structuralist school, who see language as a cultural structure which preexists and conditions the individual, would have rhetoric examine not only language but other forms of discourse in culture related to language, such as motion pictures, television, advertising, financial markets, political parties, educational systems, and so forth, which are rhetorical by nature, that is, instituted

to persuade and to effect particular results. Other modern rhetoricians feel that all linguistic communication is argumentation, and they advocate the analysis and interpretation of such discourse based on an understanding of audience response and social situations.

rhétoriqueur, also called GRAND RHÉTORIQUEUR, any of the principal poets of the school that flourished in 15th- and early 16th-century France (particularly in Burgundy), whose poetry, based on historical and moral themes, employed allegory, dreams, symbols, and mythology for didactic effect.

Guillaume de Machaut, who popularized the new lyric genres such as the rondeau, ballade, lai, and virelai in the 14th century, is considered to have been the leader of the new *rhétorique*, or poetic art. This tradition was continued by Eustache Deschamps, Christine de Pisan, Charles d'Orléans, and François Villon, as well as by Jean Froissart, the historian, and the political orator Alain Chartier. In his role as chronicler, Froissart was followed by Georges Chastellain, Olivier de La Marche, and Jean Molinet, historiographers of the Burgundian court who became known as the *grands rhétoriqueurs.* Like Chartier they favoured a didactic, elegant, and Latinate style in prose and verse, and they brought the long didactic poem of Deschamps and Christine de Pisan to new prominence. Their short poems exhibited astonishing verbal ingenuity and acrobatics and were often dependent on the pun, riddle, or the acrostic for effects. Pretentious and erudite, they enhanced their poetry through mythological inventions and attempted to enrich the French language by multiplying compound words, derivatives, and scholarly diminutives.

Other *rhétoriqueurs* were Jean Bouchet, Jean Marot, Guillaume Crétin, and Pierre Gringore. Crétin composed patriotic poems on current events, as did Gringore, whose *sotie-moralité* (satirical play) entitled *Le Jeu du prince des sots* supported the policy of Louis XII through a forceful attack on Pope Julius II. Although Gringore also attacked Julius in his poem *La Chasse du cerf des cerfs,* he condemned the enemies of religious orthodoxy as well in his *Blazon des hérétiques.*

The last and one of the best *rhétoriqueurs* was Jean Lemaire de Belges, whose works reveal the influence of Dante and Petrarch. Inspired by his travels through Italy, he attempted new metres, such as the terza rima, and expressed some of his views in the *Concorde des deux langages,* an allegory encouraging a spiritual harmony between French and Italian.

rheumatic fever, a generalized disease resulting from infection with the group A hemolytic streptococcus and characterized by fever and inflammation of the joints and heart. It occurs chiefly in children and young adults, with a peak incidence between ages 5 and 15. The exact cause of rheumatic fever is not clear; the condition is generally thought to result from the reaction of the body, possibly an allergy, to one or more products of the hemolytic streptococcus, rather than to the direct action of the infective organism. Approximately two to three percent of individuals with recognized streptococcal infection will subsequently develop rheumatic fever.

The onset of the disease is most often characterized by the sudden occurrence of fever and joint pain and inflammation several days to six weeks after a streptococcal infection, usually of the throat. Signs of cardiac involvement include heart murmurs, increased heartbeat rate, heart enlargement; inflammation of the heart muscle and supporting structures may lead to a permanent scarring and contracture of the heart valves and a marked decrease in life expectancy. Other symptoms of rheumatic fever include nodules beneath the skin and skin rashes, the most typical of which is erythema marginatum; chorea, a nervous system manifestation marked by purposeless, involuntary movements of the arms and legs; abdominal pain, nosebleeds, weakness, and loss of appetite and body weight. Generally the clinical symptoms, severity, and aftereffects of an attack of rheumatic fever are highly variable, ranging from a condition so mild as to go unnoticed to a severe acute attack associated with cardiac failure and death. During the course of rheumatic fever, the streptococcal organism may no longer be demonstrable in culture of the throat or other infected body areas, but blood titers of antibodies against the streptococcus, such as streptolysin O, are high. All of the numerous types of group A hemolytic streptococcus appear capable of inducing rheumatic fever in susceptible individuals; infection with one type confers no immunity against the others, and individuals who have experienced one attack of rheumatic fever are especially prone to subsequent attacks. Both the initial and recurrent attacks can be effectively prevented with penicillin. Symptomatic treatment of the condition includes the use of salicylates or one of the steroid hormones. Surgery may be advocated to relieve the narrowing of the openings of the heart valves.

Since the mid-20th century, the incidence and severity of rheumatic fever have declined in the United States and Great Britain, as is true also for other streptococcal infections, such as scarlet fever. This decline has occurred independently of the use of penicillin and other drugs and may simply signal the gradual dying out of the disease. In many other parts of the world, however, rheumatic fever remains a serious disease.

rheumatism, any of several disorders that have in common inflammation of the connective tissues, especially the muscles, joints, and associated structures. The most common symptoms are pain and stiffness. Specific diseases that are alternatively called rheumatism include rheumatoid arthritis (*q.v.*); rheumatic fever (*q.v.*); septic arthritis (*q.v.*) that accompanies such diseases as gonorrhea, tuberculosis, or mycotic diseases (caused by fungus); and osteoarthritis (*q.v.*).

rheumatoid arthritis, disease in which inflammatory changes occur throughout the connective tissues of the body. Most characteristically the process attacks joints of the hands and feet. Inflammation and thickening of the synovial membranes (the sacs that hold the fluid that lubricates the joints) cause irreversible damage to the joint capsule and the articular (joint) cartilage as these structures are replaced by scar tissue. Rheumatoid arthritis is three times as common in women as in men, and its onset is largely during young adulthood. Most persons with rheumatoid arthritis have a characteristic autoantibody in their blood, one of the pieces of evidence that suggest that an autoimmune mechanism plays a role in the causation of the disease. (An autoimmune reaction is a reaction against the body's own tissues.) This autoantibody is called the rheumatoid factor. What causes the autoimmune reaction is unknown, but there is evidence that persons afflicted with the disease have a genetic susceptibility to an environmental factor, such as a virus, that may trigger the reaction. Once activated, the rheumatoid factor recognizes another type of antibody as foreign and binds to it. This chemical binding activates the complement system, a series of blood proteins, which then causes the inflammation.

The active inflammation is first seen in the synovial membranes of the joints, which become red and swollen. Later, a layer of roughened scar tissue protrudes over the surface of the cartilage. Under this scar tissue the cartilage is eroded and destroyed. The joints become fixed (ankylosed) by bands of adhesion, which also may cause displacement and deformity of the joints. The skin, bones, and muscles adjacent to the joints atrophy from disuse and destruction. Painful nodules over bony prominences are fairly common manifestations that may persist or regress. Collections of white cells, mostly lymphocytes, in the connective tissue of muscle and nerve bundles cause pressure and pain. The nodular lesions may invade the connective tissue of the blood-vessel walls.

A gradual onset seems to be most characteristic of rheumatoid arthritis. Pain and stiffness in one or more joints are usually followed by swelling and heat and are accompanied by muscle pain that may become worse, persist for weeks or months, or subside. Joint pain is not always proportionate to the amount of swelling and warmth generated. Fatigue, muscle weakness, and weight loss are common symptoms. Often, before prominent signs appear, the affected person may complain of coldness of hands and feet, numbness, and tingling, all of which suggest compression of the vasomotor nerve.

Physical therapy is helpful in relieving pain and swelling in the affected joints, with the emphasis on heat followed by exercises that extend the range of motion. Rest in the acute phase is important in association with maintaining a good posture to prevent deformity. Drugs are given to relieve pain or control inflammation, or both. Orthopedic appliances are frequently used to correct or prevent gross deformity and malfunction. For rheumatoid arthritis in children, *see* Still's disease.

Rhiannon, in Celtic religion, the Welsh manifestation of the Gaulish horse goddess Epona and the Irish goddess Macha. She is best-known from *The Mabinogion,* a collection of medieval Welsh tales, in which she makes her first appearance on a pale, mysterious steed and meets King Pwyll, whom she marries. Later she was unjustly accused of killing her infant son, and in punishment she was forced to act as a horse and to carry visitors to the royal court. According to another story, she was made to wear the collars of asses about her neck in the manner of a beast.

Rhianus (b. *c.* 275 BC), Greek poet and scholar from Crete and a slave. His only surviving works are 10 or 11 epigrams of some merit preserved in the Greek Anthology. He was best-known as an epic poet, producing five epics, though the contents of only one, the *Messeniaca,* dealing with a 7th-century war between Messene and Sparta, are known. He paid little heed to those contemporary writers such as Callimachus and Theocritus who were calling for a smaller scale in epic poetry.

Rhind papyrus, ancient Egyptian scroll bearing mathematical tables and problems. This extensive document from ancient Egypt has been the source of much information about Egyptian mathematics. The papyrus was bought in 1858 in a Nile resort town by a Scottish antiquary, Alexander Henry Rhind, hence its name; less frequently, it is called the Ahmes papyrus in honour of the scribe who copied it *c.* 1650 BC.

Rhine, Confederation of the, French CONFÉDÉRATION DU RHIN, German RHEINBUND, union (1806–13) of all the states of Germany, except Austria and Prussia, under the aegis of Napoleon I, which enabled the French to unify and dominate the country until Napoleon's downfall. The formation of the confederation was preceded by French encroachment in Germany beginning in 1792: all territory west of the Rhine was annexed outright, and the first steps toward consolidation were taken by compensating the larger German states (in particular, Prussia, Bavaria, Württemberg, Baden, Hanover, and Oldenburg) for losses

there by awarding them territories of secondary German states. In 1803 the number of states was drastically reduced, and in July 1806 Napoleon united the expanded kingdoms of Bavaria and Württemberg and the enlarged states of Baden, Hesse-Darmstadt, Nassau, and Berg, as well as some smaller states, as the Confederation of the Rhine. Saxony joined the confederation in 1807 as a kingdom. In the Treaty of Tilsit (1807), Prussia ceded territory west of the Elbe River to the confederation. The Confederation of the Rhine was abolished after Napoleon's fall from power in 1813. Napoleon was chiefly interested in the confederation as a counterweight to the two principal German states, Austria and Prussia, but the consolidation that it brought broke down old barriers and later contributed to the movement for German unification.

Rhine Falls, German RHEINFALL, the most spectacular waterfall in central Europe, on the upper Rhine River just below Schaffhausen in northern Switzerland. The total fall of the cataract, including the rapids, is about 100 feet (30 m), the width 492 feet (150 m). There are two main falls divided by a pillarlike rock formation, that on the right bank dropping about 50 feet (15 m); on the left, 65 feet (20 m).

Rhine-Main-Danube Canal (Germany): *see* Main-Danube Canal.

Rhine River, German RHEIN, French RHIN, Dutch RIJN, Celtic RENOS, Latin RHENUS, major river and waterway of western Europe that rises in two small headstreams in the Alps of east-central Switzerland and flows about 865 miles (1,390 km) to enter the North Sea at the southwestern coast of The Netherlands.

A brief treatment of the Rhine River follows. For full treatment, *see* MACROPAEDIA: Europe.

The upper Rhine forms much of Switzerland's border with Liechtenstein, Austria, and Germany, and generally flows north and then west. Bending northward again at Basel, it forms part of the border between France and Germany, then follows a generally northerly course through Germany, receiving from its right (east) bank the Neckar River at Mannheim and the Main River at Mainz, where it veers west and then flows northwesterly toward the North Sea. At Coblenz it receives the Mosel River from the left bank, passes through the picturesque Rhine gorges on to Bonn and Düsseldorf, and then is joined by the Ruhr River and enters The Netherlands near Arnhem. There the Rhine breaks up into several branches (notably the Lek and the Waal). With the completion of the huge Delta Project in 1986, these main branches were closed off, and the river's waters now reach the North Sea via sluices and channels. The New Waterway Canal at Rotterdam is the main navigational link between the Rhine and the North Sea.

The Rhine has been an international waterway since the Treaty of Vienna in 1815. In its lower and middle course the river is an integral artery of the richly interconnected inland waterway system of Germany, northeastern France, and the Low Countries. Its chief ports—including Basel, Strasbourg, Mannheim, Cologne, Duisburg, and Rotterdam—transship coal and petroleum products, metallic ores, and cereals in mainly West German and Dutch barges. The hydroelectric potential of its upper reaches has been heavily utilized in the Swiss Alps and along the Swiss borders with Germany and France.

In the late 20th century the Rhine was navigable overall for 540 miles (870 km) and was navigable to ships larger than 5,000 tons deadweight as far as Rheinfelden on the Swiss-German border. The river's catchment area, including the delta area, exceeds 85,000 square miles (220,000 square km). The Main-Danube Canal (*q.v.*), which will allow barge traffic between the North Sea and the Black Sea, was scheduled to be completed in 1992.

rhinegraves, wide breeches worn by men in the mid-17th century. The breeches were probably named for Karl Florentin, Rheingraf von Salm. Not unlike a divided skirt, they were sometimes referred to as "petticoat breeches." They were usually fastened above the knee and decorated with ribbons. In England, rhinegraves were fashionable from 1660 until 1666, when Charles II dropped the style.



Rhinegraves, *c.* 1665; in the Royal Scottish Museum, Edinburgh

By courtesy of the Royal Scottish Museum, Edinburgh; photograph, Tom Scott

Rhineland, German RHEINLAND, French RHÉNANIE, historically controversial area of western Europe lying along the Rhine River, east of the modern frontier between Germany on the one hand and France, Luxembourg, Belgium, and The Netherlands on the other. Apart from the strip from Karlsruhe southward to the Swiss frontier (west of which the Franco-German frontier is formed by the Rhine), the Rhineland extends from the northern borders of the French *départements* of Moselle and Bas-Rhin over the German *Länder* (states) of the Saarland and Rheinland-Pfalz (Rhineland-Palatinate) and into northwestern Baden-Württemberg, western Hessen, and southwestern Nordrhein-Westfalen (North Rhine-Westphalia).

Along the middle Rhine River, a hilly region between Mainz and the area of Bonn, is the wine-growing country that has for centuries supported small towns and villages, as well as lords of castles and many monasteries. Below Bonn, the character of the landscape changes and broadens into the great northern European plain that leads to the North Sea. The lower Rhine region is heavily industrial.

Known in ancient Roman times as a buffer zone between Gaul and the Germanic peoples to the east, the Rhineland was later included in the Frankish kingdom of Austrasia. Later, the Rhineland was divided among the duchies of Lorraine (or Upper Lorraine and Lower Lorraine), Saxony, Franconia, and Swabia; but, during the late European Middle Ages and early modern period, the Rhineland became the seat of numerous territorial principalities. These included: in the north, the electoral archbishopric of Cologne, with the secular territories of Kleve (Cleves), Berg, and Jülich; in the central area, the electoral archbishoprics of Trier and of Mainz and the bishoprics of Worms and of Speyer, with the electoral Palatinate and the countship of Nassau; and, in the south, the bishopric of Strasbourg (Strassburg), with the cities and various lordships of Alsace and the margraviate of Baden, with Breisgau.

Exploiting the troubles of the Reformation in Germany, France encroached on Lorraine in the 16th century; Brandenburg acquired Kleve and Mark in 1614, forming the nucleus of the future power of Prussia in the Rhineland; and the Thirty Years' War gave France a foothold in Alsace. Louis XIV's wars consolidated the French position on the Alsatian Rhine, but ducal Lorraine was not definitively incorporated in France until 1766. Napoleon moved France's frontier eastward to the Rhine River and, on the right (east) bank, created the Confederation of the Rhine.

After Napoleon's downfall, the Congress of Vienna (1814–15) limited France's frontier on the Rhine to the Alsatian zone again. North of Alsace a new Palatinate was constituted for Bavaria. Northwest of the Palatinate were some little exclaves of other German states; but north of these the whole left bank as far as Kleve, together with Jülich and Aachen in the west and Trier and Saarlouis in the south, became Prussian. This Prussian territory was united with Prussia's adjacent possessions on the Rhine's right bank to form the Rheinprovinz (Rhine Province) in 1824. Prussia annexed Nassau and Meisenheim after the Seven Weeks' War of 1866 and Alsace-Lorraine after the Franco-German War of 1870–71. The Rhineland became the most prosperous area of Germany, the Prussian north in particular being highly industrialized.

After World War I the Treaty of Versailles not only restored Alsace-Lorraine to France but also allowed Allied troops to occupy portions of the right and left banks of the German Rhineland for about 5 to 15 years. Moreover, the German left bank and a right-bank strip 30 miles (50 km) deep were to be permanently demilitarized. The Rhineland was the scene of recurrent crises and controversies during the 1920s. A "Rhineland Republic" was proclaimed by rebellious separatists in October 1923 but lasted less than two weeks. The Germanophobic French resisted American and British efforts toward conciliating Germany, and the last occupying troops did not leave the Rhineland until June 30, 1930.

The Franco-Soviet five-year treaty of mutual guarantee (May 2, 1935) was declared by Nazi Germany to be a violation of earlier international agreements. While the French Senate was still debating ratification of the treaty, Adolf Hitler on March 7, 1936, repudiated the Rhineland clauses of the Treaty of Versailles and the Locarno Pact and announced that German troops had entered the demilitarized zone of the Rhineland. Unaware that Hitler had instructed his troops to retreat if the French invaded, the French general staff refused to act unless partial mobilization was ordered, which the French Cabinet refused. Protracted international negotiations failed to undo the German remilitarization of the Rhineland, and the passive attitude of the Western powers foreshadowed their acquiescence to Hitler's annexation of Austria and to his demands on Czechoslovakia in 1938.

Rhineland-Palatinate (Germany): *see* Rheinland-Pfalz.

Rhinelander, city, seat (1885) of Oneida county, northern Wisconsin, U.S., at the confluence of the Wisconsin and Pelican rivers, 45 miles (72 km) north-northeast of Wausau. It is surrounded by a heavy concentration of lakes, and the Nicolet National Forest lies to the east. A focus of pioneer logging in the late 1850s, it was incorporated in 1894 and was named for F.W. Rhinelander, president of the Milwaukee, Lakeshore and Western Railroad. The city subsequently developed as

a trading centre for a busy year-round resort area. The Rhinelander Logging Museum in Pioneer Park includes a replica of a lumber camp and displays the "Five Spot," the last narrow-gauge locomotive (built 1879) to work Wisconsin's North Woods. The museum also houses a replica of "hodag," a grotesque animal once said to have inhabited the area but exposed as a photographic hoax. Aside from tourism, lumber, paper (glassine and wax paper), high-speed drills, potatoes, and cranberries are the main economic factors. Rhinelander is the seat of Nicolet College and Technical Institute (1967). Pop. (1980) 7,873.

rhinestone, colourless, faceted glass used in jewelry; also foil-backed or silvered cut glass used to imitate diamonds. Originally used to designate gemstones cut from rock crystal obtained from the Rhine River, Germany, the name historically has been applied to faceted rock crystal in general. *See also* paste.

rhinitis, generic term for inflammation of the mucous tissue of the nose. Rhinitis may be allergic in origin and is called hay fever (*q.v.*); acute rhinitis is a synonym for head cold. *See* common cold.

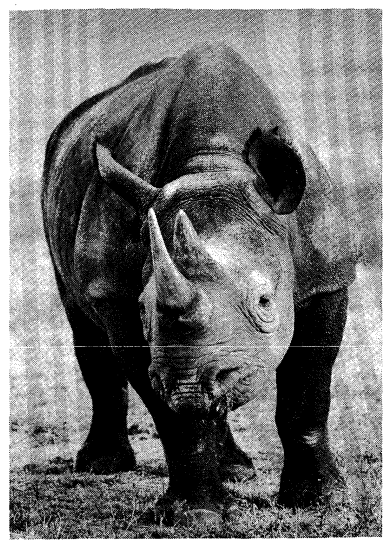
rhinoceros, plural RHINOCEROSES, RHINOCEROS, or RHINOCERI, any of five species of ponderous, hoofed mammals, family Rhinocerotidae (order Perissodactyla), found in eastern and southern Africa and in tropical Asia. The term rhinoceros is sometimes also applied to other, extinct members of the family Rhinocerotidae, a diverse group that includes several dozen fossil genera in addition to the recent ones.

Modern rhinoceroses are characterized by the possession of one (in the two species of the genus *Rhinoceros*) or two (in the other three genera) horns on the upper surface of the snout, composed not of true horn but of keratin, a fibrous protein found in hair. Modern rhinoceroses are large animals, ranging from 2.5 metres (8 feet) long and 1.5 m high at the shoulder, in the Sumatran rhinoceros (*Didermocerus,* or *Dicerorhinus, sumatrensis*), to about 4.3 m long and 2 m high in the great Indian rhinoceros (*R. unicornis*). Adults of larger species weigh three to five tons. Rhinoceroses are noted for their thick skin, which forms platelike folds, especially at the shoulders and thighs. All rhinos are gray or brown in colour, including the white, or square-lipped (*Ceratotherium simum*), which tends to be paler than the others. They are nearly or completely hairless, except for the tail tip and ear fringes, but some fossil species were covered with dense fur. The feet of the modern species have three short toes, tipped with broad, blunt nails.

Most rhinoceroses are solitary inhabitants of open grassland, savanna, scrub forest, or marsh, but the Sumatran rhino is now found only in deep forest. Interactions between individuals usually are avoided, but the square-lipped rhino lives in groups of up to 10 animals. In solitary species the home territory is crisscrossed with well-worn trails and often marked at the borders with urine and piles of dung.

Rhinoceroses have poor eyesight but acute senses of hearing and smell. Most prefer to avoid man, but males, particularly bad-tempered during the breeding season, and females with calves may charge with little provocation. The African black rhino (*Diceros bicornis*) is normally ill-tempered and unpredictable and may charge any unfamiliar sound or smell. Despite their bulk, rhinoceroses are remarkably agile; the black rhino may attain a speed of about 45 kilometres (30 miles) per hour, even in thick brush, and can wheel rapidly after missing a charge.

All but the black rhinoceros are listed as endangered in the *Red Data Book*, a compilation published by the International Union

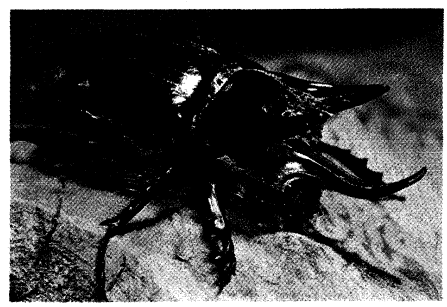


African black rhino (*Diceros bicornis*)
Camera Press—Pictorial Parade/EB Inc.

for the Conservation of Nature and Natural Resources. Despite protective laws, poaching continues, spurred by a large Oriental market for rhinoceros horn (valued as an aphrodisiac) and blood. Captive-breeding programs offer the only hope for maintaining some species until adequate protection can be provided in the wild.

rhinoceros beetle, any member of the *Dynastes* and *Oryctes* genuses of the insect subfamily Dynastinae, a subfamily of the beetle family Scarabaeidae (order Coleoptera). They are closely related to the unicorn and elephant beetles. Horn-like structures on the thorax (region behind the head) and on the head of the male (usually lacking in the females) make it conspicuous. Both males and females of the rhinoceros beetle *Oryctes* have horns.

The genus *Dynastes* includes many well-known, tropical species of the Western Hemisphere. The hercules beetle (*D. hercules*) and *D. neptunus* have a large smooth hornlike structure on the thorax that curves forward and another on the head; the two resemble an enormous pair of pincers. *Dynastes neptunus*



Rhinoceros beetle (*Oryctes*)
Stephen Dalton—EB Inc.

may be up to 150 millimetres (6 inches) long, of which 56 millimetres (2¼ inches) is horn.

rhinoceros viper, also called RIVER JACK (*Bitis nasicornis*), vividly coloured venomous snake of the family Viperidae, found near water in African rain forests. It grows to about 1.2 metres (4 feet) and has a thick body and large, hornlike scales on the end of its snout.

A complicated and attractive pattern of blue, black, purple, red, and yellow runs along the back. Its sides are green and gray.

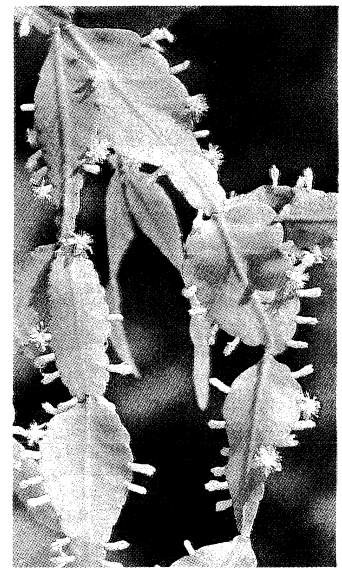
Rhinocryptidae (bird family): *see* tapaculo.

Rhinotmetus: *see* Justinian II.

rhinovirus, a group of viruses capable of causing common colds in human adults and children. They belong to the family Picornaviridae (*see* picornavirus). The virus is thought to be transmitted to the upper respiratory tract by airborne droplets. After an incubation period of 2 to 5 days, the acute stage of the illness lasts 4 to 6 days. *See also* common cold.

Rhipidistia, extinct suborder of lobe-finned bony fishes of the order Crossopterygii, which apparently included the ancestors of amphibians and the other terrestrial vertebrates. The Rhipidistia were common during the Devonian (about 400,000,000 years ago) but became extinct during the Upper Permian (about 260,000,000 years ago). They were typical crossopterygians; the related coelacanth fishes were a side branch. Anatomical details, including skull-bone patterns, infolded (labyrinthodont) tooth enamel, and elements in the paired fins that correspond somewhat with tetrapod limb bones, support the theory that the rhipidistians gave rise to the land-living vertebrates. Members of the typical genus *Osteolepis* were sharp-toothed stream and pond dwellers. Fishes of the related genus *Eusthenopteron* were slender-bodied predators.

Rhipsalis, cactus genus of about 60 species, family Cactaceae, native to tropical and subtropical America, West Indies, Africa, Madagascar, and Sri Lanka. *Rhipsalis* is the only



Rhipsalis
Werner W. Schulz

Old World representative of the cactus family. Theories proposed to account for this puzzling distribution include: (1) dispersal of the genus at an earlier geologic period when South America and Africa were joined; (2) transportation of the sticky seeds on the feet of birds; (3) floating and rafting long distances; and (4) dispersal by human agency.

These small, much-branched plants usually grow perched upon trees; some species grow among rocks or in the ground.

Rhipsalis species are cultivated as much for their strange form as for their small but numerous flowers. Small fleshy berries follow. Easter cactus (*Rhipsalis,* or *Rhipsalidopsis, rosea*), a popular spring-blooming ornamental, has fragrant 2.5-centimetre (1-inch) rosy flowers that open in the Sun. *Rhipsalis megalantha* has yellow flowers 4 cm across.

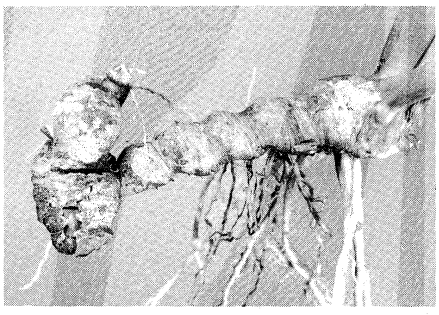
Species of *Lepismium, Pfeiffera, Erythrorhipsalis, Acanthorhipsalis,* and *Hatiora* are usually combined into the genus *Rhipsalis.*

Rhithymna (Greece): *see* Réthimnon.

rhizomastigote, any member of the flagellate protozoan order Rhizomastigida, with features

similar to both flagellates and sarcodines (protozoans having pseudopodia). Members are permanently amoeboid and may have from 1 to 50 flagella. Pseudopodia (cytoplasmic extensions) vary in number and appearance; some are axopodia (composed of an axial rod and a cytoplasmic envelope), others are lobopodia (tonguelike in form). Most (*e.g., Mastigamoeba*) are free-living in fresh and salt water, in soil, or in other organisms. An important parasitic form is *Histomonas meleagridis,* the cause of enterohepatitis (or blackhead) in poultry. Cell shape, although variable in this species, often is round; cells range from 10 to 14 microns (0.0004 to 0.0006 inch) in diameter. An active, amoeba-like organism with a flagellate stage, *H. meleagridis* is passed to new hosts in feces or eggs of nematode worms.

rhizome, in botany, horizontal, underground plant stem capable of producing the shoot and root systems of a new plant. This capability allows the parent plant to propagate vegetatively (asexually) and also enables a plant to perennate (survive an annual unfavourable season) underground. In some plants (*e.g.,*



Rhizome of an iris
John H. Gerard

water lilies, many ferns and forest herbs), the rhizome is the only stem of the plant. In such cases, only the leaves and flowers are readily visible.

rhizopod, any member of the protozoan class Rhizopodea. Three types of pseudopodia (cytoplasmic extensions) used in locomotion and digestion are found in this class: (1) long, thin reticulopodia, which fuse into a network; (2) nonfusing filopodia, similar to reticulopodia; and (3) blunt and fingerlike lobopodia (the pseudopodia formed by *Amoeba*). Tests (protective shells) are common. For information on important members of this class, *see* amoeba; Entamoeba; foraminiferan; testacean.

Rhode Island, officially THE STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS, constituent state of the United States of America, located in the northeastern United States, bounded on the north and east by Massachusetts, on the south by the Atlantic Ocean, and on the west by Connecticut. The capital is Providence.

A brief treatment of Rhode Island follows. For full treatment, *see* MACROPAEDIA: United States of America: *Rhode Island.*

Rhode Island's first European settlement was made in 1636 by the dissident minister Roger Williams and his followers, who were banished from Massachusetts. Williams, who was friendly and fair with the American Indians in the vicinity, based his settlement on the principle of religious toleration and freedom of conscience; this attracted other nonconformists and shaped the colony's views. By 1647 a confederacy of four towns was established, although a royal charter was not granted until 1663. In what are widely regarded as the first overt revolutionary deeds, the Rhode Islanders destroyed the British revenue sloop *Liberty* at Newport in 1769 and burned the revenue schooner *Gaspee* near Namquit (now Gaspee) Point in 1772. Gradual abolition of slavery began in 1784; but Rhode Island ratified the U.S. Constitution only after the Bill of Rights was incorporated in 1790. Samuel Slater's cotton-textile mill built at Pawtucket in 1790 initiated the Industrial Revolution in the United States. Agitation for the extension of political rights led to the Dorr Rebellion in 1842, but not until 1920 were they extended to women.

Eastern Rhode Island occupies the Seaboard, or Narragansett, Lowland, while the New England Upland, part of the Appalachian Highlands, occupies the western two-thirds of the state, culminating in the highest point, Jerimoth Hill, 812 feet (247 m), situated near the community of North Foster. The lowlands are characterized by numerous islands, sandy beaches, and salt marshes. The uplands consist mainly of glacial till. Rhode Island's principal rivers include the Blackstone and the Pawtuxet, which drain into Narragansett Bay, and the Pawcatuck, which drains into Block Island Sound.

The state has a moist continental climate, characterized by short summers with an average July temperature of 71° F (22° C) and longer cold winters with an average January temperature of 29° F (−2° C); average annual precipitation is 42 inches (1,067 mm) evenly distributed year round, with an average snowfall of 39 inches (990 mm). The state is subject to periodic storms, including hurricanes.

Rhode Island is the nation's smallest and most densely populated state. The earliest non-Indian settlers were Massachusetts (English) Protestants, followed by African slaves, Jews, Huguenots, and Irish Catholics. French Canadians, Italians, Portuguese, Finns, Poles, Hispanics, and Asians have also settled in the state. By the late 20th century most of the population was in semiurban Providence county.

Potatoes, corn (maize), and apples are grown around Portsmouth and Middletown and on the coastal lowlands, but most of the other glacial, rocky land can be used only for pasture, dairying, and poultry raising. Nursery and greenhouse crops account for about one-third of commercial farmings. Fishing, both for shellfish and finfish, is important.

Mining and quarrying is limited to granite, limestone, and sand and gravel for construction material. Cumberlandite, an iron-titanium ore, is found in northeastern Rhode Island but remains unexploited.

Manufacturing and services dominate the economy. Jewelry and silverware, textiles and clothing, electrical machinery, and electronics wares are the principal products. The U.S. Navy maintains a base at Newport, important for local employment, and ships are built in Newport's shipyards. Biomedical research facilities are also important.

Narragansett Bay and its tributaries have many excellent harbours. The state is also well served by railroads, highways, and airports.

Rhode Island has numerous historical sites, including the Old State House (1762). There are many notable historical museums. Religious monuments include the Friends Meeting House (1700) and the Touro Synagogue (1763), both the oldest such buildings in the United States, located in Newport.

Providence has the state's largest concentration of institutions of higher learning, including Brown University (1764) and Rhode Island College (1854). Notable libraries include Newport's Redwood Library (1747) and Providence's Athenaeum (1753) and John Carter Brown Library. Area 1,212 square miles (3,139 square km). Pop. (1990 est.) 1,002,000.

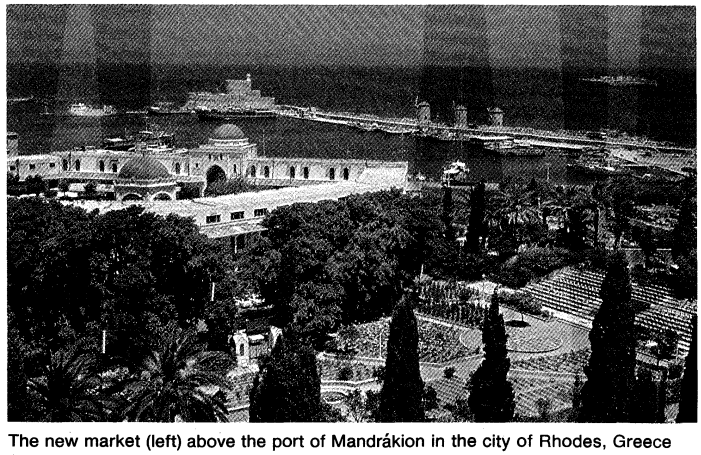
Rhode Island, also called AQUIDNECK ISLAND, island, largest in Narragansett Bay, Rhode Island, U.S., occupying an area of 45 square miles (117 square km). Aquidneck is the Indian name for what was later called Rhode Island by the Italian navigator Giovanni da Verrazano, who first saw it in 1524. Known to American colonists by its Indian name, Aquidneck was the site of the Battle of Rhode Island between American colonial forces and the British in 1778. A nearby memorial honours the black soldiers of the First Rhode Island Regiment who took the brunt of the British attack.

Basically rural in character, Rhode Island has two towns, Portsmouth and Middletown, and a city, Newport. Pop. (1986 est.) 62,560.

Consult the INDEX *first*

Rhode Island School of Design, private coeducational institution of higher learning in Providence, R.I., U.S. The school was founded in 1877, but did not offer its first instruction at the college level until 1932. It is perhaps the foremost fine-arts college in the United States. Rhode Island combines professional-arts training with a broad liberal-arts curriculum. It offers bachelor's degrees in various fields of the fine arts (*i.e.,* painting, sculpture, printmaking, ceramics, and textiles), design, architectural studies, illustration, and photographic studies. It also offers master's degrees in the fine arts, industrial design, and art education. The school has an art museum with extensive collections of American painting and decorative arts.

Rhodes, Modern Greek RÓDHOS, major city of the island of Rhodes and capital of the *nomós* (department) of Dhodhekánisos, Greece.



The new market (left) above the port of Mandrákion in the city of Rhodes, Greece
Gerald Clyde—FPG/EB Inc.

The only substantial community on the island, it stands isolated at the northernmost tip of the island. Behind the small-craft port of Mandrákion, which is separated from the commercial harbour by the tiny Boubouli Peninsula, the city proper is divided into two distinctive parts. The old city, enclosed by walls built by the Knights of Rhodes in the 14th century, surrounds the commercial harbour. The new town, begun in 1912 by the Italians, extends north of the old city to the very tip of the island and westward to the foot of the ruined acropolis (Mt. Smith; 2nd century BC). The new city includes a government building, market, a national theatre, and the church of the Evangelismos (Annunciation), built in 1925 on the plan of the Church of St. John, destroyed in 1856.

The historical fortunes of the city are linked intimately with those of the island of Rhodes. Under a modified democracy and an efficient executive, the city in antiquity enjoyed good administration. Its standard of coinage was widely accepted and its maritime law, the earliest known to have been codified, was widely quoted in the Mediterranean and was adopted by Augustus for the Roman Empire. Parts of it are still quoted. The citizens commemorated the successful resistance of a determined siege by Demetrius Poliorcetes (305 BC) by erecting (*c.* 292–280 BC) the famous Colossus of Rhodes, a bronze statue some 100 feet (30 m) or more high dedicated to the sun god Helios. About 225 BC the statue toppled during a severe earthquake that destroyed much of the island. It was not reerected because of a pronouncement by the Delphic oracle, but it was immortalized as one of the Seven Wonders of the World (*see also* Rhodes, Colossus of). Under the emperor Diocletian (AD 284–305) the city was the capital of the Roman province of the islands, and under Italian rule (1912–43) it was the administrative centre for the Dodecanese islands. Pop. (1981) 40,392.

Rhodes, Modern Greek RÓDHOS, island (*nísos*), the largest of the Dodecanese (*q.v.*) group, Greece, and the most easterly in the Aegean Sea, separated by the Strait of Marmara from Turkey. Rhodes city, on the northern tip of the island, is the capital of the *nomós* (department) of Dhodhekánisos. The 540-sq-mi (1,398-sq-km) island is traversed northwest–southeast by hills that reach 3,986 ft (1,215 m) in the summit of Atáviros. The peak commands a view of the coast of Asia Minor, the Dodecanese archipelago, and, on clear days, the summit of Mt. Ida on Crete. In antiquity the island was infested with snakes, and the name may derive from *erod,* Phoenician for "snake." Farmers still wear leather boots for protection from a surviving poisonous species. Winter temperatures average 50° F (10° C), and constant winds account for the many windmills on Rhodes. The valleys provide rich pasture, while the plains produce a variety of grains.

Minoan remains at Ialysus are evidence of early Cretan influence. With the collapse of the Minoan civilization (*c.* 1500–1400 BC), Rhodes became a powerful independent kingdom with a late Bronze Age culture. In historic times Rhodes was occupied by Dorians, mainly from Argos, *c.* 1100–1000. The Rhodian cities of Lindus, Ialysus, and Camirus, along with Cos, Cnidus, and Halicarnassus, belonged to the Dorian Hexapolis (league of six cities) by which the Greeks protected themselves in Asia Minor. The Dorian cities of Rhodes traded throughout the Mediterranean and founded colonies in Italy, Sicily, Spain, and Asia Minor and dominated several Aegean islands.

During the classical period, Rhodian affiliations vacillated between Athens, Sparta, and Persia, in attempts to preserve a balance of power. Rhodes supported Rome during its war with Philip V of Macedonia, and its fleet participated in Rome's war against Antiochus the Great of Syria. Roman competition in Asia Minor eroded Rhodian income, however, and the island steadily declined after Rome made Delos a free port *c.* 166. During the triumvirate of Antony, Octavian, and Lepidus (43 BC), the conspirator Gaius Cassius plundered Rhodes for refusal to support him. Though it continued for another century as a free city it never recovered its former prosperity; in about 227 BC a severe earthquake devastated the island.

The history of Rhodes under Byzantine rule (after AD 395) is uneventful. In 653–658 and 717–718 it was occupied by the Saracens, and the various Crusades used Rhodes as a port of staging and supply. After 1309 the Knights of St. John of Jerusalem (Knights Hospitallers) converted Rhodes into an almost impregnable fortress and built a powerful fleet for protection of the southern Mediterranean sea routes against the Turks. The Knights evacuated Rhodes in 1523 after an honourable capitulation, ending two centuries of defiance of the Turks. The island gradually declined as the result of pestilence, emigration, and harsh Turkish administration, suffering severely during the War of Greek Independence (1821–29). In 1912 Rhodes was taken from Turkey by Italy. Under the Allied peace treaty with Italy in 1947, the island was awarded to Greece.

In the classical age, Rhodes was famous as a centre of painting and sculpture and had a noted school of eclectic oratory at which the Romans Cato, Julius Caesar, and Lucretius were students. Rhodian sculptors were prolific. Among extant works is the Laocöon group executed by Polydorus, Athenodorus, and Agisandrus. The island has yielded an array of artifacts from the Mycenaean and later periods, but no Mycenaean palaces have been unearthed as in Crete and the Peloponnese. Outstanding among the ruins of Lindus is the temple, or sanctuary, of Athena Lindia, which dates from the 5th to 3rd century BC.

The Italian occupation (1912–43) brought paved roads, public works construction, and considerable archaeological activity, including the restoration of ancient and medieval monuments. With Crete and Athens, Rhodes enjoys an increasing year-round tourism, which has brought great prosperity. The economy is supplemented by the production of red wine, grain, figs, pomegranates, and oranges. Pop. (1981) 87,831.

Rhodes, Alexandre de (b. March 15, 1591, Avignon, Fr.—d. March 5, 1660, Isfahan, Persia), Jesuit missionary who was the first Frenchman to visit Vietnam.

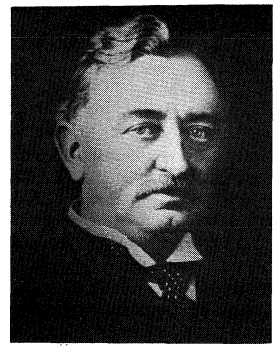
De Rhodes was admitted to the Society of Jesus at Rome in 1612 and in 1619 went to Indochina to establish a mission. Allowed to proselytize, he later estimated that he had converted some 6,700 Vietnamese to the Roman Catholic faith. He was expelled from the country in 1630 because of the jealousy of power-seeking mandarins and a fear that Christian doctrine would undermine the Confucian-based authority of the sovereign. De Rhodes described his experiences in Vietnam in *Sommaire des divers voyages et missions apostoliques du P.A. de Rhodes à la Chine et autres royaumes de l'Orient* (1653; *Rhodes of Viet Nam: The Travels and Missions of Father Alexander de Rhodes in China and Other Kingdoms of the Orient,* 1966).

De Rhodes proceeded to Macau, a Portuguese island colony off the Chinese coast, where he spent 10 years as a professor of philosophy. He returned to southern Vietnam in 1640 and stayed until 1646, when he was condemned to death; his sentence, however, was commuted to permanent exile. On his return to Europe he stopped to preach in Java and was imprisoned by its ruler.

De Rhodes returned to Rome in 1649 and pleaded with the Vatican bureaucracy on behalf of the Vietnamese missionary effort. Portuguese supremacy was on the wane, and de Rhodes hoped to establish missions there, free of Portuguese political domination and controlled by the church without intermediaries. He further proposed that the Vietnamese be trained and ordained as priests; with a native clergy, he felt, the Vietnamese would be quickly won over to Christianity. De Rhodes also spoke to French businessmen and aristocrats, describing the wealth and resources of Indochina. His exaggerated accounts of silk, spices, and gold mines attracted enough investors to finance his return to Vietnam. But the Vatican sent him to a Persian mission before he could secure transportation to Vietnam, and he died in Persia in 1660. The Vatican itself sponsored a Vietnamese missionary program in 1658, based on de Rhodes's ideas.

Alexandre de Rhodes is known for a Vietnamese–Latin–Portuguese dictionary; he perfected a romanized script, called Quoc-ngu, developed by the earlier missionaries Gaspar de Amaral and Antonio de Barbosa, and he added special marks to the roman letters, denoting tones, which in Vietnamese indicate the meaning of words. His script facilitated the communication of Christian doctrines to the Vietnamese and increased the literacy rate among the population.

Rhodes, Cecil (John) (b. July 5, 1853, Bishop's Stortford, Hertfordshire, Eng.—d. March 26, 1902, Muizenberg, Cape Colony), financier, statesman, and empire builder of British South Africa. He was prime minister of Cape Colony (1890–96) and organizer of the giant diamond-mining company De Beers Consolidated Mines, Ltd. (1888). By his will



Cecil Rhodes
EB Inc.

he established the Rhodes scholarships at Oxford (1902).

Early struggles and financial successes. Rhodes was the son of the vicar of Bishop's Stortford, and the family's roots were in the countryside, where Cecil Rhodes always felt at home: tree planting and agricultural improvement were among his lifelong passions, though his earliest ambition was to be a barrister or a clergyman. His father was prosperous enough to send one son to Eton College, another to Winchester College, and three into the army. Cecil, however, was kept at home because of a weakness of the lungs and was educated at the local grammar school. Poor health also debarred him from the professional career he planned. Instead of going to the university, he was sent to South Africa in 1870 to work on a cotton farm, where his brother Herbert was already established.

The farm in Natal was not a success. On his arrival Rhodes found that his brother had already left for the diamond fields of Griqualand West. Although Herbert returned to the farm, and the two brothers continued stubbornly trying to grow cotton for a year, the "diamond fever" eventually overcame them.

In 1871 they moved to Kimberley, the centre of mining, where life was even harder than in Natal. Herbert was restless and stayed only until 1873, but Cecil's characteristic determination kept him at Kimberley off and on for years.

For eight years, until he took a belated degree in 1881, he divided his life between Kimberley and Oxford. Both societies found him odd, though he did his best to conform outwardly to the conventions. At Oxford his eccentric habits, falsetto giggle, rambling monologues, and his unusual background intrigued the younger students around him. So did his philosophy of an almost mystical imperialism.

He gradually advanced from being a speculative digger to the status of a man of substance with ambitious ideas on the future of the diamond industry. His first partnerships were with young men as impoverished as himself, such as C.D. Rudd, with whom he formed De Beers Consolidated Mines, Ltd.—so called after the De Beers mining claims, many of which he had acquired. Eventually, success brought new friends and also rivals. Alfred Beit, a German who knew the diamond market intimately, was his most valued friend. With Beit's help, Rhodes expanded his claims until all the De Beers mines were under his control. In 1887 he set about acquiring the Kimberley mine, which was mainly controlled by Barney Barnato. A furious competition to buy up shares ended in Rhodes's favour in 1888. He finally paid more than £5,000,000 ($25,000,000)—a generous settlement—for Barnato's holding and celebrated by making his rival a member of the Kimberley Club, into which Barnato had never before even been admitted. Other lesser mines fell under Rhodes's control, until by 1891 De Beers Consolidated Mines, Ltd., owned 90 percent of the world's production of diamonds. He also acquired a large stake in the Transvaal gold mines, which had been discovered in 1885, and formed the Gold Fields of South Africa Company in 1887. Both Rhodes's major companies had terms in their articles of association allowing them to finance schemes of northward expansion.

Political involvement in Africa. Rhodes never regarded moneymaking as an end in itself. "Painting the map red," building a railway from the Cape to Cairo, reconciling the Boers and the British under the British flag, even recovering the American colonies for the British Empire, were all part of his dream. With these ideas in view, he first went into politics in 1881, offering himself for election to the parliament of the Cape Colony in a constituency in which he had to depend on Boer support. He held it for the rest of his life. Though unimpressive as a speaker and contemptuous of parliamentary procedure, he earned respect by his original views. He made friends with many Boer politicians, he espoused the cause of the natives in what were then Basutoland and Bechuanaland (now Lesotho and Botswana), and always he had his eyes fixed on the north.

His first intervention in native policy came in 1882, when he was appointed to a commission to pacify Basutoland after a minor rebellion. The rebellion had been put down by the former British governor of the Egyptian Sudan, Gen. Charles Gordon, acting for the Cape government. He succeeded not by force but by organizing discussion meetings with the tribal chiefs. Rhodes was impressed by the man and his methods, though less favourably by the contempt that Gordon showed for financial reward.

His determination to keep open a road to the north involved him in many disputes. Other imperial powers—the Germans, Belgians, and Portuguese—were in competition for the uncharted interior of Africa, as were the Transvaal Boers. The missionaries were, in Rhodes's view, overly solicitous of native interests; the Cape government was weak; and the British government, which he called the "imperial factor," was too distant to understand his ideas. But he assiduously cultivated the government's representatives in Cape Town—particularly the high commissioner Sir Hercules Robinson—with profitable results.

The crucial area was Bechuanaland, through which ran the route used by the missionaries. Rhodes intended to use it to open up the northern territories of Mashonaland and Matabeleland (both now in Rhodesia [Zimbabwe]). Mineral wealth, communications, and, eventually, white settlement were his objectives. All the boundaries were unsettled, however, and many intrusions had to be frustrated first. Boers from the Transvaal, trying to annex slices of Bechuanaland, proclaimed two small independent republics in Stellaland and Goshen. In 1882 a boundary commission, to which Rhodes again secured appointment, was sent to settle the boundaries of Griqualand West. Rhodes persuaded the commission to extend its mandate to the two small republics. In 1884, when the Germans in South West Africa declared a protectorate over two territories (which, along with Stellaland and Goshen, would have sealed off the Cape Colony from the north), he persuaded the high commissioner that the Imperial government must intervene. By the London Convention of 1884, the two republics were excluded from the Transvaal, and the Cape government agreed to help finance a protectorate over Bechuanaland.

His settlement of the Bechuanaland question was also soon threatened, for the deputy commissioner in the new area antagonized the Boers. Rhodes insisted on his removal and was appointed in his place. He succeeded in conciliating the Boers of Stellaland but could not prevent Paul Kruger, president of the Transvaal, from declaring a protectorate over Goshen, from which he withdrew only after an expeditionary force was sent up from the Cape. A conference to settle the matter was held in February 1885 on the River Vaal, where Rhodes and Kruger met for the first time. These two stubborn men, each determined to dominate Africa, each ever ready to quote Scripture for his purpose, naturally failed to achieve any meeting of minds.

Although Kruger was forced to give up Goshen, Rhodes did not get everything his own way. It was decided that southern Bechuanaland should become a crown colony and northern Bechuanaland a protectorate. Rhodes, who wanted both annexed by the Cape Colony, resigned in protest in March 1885 and thereafter devoted strenuous efforts, both in Cape Town and London, to securing the transfer of the colony to the Cape.

Two men still stood in the way of Rhodes's plans for developing the north. One was Kruger, with his policy of "Africa for the Afrikaners"—the Boers. By the Franchise Law of 1890, he denied political rights to the foreigners (Uitlanders) who had come to work the gold mines in the Transvaal. He also tried to extend Boer control to Mashonaland and Matabeleland. The ruler of the Matabele was King Lobengula, Rhodes's second obstacle. Kruger had approached him for a treaty and mining concessions in 1887, and so had many others. Lobengula, however, though uneducated, knew that once he let the white men in, he would never see their backs. The only white men he trusted were missionaries; and Rhodes duly found in John Moffat, the son of a famous missionary, a man to serve his purpose.

Once Moffat, as Assistant Commissioner for the crown colony of Bechuanaland, had, in February 1888, persuaded Lobengula to sign an exclusive treaty of friendship, Rhodes sent three of his trusted agents to obtain a mining concession based on the treaty. The concession was extracted from the reluctant Lobengula in October 1888: to the last, he hoped he had only allowed the white man to dig "a big hole." In fact, however, he had virtually signed away his kingdom, and Rhodes hastened to press the Imperial government, through the high commissioner, to grant a charter to a new company, the British South Africa Company, to develop the new territory. In October 1889 the charter was granted, and Lobengula allowed the digging to begin.

Queen Victoria found Rhode's imperialism attractive, no less than his courtly rebuttal of the accusation of being a woman hater: "How could I dislike a sex to which your Majesty belongs?" The upshot of his successful propaganda was that the charter granted by the Imperial government went far beyond what Lobengula had conceded. There was no northern limit on it; and Rhodes intended to extend the chartered company's control to Northern Rhodesia (now Zambia) and Nyasaland (now Malawi), as well as to the Bechuanaland Protectorate (now in Botswana).

In 1890 Rhodes's Pioneers began their hazardous march into Matabeleland and thence to Mashonaland, where they established a fort in September, to be called Salisbury, after the British prime minister. In the following year Harry Johnston took over the administration of Nyasaland in a dual capacity, as commissioner of the Imperial government and an employee of the chartered company. Although eventually the protectorate reverted fully to the Imperial government, Rhodes's influence was felt both north and south of the River Zambezi, and soon the new territories were called by his name.

Policies as prime minister of Cape Colony. In the meantime, he had returned to office in 1890 in the only post big enough for him, as prime minister of Cape Colony. For five years he proved a successful and imaginative prime minister. He acquired a property called Groote Schuur, which he rebuilt in the Dutch colonial style and bequeathed as an official residence for future prime ministers of the Union of South Africa. There he lavishly entertained Dutch and British inhabitants of the Cape Colony and eminent visitors of all nationalities. Everything he undertook was on a massive scale.

In parliament he cultivated the support of the Afrikaner Bond without losing the goodwill of British liberals. His agricultural policies were sensible and effective. In native policy he had to move cautiously. His Franchise and Ballot Act (1892) was passed, limiting the native vote by financial and educational qualifications. The Glen Grey Act (1894), assigning an area for exclusively African development, was introduced from the highest motives: "a Bill for Africa," as Rhodes proudly called it. His main aim was to prevent the Dutch and British quarrelling over such policies. To him that involved the risk of "mixing up the native question with the race question."

He also sought to unite the Boers and the British on his northern policy. The prospects were good because Kruger's obstinacy alienated the Cape Dutch. To ensure that commercial traffic did not have to reach the Transvaal through the Cape Colony, Kruger had built a railway to Delagoa Bay; then in 1894 he closed the "drifts," or fords, of the River Vaal to prevent transport of goods by wagon, besides imposing heavy duties on Cape produce. Rhodes went to the Transvaal capital to protest, but in vain. Kruger was compelled to yield only after a declaration by Rhodes's attorney general that he was in breach of the London Convention, coupled with a threat by Joseph Chamberlain, who had become colonial secretary in 1895, to support a military expedition.

Rhodes's patience had begun to wear thin

even earlier, partly because he knew his health was precarious, partly because he learned that the gold deposits of the Transvaal were enormous, whereas those of Mashonaland were proving poor. His northern policy was encountering unexpected frustrations. The chartered company was in financial difficulties, its resources being overstretched. Although Rhodes's agents secured some new territories for the company, elsewhere he was forestalled. An Anglo-German agreement of 1889 gave a strip of land to Germany, cutting off Bechuanaland from the north. The Belgian king Leopold anticipated Rhodes in laying claim to Katanga (1890). The Anglo-Portuguese Convention of 1891 ended his hopes of eliminating Portugal from Africa. Harry Johnston proved uncooperative in administering Nyasaland. When Rhodes paid his first visit to Rhodesia in 1891, he found the pioneers in an angry mood; to pacify them, he helped them generously out of his own pocket.

Serious trouble broke out in 1893, when Lobengula tried to reassert his control over Mashonaland. A short, sharp war ended in the total defeat and death of Lobengula. Rhodes was then at the pinnacle of his achievement, but still the wider union of southern Africa eluded him. He was growing petulant and impatient and was visibly aging. By 1895 he was determined to settle accounts with the last obstacle, President Kruger.

There was already talk of force to remedy the grievances of the Uitlanders in the Transvaal. The Uitlanders formed a National Union to support their cause, among its leaders being Rhodes's brother Frank. Kruger sought the support of Germany, and in 1895 he again closed the "drifts" across the Vaal. Again he was forced to give way, and by this time a conspiracy against him was under way. Rhodes knew about it and worked actively to foster it.

Effects of the Jameson raid on Rhodes's career. Chamberlain was privy to the plan, but no one foresaw what actually resulted. The National Union in Johannesburg lost heart and decided not to act. Rhodes, the high commissioner Sir Herbert Robinson, and Chamberlain all assumed that the plan had been called off; but Leander Starr Jameson, Rhodes's personally appointed administrator of Matabele, recklessly decided to force the hand of the Uitlanders by invading the Transvaal on his own. He launched the famous raid on Dec. 29, 1895. It was a fiasco, his whole force being captured apart from a few killed. Rhodes was compelled to resign all his offices, not only in the Cape government but also in the chartered company, but he refused to denounce Jameson.

The raid was an almost complete disaster for Rhodes. Jameson and his colleagues were sent to prison; Kruger's power was consolidated; the Dutch and British colonials were more deeply split than ever; Rhodesia and Bechuanaland were taken over by the imperial government. Only the charter was preserved, and Rhodes spent the rest of his life promoting developments in the north. He even won public sympathy. His last years were full of disappointments, both personal and political.

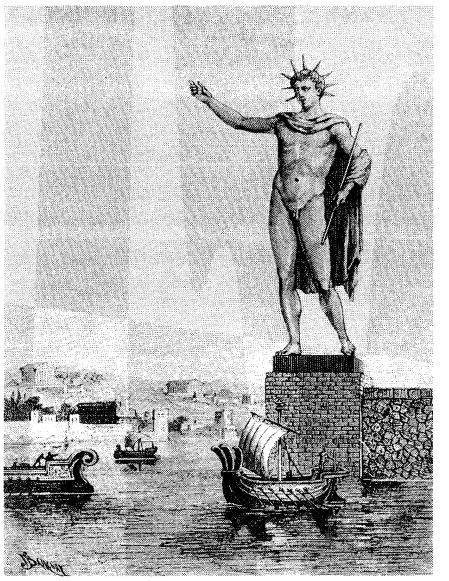
Early in 1896, while Rhodes was in England, there was a serious revolt in Matabeleland. Rhodes returned by way of Egypt and took an active part in suppressing the revolt. He finally brought it to an end by holding a peace conference. On this occasion Rhodes found the site in the Matopo Hills that he called the "View of the World" and chose it for his burial place.

His last years were soured by an unfortunate relationship with an aristocratic adventuress, Princess Radziwiłł, who sought to manipulate Rhodes and Milner and even Lord Salisbury, the English prime minister, to promote her ideas of the British Empire. Rhodes was unused to scheming women, nor could the young bachelors surrounding him protect him from her. She forged letters and bills of exchange in his name and was finally sent to prison, but not before she had caused him much annoyance and scandal. In 1901, while he was in Europe, he was recalled to Cape Town to give evidence at her trial. His last political act on his return was to support Milner in suspending the constitution of the colony until the Boer War, which broke out in October 1899, was over. He was, however, already dying of an incurable heart disease. Before either the war or even Princess Radziwiłł's trial was over, he died. His last journey through Africa in the funeral train to the Matopo Hills was a triumphal procession.

When his will was read in April 1902, his reputation immediately rose to new heights. The imaginative scheme of scholarships at Oxford for young men from the colonies and from the United States and Germany appealed to the public instinct for a more disinterested kind of imperialism. Most of his fortune was devoted to this purpose. As the will forbade disqualification on grounds of race, many nonwhite students have benefitted from the scholarships, though it is doubtful if that was Rhodes's intention. He once defined his policy as "equal rights for every white man south of the Zambezi," and later, under liberal pressure, amended "white" to "civilized." But he probably regarded the possibility of native Africans becoming "civilized" as so remote that the two expressions, in his mind, came to the same thing. (C.M.Wo./Ed.)

BIBLIOGRAPHY. John Flint, *Cecil Rhodes* (1974), is hostile to his actions and disparaging of his abilities. J.G. Lockhart and C.M. Woodhouse, *Rhodes* (also published as *Cecil Rhodes: The Colossus of Southern Africa,* 1963), is based on the Rhodes papers. Brian Roberts, *Cecil Rhodes: Flawed Colossus* (1987), is a balanced examination emphasizing the man over his business and political concerns. Robert I. Rotberg, *The Founder: Cecil Rhodes and the Pursuit of Power* (1988), an extensive work, provides psychological insights into his character.

Rhodes, Colossus of, a colossal statue of the sun god Helios that stood in the city of Rhodes (Greece) and was one of the Seven Wonders of the World. It was the work of Chares of Lindos (a city on Rhodes). The statue, which commemorated the raising of Demetrius Poliorcetes' long siege (305–304 BC) of Rhodes, was made of bronze and was reinforced with iron and weighted with stones. It was more than 100 feet (30 m) high and stood by Rhodes's harbour, perhaps shielding its eyes with one hand, as a representation in a relief suggests. It is technically impossible that the statue could have straddled the harbour entrance, and the popular belief that it did so dates only from the Middle Ages.



Colossus of Rhodes, constructed *c.* 292–280 BC, wood engraving reconstruction by Sidney Barclay, *c.* 1875

Historical Pictures Service, Chicago

The statue, which took 12 years to build (*c.* 292–280 BC), was toppled by an earthquake in about 225 BC. The fallen Colossus was left in place until AD 653, when the Arabs raided Rhodes and had it broken up and the bronze sold for scrap; it was said that the metal totaled more than 900 camel loads.

Rhodes, James Ford (b. May 1, 1848, Cleveland, Ohio, U.S.—d. January 22, 1927, Brookline, Mass.), American businessman and historian, best known for his multivolume investigation of the antebellum, American Civil War, and Reconstruction periods of the United States' history.

Although he was educated at both New York University (1865–66) and the University of Chicago (1866–67), Rhodes never earned a degree. In 1867 he left college and went to Europe, living in Paris for a time before studying metallurgy in Berlin.

Upon his return to Cleveland, Rhodes in 1874 entered the coal and steel business with his brother and his brother-in-law (Marcus A. Hanna). Rhodes & Company prospered through the marketing and transportation of coal and iron, and by 1885 James Ford Rhodes had acquired a fortune sufficient for him to retire.

For the rest of his life, Rhodes devoted himself to the study of American history. During the mid-1880s he wrote numerous articles and reviews for the *Magazine of Western History* and began the monumental project upon which rests his reputation as a historian—the *History of the United States from the Compromise of 1850.* The seven volumes of this work appeared between 1893 and 1906 and were held in high esteem as "scientific" (*i.e.,* objective and detached) historical scholarship. Rhodes's insistence upon slavery as the cause of the war and his racist interpretation of Reconstruction have since been disputed, however.

Rhodes moved to Cambridge, Mass., in 1891 and then on to Boston in 1895. He received honorary degrees from Oxford, Harvard, and Yale universities and in 1898 was elected president of the American Historical Association. He continued to write historical works until 1922. His *History of the Civil War, 1861–1865,* won the Pulitzer Prize.

Rhodes, Lawrence (b. Nov. 24, 1939, Mount Hope, W.Va., U.S.), American premier danseur and ballet director.

After performing with several companies, among them the Ballet Russe de Monte Carlo, he joined (in 1960) the Robert Joffrey Ballet, for which he created many leading roles, including The Acrobat (*Incubus*) and the male lead in *Time Out of Mind.*

In 1964 Rhodes joined the Harkness Ballet, of which he was appointed director in 1969. He joined the Netherlands National Ballet in 1970 and the Pennsylvania Ballet in 1972; he appeared with the Eliot Feld Ballet in 1974, Les Grands Ballets Canadiens in 1977, and elsewhere. He formally retired from dancing in 1978 and turned to choreography.

Rhodes, Wilfred R. (b. Oct. 29, 1877, Kirkheaton, near Huddersfield, Yorkshire, Eng.—d. July 8, 1973, Bournemouth, Hampshire), English cricketer who during his career (1898–1930) completed more doubles (1,000 runs and 100 wickets in a single season) than any other player. He appeared in 58 Test (international) matches and played in his last Test competition at the age of 52. Rhodes scored 1,000 runs 21 times, captured 100

wickets 23 times, and set the world record for the most wickets taken (4,187) in a career.

Rhodes scholarship, educational grant to the University of Oxford, established in 1902 by the will of Cecil Rhodes for the purpose of promoting unity among English-speaking nations. The scholarships are for two years, with a third year at the discretion of the trustees. Until 1976, candidates had to be unmarried males between the ages of 19 and 25 and citizens of, and have at least five years' residency in, the British Commonwealth or colonies, the Republic of South Africa, or the United States. Candidates from Germany were considered in 1903–14 and 1930–39, and from 1970 two candidates were chosen each year from the Federal Republic of Germany. Beginning in 1976, women were accepted as candidates, on the same terms. It was Rhodes's wish that while at Oxford the scholars be distributed among all the colleges, as far as possible in accordance with their own inclinations; acceptance of any scholar, however, is determined by the colleges themselves.

Rhodesia, Northern: *see* Zambia.

Rhodesia and Nyasaland, Federation of, also called CENTRAL AFRICAN FEDERATION, political unit created in 1953 and ended on Dec. 31, 1963, that embraced the British settler-dominated colony of Southern Rhodesia (Zimbabwe) and the territories of Northern Rhodesia (Zambia) and Nyasaland (Malawi), which were under the control of the British Colonial Office.

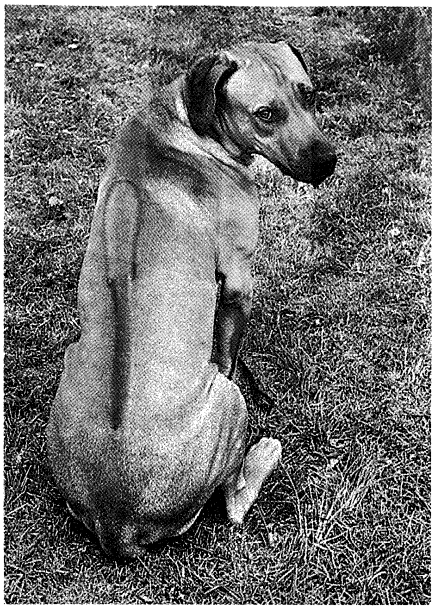
From the 1920s white European settlers in the Rhodesias had sought some form of amalgamation to counter the overwhelming numerical superiority of black Africans, but this had been blocked by a British Colonial Office that was sensitive to profound African opposition. After World War II the growth of secondary industries and greatly increased white immigration in Southern Rhodesia, compounded by the copper boom in Northern Rhodesia, led white political leaders and industrialists to urge even more strongly the advantages of an amalgamated territory that would provide larger markets and be able to draw more freely on black labour, especially in Nyasaland.

The imperial government was persuaded to support federation by the economic arguments, by the nationalist victory in South Africa in 1948, and by hopes of creating a multiracial state based on "partnership" to counter South Africa's racial policies (apartheid). Blacks in Northern Rhodesia and Nyasaland consistently opposed the federation, which they feared would be dominated by Southern Rhodesia. Throughout the 1950s policies in the federation were seen to be largely to the advantage of the white population of the south.

Black discontent came to a head in 1959, when the growing Nyasaland nationalist movement led to widespread disturbances. A state of emergency was declared, and many nationalists were detained without trial. These events convinced the British that power had to be transferred to the black majority. The achievement of independence by Malawi (July 6, 1964) and Zambia (Oct. 24, 1964) meant the effective end of federation. In Southern Rhodesia the break-up of the federation led to the white community's illegal unilateral declaration of independence (UDI) as the republic of Rhodesia in November 1965. Black majority rule was instituted there with the establishment of independent Zimbabwe in 1980.

Rhodesian man: *see* Kabwe man.

Rhodesian ridgeback, also called AFRICAN LION DOG, South African hound dog breed characterized by a narrow band of hair that grows forward along its back, against the direction of the rest of the coat. The ridge is inherited from a half-wild Hottentot hunting dog, which, by breeding with various European dogs, formed the stock that gave rise to the Rhodesian ridgeback. Typically strong, active, and of great endurance, the Rhodesian ridgeback is a trim, short-haired dog, with hanging ears and a glossy, yellowish- to reddish-brown coat. It stands 24 to 27 inches (61 to 69 centimetres) and weighs 65 to 75 pounds (30 to 34 kilograms). A versatile dog, it has distinguished itself as a hunter (especially of lions), as a guard, and as a companion.



Rhodesian ridgeback
Walter Chandoha

Rhodian Sea Law, Latin LEX RHODIA, body of regulations governing commercial trade and navigation in the Byzantine Empire beginning in the 7th century; it influenced the maritime law of the medieval Italian cities.

The Rhodian Sea Law was based on a statute in the Digest of the Code of Justinian commissioned in the 6th century and on maritime customary law originating on Rhodes in ancient times. The regulations concentrated on the liability for the cost of lost or damaged cargo. Cargo loss was greatest during storms, when part or all of it had to be thrown overboard in order to save the ship. Large amounts were also lost to piracy; from the 7th century on, there was increased danger of sea raids by Arab and Slavic pirates. Thus, the maritime law served as a form of insurance, dividing the cost of the losses between the shipowner, the owners of the cargo, and the passengers.

Rhodian Sea Law persisted in influence, if not in actual practice, through the 12th century. In the 13th and 14th centuries, Byzantine sea commerce dwindled, and eventually the law became obsolete.

rhodium (Rh), chemical element, one of the platinum metals of Group VIII of the periodic table, predominantly used as an alloying agent to harden platinum. Rhodium is a precious, silver-white metal, with a high reflectivity for light. It is not corroded or tarnished by the atmosphere at room temperature and is frequently electroplated onto metal objects and polished to give permanent, attractive surfaces for jewelry and other decorative articles. The metal is also used to produce reflecting surfaces for optical instruments.

Rhodium added to platinum in small amounts yields alloys that are harder and lose weight at high temperatures even more slowly than pure platinum. Crucibles for heating materials in the chemical laboratory are therefore commonly made from these alloys. In the industrial manufacture of nitric acid, gauze catalysts of the rhodium–platinum alloys are used because they can withstand the flame temperature as ammonia is burned to nitric oxide. A wire of the alloy 10 percent rhodium–90 percent platinum joined to a wire of pure platinum forms an excellent thermocouple for measuring high temperatures in an oxidizing atmosphere. The international temperature scale is defined over the region from 660° to 1,063° C (1,220° to 1,945° F) by the electromotive force of this thermocouple.

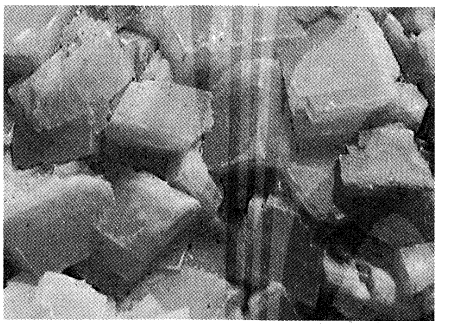
Rhodium is a rare element comprising up to 4.6 percent of native platinum alloys. It also occurs in native alloys of iridium and osmium: up to at least 11.25 percent in iridosmine and up to at least 4.5 percent in siserskite. Rhodium is generally obtained commercially as a by-product of the extraction of nickel and copper from their ores.

Natural rhodium consists entirely of stable isotope rhodium-103. The element was first isolated (1803) from crude platinum by the English chemist and physicist William Hyde Wollaston, who named it from the Greek *rhodon* ("rose") for the red colour of a number of its compounds. Rhodium is highly resistant to attack by acids; the massive metal is not dissolved by hot concentrated nitric or hydrochloric acids or even by aqua regia. The metal dissolves in fused potassium hydrogen sulfate to yield a complex, water-soluble sulfate $K_3Rh(SO_4)_3 \cdot 12H_2O$ or in hot concentrated sulfuric acid.

Rhodium chemistry centres chiefly on the valence states +1 and +3; a few compounds of the other positive states through +6 are recognized (with perhaps the exception of +2). All rhodium compounds are readily reduced or decomposed by heating to yield the powdered or sponge metal. Among these compounds rhodium(III) chloride, or rhodium trichloride, $RhCl_3$, is one of the most important. It provides a starting material for many of the other rhodium compounds in various oxidation states. In aqueous emulsions it can catalyze a number of useful organic reactions.

atomic number	45
atomic weight	102.905
melting point	1,966° C (3,571° F)
boiling point	3,727° C (6,741° F)
specific gravity	12.4 (20° C)
valence	1, 2, 3, 4, 5, 6
electronic config.	2-8-18-16-1 or $(Kr)4d^85s^1$

rhodochrosite (Greek: Rose Coloured), mineral composed of manganese carbonate ($MnCO_3$) that is a source of manganese for the ferromanganese alloys used in steel production. It is commonly found in ore veins formed at moderate temperatures, in high-temperature metamorphic deposits, and in sedimentary deposits. Notable localities are Cavnic, Romania; and Butte, Mont., and Leadville, Colo., in the United States. Magnesium, iron, and calcium



Rhodochrosite from Butte, Mont.
By courtesy of the Joseph and Helen Guetterman collection; photograph, John H. Gerard—EB Inc.

are generally partially substituted for manganese, pure rhodochrosite being relatively rare; rhodochrosite forms a partial solid-solution (chemical substitution) series with calcite and with siderite in which calcium and iron, respectively, replace manganese in the crystal structure. For detailed physical properties, *see* carbonate mineral (table).

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

rhododendron (*Rhododendron*), any of a genus of woody plants in the heath family (Ericuceae), notable for their attractive flowers and handsome foliage. The genus is large and extremely diverse, comprising about 800



Rhododendron
John P. Evans

species. They are native chiefly in the North Temperate Zone, especially in the moist acid soil of the Himalayas, southeastern Asia, and the mountains of Malaysia, where they form dense thickets. The genus *Rhododendron* includes the azalea (*q.v.*) species, which some gardeners consider distinct.

Rhododendrons range in habit from evergreen to deciduous, from low-growing ground covers to tall trees. The first species available for garden use, in the mid-1600s, was *R. hirsutum*, the hairy alpine rose, which may grow as high as 1 metre (3 feet). Others range from matlike dwarf species only 10 centimetres (4 inches) high (*R. prostratum*, from Yunnan, China) to trees in excess of 12 m *R. arboreum, R. barbatum,* and (*R. giganteum,* from Asia). Leaves are thick and leathery and are evergreen in all but the azalea species, which are deciduous. Flowers are usually tubular to funnel-shaped and occur in a wide range of colours—white, yellow, pink, scarlet, purple, and blue.

The catawba rhododendron, or mountain rosebay (*R. catawbiense*), of the southeastern United States, is plentiful and a great flowering attraction in June in the Great Smoky Mountains National Park. The hearty catawba hybrids are derived from *R. catawbiense* and allied species. The rosebay rhododendron (*R. maximum*), overlapping in distribution with the catawba, ranges more northeasterly; it is often grown as an ornamental. Both can be small trees, up to 6 m or taller. Rhodora (*R. canadense*), from northeastern North America, bears rose-purple flowers before the leaves unfurl.

rhodolite, pink or rose-red variety of pyrope (*q.v.*), a garnet mineral.

rhodonite, silicate mineral that occurs as rounded crystals, masses, or grains in various manganese ores, often with rhodochrosite. It is found in the Ural Mountains of the Soviet Union, where it is mined for ornamental uses, and in Sweden, New South Wales, California, and New Jersey. Rhodonite, a manganese, iron, and calcium silicate, $(Mn,Fe,Ca)SiO_3$, in some cases forms the primary source of very important deposits of manganese oxides, such



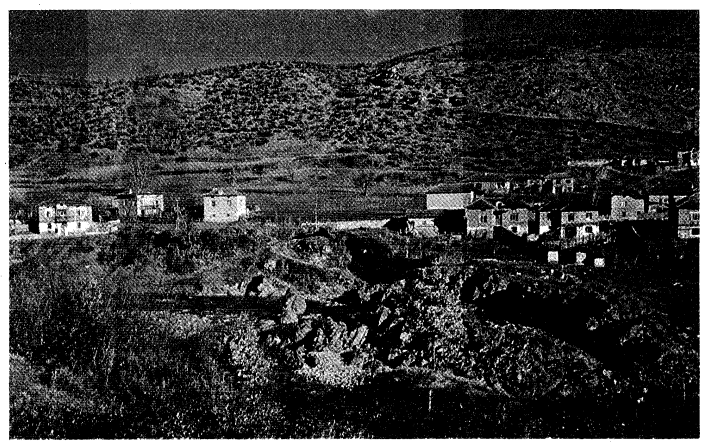
Rhodonite from Pajsberg, Swed.
By courtesy of the Field Museum of Natural History, Chicago; photograph, John H. Gerard—EB Inc.

as the manganese ores of India. For detailed physical properties, *see* silicate mineral (table).

Fine-grained rhodonite of clean, pink colour is a desirable gem and ornamental stone. It has often been used for beads, pendants, and other ornaments.

Rhodope Mountains, Bulgarian RODOPI, Greek OROSIRÁ RODHÓPIS, mountain system in the Balkan Peninsula, mainly in Bulgaria, but also reaching into Yugoslavia, Greece, and marginally into Turkey. The least accessible region in the Balkans, the system within Bulgaria has an area of 5,690 sq mi (14,737 sq km), extending 150 mi (240 km) west to east and 60 mi north to south. It is an ancient massif eroded to a wide, undulating plateau, but uplift has regenerated the erosion cycle, and the Struma and Mesta rivers have incised valleys that provide difficult routes. Elevations range from over 6,600 ft (2,000 m) in the west to about 3,300 ft in the east. Maximum elevations are Golyam (Great) Perelik, 7,188 ft, and Golyama Syutkya, 7,172 ft. The Rila and Pirin massifs, the westernmost extent of the High Rhodope, lying north and west of the Struma River Valley but outside the range proper by local distinction, reach 9,500 ft.

The system is drained by tributaries of the Maritsa River. The massif forms an important climatic barrier, protecting the Aegean lowlands from cold northerly winds and preventing warm southerly winds from blowing onto the Thracian Plain. This wild massif was a refuge for Slavic peoples during the period of Turkish rule (15th–19th century), and ancient customs survive. The lakes, river valleys, and extensive forests form the basis of a tourist industry. Hydroelectric stations are located on the Arda, which is an almost continuous lake for about 45 mi. In the southeastern Rhodope system, which is volcanic in character, lead and zinc are mined near Madan and Rudozem and then sent to Plovdiv and Kŭrdzhali for refining.



Village in the Rhodope Mountains, Bulgaria
Harrison Forman

Rila massif, High Rhodope, reaches its highest point at Musala (formerly Stalin Peak), 9,596 ft. It is a huge, rounded massif with radial drainage—the Maritsa, Iskŭr, Mesta, and Rilska all have their sources on the Rila. Around Musala are several peaks almost as high, including Dimitrov, 9,521 ft. Glaciation is evident above 7,500 ft. Hardwood and coniferous forests on the lower slopes support the timber industry. At 3,750 ft lies the Rila monastery, founded in the 10th century, which is well preserved and contains a fortified tower. Hydroelectric power stations are located on the Iskŭr and Rilska rivers. The massif was a bastion of Slavic culture during the Turkish rule. The high peaks, picturesque valleys, and mountain lakes form the basis of a local tourist industry. On Musala mountain is a cosmic radiation station. North of the Rila massif, overlooking the Sofia basin, is the Vitosha massif that reaches its maximum elevation at Chernivrŭkh, 7,513 ft. Suburbs of Sofia reach its foothills, and its upper slopes are a national park and nature reserve.

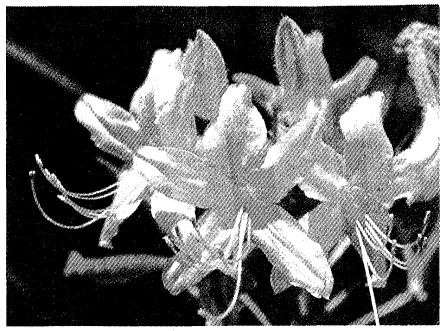
The Pirin massif, adjoining the Rila to the south and extending into Greece, bounded by the Mesta River on the east and the Struma on the west, has a similar plateau surface. Maximum elevation is at Vikhren, 9,564 ft, the second highest peak in Bulgaria. Glaciation is evident, and there are extensive alpine landforms.

Rhodophyta, division or phylum of algae the members of which are commonly known as red algae (*q.v.*).

rhodopsin, also called VISUAL PURPLE, a chromoprotein (protein linked to a pigment-carrying substance) that is contained in the light-sensitive cells of the rod type in the retina of the eye; it functions in the eye's adaptation to dim light. When the eye is exposed to bright light, the rhodopsin bleaches; after an interval of darkness, it returns to its former purple-red colour.

The pigment-bearing portion of rhodopsin is retinal, a substance formed by oxidation of vitamin A. The protein portion is opsin. In a bright light rhodopsin breaks down into retinal and opsin; in the dark the process is reversed. *See also* rod.

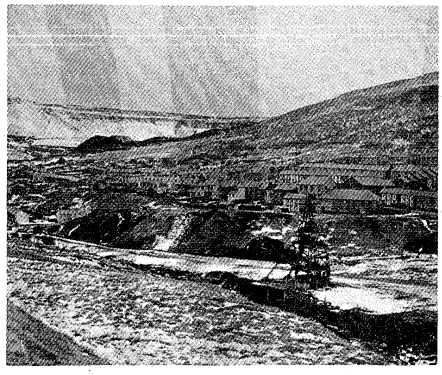
rhodora (*Rhododendron canadense*), deciduous shrub, of the heath family (Ericaceae), native to northeastern North America. It occurs most commonly in swampy regions, grows to about 90 centimetres (3 feet) in height, and has alternate, oval or oblong, smooth-edged leaves about 3.75–5 cm long. The undersurface is grayish and hairy. The showy rosy-purple flowers are about 4 cm wide and appear



Rhodora (*Rhododendron canadense*)
Peter K. Nelson

in spring before the leaves. The variety *albiflorum* has white flowers.

Rhondda, community and district, Mid Glamorgan county, Wales. The community is essentially coextensive with the district (created 1974). Rhondda district covers an area of 37 sq mi (97 sq km) and comprises an almost continuous series of towns and villages along the valleys of the Rhondda Fawr and Rhondda Fach rivers. The district is bordered by the districts of Afan to the west, Cynon Valley to the north and east, and Taff-Ely and Ogwr to the south. The town of Pentre is the administrative seat. The whole area, isolated and thinly inhabited in the early 19th century (the population in 1801 was 542), was transformed when the quality of the steam coals beneath it became known, especially after the sinking of the Treherbert pits in 1855. Many collieries were established, railways were built to the docks at Cardiff, Barry, and Port Talbot, and the valleys quickly filled with mining settlements. By 1901 the population was more than 113,000; by 1924 it was almost 170,000, including nearly 40,000 miners. By then, however, the Rhondda's exclusive dependence on mining already threatened to bring economic disaster. After 1918 the market for steam coal slumped. At one time in the mid-1930s, the local unemployment rate rose to 47 percent, and thousands of families moved from the area. Even though the government-aided opening of a wide range of light industries provided some alternative employment, the population continued to decline. Coal mining is still a major activity, despite many pit closures since 1948. Extensive afforestation of

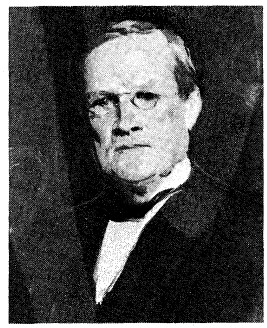


Mining village of Cwmparc in the Rhondda Valley, Mid Glamorgan
Justin B. Ingram—Bruce Coleman Inc.

abandoned land began in the 1960s. The chief local service centres are Treherbert, Treorchy, and Tonypandy. Pop. (1983 est.) 80,700.

Rhondda (of Llanwern), David Alfred Thomas, 1st Viscount, BARON RHONDDA OF LLANWERN (b. March 26, 1856, Ysgyborwen, Glamorgan, Wales—d. July 3, 1918, Llanwern, Monmouthshire, Eng.), Welsh coal-mining entrepreneur, leading figure in industrial South Wales, and government official who introduced food rationing into Great Britain in World War I.

After he entered his family's coal business in 1879, Thomas promoted several mergers of mining companies and in 1913 formed Consolidated Cambrian, Ltd., a huge mining organization. For 22 years he was a Liberal member of the House of Commons. After surviving the disaster of the British steamship "Lusitania" (torpedoed by a German submarine, May 7, 1915), he went to the United States to direct the supply of U.S. munitions to Great Britain. Prime Minister David Lloyd George appointed him president of the Local Government Board (December 1916) and controller at the Ministry of Food (June 1917), in which office he stabilized prices, regulated supplies, and gradually (from Feb. 25, 1918) instituted a rationing system, which became fully effective in the month of his death. He was created a baron in 1916 and a viscount in



Rhondda, painting by Joseph Solomon, in the National Museum of Wales, Cardiff
By courtesy of the National Museum of Wales, Cardiff

1918. (The viscountcy went to his only child, a daughter, after his death.)

Rhône, *département,* Rhône–Alpes region, east central France, embracing the city of Lyon, its capital, and the northeastern slopes of the Massif Central. With an area of 1,241 sq mi (3,215 sq km), it was created mainly from a part of the historic Lyonnais province, but in 1967 it received small additions detached from Isère and Ain *départements* to facilitate the administration of the Lyon district. The Rhône River flowing east–west makes a sweeping bend through Lyon, below which it is joined by the Saône River flowing north–south along its eastern border. To the west of the Rhône and Saône plains, the northern half is occupied by the Monts (mountains) du Beaujolais and the southern half by the Monts du Lyonnais. The Lyon region, which is foggy, has hot summers and moderate winters; abundant rain falls on the heights.

Good farmland, on which are grown cereals and sugar beets, extends over the Rhône-Saône plain; grapevines, from which the well-known Beaujolais wines are produced, grow on higher ground below 1,500 ft (457 m). The *département* has varied industries. Lyon has for centuries been a world centre of the silk and cloth industries, though synthetic fibres have almost completely supplanted silk. Important metallurgical, chemical, motor vehicle, and food-processing works are located in the Lyon area, which has four-fifths of the population. The largest employer, however, is the service sector, centred on Lyon, a transportation junction of road, rail, and inland water routes. The *département* has two *arrondissements,* Lyon and Villefranche-sur-Saône, and is in the educational division of Lyon. Pop. (1982) 1,445,208.

Rhône-Alpes, planning region (French *région de programme*), encompassing the southeastern French *départements* of Loire, Rhône, Ain, Haute-Savoie, Savoie, Isère, Drôme, and Ardèche. The capital is Lyon. The region has an area of 16,870 sq mi (43,694 sq km) and is bounded by the *départements* of Hautes-Alpes to the southeast, Vaucluse and Gard to the south, Lozère, Haute-Loire, Puy-de-Dôme, and Allier to the west, and Saône-et-Loire and Jura to the north. Switzerland lies to the northeast and Italy to the east. The Massif Central extends into Ardèche and is separated by a series of valleys from the Alps to the east. The Jura Mountains rise in the south; northern Rhône and Isère belong to the low-lying basin of the Saône River. A mountain climate prevails.

The region is densely populated. The population declined slightly between 1901 and 1946, contradicting a stronger national trend of even greater decline; since World War II, however, it has subsequently increased at a rate well above the national average. Immigrants and a relatively high birth rate have accounted for the increase, which has favoured Isère, Rhône, and Haute-Savoie. The population is heavily concentrated in the agglomerations of Lyon, Roanne, Saint-Étienne, Bourg-en-Bresse, Annecy, Chambéry, Grenoble, and Valence.

Agriculture is highly mechanized and employs only a small percentage of the work force. Animal husbandry predominates; fodder and cereals are the leading crops. Viticulture is largely limited to the Rhône Valley.

Industries are highly developed. Metalworking is concentrated around Lyon, Grenoble, and Saint-Étienne and along the Arve River. The region is a leading producer of synthetic fibres. Coal is mined in the basin of Saint-Étienne; La Mure in Isère produces anthracite. Petroleum is refined at Feyzin in Rhône. Winter sports are a major industry and centre on Chamonix-Mont-Blanc, Megève, Morzine, Avoriaz, and Flaine in Haute-Savoie, Val-d'Isère, Tignes, and Courchevel in Savoie, and Alpe-d'Huez and Chamrousse in Isère. Pop. (1982) 5,015,947.

Rhône-Poulenc SA, major French state-owned chemical manufacturer, with emphasis on the production of organic chemicals, synthetic fibres, and pharmaceuticals. Headquarters are in Paris.

The company originated as a dyestuffs manufacturer in 1801 under the name Maison Debai-Extraits Tintoriaux and in 1895 was established as Société Chimique des Usines du Rhône. In 1928 it merged with Établissements Poulenc Frères, the pharmaceutical house established by Camille Poulenc (1864–1942), the founder of the French pharmaceutical industry and a collaborator of Pierre and Marie Curie. The new Société des Usines Chimiques Rhône-Poulenc immediately founded subsidiaries to develop pharmaceutical specialties and new techniques for the manufacture of synthetic textiles. The company adopted its present name in 1961. It was nationalized by the French government in 1982.

Since the entry of France into the Common Market in 1957, Rhône-Poulenc has been instrumental in the reorganization of the French chemical industry. In 1961 it absorbed Celtex, a major synthetic fibre producer, and has since become a leader in that field in France. Synthetic fibres now account for a larger share of company production than do pharmaceuticals, although the French public is still likely to identify Rhône-Poulenc with its drug products.

The company has expanded into the production of plastics, fine specialty chemicals, films for packaging, electromagnetic tapes, and communications and copying systems. It also produces textiles, glues, paints, varnishes, and agricultural chemicals. While the bulk of the firm's sales come from France, it also has important markets in other western European

countries, the Americas, Africa, Australia, the Middle East, and the Far East.

Rhône River, river of Europe, an historic southern gateway, and the only major river of the continent that flows directly to the Mediterranean Sea.

A brief treatment of the Rhône River follows. For full treatment, *see* MACROPAEDIA: Europe.

Alpine in character, the scenic and sometimes wild course of the Rhône has been shaped by neighbouring mountain systems. Emerging from the Rhône Glacier in the Alps of south-central Switzerland, the river flows generally westward through a series of structural troughs and wider intermontane valleys before entering Lake Geneva. Exiting that lake through the city of Geneva, the Rhône enters France, transiting the Jura Mountains in a complicated zigzag course before merging with its principal tributary, the Saône, at the city of Lyon. Turning south, the Rhône continues to receive powerful tributaries of Alpine origin (including the Isère, Durance, and Ardèche) as it flows through gorges and basins hollowed out by the glaciers of the Ice Age between the Alps and the Massif Central. The Rhône enters the Mediterranean through the braided channels of its alluvial deposits west of Marseille. The 505-mile- (813-kilometre-) long river occupies a drainage basin of about 37,750 square miles (97,775 square km), and its average annual discharge near the river's mouth is 59,000 cubic feet per second (1,700 cubic m per second). The strong gradient and gravel shoals of even the lower stretches of the Rhône long proved an obstacle to navigation. Between the late 1940s and late 1970s, however, a French government-sponsored multipurpose scheme regularized the river's flow south of Lyon through a series of dams and canals. Hydroelectric and nuclear power stations were constructed along the river, and irrigation canals were more adequately utilized; and so by the late 1970s Lyon had become regularly navigable to barges of from 3,000 to 5,000 tons. The hydroelectric potential of the upper Rhône has been effectively harnessed by the Swiss. A canal under construction connecting the Saône River north of Lyon to the Rhine River will eventually allow large barges to cross Europe from the North Sea to the Mediterranean Sea.

Rhône wine, any of numerous table wines, mostly red, from the Côtes du Rhône region of southeastern France. The vineyards are situated on either side of the Rhône River from south of Lyon to Avignon.

Wines designated by the broadest regional appellation, Côtes du Rhône, are agreeable but fairly undistinguished reds. The better wines are bottled under more specific district or village names, such as the red Châteauneuf-du-pape and the rosé Tavel, both from the southern Rhône. Wines of the northern Rhône are as a group the more distinguished, notable vineyards being Hermitage, Côte-rôtie, Cornas, and Saint-Joseph. The best white Rhônes, Condrieu and Château Grillet, are also made in the northern section. A highly esteemed sweet white, Beaumes-de-Venise, is made in the south.

rhubarb, also called PIEPLANT, any of several species of the genus *Rheum* (family Polygonaceae), especially *Rheum rhaponticum* (or *R. rhabarbarum*), a hardy perennial grown for its large, succulent leafstalks, which are edible.

The rhubarb is best adapted to the cooler parts of the temperate zones. The plant's fleshy, tart, and highly acid leafstalks are used in pies, often with strawberries, in compotes and preserves, and sometimes as the base of a wine or an aperitif. The roots withstand cold well, although the tops are killed in autumn. The rhubarb's leaves contain a toxic substance and are usually not eaten, except in certain



Rhubarb (*Rheum rhaponticum*)
Derek Fell

areas of the Himalayas, where they may be cooked and consumed.

In Asia, where it originated, the rhubarb produces large clumps of enormous leaves, up to 60 cm (2 feet) across, on proportionately large petioles, or leafstalks, which are 25 mm (1 inch) or more in diameter and up to 60 cm in length, and which arise from an underground stem. The huge leaves appear early in the spring; later in the season a large central flower stalk may appear and bear numerous small, greenish white flowers and angular, winged fruits containing one seed.

Rhubarb root, from *Rheum officinale* and *R. palmatum,* has been used in medicine in China and Tibet from very early times, primarily as a cathartic. It was described in the Chinese herbal *Pen-king,* which is believed to date from 2700 BC. In England the culture of rhubarb for medicinal purposes began in 1777 at Banbury in Oxfordshire. The constituents that give rhubarb its purgative properties and its yellow colour are anthracene glycosides. Nearly 40 percent of the drug consists of calcium oxalate, which gives it the characteristic grittiness. Also present is the astringent rheotannic acid. Numerous other constituents include emodin, mucilage, resins, rheumic acid, and aporhetin.

Rhuddlan, community and district (borough), Clwyd county, northeastern Wales. The settlement, located at the head of the fertile Vale of Clwyd, grew up around a castle dating back to 1073. The castle now standing in Rhuddlan was completed by Edward I of England in 1282, at which time the task of diverting and canalizing the River Clwyd was also completed. In 1282 Edward I's queen, Eleanor of Castile, gave birth to a daughter in Rhuddlan castle, and in 1284 Edward I issued, from Rhuddlan, the Statute of Rhuddlan providing for the government of the conquered principality of Wales. In 1399 Richard II was held in the castle on his way to Flint, where he formally surrendered his crown to Henry Bolingbroke. During the English Civil War, the castle fell in 1646 to General Mytton, a well-known Parliamentary leader and commander.

The district of Rhuddlan was created in 1974 and comprises part of the North Wales coast, including the mouth of the River Clwyd and part of the Vale of Clwyd. Covering an area of 42 square miles (109 square km), it borders the districts of Colwyn to the west, Glyndŵr to the south, and Delyn to the east. The district is noted for the seaside resorts of Prestatyn and Rhyl. The administrative seat of the district and one of the most popular resorts in northern Wales, Rhyl has a promenade that extends for 3 miles (5 km) along its sandy beaches; a major indoor entertainment complex, the Suncentre (opened in 1980); the Botanical Gardens; and the Royal Floral Hall. The Royal Lido at Prestatyn has a ballroom, restaurant, swimming pool, and children's centre, with a varied program of summer entertainment. Sheep raising and dairy farming are the dominant economic activities further inland. The seaside resorts have excellent rail and road links with Merseyside, Lancashire, and the English Midlands. Pop. (1981) community, 3,560; (1986 est.) district, 55,200.

rhumb chart: *see* portolan chart.

rhumb line (navigation): *see* loxodrome.

rhumba (dance): *see* rumba.

Rhus, genus of about 150 species of shrubs, small trees, and vines, of the cashew family (Anacardiaceae), including the popular sumacs (*see* sumac). Authorities disagree over the inclusion of poison oak, poison sumac, and poison ivy (*q.v.*), which are often classified in a separate genus, *Toxicodendron.*

Several species are of local economic value. The wax tree (*R. succedanea*) has berries that yield a commercial wax and a sap that provides a natural lacquer. The varnish tree, or lacquer tree (*R. verniciflua*), source of Japanese lacquer, is poisonous to the touch, as is the North American poison sumac (*R. vernix*). Fruits of many sumacs and of sourberry, or lemonade berry (*R. integrifolia*), can be brewed into a lemony drink. Both sourberry and sugarbush (*R. ovata*) are cultivated as ornamentals in southern California.

Rhyl, seaside town, seat of Rhuddlan district, Clwyd county, Wales, at the mouth of the River Clwyd. The town is predominantly a holiday resort, with extensive sandy beaches and excellent rail and road links with Merseyside, Lancashire, and the English Midlands. Its promenade stretches for 3 miles (5 km), with a domed pavilion and the all-glass Royal Floral Hall. Prestatyn, which adjoins Rhyl to the east, is a similar holiday resort; it also has remains of prehistoric settlement, Offa's Dyke (8th century), and a demolished castle (12th century). Pop. (1981) 23,124.

rhyme, also spelled RIME, phenomenon that occurs when two or more words with similarly sounding final syllables are so placed as to echo one another. Rhyme is used by poets and occasionally by prose writers to produce sounds appealing to the reader's senses and to unify and establish a poem's stanzaic form. End rhyme (*i.e.,* rhyme used at the end of a line to echo the end of another line) is most common, but internal, interior, or leonine rhyme is frequently used as an occasional embellishment in a poem; *e.g.,* William Shakespeare's "Hark; hark! the lark at heaven's gate sings," or as part of the regular rhyme scheme:

> And the silken sad uncertain rustling of each
> purple curtain
> Thrilled me—filled me with fantastic terrors
> never felt before
> So that now, to still the beating of my heart,
> I stood repeating:
> 'Tis some visitor entreating entrance at
> my chamber door'.
> (Edgar Allan Poe, "The Raven")

There are three rhymes recognized by purists as "true rhymes": masculine rhyme, in which the two words end with the same vowel–consonant combination (stand / land); feminine rhyme (sometimes called double rhyme), in which two syllables rhyme (profession / discretion); and trisyllabic rhyme, in which three syllables rhyme (patinate / latinate). The too regular effect of masculine rhyme is sometimes softened by using trailing, or semirhyme, in which one of the two words trails an additional unstressed syllable behind it (trail / failure). Other types of rhyme include eye rhyme, in which syllables are identical in spelling but are pronounced differently (cough / slough), and pararhyme, first used systematically by the 20th-century poet Wilfred Owen, in which the two syllables have different vowel sounds but identical penultimate and final consonantal groupings (grand / grind). Feminine pararhyme has two forms, one in which both vowel sounds differ, and one in which only one

does (ran in / run on; blindness / blandness). Weakened, or unaccented, rhyme occurs when the relevant syllable of the rhyming word is unstressed (bend / frightened). Because of the way in which lack of stress affects the sound, a rhyme of this kind may often be regarded as consonance, which occurs when the two words are similar only in having identical final consonants (best / least).

Another form of near rhyme is assonance, in which only the vowel sounds are identical (grow / home). Assonance was regularly used in French poetry until the 13th century, when end rhyme replaced it. It continues to be important in the poetic technique of Romance languages but performs only a subsidiary function in English verse.

Many traditional poetic forms utilize set rhyme patterns; for example, the sonnet, villanelle, rondeau, ballade, chant royal, triolet, canzone, and sestina. Rhyme seems to have developed in Western poetry as a combination of earlier techniques of end consonance, end assonance, and alliteration. It is found only occasionally in classical Greek and Latin poetry but more frequently in medieval religious Latin verse and in songs, especially those of the Roman Catholic liturgy, from the 4th century. Although it has been periodically opposed by devotees of classical verse, it has never fallen into complete disuse. Shakespeare interspersed rhymed couplets into the blank verse of his dramas; Milton disapproved of rhyme, but Samuel Johnson favoured it. In the 20th century, although many advocates of free verse ignore rhyme, other poets have continued to introduce new and complicated rhyme schemes.

rhyme royal, rhyme also spelled RIME, seven-line stanza in iambic pentameter, rhyming *ababbcc,* first used in English verse by Chaucer in *Troilus and Criseyde* and *The Parlement of Foules.* Traditionally, the name rhyme royal is said to derive from *The Kingis Quair,* attributed to James I of Scotland (1394–1437), but some critics trace the name to the French chant royal. Chaucer probably borrowed it from the French poet and musician Guillaume de Machaut (*c.* 1300–77), who may have invented it or derived it from earlier French and Provençal poets.

Rhyme royal became the favourite form for long narrative poems during the 15th and early 16th centuries. Shakespeare's *Rape of Lucrece* (1594) was the last important poem of the period in rhyme royal. Later Milton experimented with the form, and it was successfully used by William Morris in the 19th century and by John Masefield in the 20th.

Rhymney Valley, district, Mid Glamorgan County, southeastern Wales. It was created in 1974, covers an area of 68 sq mi (176 sq km) and extends from the edge of Brecon Beacons National Park in the north to the outskirts of the city of Cardiff in the south. It is bordered by the districts of Brecknock to the north; Rhondda, Islywn, and Newport to the east, Cardiff to the south, and Taff-Ely and Merthyr Tydfil to the west. In about AD 75 the Romans built a fort at Caerphilly in the south and located a command garrison in western Rhymney Valley at the site of what is now Old Gelligaer. In 1268 Gilbert de Clare, lord of Glamorgan, began construction of Caerphilly castle, but in 1270 the structure was destroyed by Owen Glendower, the self-proclaimed prince of Wales. It was begun again in 1271 and survived the damages of the English Civil War in the 1640s. The castle, occupying an area of 30 ac (12 ha), is the largest in Great Britain after Windsor.

Essentially a coal-mining district, Rhymney Valley experienced its most significant growth in the 18th and 19th centuries during the rapid development of the coal and iron industries. Coal mining is still the main source of employment in the town of Gelligaer, although there has been some diversification of industry since 1945. Caerphilly has become an important shopping centre for the district as well as a residential base for workers who commute to Cardiff. The mining town of Rhymney, farther north, also has some breweries and light engineering. Bargoed is the administrative seat for the district. Former mining-land reclamation plans, together with new recreational facilities, are expected to increase tourism in the valley. Pop. (1983 est.) 104,700.

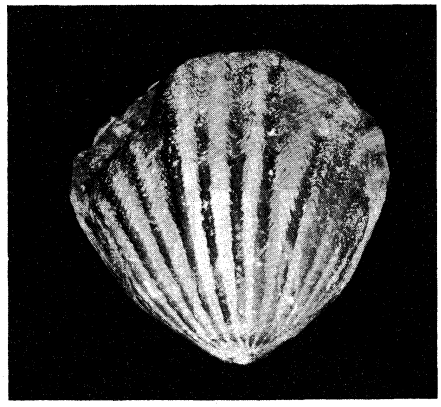
Rhyn, Otto Henne am: *see* Henne am Rhyn, Otto.

Rhynchocephalia, reptilian order that arose in the Triassic and Jurassic periods (225,000,000 to 136,000,000 years ago) and survives today as the tuatara (*q.v.*) of New Zealand.

rhynchophthirinan, any member of the suborder Rhynchophthirina of the louse order Phthiraptera, consisting of the genus *Haematomyzus* with two species. Although its origins and relationships are uncertain, the suborder is considered intermediate between the chewing lice and the sucking lice.

The elephant louse (*H. elephantis*) is found on African and Indian elephants, and *H. hopkinsi* on the African warthog. They have mouthparts that can pierce thick skin.

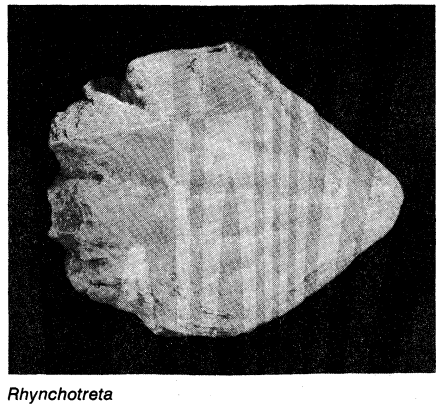
Rhynchotrema, extinct genus of brachiopods, or lamp shells, found as fossils in Middle and Upper Ordovician rocks (the Ordovician Period began 500,000,000 years ago and lasted 70,000,000 years). The shell is small and distinctive for its strongly developed ribbing. *Rhynchotrema* is a useful Ordovician index, or guide, fossil.



Rhynchotrema

By courtesy of the trustees of the British Museum (Natural History); photograph, Imitor

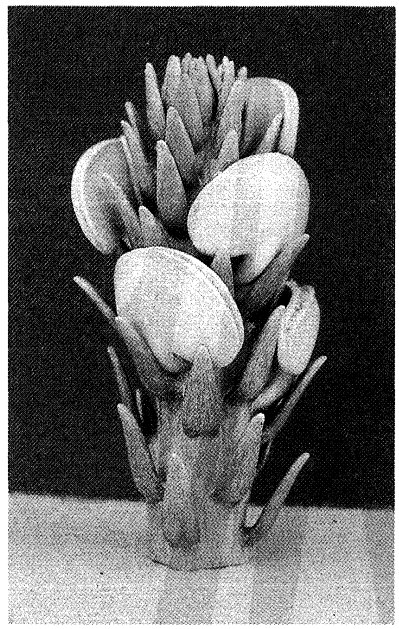
Rhynchotreta, extinct genus of brachiopods (lamp shells) commonly found as fossils in Silurian marine rocks (between 395,000,000 and 430,000,000 years old). Its small, roughly triangular shell is prominently ornamented by distinct ridges that run lengthwise to the shell margin. Because of its limited time range, *Rhynchotreta* is a good guide, or index, fossil for Silurian rocks and time.



Rhynchotreta

By courtesy of the trustees of the British Museum (Natural History); photograph, Imitor

Rhynie plants, several genera of fossil plants uncovered near Rhynie, Aberdeen, Scot., of significance in tracing the evolution of vascular plants (plants with special cells that conduct water and food). The rocks containing these fossils are of Middle Devonian age (about 365,000,000 years ago) and are part of a geological formation called the Old Red Sandstone.



Asteroxylon (model)

H.R. Allen from the Natural History Photographic Agency—EB Inc.

Three genera are represented by almost perfectly preserved fossils of virtually entire plants: *Rhynia* and *Horneophyton,* of the family Rhyniaceae; and *Asteroxylon,* of the family Asteroxylaceae. *Rhynia,* often regarded as the most primitive vascular plant, is not necessarily the one from which later plants evolved. In fact, there is evidence that *Rhynia* evolved from vascular plants that extend back into the Silurian Period (which began 430,000,000 years ago and lasted 35,000,000 years). Slender leafless stems arose from a horizontal underground stem (rhizome). In *R. gwynne-vaughani* the erect shoots were about 17 centimetres (7 inches) high; in *R. major* they were about three times that height. *Rhynia* grew in dense cover with *Horneophyton* and *Asteroxylon. Asteroxylon,* which grew to about 50 cm (20 in.), had erect stems clothed completely with scalelike leaves. *Rhynia* and *Horneophyton* reproduced by means of spores borne in spore cases at the tips of stems. *Asteroxylon* had kidney-shaped spore cases borne laterally, directly on the main axes.

rhyolite, extrusive igneous rock that is the volcanic equivalent of granite. Most rhyolites are porphyritic, indicating that crystallization began prior to extrusion. Crystallization may sometimes have begun while the magma was deeply buried; in such cases, the rock may consist principally of well-developed, large, single crystals (phenocrysts) at the time of extrusion. The amount of microcrystalline matrix (groundmass) in the final product may then be so small as to escape detection except under the microscope; such rocks (nevadites) are easily mistaken for granite in hand specimens.

In most rhyolites, however, the period of such crystallization is relatively short, and the rock consists largely of a microcrystalline or partly glassy matrix containing few phenocrysts. The matrix is sometimes micropegmatic or granophyric. The glassy rhyolites include obsidian, pitchstone, perlite, and pumice.

The chemical composition of rhyolite is very like that of granite (*q.v.*). This equivalence implies that at least some and probably most granites are of magmatic origin. The phenocrysts of rhyolite may include quartz, alkali feldspar, oligoclase feldspar, biotite, amphibole, or pyroxene. If an alkali pyroxene or alkali amphibole is the principal dark mineral, oligoclase will be rare or absent, and the feldspar phenocrysts will consist largely or entirely of alkali feldspar; rocks of this sort are called pantellerite. If both oligoclase and alkali feldspar are prominent among the phenocrysts, the dominant dark silicate will be biotite, and neither amphibole nor pyroxene, if present, will be an alkaline variety; such lavas are the quartz porphyries or "true" rhyolites of most classifications.

Certain differences between rhyolite and granite are noteworthy. Muscovite, a common mineral in granite, occurs very rarely and only as an alteration product in rhyolite. In most granites the alkali feldspar is a soda-poor microcline or microcline-perthite; in most rhyolites, however, it is sanidine, not infrequently rich in soda. A great excess of potassium over sodium, uncommon in granite except as a consequence of hydrothermal alteration, is not uncommon in rhyolites.

Rhyolites are known from all parts of the Earth and from all geologic ages. They are mostly confined, like granites, to the continents or their immediate margins, but they are not entirely lacking elsewhere. Small quantities of rhyolite (or quartz trachyte) have been described from oceanic islands remote from any continent.

Consult the INDEX *first*

Rhys, Ernest Percival (b. July 17, 1859, London—d. May 25, 1946, London), English man of letters who, as editor of Everyman's Library, a series of inexpensive editions of



Ernest Rhys
J.M. Dent & Sons Ltd., London

world classics, influenced the literary taste of his own and succeeding generations.

Although ill health interrupted his education, Rhys showed early promise and an innate love of books. In 1886 he became a poet and free-lance critic and editor in London. He contributed to reviews and to the two volumes published by the Rhymers' Club, of which he, with William Butler Yeats, was a founder-member, and was employed by various publishers as an editor. His association with the publisher J.M. Dent began with his editing a series of lyric poetry (1894–99), and in 1904 Dent invited him to edit Everyman's Library (a title suggested by Rhys). The first volume came out in 1906, and, by the time of Rhys's death, of the 1,000 volumes planned, 983 had been published. Rhys's own writings included volumes of essays and poems and two volumes of reminiscences, *Everyman Remembers* (1931) and *Wales England Wed* (1940).

Rhys, Jean (b. Aug. 24, 1894, Roseau, Dominica, Windward Islands, West Indies—d. May 14, 1979, Exeter, Devon, Eng.), British novelist who earned acclaim for her early works set in the bohemian world of Europe in the 1920s and 1930s but who stopped writing for nearly three decades, until she wrote a successful novel set in the West Indies.

The daughter of a Welsh doctor and a Creole mother, Jean Rhys lived and was educated in Dominica until she went to London at the age of 16 and worked as an actress before moving to Paris. There she was encouraged to write by the English novelist Ford Madox Ford. Her first book, a collection of short stories, *The Left Bank* (1927), was followed by such novels as *Postures* (1928), *After Leaving Mr. Mackenzie* (1931), *Voyage in the Dark* (1934), and *Good Morning, Midnight* (1939).

After moving to Cornwall she wrote nothing until her remarkably successful *Wide Sargasso Sea* (1966), a novel that reconstructed the earlier life of the fictional character Antoinette Cosway, who was Mr. Rochester's mad first wife in Charlotte Brontë's *Jane Eyre*. *Tigers Are Better-Looking, with a Selection from the Left Bank* (1968) and *Sleep It Off Lady* (1976), short-story collections, followed. *Smile Please*, an unfinished autobiography, was published in 1979.

Rhys, Siôn Dafydd, also called JOHN DAVID RHYS, or JOHN DAVIES (b. 1534, Llanfaethlu, Anglesey, Wales—d. *c.* 1609, Clun Hir?, Brecknockshire), Welsh physician and grammarian whose grammar, *Cambrobrytannicae Cymraecaeve linguae institutiones et rudimenta* (1592), was the foundation of all later Welsh grammatical studies.

Rhys spent some time at Oxford, then earned a degree in medicine from the University of Siena, Italy. He practiced as a physician at Cardiff, Wales, before devoting all his time to his grammar. He attempted to set down the rules of bardic poetry and the principle of the Welsh language but did so according to the Latin grammatical structure. His book includes a greeting in Welsh, a grammar of the Welsh language, a discussion of the poetic art, and a collection of Welsh poetry. It is valuable in that it contains items of knowledge that otherwise might have been lost.

rhythm, in music, element of time. Since music unfolds in time, it might seem that rhythm is its most important aspect, but the rhythmic element—the placement of sounds in time—cannot be divorced from the nature of the sounds themselves; for instance, a regular rhythm of one sound per second will produce a quite different effect depending on whether the sounds are drum strokes, notes on a piano, or orchestral chords. By extension it becomes clear that rhythm is not just a matter of timing; it depends also on accentuation, interval, harmony, and tone colour. This complexity is something that is felt instinctively by any performing musician.

A brief treatment of rhythm follows. For full treatment, *see* MACROPAEDIA: Music, The Art of.

The foundation of rhythm in most music is simple; it is the regular beat. Indeed, in everyday language the word rhythm often refers to this kind of pulsation; one speaks of the rhythm section in a light orchestral arrangement, or of musicians having a sense of rhythm when emphatic regular accents are the result. A prominent beat tends, too, to be the most important rhythmic feature in music originating in the dance, whether it be a mazurka, a rock number, or an African drum solo.

The organization of beats is the province of metre. In Western music the most common metres are duple, with two beats to the bar, and triple, with three beats to the bar, plus their various compounds, such as quadruple, with two units of two beats (a traditional marching metre), and sextuple, with two units of three beats. Normally a piece will be a succession of bars having essentially the same metre, though of course the beats may be combined or divided differently in different bars, and all sorts of variations are possible.

The origins of rhythm in Western music are a matter of dispute. Some authorities maintain that plainsong was performed with a decisive metre, while others hold that it was delivered in an irregular manner, as in speech. Musicians had certainly developed a notation for different kinds of metre by the 12th century, however, and during the 14th century the notation of rhythm reached a peak of complexity unequalled until the 1950s. This refinement could not, though, be sustained once composers began giving more thought to harmony, as happened during the Renaissance, and rhythm regained its foundations in simplicity and regularity.

What happened during the 17th century was a division into two varieties of rhythm, one based on repeating pattern in the manner of dance, the other based on the freer rhythms of speech and to be found most usually in music for solo voice; this division is reflected in the distinction in opera between aria and recitative. Meanwhile, the clarity of design in the former kind of music had much to do with the rhythmic achievements of Joseph Haydn, Wolfgang Amadeus Mozart, and Ludwig van Beethoven, who were able to work with great subtlety at several different levels within the transparent outline of even (as opposed to odd) bars and even groupings of them, usually into phrases of four or eight bars.

The 19th century saw an erosion of this metrical system through an abundance of cross rhythms, subdivisions, and irregularities, to the extent that many composers in the 20th century discarded metre along with the system of major and minor keys. In some cases the primitive pulsation has been brought once more to the surface, as in Igor Stravinsky's *Rite of Spring*. In others all traces of rhythmic pattern have been abandoned.

rhythm, in poetry, the patterned recurrence, within a certain range of regularity, of specific language features, usually features of sound. Although difficult to define, rhythm is readily discriminated by the ear and the mind, having as it does a physiological basis. It is universally agreed to involve qualities of movement, repetition, and pattern and to arise from the poem's nature as a temporal structure. Rhythm, by any definition, is essential to poetry; prose may be said to exhibit rhythm but in a much less highly organized sense. The presence of rhythmic patterns heightens emotional response and often affords the reader a sense of balance.

Metre (*q.v.*), although often equated with rhythm, is perhaps more accurately described as one method of organizing a poem's rhythm. Unlike rhythm, metre is not a requisite of poetry; it is, rather, an abstract organization of elements of stress, duration, or number of syllables per line into a specific formal pattern. The interaction of a given metrical pattern with any other aspect of sound in a poem produces a tension, or counterpoint, that creates the rhythm of metrically based poetry.

Compared with the wide variety of metrical schemes, the types of metrically related rhythms are few. Duple rhythm occurs in lines

composed in two-syllable feet, as in Shakespeare's line,

′ ∪ ∪ ∪ ∪ ′ ∪ ′ ∪ ′
Tired with | all these, | for rest | ful death | I cry

In metrical schemes based on three-syllable feet, the rhythm is triple:

∪ ∪ ′ ∪ ∪ ′ ∪ ∪ ′
For the strength | of the Pack | is the Wolf, |
∪ ∪ ′ ∪ ∪ ′ ∪ ∪ ′
and the strength | of the Wolf | is the Pack
(Kipling)

Rising rhythm results when the stress falls on the last syllable of each foot in a line:

∪ ′ ∪ ′ ∪ ′ ∪ ′ ∪ ′
When I | consid | er how | my light | is spent
(Milton)

The reverse of this is falling rhythm:

′ ∪ ′ ∪ ′ ∪ ′ ∪
Bacchus' | blessings | are a | treasure
(Dryden)

Running, or common, rhythm occurs in metres in which stressed and unstressed syllables alternate (duple rhythm, rising or falling). Gerard Manley Hopkins, in reaction against traditional metres, coined the term sprung rhythm (*q.v.*) to apply to verse wherein the line is measured by the number of speech-stressed syllables, the number of unstressed syllables being indeterminate.

The rhythms of free verse (*q.v.*) derive from the systematic repetition of language elements other than metrical stress patterns. Differentiation between the rhythmical basis of free verse and that of metrical verse involves a relative, rather than an absolute, distinction regarding the range of language features considered and the extent to which they are patterned. Since metrical verse is principally concerned with the distribution of relative stress values, it does not account for the significance of other linguistic features that may contribute to rhythmic effect. In free verse, rhythm most commonly arises from the arrangement of linguistic elements into patterns that more nearly approximate the natural cadence of speech and that give symmetry to the verse. The rhythmical resources available to free verse include syntactical patterning; systematic repetition of sound, words, phrases, and lines; and the relative value of temporal junctures occasioned by caesura (a marked pause in the middle of a line), line length, and other determinants of pace. Some authorities recognize in the highly organized patterning of imagery a further source of poetic rhythm. The following lines from Walt Whitman's "Song of Myself" illustrate many of these rhythmical devices:

Twenty-eight young men bathe by the shore,
Twenty-eight young men and all so friendly;
Twenty-eight years of womanly life and all
so lonesome.
She owns the fine house by the rise of the
bank,
She hides, handsome and richly drest aft the
blinds of the window.

The rhythms that are characteristic of particular poets are sometimes ascribed to units of breath, as in the essay "Projective Verse" (1950) by the poet and critic Charles Olsen: "And the line comes (I swear it) from the breath, from the breathing of the man who writes, at the moment that he writes . . . ."

rhythm, biological: *see* biological rhythm.

rhythm and blues, any of a number of closely related musical styles developed in the United States by black performers. The various styles were, like all black American music, based on a mingling of European influences with jazz rhythms and tonal inflections, particularly syncopation and the flatted blues chords. More specifically the style grew out of the blues of the rural American South, which blended work chants, shouts, and hollers with songs of joy, lament, and other deeply felt emotions; it was greatly influenced by the gospel music of black churches.

Among the many styles lumped together as rhythm and blues, three major forms were distinguishable. The earliest, called race, which actually dated from before World War II and which was the first to disappear, was the style of the "jump" band. Such a band was often the remnant of a band whose avant-garde jazz members had left to join bebop, an experimental movement with music interesting to hear but impossible to dance to. The jump bands placed increasing emphasis on strong rhythm, exciting solo work (especially by saxophones), and vocals in a shout-blues manner. The large jump bands had, for the most part, vanished by the early 1950s.

A second form of rhythm and blues grew up in the 1940s mainly in the bars and clubs of Chicago's South Side and was often called Chicago blues. Exemplified by such performers as Muddy Waters, Sonny Boy Williamson, and Howlin' Wolf, Chicago blues was typically played—loudly—by a small group with electric guitar, harmonica, electric bass, electric piano or organ, and drums. Melody lines and vocals drew heavily on the rural blues, with the rhythm strong and dance-oriented.

The third major form, rather more diffuse, was primarily vocal, with the instrumental backing varying from full orchestra to none at all. Usually performed by a group, the style employed close harmonies and nearly always a subdued and medium-to-slow tempo. The church influence was pronounced; the lead voice tended to the upper register and often either rode over the wordless chords of the others or engaged them in a call-and-response pattern.

In the middle 1950s the term rhythm and blues was used by record companies and trade publications to designate music intended for the black audience, replacing such earlier and less circumlocutory terms as ebony, sepia, and race music. The change reflected a breakdown of the traditional separation of the black and white music markets, a change that was accelerated by the emergence of rock. With the gradual disappearance of its exclusively black audience, the Chicago blues style began to seem less a vital form than a folk tradition, while the gospel style was transformed into the more sophisticated and commercial "soul" music of broad appeal.

rhythmic mode, rhythmic organization in triple patterns underlying all polyphonic (many-voiced) music of the late 12th and 13th centuries, beginning with the descant sections of two-part organa of the Notre-Dame school in Paris and culminating in the multilingual motets of the 13th century; the latter forms feature two or three rhythmic modes simultaneously in different parts of the polyphonic texture. It was the system of rhythmic modes that facilitated the temporal coordination of polyphonic parts.

The six rhythmic modes were analogous to classical poetic metres: I (trochee) ♩ ♪; II (iamb) ♪ ♩; III (dactyl) ♩. ♪ ♩; IV (anapest) ♪ ♩ ♩.; V (spondee) ♩. ♩.; and VI (tribrach) ♩♩♩ ♩♩♩. By arranging the customary square *neumes* (notational devices indicating pitch but not duration per se) in certain consistent patterns with special attention to the position of the ligatures (notational signs combining several successive pitches), the medieval scribes were able to communicate the intended rhythmic mode. Thus, a triple ligature followed by two double ligatures indicated the first mode. Since the last pitch in a ligature was always read as a long value, the preceding pitch was understood to be short, while, in this particular arrangement, the initial pitch was considered to be long by extrapolation. Non-Western counterparts of the medieval rhythmic modes are found in the Islāmic *īqāʿāt* and the Indian *tāla*.

rhythmic sportive gymnastics, also called MODERNE GYMNASTICS, or MODERN RHYTHMIC GYMNASTICS, the performance of systematic physical exercise with the aid of such hand apparatuses as ropes, hoops, balls, clubs, and ribbons. It is closely related to women's artistic gymnastics—a sport performed on the vaulting horse, uneven parallel bars, balance beam, and floor—and, like synchronized swimming, is allied with dance. The sport dates from the 18th century; and, although some gymnasts participated at the Olympic Games from 1948 to 1956 in individual and group exercises, it was not until the 1984 Olympiad that individual competition became an official competitive event. World championships have been held biannually, in a succession of host cities, since 1963.

An individual routine is performed by one gymnast with one apparatus for 1–1½ minutes, whereas a group routine is performed by six gymnasts with six pieces of apparatus for 2½–3 minutes. Both are accompanied by a single musical instrument, usually a piano. The length of the rope used is determined by the height of the individual participant; the plastic or wooden hoop's interior diameter may vary from 80 to 90 cm (32 to 36 in.); the 18–20-cm plastic or rubber ball must weigh a minimum of 400 g (14 oz); a pair of clubs, 40–50 cm long, must each weigh a minimum of 150 g; and the ribbon, a satin strip 5 cm wide and 6 m (19¾ ft) long, is attached to a slender, flexible wooden stick, or cane, that is 50–60 cm in length. The apparatus can be of any colour except gold, silver, or bronze.

There are no compulsory elements at the elite and international levels in rhythmic gymnastics, although at least two superior moves (three at the Olympics) and six elements of difficulty are expected to be executed in any one exercise. Artistry—including originality of routine and its execution, gestures and facial expressions, and fluidity of line and movement—counts far more than vigorous acrobatics in scoring points. *See also* Olympic Games.

To make the best use of the Britannica, consult the INDEX *first*

ria, funnel-shaped estuary that occurs at a river mouth and is formed by the submergence of the lower portion of the river valley. Generally occurring along a rugged coast perpendicular to a mountain chain, many rias were formed by the rise in sea level after the melting of the vast continental glaciers. Rias are commonly very irregular and may have several branching tributaries; they usually are the major drainage systems of the adjacent areas. Their widening funnel shape and steadily increasing depth seaward usually cause an exaggerated tidal effect within the estuary.

Riabushinskii FAMILY: *see* Ryabushinsky family.

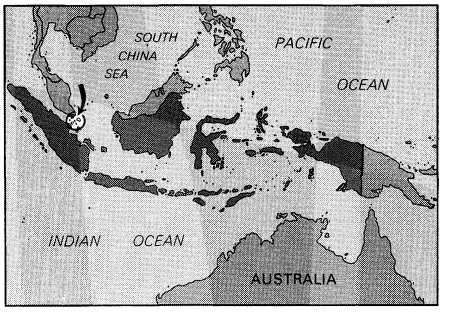
Rialto Bridge, crossing over the narrowest point of the Grand Canal in the heart of



Rialto Bridge, Venice
Cary Wolinsky—Stock, Boston, Inc.

Venice, built in the closing years of the 16th century, renowned as an architectural and engineering achievement of the Renaissance. It was designed and built following a design competition by Antonio da Ponte, who also designed Venice's Bridge of Sighs. A single stone-arch span supports a broad, rectangular deck carrying two arcades of shops fronting on three roadways. The lower chord of the bridge is only 83 feet (25 m), while the width is 66 feet (20 m).

Riau, *provinsi* ("province"), east-central Sumatra, Indonesia. It is bounded by the provinces of Jambi on the south, Sumatera Barat (West Sumatra) on the west, Sumatera Utara (North Sumatra) on the north and northwest, the Malacca Strait on the east, and the Berhala Strait on the southeast. Riau covers a total area of 36,511 square miles (94,562 square km) and includes the island groups of Karimun, Batam, and Bintan to the east; the Lingga, Singkep, Rupat, and Bengkalis islands in the Strait of Malacca; and the Tambelan, Anambas, and Natuna islands in the South China Sea.



Riau

The region formed part of the Buddhist Śrivijaya empire, with its capital at Palembang (Sumatra), and served as a base for the conquest of Hindu kingdoms on the Malay Peninsula in the 7th century. The Hindu Majapahit empire of eastern Java established supremacy over the region with the fall of the Śrivijaya empire in the 14th century. Muslim states were established in the 16th century subsequent to the disintegration of the Majapahit empire. When the Portuguese seized the Malay state of Malacca in 1511, its last sultan founded the Riau-Johore kingdom, and that became the nucleus of the Malay civilization. The Dutch arrived in 1596, and the British followed shortly afterward. Interpower rivalry and attacks by the *orang laut* (sea pirates) adversely affected the fortunes of the region. The Dutch gained control of the region by the end of the 18th century. The British occupied it for a short period near the end of the 18th and in the early 19th century. After an interval of Japanese occupation during World War II, the province was incorporated into the newly formed Republic of Indonesia in 1950.

The Batak Plateau and the Padang Highlands of the Barisan Mountains situated along the central half of its western boundary constitute the only uplands in the province. The Tiga Puluh Mountains, which have an average elevation of 2,369 feet (722 m), thrust northward near the province's south-central boundary. A belt of swamps, fed by the Rokan, Tapung, Siak, Kampar, and Indragiri rivers flowing eastward from the highlands, extends inward from Sumatra's northeastern coast to a maximum width of approximately 150 miles (240 km); swamps also cover the greater part of Rupat and Bengkalis islands. The region is subject to occasional flooding, and the coast is deeply indented by estuaries. The swamp vegetation comprises sedge, pandanus, rattan, and ferns; dense bamboo thickets border the swamps at many places, and the estuaries are dotted with mangroves. Agriculture is the principal occupation; rice, corn (maize), cassava, soybeans, copra, gambier (dye), pepper, timber, and fish are produced. The major large-scale industry is the mining of tin and bauxite on Bintan and Singkep islands. Other industries include food processing, paper making, and wood carving. The internal transport is mainly by riverboat; roads are confined mainly to the hinterland around Pakanbaru, the provincial capital. A number of ethnic groups, including the Sakai, Laut, Hutan, and Akik, make up the population, which is predominantly Muslim. There are also many Coastal Malay and Chinese. Pop. (1987 est.) 2,655,900.

Riazan (Russian S.F.S.R.): *see* Ryazan.

rib, any of several pairs of narrow, curved strips of bone (sometimes cartilage) attached dorsally to the vertebrae and, in higher vertebrates, to the breastbone ventrally, to form the bony skeleton, or rib cage, of the chest. The ribs help to protect the internal organs that they enclose and lend support to the trunk musculature.

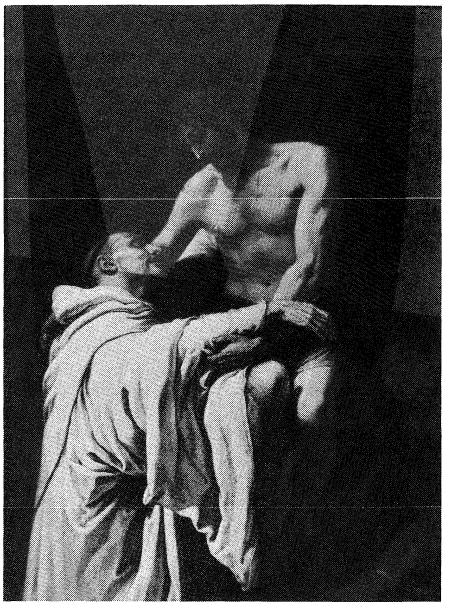
Fish have two sets of ribs, which attach to the upper and lower parts of the vertebral arches and which do not join in front. The upper (dorsal) set of ribs is believed to have evolved into the ribs of land vertebrates. Attachment of ribs to a breastbone (sternum) to form a rib cage appeared first in reptiles. In the primitive condition, ribs were attached to all vertebrae; this is still true in some reptiles (*e.g.,* snakes), but in mammals only thoracic vertebrae carry ribs. Remnants of cervical ribs secondarily fused to cervical vertebrae (the uppermost part of the vertebral column) are represented by part of the transverse process of the cervical vertebrae.

The number of pairs of ribs in mammals varies from 9 (whale) to 24 (sloth); of true ribs, from 3 to 10 pairs. In humans there are normally 12 pairs of ribs. The first seven pairs are attached directly to the sternum by costal cartilages and are called true ribs. The 8th, 9th, and 10th pairs—false ribs—do not join the sternum directly but are connected to the 7th rib by cartilage. The 11th and 12th pairs—floating ribs—are half the size of the others and do not reach to the front of the body. Each true rib has a small head with two articular surfaces—one that articulates on the body of the vertebra and a more anterior tubercle that articulates with the tip of the transverse process of the vertebra. Behind the head of the rib is a narrow area known as the neck; the remainder is called the shaft.

For a depiction of the ribs in human anatomy, shown in relation to other parts of the body, *see* the colour Trans-Vision in the PROPAEDIA: Part Four, section 421.

Ribalta, Francisco (b. 1565, Castellón de la Plana, Spain—d. Jan. 12, 1628, Valencia), Spanish painter who was one of the first artists to be influenced by the new realism initiated by Caravaggio in Italy. Ribalta's use of light and shadow to give solidity to his forms made him the first native Spanish *tenebroso* (a painter who emphasizes darkness rather than light), and he was a major influence on later Spanish painters.

Ribalta probably studied under Navarrete el Mudo at El Escorial and in Madrid. Only one painting from his first period has survived, the "Nailing to the Cross" (1582). It is an undistinguished Mannerist work. In 1598 he moved to Valencia and established a large studio under the patronage of the archbishop, Juan de Ribera. His compositions of this period, notably the "Retable of Santiago" in the church of Algemesí (1603, 1610), are highly imitative and mediocre. In his last period, after 1612, he achieved both originality and grandeur. Paintings such as "The Singer" and "Christ Embracing St. Bernard" and the "Portacoeli Retable" are marked by their monumental and powerfully modeled forms, a simplicity of composition, and realistic lighting. These


"Christ Embracing St. Bernard," oil painting by Ribalta; in the Prado, Madrid
A. Gutierrez—Ostman Agency

late paintings anticipate the work of Diego Velázquez, Francisco de Zurbarán, and José de Ribera later in the 17th century.

Ribandism (Irish nationalist movement): *see* Ribbonism.

Ribas, Óscar (Bento) (b. Aug. 17, 1909, Luanda, Angola), Portuguese-Angolan folklorist and novelist who devoted his life to recording the unwritten culture of the Kimbundu-speaking people of Angola. Ribas, the son of a Portuguese father and an Angolan mother, gradually went blind during his early 20s but remained an indefatigable researcher and writer.

Ribas began his literary career as a writer of romantic tales. The publication of *Uanga* (1951; "Enchantment") and *Ecos da Minha Terra* (1952; "Echoes of My Land") marked a new African direction in his writing. *Uanga,* which Ribas called a folkloric Angolan novel, follows the marriage of an African man and woman, but it also presents a wealth of Kimbundu fables, songs, and folk sayings. Ribas published an expanded version in 1969. *Ecos da Minha Terra* is a collection of stories based on legends and folktales.

Ribas' study of Kimbundu culture and religion, *Ilundo: Divindades e Ritos Angolanos* (1958; "Ilundo: Angolan Divinations and Rites"), appeared after 18 years of research. It was followed by *Missosso: Literatura Tradicional Angolana,* 3 vol., (1961–64; "Missosso: Traditional Angolan Literature"), a linguistic work containing a vernacular dictionary and Portuguese versions of Angolan tales (*missosso*) and proverbs. Ribas' autobiography, *Tudo Isto Aconteceu* (1975; "All of This Happened"), confirms Ribas' attachment to an Angola in which blacks and whites live fraternally.

Ribāṭ (Morocco): *see* Rabat.

Ribaut, Jean (b. *c.* 1520, Dieppe, Fr.—d. Oct. 12, 1565, Florida [now in U.S.]), French naval officer, explorer, and colonizer.

Jean Ribaut began his naval career as a youth, rising through the ranks to become one of the most dependable officers serving under Admiral Gaspard de Coligny. In 1558 Ribaut was commander of a French supply

vessel at the successful capture of Calais from the English, and the following year he went to Scotland to supervise French interests in that nation.

Ribaut was appointed commander of an expedition that was designed to found a French Huguenot colony in Florida in 1562. Early that spring he sailed from France with three ships carrying approximately 150 colonists, and on May 1 they landed near the mouth of the St. John's River (or, as he called it, Rivière de Mai) in Florida. Ribaut claimed the lands for France but sailed northward to the sound of Port Royal, which he named, and established Charlesfort (probably on southern Port Royal Island, now in South Carolina, U.S.). He returned to France on July 20, 1562. France's religious wars prevented him from bringing fresh supplies to Charlesfort, and the colonists there soon abandoned the settlement. A Protestant, Ribaut was forced to seek refuge in England, where he subsequently was imprisoned after refusing to assist a colonization project in the New World. While he was in England, his memoir, *Whole and True Discovery of Terra Florida,* was published.

Ribaut eventually was released from prison by Queen Elizabeth I. In 1565 Admiral Coligny dispatched him with seven ships to reinforce the recently founded Huguenot settlement of Fort Caroline on the St. John's River. The Spanish government of Philip II, with its own claims to Florida, ordered Pedro Menéndez de Avilés to destroy the French colony. Menéndez finally succeeded in capturing Fort Caroline after an overland expedition from his own settlement at St. Augustine and captured Ribaut when a storm scattered Ribaut's fleet and drove his flagship ashore. Menéndez, who earlier had massacred the French prisoners at Fort Caroline, ordered Ribaut and his surviving crew members executed as Protestant heretics.

Ribbentrop, Joachim von (b. April 30, 1893, Wesel, Ger.—d. Oct. 16, 1946, Nürnberg), German diplomat, foreign minister under the Nazi regime (1933–45), and chief negotiator of the treaties with which Germany entered World War II.

Ribbentrop was the son of an army officer in a middle-class family. After attending schools in Germany, Switzerland, France, and England, he went to Canada (1910), but he returned to Germany at the outbreak of World War I, in which he served as a hussar on the Eastern Front. He was then assigned to the German military mission in Turkey. Upon his return to Germany at the end of the war, Ribbentrop worked as a *Sekt* (sparkling wine) salesman until his marriage in 1920 to the daughter of a wealthy *Sekt* producer made him financially independent. Thereafter he persuaded a distant ennobled relative to adopt him so that he could affix "von" to his name.

Ribbentrop met Adolf Hitler in 1932 and joined the National Socialist Party the same year, becoming the führer's chief adviser on foreign affairs after the Nazi accession to power (Jan. 30, 1933). After his appointment in 1934 as *Reich* commissioner for disarmament at Geneva, he negotiated in June 1935 the Anglo-German Naval Agreement, which authorized German naval rearmament. In 1936 Ribbentrop became ambassador to Great Britain; by 1938, when he left his post, he had become a thorough Anglophobe. His advice to Hitler, that Britain could not aid Poland effectively, proved correct in the short run.



Ribbentrop
Heinrich Hoffmann, Munich

In the meantime, Ribbentrop had also negotiated the Anti-Comintern Pact with Japan (1936) and, after his appointment as minister of foreign affairs in February 1938, he signed the "Pact of Steel" with Italy (May 22, 1939), linking Europe's two fascist dictatorships in an alliance in case of war. Ribbentrop's greatest diplomatic coup, however, was the German-Soviet Nonaggression Pact of Aug. 23, 1939, which cleared the way for Hitler's attack on Poland on Sept. 1, 1939, thus beginning World War II.

With the outbreak of the war, Ribbentrop's importance rapidly declined. He signed the Tripartite Pact with Japan and Italy (Sept. 27, 1940), which provided for mutual assistance against the United States, but thereafter diplomacy became a secondary concern. Ribbentrop maintained himself only through Hitler's backing. Even this support faded after some Foreign Office personnel were implicated in the plot of July 20, 1944, to assassinate Hitler.

Ribbentrop was captured in Hamburg on June 14, 1945, tried before the International Military Tribunal at Nürnberg, found guilty on four major counts, and hanged. While in prison he wrote *Zwischen London und Moskau* (1953; "Between London and Moscow"; Eng. trans. *The Ribbentrop Memoirs*).

Ribble, River, river in North Yorkshire and Lancashire, England, formed by the confluence of the Gayle and Cam becks (streams). The river first flows almost due south between Ingleborough Mountain (2,373 feet [723 m]) and Pen-y-Ghent (2,273 feet [693 m]) and then through open country, a long gorge, and a wide valley (devoted mostly to pastoral farming) until it is joined by its two main tributaries, the Hodder from the north and the Calder. The Ribble then meanders between bluffs that rise 150 feet (46 m) high a mile apart on either side of the floodplain. Preston lies on the northern side at the lowest bridge point. The channel to the Irish Sea coast, 12 miles (19 km) away, has been straightened to provide a shipping lane to Preston. The Ribble is 75 miles (120 km) long.

Ribble Valley, district (borough), county of Lancashire, northwestern England, occupying an area of 225 square miles (583 square km) in the central part of the county, its northern and central parts lying within the western Pennine uplands. The River Ribble flows through a wide, cultivated lowland valley and drains the southeastern and southern parts of the district, distinctively separating another Pennine upland area at the southern limits of the district.

The predominantly grit moorland in the district's section of the Pennines is underlain by relatively slablike limestone summits that are deeply dissected by upland dales. A former royal hunting ground in the northeastern part of the district has been planted with conifers; but for this, the Forest of Bowland (as much of the upland area is officially known) is a misnomer. Pendle Hill, a prominent limestone hill, rises to 1,831 feet (558 m) above the towns of Clitheroe and Whalley at the southern limits of the district; there George Fox (1624–91) reported receiving the vision that moved him to form the Society of Friends (Quakers). The hill has also been historically associated with witchcraft as described in William Harrison Ainsworth's *Lancashire Witches* (1849). Clitheroe, the district seat, serves as a market centre and has a variety of light industries. Limestone is quarried nearby. Sheep and cattle graze the hillsides. Pop. (1986 est.) 51,900.

Ribbon Fall, cataract on the west slope of the Sierra Nevada in Yosemite National Park, east-central California, U.S. With a drop of 1,612 feet (491 m), it is one of the world's highest waterfalls and one of the park's most scenic features. Reaching a peak volume during May and June, it is fed mainly by melting snow; hence, it is sometimes dry for part of the year.

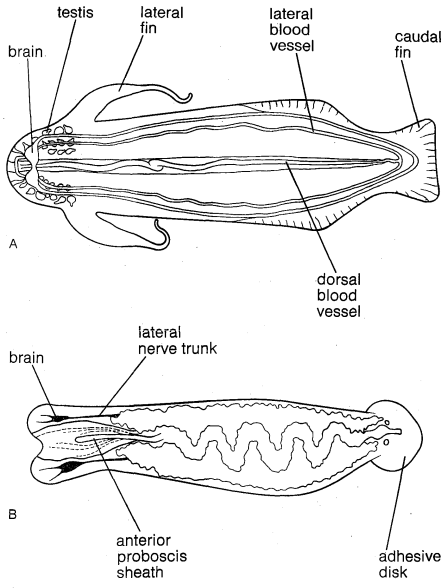
ribbon seal (*Histriophoca fasciata*), earless seal of the family Phocidae found in the North Pacific and the Bering Sea. The male, growing to about 1.7 m (5.6 feet) in length and 95 kg (210 pounds) in weight, is dark brown with broad, yellowish, ribbonlike markings. The smaller female and the young are paler, and the bands are less conspicuous. The ribbon seal lives alone or in small groups and feeds on fish, squid, and other marine animals. It is valued for its hide by Eskimos and is taken, though not in large numbers, by Japanese sealers.

ribbon worm, also called BOOTLACE WORM, PROBOSCIS WORM, NEMERTINE, OR NEMERTEAN, any member of the invertebrate phylum Nemertea (sometimes called Nemertinea, or Rhynchocoela), which includes mainly free-living forms but also a few parasites of crustaceans, mollusks, and sea squirts. The majority of the approximately 900 known nemertean species are found in marine habitats. Some, however, live in freshwater or on land. The name proboscis worm derives from the muscular eversible proboscis, which is housed in a chamber above the gut. This tube-shaped organ, which in many aquatic forms has a needlelike stylet, is typically used to trap the prey; in land-dwelling species it may be used for rapid movement.

The ribbon worms are the simplest animals to possess a circulatory system and a gut with a separate mouth and anus. The body is usually long and slender and is often extended greatly during movement. Most species are less than 20 cm (8 inches) long, but the giant species *Lineus longissimus* may reach a length of 30 m (100 feet). Some forms that swim in deep water are flat and broad, with finlike appendages. Often uniformly coloured, various species of ribbon worms are vividly patterned with stripes, bands, speckles, or geometric shapes.

Male and female ribbon worms occur in most species, with annual reproduction typical. Usually eggs and sperm are released separately, and fertilization takes place externally. The fertilized egg develops by a process similar to that of flatworms (phylum Platyhelminthes), annelids (phylum Annelida), and mollusks (phylum Mollusca). Ribbon worms can develop in one of two ways: the most common is the direct method, without a larval stage; the other is indirect and includes a larva, which may be one of two types. One kind, a free-swimming larva of complicated pattern known as the pilidium, is more common; the other type, similar to an adult, is called Desor's larva. Larvae change into young ribbon worms. Within the genera *Prostoma* and *Geonemertes,* the species may be either dioecious (*i.e.,* separate male and female animals) or hermaphroditic (*i.e.* male and female reproductive organs in one animal). All ribbon worms have the ability to regenerate lost or damaged parts of their bodies; some species actually break up and form a number of fragments, which then grow into complete individuals. This mechanism provides asexual reproduction.

The affinities of the nemerteans lie with the flatworms; both have similar types of embryonic development and the same basic body plan. Unlike the flatworms, however, the rib-



Structure of ribbon worms
(A) *Nectonemertes mirabilis* and (B) *Malacobdella*

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bon worms have a complete gut and a circulatory system. The ribbon worms generally are regarded as a distinct phylum at the highest point of acoelomate (without a body cavity) development. The important features used to classify the ribbon worms include the position of the brain relative to the mouth, the presence or absence of a stylet (or stylets) on the proboscis, and the position of the lateral nerves relative to the muscle layers.

Certain bloodworm (*q.v.*) species of the phylum Annelida are also sometimes known as proboscis worms.

ribbonfish, any of several species of deep-sea, marine fishes constituting the family Trachipteridae (order Lampridiformes). The family contains three genera: *Trachipteras, Desmodema,* and *Zu.* These slender-bodied fishes occur in all the major oceans. The name ribbonfish comes from the long, string-like dorsal fin that originates behind the head and waves like a ribbon as the fish swims. Ribbonfishes are further distinguished by their upward-pointing caudal fins and lack of anal fins. The largest of the ribbonfishes, *T. arcticus,* reaches a length of 2 m (6.5 feet) and is found in cold northern waters.

Ribbonism, also called RIBANDISM, Irish secret-society movement that began at the end of the 18th century in opposition to the Orange Society, or Protestant Orangemen. It was represented by various associations under different names, organized in lodges, and recruited all over Ireland from the lower classes. The actual name of Ribbonism (from a green badge worn by its members) became attached to the movement later, about 1826; and, after it had grown to its height in about 1855, it declined in force and was practically at an end in its old form when in 1871 Ribbonism was declared illegal.

Ribe, city, seat of Ribe *amtskommune* (county commune), southwestern Jutland, Denmark, on the Ribe River, 4 miles (6 km) from the North Sea. One of Denmark's oldest towns, it was first mentioned in 862 and became a bishopric in 948. In the Middle Ages it was a thriving port and favourite royal resort, centred on Riberhus (a castle founded in the early 12th century and destroyed by the Swedes in 1658). The Romanesque Ribe Cathedral dates from 1122 to 1170. The church and monastery of St. Catharinæ were founded in 1228. Many half-timbered houses date from the 16th and 17th centuries, including one that served as a school from 1500 to 1856. Local industries include iron founding, food processing, and textile mills.

Ribe *amtskommune* (area 1,209 square miles [3,131 square km]) is hilly in the east. Its economy is based on agriculture and dairying. Esbjerg is the chief city. The crusading American journalist Jacob August Riis was a native of Ribe. Pop. (1985 est.) city, 7,798; (1987 est.) mun., 17,956; (1988 est.) *amtskommune,* 217,973.

Ribeauvillé, German RAPPOLTSWEILER, town, Haut-Rhin *département,* Alsace *région,* in eastern France. It lies at the entrance of the valley of the Strengbach, under the Vosges Mountains, 33 miles (53 km) southwest of Strasbourg. It is distinguished by a medieval gate, the Porte des Bouchers (a relic of the ancient walls that surrounded the city), and it has many medieval houses and two fine Gothic churches, of St. Gregory and St. Augustine. The Carolabad, a saline spring with a temperature of 64° F (17° C), made Ribeauvillé a watering place. It now has textile, printing, and photographic industries.

Rappoltsweiler, known in the 8th century as Rathaldovilare, passed from the bishops of Basle to the lords of Rappoltstein, famous nobles of Alsace. The lord of Rappoltstein was the protector of wandering minstrels. When the family became extinct in 1673 this office of king of the pipers (*Pfeiferkönig*) passed to the counts palatine of Zweibrücken-Birkenfeld. The minstrels had a pilgrimage chapel near Rappoltsweiler, dedicated to their patron saint, Maria von Dusenbach, and here they held an annual feast on September 8. Near the town are the ruins of a number of famous castles, including that of Saint-Ulrich (Ulrichsburg). Pop. (1982) 4,302.

Ribeirão Prêto, city, in the highlands of northeastern São Paulo state, Brazil, at 1,700 feet (520 m) above sea level, on the Prêto River, a tributary of the Pardo River. Founded in 1856 and formerly called Entre Rios and São Sebastião do Ribeirão Prêto, the settlement was given town status in 1870 and was made the seat of a municipality in 1871. It was long renowned as a colonization and coffee-growing centre. Now *feijão* (beans), rice, corn (maize), sugar, cotton, and fruits are also cultivated in the area. Following the arrival of the Mogiana Railway (1883), the community developed industrially. Manufactures include textiles, cottonseed oil, and beer. The city is accessible by road, rail, and air from São Paulo city, 175 miles (282 km) south-southeast. A Helen Keller School for the Blind is in Ribeirão Prêto. Pop. (1980 prelim.) 300,704.

Ribeiro, Aquilino (Gomes) (b. Sept. 13, 1885, Beira Alta, Port.—d. May 27, 1963, Lisbon), novelist, the mainstay of Portuguese fiction writing until the surge of neorealist regionalism that began in 1930.

Ribeiro's revolutionary activism forced him to flee Portugal several times between 1908 and 1932. Much of his time in exile was spent in Paris. Although he is one of his country's most prolific writers, he is less widely read than many others because of his use of regional terminology deriving from the rural northeastern section of the country. Much of his prose portrays human types and ways of life observed during his own formative years in Beira Alta.

Aquilino Ribeiro launched his writing career in 1914 with *Jardim das Tormentas* ("The Garden of Torments") and then *Terras do demo* (1919; "Lands of the Demon"), followed by pieces of shorter fiction subsequently included in *Estrada de Santiago* (1922; "The Road to Santiago"). He remained active into the late 1950s, publishing *A casa grande de Romarigães* (1957; "The Great House of Romarigães") and *Quando os lobos uivam* (1958; "When the Wolves Howl"). During his 40-year career, Ribeiro published some two dozen novels, most of them notable for the stylistic craft used to depict a geographic region with its rustic slang, archaic forms of speech, human types, fauna, and flora. The most memorable of Ribeiro's protagonists is Malhadinhas, a muleteer who appears in *Estrada de Santiago* and who became the prototype of the rural Portuguese for many contemporary readers.

Ribeiro, Bernardim (b. *c.* 1482, Torrão, Port.—d. October 1552, Lisbon), Portuguese poet and prose writer who introduced the pastoral style to Portugal in five idylls, or eclogues, and a prose romance. His lyrical treatment of the yearnings of unrequited love provided models for the tradition of the *saudade* (poem of longing) that profoundly influenced the development of Portuguese literature.

Ribeiro was the son of a treasurer in the household of the Duke de Viseu. He studied law at the university in Lisbon between 1507 and 1512. Later he frequented the court of King Manuel I, where, according to tradition, he fell in love with one of the court ladies, who, however, rejected him. Ribeiro probably spent the years 1521–24 in Italy. On his return in 1524, he was appointed secretary to King John III. His last years were clouded by a mental disorder.

Ribeiro also wrote the chivalric and pastoral romance *Livro das Saudades* (1554–57; "Book of Yearnings"). This prose work, better known by its opening words as *Menina e Moca* ("Child and Damsel"), is generally considered a masterpiece of Portuguese literature of the Renaissance. Innovative in its use of prose, Ribeiro's tale established a stylistic tradition that has endured as a major force in Portuguese literature.

Ribeiro Couto, Rui (b. March 12, 1898, Santos, Braz.—d. May 30, 1963, Paris), Brazilian poet, short-story writer, and diplomat, one of the leading figures of Modernism in its early years. Originally a symbolist poet, Ribeiro Couto evolved toward the Modernism that exploded upon the Brazilian literary scene in the early 1920s, publishing poems and short stories concerning themes of humble everyday life. Besides his works in Portuguese, he also wrote fluently in French.

Among his best-known volumes of short stories are *O crime do estudante Batista* (1922: "The Crime of Batista the Student"), *O clube das esposas enganadas* (1933; "The Deceived Wives' Club"), and *O largo da matriz* (1940; "Cathedral Square"). His volumes of poetry include *Dia longo* (1944; "A Long Day"), *Um homem na multidão* (1923; "A Man in the Crowd"), and *Mar e rio* (1952; "Sea and River"). He was elected to the Brazilian Academy of Letters in 1934. His diplomatic career took him to consulates in Marseille, Paris, The Netherlands, Lisbon, and Belgrade. He was also active as a journalist.

Ribera, José de, José also spelled JUSEPE, JOSEF, or GIUSEPPE, byname LO SPAGNOLETTO (Italian: "The Little Spaniard") (baptized Feb. 17, 1591, Játiva, Spain—d. Sept. 2, 1652, Naples), Spanish painter and printmaker, noted for his Baroque dramatic realism and his depictions of religious and mythological subjects.

He was born in Spain but spent most of his life in Italy. Little is known of his life in Spain, though he is said by the painter and biographer Antonio Palomino to have received his first training there under Francisco Ribalta. It is not known when he went to Italy, but there is evidence that as a young man he worked in Parma and Rome. In 1616 he married in Naples, then under Spanish rule, where he remained the rest of his life. In 1626 he signed as a member of the Roman Academy of St. Luke and in 1631 as a knight of the Papal

Order of Christ, although he always retained his Spanish identity.

The whole of Ribera's surviving work appears to belong to the period after he settled in Naples. His large production comprises mainly religious compositions, along with a number of classical and genre subjects and a few portraits. He did much work for the Spanish viceroys, by whom many of his paintings were sent to Spain. He was also employed by the Roman Catholic church and had numerous private patrons of various nationalities. His paintings were widely imitated and copied in Spain. From 1621 onward there are numerous signed, dated, and documented works from Ribera's hand.

Ribera's paintings are austere or gloomy in mood and can be rather dramatic in their presentation. The chief elements of Ribera's style, tenebrism (dramatic use of light and shadow) and naturalism, are used to emphasize the mental and physical suffering of penitent or martyred saints or tortured gods. Realistic detail, often horrific, is accentuated by means of coarse brush marks on thick pigment to represent wrinkles, beards, and flesh wounds. Ribera's technique is characterized by sensitivity of outline and the sureness with which he rendered the changes from brilliant light to darkest shadow.

Ribera was one of the few 17th-century Spanish artists to produce numerous drawings, and his etchings were among the finest produced in Italy and Spain during the Baroque period.

Ribes, genus of about 150 species of shrubs of two distinct groups, the currants and the gooseberries, constituting the family Grossulariaceae (often included in the family Saxifragaceae). They are native to the temperate regions of North America, extending southward into the Andes. Some authorities separate the gooseberries as the genus *Grossularia.* Currants usually lack spines, while gooseberries are usually prickly. Flowers of currants are generally clustered, those of gooseberries more often solitary. The fruits of both groups are used in cooking and baking.

Species grown for their edible fruit include the English, or European, gooseberry (*R. uvacrispa*), American gooseberry (*R. hirtellum*), black currant (*R. nigrum*), buffalo currant (*R. odoratum*), and common, garden, or red, currant (*R. sativum*). Species of ornamental value include the alpine currant (*R. alpinum*); buffalo currant; fuchsia-flowered gooseberry (*R. speciosum*); golden, or clove, currant (*R. aureum*), bearing spicy-fragrant yellow flowers; and *R. viburnifolium,* a sprawling evergreen. Because all *Ribes* species are alternative hosts of the destructive blister rust fungus, which also attacks white pines, there are local prohibitions to growing *Ribes* near any white pine plantations.

riboflavin: *see* vitamin B_2.

riboflavin deficiency: *see* vitamin B_2 deficiency.

ribonucleic acid: *see* RNA.

ribose, also called D-RIBOSE, five-carbon sugar found in RNA (ribonucleic acid), where it alternates with phosphate groups to form the "backbone" of the RNA polymer and binds to nitrogenous bases. Ribose phosphates are components of the nucleotide coenzymes and are utilized by microorganisms in the synthesis of the amino acid histidine.

ribosome, tiny particle that is present in large numbers in all living cells and which is the site of protein synthesis. Ribosomes are tiny granules that occur both as free particles within cells and as particles attached to the membranes of the endoplasmic reticulum. A ribosome measures about 200 angstroms in diameter and consists of about 40 percent protein and 60 percent RNA. It is composed of four RNA molecules and about 70 different proteins. In shape the ribosome is composed of two subunits, a larger one and a smaller one, each of which has a characteristic shape. Ribosomes are very numerous in a cell and account for a large proportion of its total RNA.

Ribosomes are the sites at which information carried in the genetic code is converted into protein molecules. The ribosome is the site at which messenger RNA (mRNA) determines the sequencing of transfer RNA (tRNA) molecules, which in turn bind to amino acids to form proteins. The newly formed proteins detach themselves from the ribosome site and migrate to other parts of the cell for use.

Ribot, Alexandre (-Felix-Joseph) (b. Feb. 7, 1842, Saint-Omer, Fr.—d. Jan. 13, 1923, Paris), French statesman of the Third Republic who was four times premier of France.

Ribot studied law and rose to be director of the Department of Criminal Affairs at the Ministry of Justice. He was elected in 1878 to represent Pas-de-Calais in the Chamber of Deputies. Ribot was a moderate republican, and he specialized in financial matters. He lost his seat in October 1885 but was returned for Pas-de-Calais in 1887 and thereafter held the post until his election to the Senate in 1909. As minister of foreign affairs from March 1890 to February 1892, he initiated the rapprochement with Russia that was to ripen into alliance in 1894. He resumed the portfolio of foreign affairs when he became premier on Dec. 6, 1892, but his government fell four months later in the Panama Canal scandal. Premier again and also minister of finance from Jan. 26, 1895, Ribot sponsored the expedition to establish a protectorate over Madagascar, but he once again was forced to resign over a financial scandal.

Ribot was in the opposition from 1896 to 1914. He became a member of the Académie Française in 1906. In 1909 he was elected senator for Pas-de-Calais; in this role he specialized in foreign policy. In June 1914, he served very briefly as premier. After this government fell, he was appointed minister of justice; and in August of that year, after the outbreak of World War I, he again became minister of finance. He held this post for more than 2 years. He was again premier and minister of foreign affairs in March–September 1917, his most important act being to make General Philippe Pétain commander in chief of the French armies in May of that year.

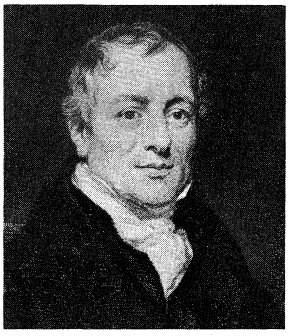
Ribot, Théodule-Armand (b. Dec. 18, 1839, Guingamp, Fr.—d. Dec. 9, 1916, Paris), French psychologist whose endeavour to account for memory loss as a symptom of progressive brain disease, iterated in his *Les Maladies de la mémoire* (1881; *Diseases of Memory*), constitutes the most influential early attempt to analyze abnormalities of memory in terms of physiology.

Ribot received his doctorate from the École Normale Supérieure. He taught at the Sorbonne from 1885 to 1888, and from 1889 to 1896 he held a chair of experimental and comparative psychology at the Collège de France. After studying the works of English and German psychologists, Ribot began his analysis of abnormal psychology. His published works on the subject, in addition to *Diseases of Memory,* included studies of diseases of will, personality, and attention. In later years Ribot became interested in affective and emotional factors in psychology.

Ricardo (Leite), Cassiano (b. July 26, 1895, São José dos Campos, Braz.—d. Jan. 14, 1974, Rio de Janeiro), poet, essayist, literary critic, and journalist, one of the most versatile 20th-century Brazilian poets. During his long life he participated in every literary movement from Parnassianism through Modernism to the Concretism and Praxis Poetry of the 1960s.

Ricardo's poetic production covers the period 1915–71. He was a prime mover during the early 1920s in the "Anta" subgroup of literary Modernism, which urged a nationalistic rediscovery of the land and its indigenous folkloric traditions. *Martim Cererê* (1928), perhaps his best-known collection of poems, dates from this period. From nationalism, Ricardo evolved toward the compassionate, universal, "post-atomic" worldview evident in *Jeremias sem-chorar* (1964; "Tearless Jeremiah") and other collections of the 1950s and 1960s. He wrote extensively in the area of literary theory and exercised a marked influence on every generation of young poets through the early 1970s.

Ricardo, David (b. April 18/19, 1772, London, Eng.—d. Sept. 11, 1823, Gatcombe Park, Gloucestershire), English economist who gave systematized and classical form to the rising science of economics in the 19th century. His laissez-faire doctrines were typified in his Iron Law of Wages, which stated that all attempts to improve the real income of workers were futile and that wages perforce remained near the subsistence level.



Ricardo, portrait by Thomas Phillips, 1821; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Early life. Ricardo was the third son of a Dutch Jew who had made a fortune on the London Stock Exchange. At the age of 14 he entered his father's business, for which he showed great aptitude. By the time he was 21, however, he had broken with his father over religion, become a Unitarian, and married a Quaker. This required him to set up on his own. He continued as a member of the stock exchange, where his talents and character won him the support of an eminent banking house. He did so well that in a few years he acquired a fortune and was then in a position to indulge his wide-ranging tastes in literature and science, particularly in the fields of mathematics, chemistry, and geology.

His interest in economic questions arose in 1799 when he happened to read Adam Smith's *Wealth of Nations.* For 10 years he studied economics, somewhat offhandedly at first and then with greater concentration. His first published work was *The High Price of Bullion, a Proof of the Depreciation of Bank Notes* (1810), an outgrowth of letters Ricardo had published in the *Morning Chronicle* the year before. His book gave a fresh stimulus to the controversy then raging over the policy of the Bank of England. The strains of the wars with France had caused the government to forbid the Bank of England to pay its notes in gold. Freed from the necessity of cash payment, both the Bank of England and the country banks had increased the amount of their note issues and the volume of their lending. The directors of the Bank of England maintained that the subsequent increase in prices and the depreciation of the pound had no relation to the increase in bank credit. Ricardo and other

opponents of that view asserted that there indeed was a close connection between the volume of bank notes and the level of prices and that the level of prices in turn affected foreign exchange rates and the inflow or outflow of gold. It followed that the bank, as custodian of the central gold reserve of the country, must shape its lending policy according to general economic conditions and exercise control over the volume of money and credit. The controversy was thus of the highest importance in the development of central banking theory. A committee appointed by the House of Commons, known as the Bullion Committee, confirmed Ricardo's views and recommended the repeal of the Bank Restriction Act.

At this time Ricardo began to acquire some friends who were to have considerable influence on his further intellectual development. One of these was the philosopher and economist James Mill (father of John Stuart Mill), who became his political and editorial counsellor. Another friend was the Utilitarian philosopher Jeremy Bentham. Still another was Thomas Malthus, best known for his theory that population tends to increase faster than the food supply—an idea that Ricardo accepted.

In 1815 another controversy arose over the Corn Laws, which regulated the import and export of grain. A decline in wheat prices had led Parliament to raise the tariff on imported wheat. This provoked a popular outcry and caused Ricardo to publish his *Essay on the Influence of a Low Price of Corn on the Profits of Stock* (1815), in which he argued that raising the tariff on grain imports tended to increase the rents of the country gentlemen while decreasing the profits of manufacturers.

Retirement from business. The year before his Corn Law essay, at the age of 42, he had retired from business and taken up residence in Gloucestershire, where he had extensive landholdings. In 1819 he purchased a seat in the House of Commons, as was done in those times, and entered Parliament as a member for Portarlington. He was not a frequent speaker, but so great was his reputation in economic affairs that his free-trade opinions were received with respect, although they did not yet represent the dominant thinking in the House.

In his *Principles of Political Economy and Taxation* (1817), Ricardo undertook to analyze the laws determining the distribution of the social product among the "three classes of the community," namely, the landlords, the workers, and the owners of capital. He applied his findings more widely, however, and elaborated various other economic principles. He found the relative domestic values of commodities to be dominated by the quantities of labour required in their production, rent being eliminated from the costs of production.

He concluded that profits vary inversely with wages, which move with the cost of necessaries, and that rent tends to increase as population grows, rising as the marginal costs of cultivation rise. He supposed that there was little tendency to unemployment; but he remained apprehensive lest population grow too rapidly, depress wages to the subsistence level, and, by extending the margin of cultivation, reduce profits and check capital formation. He also concluded that trade between countries was not dominated by relative costs of production and by differences in internal price structures that reflected the comparative advantages of the trading countries and made exchange desirable. He treated monetary questions and especially taxation at length. Although he built in part upon the work of Adam Smith, he defined the scope of economics more narrowly than had Smith and included little explicit social philosophy.

Illness forced Ricardo to retire from Parliament in 1823. He died that year at the age of 51.

Assessment. Despite his relatively short career and the fact that most of it was preoccupied with business affairs, Ricardo achieved a leading position among the economists of his time. His views won considerable support in England despite the abstract style in which he set them forth and in the face of heavy counterfire from his opponents. Although his ideas have long since been superseded or modified by other work and by new theoretical approaches, Ricardo retains his eminence as the thinker who first systematized economics. Writers of various persuasions drew heavily upon his ideas, including those who favoured laissez-faire capitalism and those, such as Karl Marx and Robert Owen, who opposed it.

(J.J.Sp.)

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Ricca, Paul, byname THE WAITER, original name FELICE DELUCIA (b. Nov. 14, 1897, Naples—d. Oct. 11, 1972, Chicago), Chicago gangster who was considered "the brains" behind the operations of Al Capone and Capone's successors, Frank Nitti and Tony Accardo. He was the Chicago representative in the formation of the national crime syndicate in 1934, led by Lucky Luciano, Meyer Lansky, and other New York bosses.

Ricca grew up in Naples and was convicted of murder there in 1917. He served two years in prison, murdered again, and fled to the United States (1919). After making his way to Chicago, he became Al Capone's bodyguard and eventually one of his chief aides. In 1943 he was indicted and convicted (with seven others) of conspiring to extort $1,000,000 from four film studios (Loew's, Paramount, Twentieth Century–Fox, and Warner Brothers) under threat of "union trouble." He was sentenced to 10 years in prison but was mysteriously released after serving only three years; a congressional probe later concluded that the syndicate's influence reached to high levels of the federal executive. He was again convicted in 1959 of income-tax evasion and served 27 months of a nine-year sentence; his deportation was ordered in 1959 but was never carried out.

Riccardo (Italian personal name): *see under* Richard.

Ricci, Saint Catherine dei: *see* Catherine, Saint.

Ricci, Matteo, Wade–Giles romanization LI MA-TOU, Pinyin LI MADOU (b. Oct. 6, 1552, Macerata, Papal States—d. May 11, 1610, China), Italian Jesuit missionary who introduced Christian teaching to the Chinese Empire in the 16th century. He lived there for nearly 30 years and was a pioneer in the attempt at mutual comprehension between China and the West. By adopting the language and culture of the country, he gained entrance to the interior of China, which was normally closed to foreigners.

Early life and education. Ricci was from a noble family in Macerata, in central Italy. His father, Giovanni Battista Ricci, a pharmacist by profession, dedicated most of his time to public affairs and for a time served as governor of the city. His mother, Giovanna Angiolelli, was known for her simple piety. Matteo, their oldest child, after preliminary studies at home, entered the school that the Jesuit priests opened in 1561 in Macerata. After completing his classical studies, he set out at the age of 16 for Rome to study law. There he was attracted to the life of the Jesuits, and on Aug. 15, 1571, he requested permission to join the order.

Approved by the Pope in 1540, the Society of Jesus (Jesuits) was already well known for its spirit of apostolic initiative. Its members were distinguishing themselves in scientific research as well as in their voyages to the new worlds. Stimulated by the examples of his seniors, Ricci dedicated himself to efforts in both fields. Shortly after beginning his study of science under the noted mathematician Christopher Clavius, he volunteered for work overseas in the Far East. In May 1577 he set off for Portugal, where he studied for a short time at the University of Coimbra while waiting for a ship. In the following year, on March 24, he embarked at Lisbon and arrived on September 13 at Goa, the Portuguese outpost on the central west coast of India. Ricci carried on his studies for the priesthood there but was ordained in 1580 at Cochin, on the Malabar Coast, where he had been sent for reasons of health. Returning to Goa, he was ordered, in April 1582, to proceed to China.

With its huge population, China was an area that Christian missionaries, especially the Jesuits, greatly wished to enter. St. Francis Xavier, one of the first companions of St. Ignatius of Loyola, died in 1552 on the tiny island of Shangchuan in sight of the tightly closed mainland. When Ricci arrived, China was still closed to outsiders; but the missionary strategy of the Jesuits had undergone modification. Great stress was put on the importance of learning the Chinese language and of acquiring knowledge of the culture. Previously, missionaries had attempted to impose Western customs and the use of the Latin language in religious rites. The new approach of adaptation to national customs was established by Alessandro Valignano, who had received Ricci into the Jesuits and was at this time visitor of the Jesuit missions in the Far East. (A visitor is the official responsible for making sure the religious and temporal affairs of all the houses of an institute in an area are properly followed.) First Michele Ruggieri and then Ricci were called to the Portuguese province of Macau to prepare to evangelize China; Ruggieri, however, returned to Italy in November 1588, leaving to his younger compatriot the burden and the honour of founding the church in China.

Mission to China. Ricci arrived at Macau, a small peninsula on the east coast of China, in August 1582, and began at once his study of Chinese. The following year he and Ruggieri were given permission to settle in Chao-ch'ing, then the capital of Kwangtung Province. In his *History of the Introduction of Christianity in China,* Ricci described their work as follows:

> So as not to occasion any suspicion about their work, the fathers [*i.e.,* the Jesuits] initially did not attempt to speak very clearly about our holy law. In the time that remained to them after visits, they rather tried to learn the language, literature, and etiquette of the Chinese, and to win their hearts and, by the example of their good lives, to move them in a way that they could not otherwise do because of insufficiency in speech and for lack of time.

Despite that caution, Ruggieri published the first Catholic catechism in Chinese, and Ricci produced the first edition of his remarkable map of the world, the "Great Map of Ten

Thousand Countries," which showed the Chinese intelligentsia China's geographical relation to the rest of the world.

In 1589 Ricci moved from Chao-ch'ing to Shao-chou (Shiuhing), where he became a close friend of the Confucian scholar Ch'ü T'ai-su. Ricci taught him the rudiments of mathematics, receiving in return an introduction into the circles of the mandarins (high civil or military officials of the Chinese Empire) and of the Confucian scholars. Ch'ü, noting that Ricci wore the habit of a Buddhist monk (which he had adopted upon entering China), suggested that it would be better to dress as a Chinese scholar, a suggestion that Ricci followed immediately after leaving Kwangtung.

Feeling increasingly at home, Ricci decided to make an attempt to enter the Imperial city of Peking. His effort in 1595, however, was not successful because a Sino-Japanese conflict in Korea had made all foreigners suspect. He had to return from Peking to stop first at Nan-ch'ang and then Nanking. During his stay at Nan-ch'ang, from 1595 to 1598, he became a friend of two princes of the royal blood. At the request of one of them, he wrote his first book in Chinese, *On Friendship.* At Nanking, where he settled in February 1599, he was engaged chiefly in astronomy and geography. In his *History,* he commented on the effects of this work:

> The fathers gave such clear and lucid explanations on all these matters which were so new to the Chinese, that many were unable to deny the truth of all that he said; and, for this reason, the information on this matter quickly spread among all the scholars of China. From this one can understand how much esteem was given to the Jesuits as well as to our land which thenceforth they did not dare to describe as barbarian, a word they were accustomed to use in describing countries other than China.

Encouraged by the reception he received at Nanking, Ricci made a second attempt to reach Peking. He entered the city in January 1601, accompanied by his Jesuit colleague, the young Spaniard Diego Pantoja. Although Ricci was not received by the Emperor, he was given permission to remain in the capital. From then on, he never left Peking, and he dedicated the rest of his life to its people, teaching them science and preaching the gospel. His efforts to attract and convert the Chinese intelligentsia brought him into contact with many outstanding personalities, among them Li Chih-tsao, Hsü Kuang-ch'i, and Yang T'ing-yün (who became known as the "Three Pillars of the Early Catholic Church" in China and who assisted the missionaries, especially in their literary efforts) and Feng Ying-ching, a scholar and civic official who was imprisoned in Peking. During his years in Peking, Ricci wrote several books in Chinese: "The Secure Treatise on God" (1603), "The Twenty-five Words" (1605), "The First Six Books of Euclid" (1607), and "The Ten Paradoxes" (1608).

The secret of Ricci's success was his ability to go beyond cultural barriers and befriend men of another race and religion. His remark about his friend Feng Ying-ching brings out well the spirit of this great missionary: "He treated the affairs of our fathers as if they were his own and our fathers in turn treated his as if they were ours." (J.H.-s.S.)

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Ricci, Ruggiero (b. July 24, 1918, San Francisco), U.S. violinist known especially for his performances of Paganini's works.

Ricci was born into a musical family and studied as a child with Louis Persinger. He gave his first concert in San Francisco at the age of 10. After further study with Michael Piastro and Georg Kulenkampff, he made a European tour in 1932. From 1933 to 1937 he studied with Paul Stassevitch, reaching maturity as an accomplished virtuoso with command of the 19th-century bravura repertory. Playing his 1734 Guarneri violin, he appeared regularly in Europe and America. He premiered the concertos of Alberto Ginastera (New York, 1963) and Gottfried von Einem (Vienna, 1970) and introduced the rediscovered Concerto No. 4 of Paganini to American audiences (1971). He taught at Indiana University from 1970 to 1973, at the Juilliard School from 1975 to 1980, and at the University of Michigan at Ann Arbor from 1982.

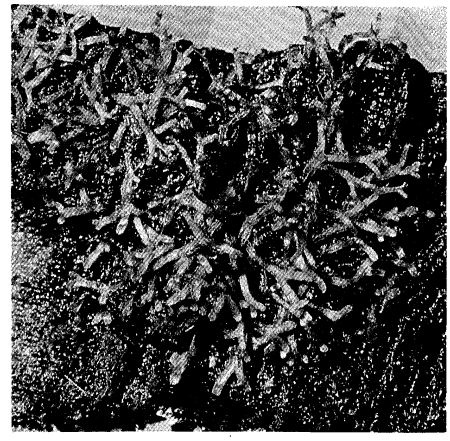
Ricci-Curbastro, Gregorio (b. Jan. 12, 1853, Lugo, Papal States—d. Aug. 6, 1925, Bologna, Italy), Italian mathematician instrumental in the development of the absolute differential calculus (also called the Ricci calculus), now known as tensor analysis.

Ricci was a professor at the University of Padua from 1880 to 1925. His earliest work was in mathematical physics, notably on the laws of electric circuits and in differential equations. The systematic theory of tensor analysis was created by Ricci from 1887 to 1896, with significant extensions later contributed by his pupil Tullio Levi-Civita.

Tensor analysis concerns relations that are covariant; *i.e.,* relations that remain valid when changed from one system of coordinates to any other system. The origins of tensor analysis are rooted in the differential geometry of the noted German mathematician Georg Riemann. The first steps in the development of the appropriate technique of tensors had been taken by Elwin Bruno Christoffel of Germany, while important concepts had been introduced by Eugenio Beltrami of Italy and Rudolf O.S. Lipschitz of Germany. For some time Ricci's new calculus was largely unnoticed. Later, however, Einstein found Ricci's methods to be indispensable as the mathematical formulation of his theory of general relativity.

In his studies of applying tensor analysis to the study of surfaces, Ricci encountered several interesting metric properties of hyperspaces. One of them, a form of the Riemann-Christoffel curvature tensor, was the Ricci tensor (R^{ij}), which occurs in Einstein's gravitational equations and is often called the Einstein tensor. The interest in tensor analysis generated by its use in general relativity has resulted in extensive use of it in differential geometry and other branches of mathematics.

Riccia, genus of liverworts (small, creeping plants) in the order Marchantiales, widely distributed throughout the world. The most well-known species, *Riccia fluitans,* sometimes called slender riccia, forms branching green ribbons about 0.1 centimetre (about 0.04 inch) wide and about 1.3 to 5 centimetres long that float in shallow ponds. The ribbons often become tangled in large masses. Other species of *Riccia* form rosettes on moist soils.



Riccia fluitans
Walter Dawn

Riccio, Andrea, original name ANDREA BRIOSCO, also called ANDREA CRISPUS (b. *c.* 1470, Padua, Republic of Venice—d. 1532, Padua), Renaissance sculptor and goldsmith best known for his miniature sculptures in bronze.

Riccio was trained in the workshop of B. Bellano and was active principally as a bronze sculptor. He executed the great paschal candlestick for S. Antonio at Padua (1507–16) and the Girolamo della Torre monument in S. Fermo at Verona (1516–21). The bronze reliefs from the latter are now in the Louvre, Paris. The style and imagery of both works are strongly influenced by Paduan Humanism. Riccio was also a prolific maker of bronze statuettes. For the most part his subjects were drawn from classical mythology. Unlike the statuettes of his contemporary Antico at Mantua, Riccio's are romantic in treatment, with marked individuality and expressive character. Outstanding examples are the "Boy Milking a Goat" in the Bargello, Florence, the "Warrior on Horseback" in the Victoria and Albert Museum, London, and the "Arion" in the Louvre.



"Warrior on Horseback," bronze statuette by Riccio, first quarter of the 16th century; in the Victoria and Albert Museum, London
By courtesy of the Victoria and Albert Museum, London

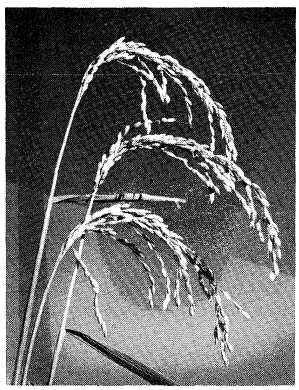
Riccio, David, original Italian DAVIDE RIZZIO (b. *c.* 1533, Pancalieri, near Turin, Piedmont—d. March 9, 1566, Edinburgh), secretary to Mary Stuart, Queen of Scots; he helped to arrange her marriage to Henry Stewart, Lord Darnley.

Riccio was the son of a musician. In 1561 he went to Scotland with the Duke of Savoy's

ambassador. After entering the Queen's service as a musician, he became (in December 1564) her French secretary, he being chosen for his trustworthiness rather than for his knowledge of the language. After her marriage, on July 29, 1565, he remained her close adviser and largely wrote her letters to the pope. Darnley's jealousy was exploited by Scottish nobles, who considered Riccio an arrogant parvenu and who desired his removal as the preliminary to the virtual deposition of Mary. Darnley seems to have harboured suspicions that Riccio was responsible for Mary's pregnancy.

While Darnley was present, the 4th Earl of Morton, Lord Ruthven, and other armed men dragged Riccio from Mary in her supper room in Holyroodhouse, Edinburgh, and stabbed him to death.

rice, edible starchy cereal grain and the plant by which it is produced. Roughly one-half of the world population, including virtually all of East and Southeast Asia, is wholly dependent upon rice as a staple food; 95 percent of the world's rice crop is eaten by humans.



Rice (*Oryza sativa*)
Grant Heilman

The cultivated rice plant, *Oryza sativa,* is an annual grass of the Gramineae family. It grows to about 1.2 m (4 feet) in height. The leaves are long and flattened, and its panicle, or inflorescence, is made up of spikelets bearing flowers that produce the fruit, or grain.

The origin of rice culture has been traced to India in about 3000 BC. Rice culture gradually spread westward and was introduced to southern Europe in medieval times. With the exception of the type called upland rice, the plant is grown on submerged land in the coastal plains, tidal deltas, and river basins of tropical, semitropical, and temperate regions. The seeds are sown in prepared beds, and when the seedlings are 25 to 50 days old, they are transplanted to a field, or paddy, that has been enclosed by levees and submerged under 5 to 10 cm (2 to 4 inches) of water, remaining submerged during the growing season.

The harvested rice kernel, known as paddy, or rough, rice, is enclosed by the hull, or husk. Milling usually removes both the hull and bran layers of the kernel, and a coating of glucose and talc is sometimes applied to give the kernel a glossy finish. Rice that is processed to remove only the husks, called brown rice, contains about 8 percent protein and small amounts of fats and is a source of thiamine, niacin, riboflavin, iron, and calcium. Rice that is milled to remove the bran as well is called white rice and is greatly diminished in nutrients. When white rice forms a major portion of the diet, there is a risk of beriberi, a disease resulting from a deficiency of thiamine and minerals. Parboiled white rice is processed before milling to retain most of the nutrients, and enriched rice has iron and B vitamins added to it. Rice is cooked by boiling. It is eaten alone and in a great variety of soups, side dishes, and main dishes in Oriental, Middle Eastern, and many other cuisines.

The by-products of milling, including bran and rice polish (finely powdered bran and starch resulting from polishing), are used as livestock feed. Oil is processed from the bran for both food and industrial uses. Broken rice is used in brewing, distilling, and in the manufacture of starch and rice flour. Hulls are used for fuel, packing material, industrial grinding, fertilizer manufacture, and in the manufacture of an industrial chemical called furfural. The straw is used for feed, livestock bedding, roof thatching, mats, garments, packing material, and broomstraws.

In the 1960s, the so-called Green Revolution, an international scientific effort to diminish the threat of world hunger, produced improved strains of numerous food crops, including that known as miracle rice. Bred for disease resistance and increased productivity, this variety is characterized by a short, sturdy stalk that minimizes loss from drooping. Poor soil conditions and other factors, however, inhibited its anticipated widespread success.

The principal rice-producing countries are China, India, Japan, Bangladesh, Indonesia, Thailand, and Burma. Other important producers are Vietnam, Brazil, South Korea, Philippines, and the United States. In the late 20th century, the world rice crop averaged between 800,000,000,000 and 950,000,000,000 pounds annually and was cultivated on an average of about 358,000,000 acres (145,000,000 hectares). *See also* wild rice.

Rice, Alice (Caldwell) Hegan (b. Jan. 11, 1870, Shelbyville, Ky., U.S.—d. Feb. 10, 1942, Louisville, Ky.), American novelist and short-story writer most widely known for her 1901 best-seller, *Mrs. Wiggs of the Cabbage Patch,* a book often translated, staged, and filmed since its publication.

Rice was the daughter of a successful art dealer. At the age of 16 she served as an aide at a mission Sunday school in a Louisville slum known as the Cabbage Patch. With Louise Marshall, she later founded (1910) the Cabbage Patch Settlement House in Louisville, which grew to include a paid staff and more than 100 volunteers. In addition to *Mrs. Wiggs of the Cabbage Patch,* Rice wrote many other novels noted for pathos and humour. Her autobiography, *The Inky Way,* appeared in 1940.

Rice, Dan, original name DANIEL McLAREN (b. Jan. 25, 1823, New York City—d. Feb. 22, 1900, Long Branch, N.J., U.S.), American clown who was one of the most highly acclaimed clowns in the history of the circus. Rice was renowned for an act that included singing, dancing, witty badinage with the audience, feats of strength, trick riding, and exhibitions of trained wild animals.



Dan Rice
By courtesy of the Circus World Museum, Baraboo, Wisconsin

He was a jockey as a boy and started his circus career at 17, when he bought a half interest in a trained pig. Next he was a strong man, and in 1844 he made his debut as a clown. A star of the one-ring circus, Rice achieved national prominence as an equestrian jester. By the 1860s he was at the height of his career, commanding the then-phenomenal salary of $1,000 a week. He toured the United States with his own one-horse show and with other circuses and was recognized everywhere by the Uncle Sam beard that was his trademark. President Zachary Taylor made Rice an honorary colonel; in 1868 he put himself forward for the Republican nomination for the presidency. An alcoholic, Rice began walking out on contracts, and in 1885 he made his last tour.

Rice, Elmer, original name ELMER REIZENSTEIN (b. Sept. 28, 1892, New York City—d. May 8, 1967, Southampton, Hampshire, Eng.), American playwright, director, and novelist noted for his innovative and polemical plays.

Rice graduated from the New York Law School in 1912 but soon turned to writing plays. His first work, the melodramatic *On Trial* (1914), was the first play to employ on stage the motion-picture technique of flashbacks, in this case to present the recollections of witnesses at a trial. In *The Adding Machine* (1923) Rice adapted techniques from German Expressionist theatre to depict the dehumanization of man in the 20th century. His most important play, *Street Scene* (1929), was a starkly realistic tragedy set outside a New York City slum tenement building. The play won a Pulitzer Prize and was adapted into a highly popular musical (1947) with lyrics by Langston Hughes and music by Kurt Weill. *Counsellor-at-Law* (1931) was a rather critical look at the legal profession. In *We, the People* (1933), *Judgment Day* (1934), and several other polemical plays of the 1930s, Rice treated the evils of Nazism, the poverty of the Great Depression, and racism. Rice also wrote several novels and an autobiography, entitled *Minority Report* (1963).

Rice, Five Pecks of (Taoist movement): *see* Five Pecks of Rice.

Rice, (Henry) Grantland (b. Nov. 1, 1880, Murfreesboro, Tenn., U.S.—d. July 13, 1954, New York City), sports columnist and author who established himself over many years as one of the United States' leading sports authorities.

Rice graduated from Vanderbilt University in 1901, after which he worked for the *Nashville* (Tenn.) *Daily News* and other Southern newspapers, including the *Atlanta Journal,* as a sports writer. Between 1907 and 1911 he traveled the South umpiring and refereeing at football and baseball games. In 1911 he was hired by the *New York Evening Mail,* and in 1914 he joined the *New York Tribune,* later the *Herald Tribune.* He wrote sports stories for both papers; with the *Tribune* and the *Herald Tribune* he established a reputation as a sports authority. By one estimate, Rice wrote more than 22,000 columns and more than 67,000,000 words. His syndicated column, "The Sportlight," was the most influential of its day, and he also produced popular short motion pictures of sporting events. In 1924 Rice gave the backfield of the University of Notre Dame's football team its enduring name, the "Four Horsemen," and his annual selections of All-American football teams for *Collier's* magazine were considered to be authoritative. He published three books of poetry and coined the famous phrase that it was not important whether you "won or lost, but how you played the game." His autobiography, *The Tumult and the Shouting,* appeared in 1954.

Rice, Thomas Dartmouth (b. May 20, 1808, New York City—d. Sept. 19, 1860, New York City), popularly known as "Jim Crow" Rice and regarded as the father of the American minstrel show.

Rice was an itinerant actor until his song and dance "Jim Crow," first presented in Louisville in 1828, caught the public fancy and made him one of the most popular specialty performers of his day. Although he was not the first entertainer to impersonate a Negro, Rice created a vogue for such impersonations in both the United States and England through a series of extremely successful tours. He wrote and appeared in *Ginger Blue, Jim Crow in London,* and a burlesque of *Othello.* These engendered the stereotypes for the skits in the popular minstrel shows that evolved in the 1840s, primarily as a result of Rice's success. Rice died in poverty.

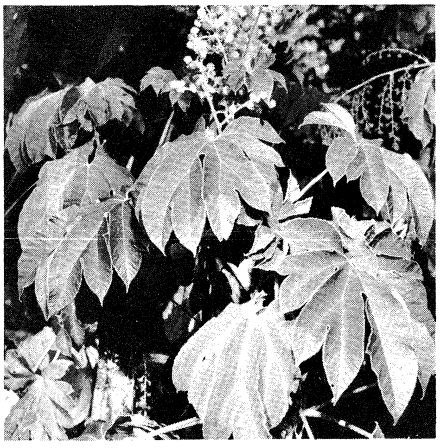
Rice Mother, widely distributed and variegated figure in the mythology of peoples of the Indonesian culture. There are three main types of Rice Mother, which are either found separately or combined.

The first is that of a goddess from whose body rice was first produced. The second is that of an all-nourishing Mother Rice (Me Posop), who is the guardian of crops and good fortune and whose milk is rice—which is considered to be the soul-stuff of every living thing. The third is the last sheaf of harvested rice that is ritually cut and dressed as a woman. This is believed to contain the concentrated soul-stuff of the field (analogous customs occur in peasant Europe, where the last sheaf is designated Wheat Mother, Barley Mother, and other grain names).

In other traditions a particular rice plant is designated as Mother Rice from the time of planting, and its vitality is believed to influence the growth of all of the other plants in the field.

rice paddy: *see* paddy.

rice-paper plant (*Tetrapanax papyriferum*), shrub or small tree, of the ginseng family (Araliaceae), native to southern China and Taiwan. It is the source of rice paper. It has large, lobed leaves that form an almost palm-



Rice-paper plant (*Tetrapanax papyriferum*)
Walter Dawn

like crown. The central tissues of the stem are split and pressed into thin sheets used for surgical dressings and as watercolour paper.

rice rat (*Oryzomys*), any of numerous species of mouselike rodents, belonging to the family Cricetidae (order Rodentia), found from the United States through South America. Rice rats are harsh-furred rodents, yellowish to grayish brown above, and white below, and are up to 20 centimetres (8 inches) long excluding the long, sparsely haired tail. They live primarily in marshy coastal areas, building nests of woven grass or, if the ground is dry, digging burrows. Food consists of grasses, seeds, fruit, and some fish or other animal protein. Rice rats may damage crops but in general are not particularly destructive. The number of distinct species ranges from about 60 to 130, depending on the authority.

ricebird, any of several birds that frequent rice fields or paddies. *See* Java sparrow; mannikin.

ricercare, also spelled RICERCAR (Italian: "to seek out"), plural RICERCARI, musical composition for instruments in which one or more themes are developed through melodic imitation; it was prominent in the 16th and 17th centuries. The earliest ricercari, which were for the lute, appeared in 1507. Well-suited to the technical capabilities of the lute, they mixed passages in chordal style, running scale passages, and alternation of high and low phrases suggesting the many-voiced texture of polyphonic music. By 1523 Marcantonio Cavazzoni and, later, others, composed ricercari for the organ and eventually for ensembles of viols. During this period the free solo style yielded to melodic imitation reminiscent of the motet (a sacred vocal composition). Andrea Gabrieli and other Venetian composers often wrote ricercari based only on one theme treated extensively in the manner of the later fugue—*e.g.,* by stretto (playing the theme against itself with repeated, closely spaced entrances) and augmentation and diminution (playing the theme in longer or shorter note values).

Other instrumental forms of the period, the canzona and fantasia, closely resembled the ricercare, particularly in the use of melodic imitation, and the names were often interchanged. In Spain, pieces written in ricercare style were known as *tientos* ("trials").

Rich, Barnabe (b. 1542—d. Nov. 10, 1617), English author and soldier whose *Farewell to Militarie Profession* (1581) was the source for Shakespeare's *Twelfth Night.*

He entered military service in 1562 and fought in the Low Countries and in Ireland; he eventually became a captain. Later he was an informer for the crown in Ireland under Elizabeth I and James I.

Rich, Claudius James (b. March 28, 1787, Dijon, Fr.—d. Oct. 5, 1820, Shīrāz, Persia), British business agent in Baghdad whose examination of the site of Babylon (1811) is considered the starting point of Mesopotamian archaeology.

Rich was a man of remarkable linguistic accomplishment; he knew Greek, Latin, Hebrew, Persian, Syriac, and several modern European languages from boyhood. Fluency in Turkish and Arabic served him well during his appointment, from age 21 until several months before his death, as East India Company resident at Baghdad, then under Ottoman dominion. His exceptional administrative ability helped to establish more than a century of British influence in Mesopotamia.

During periods of respite from the pressures of his office, he visited sites of ancient Mesopotamian cities and collected antiquities that were purchased by the British Museum in 1825 and became the foundation of Mesopotamian antiquarian studies in England. On his expedition to the site of Babylon he sketched, made an approximate survey of the area, dug up inscribed bricks, and had underground cavities explored. He concluded, however, that little more could be learned without excavation. His findings, published in a Viennese journal in 1812, were reprinted in *Memoir on the Ruins of Babylon* (1815) and expanded in *Second Memoir on Babylon* (1818). Another of his works that stimulated interest in Mesopotamian archaeology was *Narrative of a Residence in Koordistan . . .*, 2 vol. (1836), which was also valuable for its geographical observations of Mesopotamia and Iran.

Rich, John (b. *c.* 1682—d. Nov. 26, 1761, London), English theatre manager and actor, the popularizer of English pantomime and founder of Covent Garden Theatre.

Rich was a manager by inheritance; he received a three-quarter share in Lincoln's Inn Fields Theatre from his father, Christopher Rich, in 1714, and, after running that house successfully for 18 years, he founded Covent Garden Theatre in 1732. At both theatres he staged entertainments of a new type based on Italian foundations known as pantomime. In these he combined a classical fable with a grotesque story in commedia dell'arte style involving Harlequin and his beloved Columbine. From 1717 until the year before his death, he played Harlequin under his stage name of Lun and thus helped develop the harlequinade of English pantomime tradition. After Rich's death, David Garrick paid tribute to the matchless expressiveness of his miming.

In 1727 Rich produced John Gay's *The Beggar's Opera,* which ran for a record number of 63 performances and, as was said at the time, "made Gay rich and Rich gay."

Rich, Lady Penelope, *née* DEVEREUX (b. 1562?—d. 1607), English noblewoman, who married (1581) Lord Rich but, dissatisfied, welcomed the attentions of the courtier poet Sir Philip Sidney. She was the "Stella" of his love poems *Astrophel and Stella* (1591). She later became Lord Mountjoy's mistress, was divorced (1605), and married Mountjoy.

Rich (of Leighs), Richard Rich, 1st Baron (b. *c.* 1496, London—d. June 12, 1567, Rochford, Essex, Eng.), powerful minister to England's King Henry VIII and lord chancellor during most of the reign of King Edward VI. Although he participated in the



Richard Rich, engraving by R. Dalton after a portrait by Hans Holbein the Elder
By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

major events of his time, Rich was more a civil servant than a politician; by shifting his allegiances he continually came out on the winning side in political and religious struggles.

Rich was trained in law and in 1533 became solicitor general. He was prosecutor at the treason trials of Sir Thomas More and Bishop John Fisher in 1535, and it was specifically his testimony against More that led to More's conviction. He then helped Henry's chief minister, Thomas Cromwell, carry out the dissolution of the monasteries. In 1536 he was elected speaker of the House of Commons, and by 1540 Rich had become a privy councillor.

Shortly after Henry VIII's death in January 1547 he was made Baron Rich, and in October he became lord chancellor. Two years later he helped John Dudley, earl of Warwick (later duke of Northumberland), overthrow Edward Seymour, duke of Somerset, regent to young Edward VI, but in 1551 Rich resigned the lord chancellorship on grounds of ill health. Like the other councillors, he acquiesced when Edward illegally designated Northumberland's daughter-in-law Lady Jane Grey successor to

the crown; nevertheless, after Edward's death in 1553, Rich changed sides and supported the cause of Mary Tudor, a Roman Catholic who ruled as Queen Mary I. Thereafter, his health prevented him from taking a prominent part in public affairs.

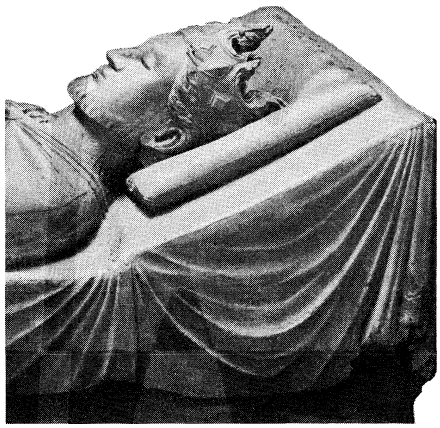
Rich, Robert: *see* Warwick, Robert Rich, 2nd earl of.

Richard, name of rulers grouped below by country and indicated by the symbol •.

Foreign-language equivalents:
French ..... Richard
German ..... Richard

ENGLAND

• **Richard I,** byname RICHARD THE LION-HEART, or LION-HEARTED, French RICHARD COEUR DE LION (b. Sept. 8, 1157, Oxford—d. April 6, 1199, Châlus, Duchy of Aquitaine), duke of Aquitaine (from 1168) and of Poitiers (from 1172) and king of England, duke of Normandy, and count of Anjou (1189–99). His knightly manner and his prowess in the Third Crusade (1189–92) made him a popular king in his own time as well as the hero



Richard I, detail of tomb effigy in the abbey church of Fontevrault-l'Abbaye, Fr.
Giraudon—Art Resource/EB Inc.

of countless romantic legends. He has been viewed less kindly by more recent historians and scholars.

Early life. Richard was the third son of Henry II and Eleanor of Aquitaine, and he was given the Duchy of Aquitaine, his mother's inheritance, at the age of 11 and was enthroned as duke at Poitiers in 1172. Richard possessed precocious political and military ability, won fame for his knightly prowess, and quickly learned how to control the turbulent aristocracy of Poitou and Gascony. Like all Henry II's legitimate sons, he had little or no filial piety, foresight, or sense of responsibility. He joined his brothers in the great rebellion (1173–74) against their father, who invaded Aquitaine twice before Richard submitted and received pardon. Thereafter Richard was occupied with suppressing baronial revolts in his own duchy. His harshness infuriated the Gascons, who revolted in 1183 and called in the help of the "Young King" Henry and his brother Geoffrey of Brittany in an effort to drive Richard from his duchy altogether. Alarmed at the threatened disintegration of his empire, Henry II brought the feudal host of his continental lands to Richard's aid, but the younger Henry died suddenly (June 11, 1183) and the uprising collapsed.

Richard was now heir to England, and to Normandy and Anjou (which were regarded as inseparable), and his father wished him to yield Aquitaine to his youngest brother, John. But Richard, a true southerner, would not surrender the duchy in which he had grown up, and even appealed, against Henry II, to the young king of France, Philip II Augustus. In November 1188 he did homage to Philip for all the English holdings on French soil and in 1189 openly joined forces with Philip to drive Henry into abject submission. They chased him from Le Mans to Saumur, forced him to acknowledge Richard as his heir, and at last harried him to his death (July 6, 1189).

King of England. Richard received Normandy on July 20 and the English throne on September 30. Richard, unlike Philip, had only one ambition, to lead the crusade prompted by Saladin's capture of Jerusalem in 1187. He had no conception of planning for the future of the English monarchy and put up everything for sale to buy arms for the crusade. Yet he had not become king to preside over the dismemberment of the Angevin empire. He broke with Philip and did not neglect Angevin defenses on the Continent. Open war was averted only because Philip also took the cross. Richard dipped deep into his father's treasure and sold sheriffdoms and other offices. With all this he raised a formidable fleet and an army, and in 1190 he departed for the Holy Land, travelling via Sicily.

Sicily. Richard found the Sicilians hostile and took Messina by storm (October 4). To prevent the German emperor Henry VI from ruling their country, the Sicilians had elected the native Tancred of Lecce, who had imprisoned the late king's wife, Joan of England (Richard's sister), and denied her possession of her dower. By the Treaty of Messina Richard obtained for Joan her release and her dower, acknowledged Tancred as king of Sicily, declared Arthur of Brittany (Richard's nephew) to be his own heir, and provided for Arthur to marry Tancred's daughter. This treaty infuriated the Germans, who were also taking part in the Third Crusade, and it incited Richard's brother John to treachery and rebellion. Richard joined the other crusaders at Acre on June 8, 1191, having conquered Cyprus on his way there. While at Limassol in Cyprus, Richard married (May 12) Berengaria of Navarre.

The holy land. Acre fell in July 1191, and on September 7 Richard's brilliant victory at Arsūf put the crusaders in possession of Joppa. Twice Richard led his forces to within a few miles of Jerusalem. But the recapture of the city, which constituted the chief aim of the Third Crusade, eluded him. There were fierce quarrels among the French, German, and English contingents. Richard insulted Leopold V, duke of Austria, by tearing down his banner and quarrelled with Philip Augustus, who returned to France after the fall of Acre. Richard's candidate for the crown of Jerusalem was his vassal Guy de Lusignan, whom he supported against the German candidate, Conrad of Montferrat. It was rumoured, unjustly, that Richard connived at Conrad's murder. After a year's unproductive skirmishing, Richard (September 1192) made a truce for three years with Saladin that permitted the crusaders to hold Acre and a thin coastal strip and gave Christian pilgrims free access to the holy places.

Imprisonment. Richard sailed home by way of the Adriatic, because of French hostility, and a storm drove his ship ashore near Venice. Because of the enmity of Duke Leopold he disguised himself, but he was discovered at Vienna in December 1192 and imprisoned in the Duke's castle at Dürnstein on the Danube. Later, he was handed over to Henry VI, who kept him at various imperial castles. It was around Richard's captivity in a castle, whose identity was at first unknown in England, that the famous romance of Blondel was woven in the 13th century.

Under the threat of being handed over to Philip II, Richard agreed to the harsh terms imposed by Henry VI: a colossal ransom of 150,000 marks and the surrender of his kingdom to the Emperor on condition that he receive it back as a fief. The raising of the ransom money was one of the most remarkable fiscal measures of the 12th century and gives striking proof of the prosperity of England. A very high proportion of the ransom was paid, and meanwhile (February 1194) Richard was released.

Return to England. He returned at once to England and was crowned for the second time on April 17, fearing that the independence of his kingship had been compromised. Within a month he went to Normandy, never to return. His last five years were spent in warfare against Philip II, interspersed with occasional truces. The King left England in the capable hands of Hubert Walter, justiciar and archbishop of Canterbury. It was Richard's impetuosity that brought him to his death at the early age of 42. The Vicomte of Limoges refused to hand over a hoard of gold unearthed by a local peasant. Richard laid siege to his castle of Châlus and in an unlucky moment was wounded. He died in 1199. He was buried in the abbey church of Fontevrault, where Henry II and Queen Eleanor are also buried, and his effigy is still preserved there.

Assessment. Richard was a thoroughgoing Angevin, irresponsible and hot-tempered, possessed of tremendous energy, and capable of great cruelty. He was more accomplished than most of his family, a soldier of consummate ability, a skillful politician, and capable of inspiring loyal service. He was a lyric poet of considerable power and the hero of troubadours. In striking contrast with his father and with King John, he was, there seems no doubt, a homosexual. He had no children by Queen Berengaria, with whom his relations seem to have been merely formal.

(G.W.S.B.)

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• **Richard II** (b. Jan. 6, 1367, Bordeaux, Fr.—d. February 1400, Pontefract, Yorkshire,



Richard II, detail of a portrait by an unknown artist; in Westminster Abbey, London
By courtesy of the Dean and Chapter of Westminster

Eng.), king of England from 1377 to 1399. His ultimate defeat and death in conflicts with powerful aristocratic opponents contributed to the enfeeblement and instability that characterized the English monarchy for the next 85 years.

He was the son of Edward the Black Prince and grandson of King Edward III and Richard succeeded to his grandfather's throne in June 1377. He had not yet come of age, and the government continued to be run by the same nobles—dominated by his uncle, John of Gaunt, duke of Lancaster—who had held power in the last years of the reign of Edward III.

Gaunt's misrule hastened the economic deterioration brought on by the Black Death and the prolonged conflict with France (the Hundred Years' War, 1337–1453). The result was the Peasants' Revolt of 1381, the first great crisis of Richard's reign. Although he was probably acting under directions from his counsellors, Richard displayed great presence of mind when he pacified the rebels with deceptive promises on June 14–15, 1381. In 1382 the King was married to Princess Anne of Bohemia (died 1394), to whom he became deeply devoted. By 1385 he had begun to build up a personal following of such frivolous courtiers as Robert de Vere, earl of Oxford. At the same time there emerged a ruthless opposition led by Thomas of Woodstock, duke of Gloucester; Richard Fitzalan, earl of Arundel; and Thomas de Beauchamp, earl of Warwick.

Gaunt kept the peace between the factions until, in July 1386, he departed for Spain to pursue his personal dynastic ambitions in Castile, leaving Richard at the mercy of his enemies. At their instigation Parliament impeached his chancellor, Michael de la Pole, earl of Suffolk (1386), and created an 11-man commission to oversee the King's activities for a year. When Richard declared these measures treasonable violations of the royal prerogative, his opponents retaliated by having the Parliament of 1388 outlaw his closest friends, some of whom were executed. The defenseless king submitted to the five principal opposition leaders—called the appellants—until in May 1389 he announced his intention to rule as an independent monarch of full age.

Gaunt's return from Spain in late 1389 stabilized the situation, and for eight years Richard worked in apparent harmony with Gaunt and the appellant lords. All this time the King was evidently waiting for an opportunity to revenge himself against his former enemies. He gradually formed a second and stronger royalist party, and by 1397 he was ready to strike. He had Arundel convicted of treason and executed; Warwick was banished and Gloucester imprisoned and murdered.

In September 1398 a quarrel between two former appellants, Gaunt's son Henry Bolingbroke and Thomas Mowbray, duke of Norfolk, gave the King an opportunity to banish both men. Hence, upon the death of John of Gaunt in February 1399, Richard had an excuse to confiscate the vast Lancastrian estates, which would have passed to Bolingbroke. He then made the disastrous mistake of leaving for Ireland (May 1399). In his absence Bolingbroke invaded England and rallied the nobility around himself. Returning to England in August, Richard surrendered to Bolingbroke without a fight. He abdicated (September 30) in favour of Bolingbroke, who ascended the throne as King Henry IV. In October Richard was imprisoned in Pontefract Castle, where he died four months later, possibly by starving himself to death. Shakespeare's story of his murder in *Richard II* rests on no reliable authority. Richard revealed a sensitive appreciation of literature by patronizing Geoffrey Chaucer, John Gower, and Jean Froissart. A.B. Steel's *Richard II* was published in 1941.

• **Richard III,** also called (1461–83) RICHARD PLANTAGENET, DUKE OF GLOUCESTER (b. Oct. 2, 1452, Fotheringhay Castle, Northamptonshire, Eng.—d. Aug. 22, 1485, Bosworth, Leicestershire), last Yorkist king of England, who usurped power in June 1483 and ruled until he was killed in battle. An extremely controversial figure, he has been portrayed by historians and in literature as a monster of unparalleled villainy. Modern scholars, on the other hand, tend to regard him as a potentially capable monarch whose reputation for



Richard III, detail of a painting by an unknown artist; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

wickedness originated in 16th-century political propaganda.

He was the youngest son of Richard, duke of York (died 1460) and was made duke of Gloucester in 1461 after his eldest brother, Edward of York, had deposed the weak Lancastrian monarch Henry VI and assumed power as Edward IV. In October 1470, Richard and Edward were driven into exile by Richard Neville, earl of Warwick, who put Henry VI back on the throne. Returning with Edward to England in March 1471, Richard commanded the vanguard forces in two victories over the Lancastrians—at Barnet and Tewkesbury—that led to Edward's restoration. It is likely that Richard had a hand in the murder of Henry VI in the Tower of London on the night of May 21, 1471. As a reward for his fidelity, the King gave him high offices and large grants of land.

Upon the death of Edward IV on April 9, 1483, Richard became protector of the realm for Edward's son and successor, the 12-year-old king Edward V. Soon he came into conflict with the faction headed by Edward IV's widow, Elizabeth Woodville, which dominated the young monarch. Richard broke the power of the Woodvilles by arresting and eventually executing their leaders and by taking into custody Edward V and his nine-year-old brother. London preachers were then persuaded to announce that Edward IV's marriage had been invalid and his children illegitimate and that Richard was therefore his brother's rightful successor. On June 25 an assembly of lords and commoners endorsed these claims; the following day King Richard III officially began his reign.

When the two young princes disappeared in August 1483, it was rumoured that Richard, their uncle, had had them murdered. There is a strong possibility that the rumour was fact, but another prime suspect in the mystery was Richard's close associate Henry Stafford, duke of Buckingham. Having secretly turned against the King, Buckingham may have killed the princes in order to discredit him. The rebellion raised by Buckingham in southern England in October 1483 appeared at first to be a severe threat to Richard's regime, but it quickly collapsed, and the Earl was executed. In order to live down his past and enlarge his narrow base of support, Richard now devoted his full attention to his kingly duties; he promoted trade and instituted financial reforms. But time was not on his side; the aristocracy and gentry, whose support he desperately needed, found it difficult to accept him as a legitimate ruler.

Meanwhile, Richard's enemies were joining his rival, Henry Tudor, earl of Richmond, a claimant to the throne of Lancastrian ancestry who was living in exile in France. On Aug. 7, 1485, Henry landed with his army in South Wales; he marched east and engaged Richard in battle on Bosworth Field on August 22. Richard's forces were larger than Henry's, but several of the King's most powerful nobles defected at a crucial moment in the battle. Refusing to flee, Richard died fighting bravely against overwhelming odds. Henry Tudor then ascended the throne as King Henry VII (ruled 1485–1509) and united the Yorkist and Lancastrian claims by marrying Edward IV's daughter Elizabeth of York.

Not surprisingly, Richard was continually maligned in Tudor times through such writings as Shakespeare's play *Richard III.* As to the allegation—in Shakespeare and elsewhere—that Richard was a hunchback, neither portraits nor contemporary reports reveal such a deformity, although there is some indication that one of his shoulders was higher than the other. There is a biography of Richard by P.M. Kendall, *Richard the Third* (1955).

GERMANY/HOLY ROMAN EMPIRE

• **Richard,** also called EARL OF CORNWALL (b. Jan. 6, 1209, Winchester, Hampshire, Eng.—d. April 2, 1272, Berkhampstead Castle, Hertfordshire), king of the Romans from 1256 to 1271, aspirant to the crown of the Holy Roman Empire.

He was the second son of King John of England and was created earl of Cornwall (May 30, 1227). Between 1227 and 1238 he frequently opposed his brother, King Henry III by joining the barons in several crises but never proceeding to rebellion and always making Henry pay heavily for reconciliation. He took the cross (1236) and led a small English force to the Holy Land (June 1240–January 1242), refortifying Ascalon and negotiating an advantageous treaty. During Henry III's disastrous Poitevin campaign in France (1242), Richard's prompt retreat at Saintes and his persuasive diplomacy at Taillebourg saved Henry from capture. While acting regent of England during Henry's Gascon visit (1253–54), Richard summoned knights to represent the shires at the critical Easter Parliament of 1254. Reputedly the richest magnate in England, he refused Pope Innocent IV's offer of the Sicilian crown (1252–53) but accepted imperial candidature (1256), purchased four of the seven electoral votes, was elected king of the Romans and crowned at Aachen (Aix-la-Chapelle; May 17, 1257). By lavish bribery he gained recognition throughout the Rhineland, returning home in January 1259.

He helped Henry to overthrow the Provisions of Oxford (which can be regarded as the first written constitution in English history), but from June to October 1260 he again visited Germany, then discovering the absurdity of his hopes of the imperial crown. Later visits to Germany (1262–63 and 1268–69) also achieved nothing useful.

He helped Henry invaluably against the rebel barons (1263–64) but was captured at Lewes (May 14, 1264) and imprisoned at Wallingford and then at Kenilworth until the overthrow of Simon de Montfort at Evesham (Aug. 4, 1265). He then worked ceaselessly to obtain the relatively moderate settlement of the Dic-

tum of Kenilworth (Oct. 31, 1266). His fourth and last visit to Germany (August 1268–August 1269) is notable only for his third marriage, to Beatrice of Falkenburg.

NORMANDY

• **Richard I,** byname RICHARD THE FEARLESS, French RICHARD SANS PEUR (b. *c.* 932—d. 996), duke of Normandy (942–996), son of William I Longsword.

Louis IV of France took the boy-duke into his protective custody, apparently intent upon reuniting Normandy to the crown's domains; but in 945 Louis was captured by the Normans, and Richard was returned to his people. Richard withstood further Carolingian attempts to subdue his duchy and, in 987, was instrumental in securing the French crown for his brother-in-law, the Robertian Hugh Capet.

• **Richard II,** byname RICHARD THE GOOD, French RICHARD LE BON (d. 1026/27), duke of Normandy (996–1026/27), son of Richard I the Fearless. He held his own against a peasant insurrection, helped Robert II of France against the duchy of Burgundy, and repelled an English attack on the Cotentin Peninsula that was led by the Anglo-Saxon king Ethelred II the Unready. He also pursued a reform of the Norman monasteries.

• **Richard III** (d. Feb. 3, 1027), duke of Normandy (1026–27, or 1027), son of Richard II the Good. He was succeeding in quelling the revolt of his brother, Robert, when he died opportunely, perhaps of poison, making way for his brother's succession as Robert I.

• **Richard (IV):** *see* Richard I (England).

Richard COEUR DE LION: *see* Richard I (England).

Richard DE BURY: *see* Bury, Richard de.

Richard LE GRANT, also called RICHARD GRANT, RICHARD LE GRAND, or RICHARD OF WETHERSHED (d. Aug. 3, 1231, San Gemini, Duchy of Spoleto [Italy]), 45th archbishop of Canterbury (1229–31), who asserted the independence of the clergy and of his see from royal control.

Richard was the chancellor of Lincoln Cathedral (1221–29), Lincolnshire. He was then appointed archbishop by Pope Gregory IX at the request of King Henry III of England and the English bishops and was consecrated on June 10. He soon disputed with Henry over a tax on the clergy, who, he argued, were not bound by secular rules and should not participate in secular affairs.

Soon after this dispute, Henry entrusted the chief justiciar, Hubert de Burgh, one of the greatest professional administrators of the time, with Tunbridge Castle. Richard, upholding his metropolitan rights, said Tunbridge belonged to his see and appealed to the king, who rejected his claim. He then excommunicated all those, except Henry, in possession of the land and castle, and in the spring of 1231 he took his case to Rome. Gregory decided in favour of Richard, but the archbishop died at the convent of the Friars Minor, in San Gemini, on his way home. Hubert was spuriously charged with having poisoned him.

Richard OF CHICHESTER, SAINT, original name RICHARD WYCHE, DE WYCH, or DE WICIO (b. *c.* 1198, Droitwich, Worcestershire, Eng.—d. April 3, 1253, Dover, Kent; canonized Jan. 28, 1262; feast day April 3), bishop of Chichester, who championed the ideals of St. Edmund of Abingdon.

After becoming an M.A. of Oxford, Richard studied canon law at Paris and perhaps at Bologna and later became chancellor of Oxford. From 1236 to 1240 he was chancellor to Edmund of Abingdon, archbishop of Canterbury. After Edmund's death, Richard studied theology at the Dominican school at Orléans, where he was ordained priest.

His election as bishop of Chichester (1244) gained him the enmity of the crown, because the earlier election of Robert Passelewe, Henry III's candidate, had been quashed. After Richard's consecration by Pope Innocent IV at Lyon (March 5, 1245), Henry, who had forcibly prevented Richard from entering Chichester, allowed him to take possession of his see and to receive income from diocesan real estate.

Richard OF ELY: *see* Fitzneale, Richard.

Richard OF SAINT-VICTOR (b. Scotland/England—d. March 10, 1173, Paris, Fr.), Roman Catholic theologian whose treatises profoundly influenced medieval and modern mysticism.

Richard entered the Abbey of Saint-Victor, Paris, and studied under the scholastic theologian and philosopher Hugh of Saint-Victor, becoming prior in 1162. Although Richard wrote on the Trinity and the Scriptures, he is chiefly remembered for his works on mysticism. With their extensive symbolism, his works synthesize and elaborate the teachings that made the school of Saint-Victor renowned throughout the 12th century.

According to Richard, the soul proceeds from sense perception to ecstasy through imagination, reason, and intuition. The soul employs secular learning as well as divine revelation until it is finally united with God in divine contemplation. Richard's *Benjamin major* and *Benjamin minor* became standard manuals on the practice of mystical spirituality.

His influence on medieval mysticism is evident in the works of the 13th-century Italian theologian St. Bonaventure, who discussed faith as the foundation of mystical contemplation in the tradition of the school of Saint-Victor, and in those of the 14th-century French theologian Jean de Gerson. Richard's influence on later mysticism is evidenced by the appearance of six editions of his works between 1506 and 1650.

Richard OF WETHERSHED: *see* Richard le Grant.

Richard STRONGBOW: *see* Pembroke, Richard FitzGilbert, 2nd Earl of.

Richard THE FEARLESS: *see* Richard I *under* Richard (Normandy).

Richard THE GOOD: *see* Richard II *under* Richard (Normandy).

Richard THE LION-HEART, also called THE LION-HEARTED: *see* Richard I *under* Richard (England).

Richard WYCHE, also spelled DE WYCH, or DE WICIO: *see* Richard of Chichester, Saint.

Richards, Audrey I(sabel) (b. July 8, 1899, London, Eng.—d. June 29, 1984, near Midhurst, West Sussex), English social anthropologist and educator known chiefly for her researches among several eastern African peoples, especially the Bemba. She did fieldwork in Northern Rhodesia (Zambia), Uganda, and the Transvaal. Among her subjects of study were social psychology, food culture, nutrition, agriculture, land use, and economic organization.

Richards spent much of her youth in India, where her father served on the Viceroy's Council. She received her M.A. from Newnham College, Cambridge, in 1928 and studied with Bronisław Malinowski at the London School of Economics (Ph.D., 1929), where she later taught (1931–32, 1935–37). She also taught at the University of Witwatersrand, S.Af. (1938–40), London University (1946–50), Makerere College, Uganda (1950–56), and the University of Cambridge (1956–67), where she founded and directed the Centre for African Studies. Her works include *Hunger and Work in a Savage Tribe* (1932), *Land, Labour and Diet in Northern Rhodesia* (1939), and *The Multicultural States of East Africa* (1969). She was made a Companion of the Order of the British Empire (C.B.E.) in 1955.

Richards, Dickinson Woodruff (b. Oct. 30, 1895, Orange, N.J., U.S.—d. Feb. 23, 1973, Lakeville, Conn.), American physiologist who shared the Nobel Prize for Physiology or Medicine in 1956 with Werner Forssmann and André F. Cournand. Cournand and Richards adapted Forssmann's technique of using a flexible tube (catheter), conducted from an elbow vein to the heart, as a probe to investigate the heart.

Richards received an A.B. degree from Yale University in 1917 and later studied at Columbia University's College of Physicians and Surgeons (M.A., 1922; M.D., 1923). After a hospital internship and a brief study in England, he returned to Columbia University in 1928 and taught there from 1947 to 1961. From 1945 to 1961 he worked at Bellevue Hospital, New York City, where he met Cournand. Their use and perfection of Forssmann's method, known as cardiac catheterization, permitted them to measure blood pressure and other conditions inside the heart.

Richards, Ellen Swallow, *née* ELLEN HENRIETTA SWALLOW (b. Dec. 3, 1842, Dunstable, Mass., U.S.—d. March 30, 1911, Boston), American chemist and founder of the home economics movement in the United States. She is credited with building a bridge between scientific analysis and household management through her direction of a series of conferences at Lake Placid, N.Y., beginning in 1899. There the term home economics was coined, and Richards worked out the curriculum for the teaching of the new field. In 1908 she was chosen first president of the American Home Economics Association.

Swallow was trained as a chemist, earning an A.B. from Vassar College in Poughkeepsie, N.Y., in 1870 and, as the first woman admitted to the Massachusetts Institute of Technology (MIT), a B.S. in 1873. In 1875 she married Robert Hallowell Richards, an expert in mining and metallurgy at MIT. In 1876 Ellen Swallow Richards developed a women's laboratory at MIT to foster the scientific training of women; in 1878 she was appointed instructor of chemistry at MIT. In 1882 she became one of the founding members of the Association of Collegiate Alumnae (later the American Association of University Women).

In 1884 Richards' title was changed to instructor in sanitary chemistry, which reflected her interest in the analysis of water, air, and sewage. She developed new methods of testing chemical content and pollution. In 1890 she led the first attempt at public education in home economics with the opening of the New England Kitchen in Boston, a public kitchen that demonstrated nutrition and home economics.

Richards was the author of a number of books linking science to the problems of daily living. They include *The Chemistry of Cooking and Cleaning* (1882); with Marion Talbot, *Home Sanitation* (1887); and *Euthenics: The Science of Controllable Environment* (1912).

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Richards, Sir Gordon (b. May 5, 1904, Oakengates, Shropshire, Eng.—d. Nov. 10, 1986, Kintbury, Berkshire), English jockey, the first to ride 4,000 winners and the leading rider in British flat (Thoroughbred) racing for 26 of his 34 seasons (1921–54). His career total of 4,870 victories was a world record, broken by Johnny Longden of the United States on Sept. 3, 1956. He was the first jockey ever to be knighted.

Richards first led British jockeys in victories in 1925. In 1943, when he established a British single-season record of 269 winners, he exceeded Fred Archer's career total of 2,749, a record for British riders. On May 4, 1950, Richards rode his 4,000th winner. In 1953, a few weeks after he had been knighted, he scored his only triumph in the Derby. He was more successful in other leading stakes races, winning the St. Leger five times and the 2,000 Guineas on three occasions. After being injured twice in races (May and July 1954), he retired as a jockey and became a trainer of racehorses (1955–70) and a racing manager thereafter. His autobiography, *My Story*, was published in 1955; a biography by Michael Seth-Smith, *Knight of the Turf*, was published in 1980.

Richards, I(vor) A(rmstrong) (b. Feb. 26, 1893, Sandbach, Cheshire, Eng.—d. Sept. 7, 1979, Cambridge, Cambridgeshire), English critic, poet, and teacher who was highly influential in developing a new way of reading poetry that led to the New Criticism (*q.v.*). A student of psychology, he concluded that poetry performs a therapeutic function by coordinating a variety of human impulses into an aesthetic whole, helping both the writer and the reader maintain their psychological well-being.

Richards was educated at Magdalene College, Cambridge, and was a lecturer in English and moral sciences there from 1922 to 1929. In that period he wrote three of his most influential books: *The Meaning of Meaning* (1923; with C.K. Ogden), a pioneer work on semantics; and *Principles of Literary Criticism* (1924) and *Practical Criticism* (1929), companion volumes developing his critical method.

During the 1930s, Richards spent much of his time developing Basic English, a system originated by Ogden that employed only 850 words; Richards believed a universally intelligible language would help to bring about international understanding. He took Basic English to China as a visiting professor at Tsing Hua University (1929–30) and as director of the Orthological Institute of China (1936–38). In 1942 he published a version of Plato's *Republic* in Basic English. He became professor of English at Harvard University in 1944, working mainly in primary education, and emeritus professor there in 1963. His verse has been collected in *Internal Colloquies* (1971) and *New and Selected Poems* (1978). His essay collections include *Science and Poetry* (1926; revised as *Poetries and Sciences* [1970]), *Speculative Instruments* (1955), *Beyond* (1974), and *Poetries* (1974). *Complementarities* (1976) includes uncollected essays from 1919 to 1975.

Richards, Theodore William (b. Jan. 31, 1868, Germantown, Pa., U.S.—d. April 2, 1928, Cambridge, Mass.), American chemist whose research on the atomic weights of approximately 60 elements indicated the existence of isotopes and earned him the 1914 Nobel Prize for Chemistry.

Richards graduated from Haverford College, Pa., (1885) and took advanced degrees at Harvard University, where he became instructor in chemistry in 1891 and full professor in 1901.

Richards greatly improved the technique of gravimetric atomic weight determinations, introducing quartz apparatus, the bottling device, and the nephelometer (an instrument for measuring turbidity). Although the atomic weight values of Jean Servais Stas had been regarded as standard, about 1903 physicochemical measurements showed that some were not accurate. Richards and his students revised these figures, lowering, for instance, Stas's value for silver from 107.93 to 107.88. Richards' investigations of the atomic weight of lead from different sources helped to confirm the existence of isotopes. His later researches were concerned mainly with the physical properties of the solid elements and included much original work on atomic volumes and compressibilities.

Richards, William (b. Aug. 22, 1793, Plainfield, Mass., U.S.—d. Nov. 7, 1847, Hawaiian Islands), American missionary who helped to promote a liberal constitutional monarchy in the Hawaiian Islands.

He graduated from Williams College (Massachusetts) in 1819 and from Andover Theological Seminary in 1822. In the fall of 1822 he married and, with his bride, sailed for the Hawaiian Islands, where he resided (on Maui) for the next several years as a missionary. In 1838 the king asked him to become an adviser, and he thereafter spent his time urging the improvement of the political system, helping to transform Hawaii into a modern constitutional state, with a bill of rights (1839) and a constitution (1840). In 1842 he went abroad as a diplomat seeking British, French, and U.S. acknowledgment of Hawaiian independence. No treaties were signed, but verbal acknowledgments were extended. Subsequently he held other positions, notably minister of public instruction (1846–47).

He wrote *Memoir of Keopuolani, Late Queen of the Sandwich Islands* (1825) and edited the *Translation of the Constitution and Laws of the Hawaiian Islands* (1842).

Richards, Sir William Buell (b. May 2, 1815, Brockville, Upper Canada—d. Jan. 26, 1889, Ottawa), politician and jurist who was the first chief justice of the Supreme Court of Canada (1875–79).

He was educated at Johnstown District Grammar School in his native Brockville and at Potsdam Academy in New York state and then studied law in an uncle's law offices, being admitted to the Canadian bar in 1837. He joined many community organizations and became an ardent member of the Reform Party. He was a representative in the Legislative Assembly of Canada (1848–53) and, during this period, attorney general for Upper Canada (1851–53), when he pursued many aspects of legal reform, including reorganizing the statute law and raising the requirements for admission to the bar. Although he was a better politician than a legal scholar, he was appointed a puisne judge in the Court of Common Pleas in 1853 and became its chief justice in 1863. He became a highly popular jurist, known for his wit and common sense if not for any brilliant juridical vision.

In 1871 he visited the Supreme Court of the United States in Washington, D.C., to observe its operations; and, when the Supreme Court of Canada was formed in 1875, he was named its first chief justice, serving until his retirement in 1879. He became a staunch defender of the young court, helping to establish its rules of order, its procedures, and its jurisdiction. He was knighted in 1877.

Richardson, city, northern suburb of Dallas, Dallas and Collin counties, northern Texas, U.S. The original founders settled Breckenridge township (*c.* 1853) south of the present city limits in what is now Restland. In 1872 Ryley and Jack Wheeler gave land for a townsite and right-of-way to the Houston and Texas Central Railway, and the town was laid out and named for George Richardson, then president of the railroad. Most of the business area was rebuilt in the early 1890s after a destructive fire. Completion of the "Red Brick Road" (later Greenville Highway) to Dallas in 1924 brought a quick increase in population. Richardson was incorporated the following year and adopted a city charter in 1956.

Although mainly residential, the city has developed into a research centre, including the Sun Oil Company Laboratory and the W.L. Clayton Research Center (foods); manufactures include electronic equipment. Pop. (1980) 72,496.

Richardson, Benjamin (b. 1802, Stourbridge, Worcestershire, Eng.—d. 1887) founder of one of the great English glass-manufacturing houses, who was instrumental in the introduction of modern glass-working methods to England. Richardson's Stourbridge factory was the first in the country to have a threading machine for making filigree glass and the first to make mass-produced pressed glass tumblers. The factory pioneered in the use of pressing machines for decorating flint glass with relief ornaments. His firm also became one of the leaders in producing cameo glass for commercial sale.

Richardson became a public figure when he offered £1,000 to anyone who could produce a replica of the British Museum's famous Portland Vase. The blue-and-white Roman vase was considered one of the most beautiful pieces of glassware ever made and the finest surviving example of Roman cameo glass. The first successful replica of the vase was completed in 1876 by a former employee of Richardson's, a local glassmaker named John Northwood (*q.v.*), but it was not made for Richardson. Northwood's piece had been commissioned in 1873 by Philip Pargeter, himself a glass manufacturer and a nephew of Richardson. Richardson is also remembered for his efforts to reduce the cost of manufacturing quality glassware, thus rendering it accessible to the general public.

Richardson, Dorothy M(iller), married name DOROTHY ODLE (b. May 17, 1873, Abingdon, Berkshire, Eng.—d. June 17, 1957, Beckenham, Kent), English novelist, an often neglected pioneer in stream-of-consciousness fiction.

Richardson passed her childhood and youth in secluded surroundings in late-Victorian England. After her schooling, which ended when, in her 17th year, her parents separated, she engaged in teaching, clerical work, and journalism. In 1917 she married the artist Alan Elsden Odle. She commands attention for her ambitious sequence novel *Pilgrimage* (published in separate volumes—she preferred to call them chapters—as *Pointed Roofs,* 1915; *Backwater,* 1916; *Honeycomb,* 1917; *The Tunnel,* 1919; *Interim,* 1919; *Deadlock,* 1921; *Revolving Lights,* 1923; *The Trap,* 1925; *Oberland,* 1927; *Dawn's Left Hand,* 1931; *Clear Horizon,* 1935; the last part, *Dimple Hill,* appeared under the collective title, four volumes, 1938).

Pilgrimage is an extraordinarily sensitive story, seen cinematically through the eyes of Miriam Henderson, an attractive and mystical New Woman. Although the length of the work and the intense demand it makes on the reader have kept it from general popularity, it is a significant novel of the 20th century. A biography, *Dorothy Richardson* by G.G. Fromm, appeared in 1977.

Richardson, Henry Handel, pseudonym of ETHEL FLORENCE LINDESAY ROBERTSON, *née* RICHARDSON (b. Jan. 3, 1870, Melbourne—d. March 20, 1946, Fairlight, Sussex, Eng.), Australian novelist whose trilogy *The Fortunes of Richard Mahony,* combining description of an Australian immigrant's life and work in the goldfields with a powerful character study, is considered the crowning achievement of modern Australian fiction to that time.

From 1883 to 1887 Richardson was a pupil at the Presbyterian Ladies' College in Melbourne. In 1888 she left Australia to study music in Leipzig and spent the rest of her life abroad, making only one brief visit to Australia in 1912. In Leipzig she met J.G. Robertson, whom she married in Dublin in 1895 and

who in 1904 was appointed first professor of German Literature at London University. She abandoned the idea of becoming a concert pianist and began writing.

In Germany she began her first novel, *Maurice Guest* (1908), the story of a young English music student in Leipzig whose career and life are ruined by a tragic love affair. In 1904 she and her husband settled in England. Her second novel, *The Getting of Wisdom* (1910), is an account of her life at the boarding school in Melbourne. On completing it she began the trilogy that occupied the next 20 years of her life, *The Fortunes of Richard Mahony* (1930; *Australia Felix,* 1917; *The Way Home,* 1925; *Ultima Thule,* 1929). The central character is based to a large extent on her father (who had emigrated from Dublin to Australia and who died in 1879), reconstructed with the help of his letters and diaries. The novel is a detailed and sympathetic account of his tragic life, in particular of his inability to adjust himself to his adopted country. Her last novel, *The Young Cosima* (1939), is a reconstruction of the love triangle of Richard Wagner, Cosima Liszt, and Hans von Bülow. She also wrote a number of short stories, published as *The End of a Childhood and Other Stories* (1934), and an unfinished autobiography, *Myself When Young* (1948).

Richardson, Henry Hobson (b. Sept. 29, 1838, Priestley Plantation, La., U.S.—d. April 27, 1886, Brookline, Mass.), U.S. architect, the initiator of the Romanesque revival in the United States and a pioneer figure in the development of an indigenous, modern American style of architecture. His works include the Brattle Square and Trinity churches in Boston, Sever (1878–80) and Austin (1881–83) halls at Harvard University, and Glessner House, Chicago (1885–87).



Henry Hobson Richardson

By courtesy of The Prairie School Press, Palos Park, Illinois

Richardson was the great-grandson of the 18th-century political and religious dissenter and discoverer of oxygen, Joseph Priestley (1733–1804). His distinguished pedigree and his own affability made his move from the South to Harvard University in 1855 as easy as it was eventually to be rewarding. Harvard then offered more in personal contacts than in intellectual stimulation, and Richardson's later clients, such as Henry Adams (1838–1918), were largely drawn from the Porcellian Club and other social circles that he entered with ease. He never returned to the South.

Sometime during his Harvard days Richardson decided to become an architect. In Boston he was surrounded by buildings of plain granite design that affected the best of his own later work, but for formal training he had to go abroad, for there were no schools of architecture in the United States before the Civil War. Fluent in French from his Louisiana childhood, he studied at the École des Beaux-Arts in Paris from 1860 to 1862, when the Civil War at home cut off his income. He then worked in the office of the French architect Théodore Labrouste (1799–1885). Richardson remained with Labrouste until he returned to the United States in October 1865. In Paris he mastered the analytical architectural planning that characterizes much of his mature work and that was formulated by his friend the architect and École professor Julien Guadet in his *Éléments et théorie de l'architecture,* published in Paris in 1902.

Richardson returned to America with every expectation of quick success, for he was among the best trained architects in the country and had many important connections. In November 1866, he was awarded his first commission, the Church of the Unity in Springfield, Mass. (now demolished), where one of his former classmates was an influential member of the congregation. His career launched, Richardson married Julia Gorham Hayden of Boston on Jan. 3, 1867. They moved into a house of his own design (now altered) on Staten Island, New York, where five of his six children were born. Richardson's neighbour was Frederick Law Olmsted (1822–1903), the journalist and renowned landscape architect with whom he later frequently collaborated.

Richardson lived and worked in New York City for the next eight years, forming, in October 1867, a partnership with the architect Charles D. Gambrill (1832–80) that lasted exactly 11 years, but was never more than one of administrative convenience. From his Manhattan office and the drafting board in his Staten Island home came the drawings for the early commissions in Springfield, the State Asylum for the Insane in Buffalo, and the Brattle Square and Trinity churches in Boston. Designed for the renowned preacher Phillips Brooks (1835–93), Trinity was one of the most important Episcopal churches in America. Richardson's Romanesque revival design won him a national reputation, many imitators, and so many New England commissions that it became desirable to move to the Boston area. In 1874 he bought an early 19th-century dwelling resembling the plantation houses of the South in suburban Brookline. He added to it his office and studio. His last 12 years were spent with his family and assistants in these busy surroundings so reminiscent of his childhood environment.

During these last years Richardson produced the buildings upon which his reputation principally rests. He designed houses, community libraries, suburban railroad stations, educational buildings, and commercial and civic structures. Instead of the splintered massing, narrow vertical proportions, and disparate Gothic features used by his contemporaries, he favoured horizontal lines, simple silhouettes, and uniform, large-scale details of Romanesque or Byzantine inspiration. Since his best commercial structure, the Marshall Field Wholesale Store in Chicago, and most of his railroad stations in the northeastern United States were demolished long ago, the development of Richardson's work in the last years of his life can now best be studied at Sever and Austin halls at Harvard University; at the Allegheny County Buildings in Pittsburgh; at the Glessner House in Chicago; or in the series of libraries in the small towns around Boston, from Woburn and North Easton to Quincy and Malden. The Crane Memorial Library in Quincy, with its tripartite layering of a rough-faced granite base beneath continuous clerestory windows topped with a tiled gable roof and its cavernous entrance arch, stands with the finest and most characteristic works of his maturity.

Richardson was a sociable and colourful man. A figure of immense girth, he was known for his hearty appetite for food and drink. He enjoyed entertaining his friends, such as the American sculptor Augustus Saint-Gaudens, with large quantities of champagne and gourmet cuisine. On special occasions he served such delicacies as Chesapeake Bay oysters especially shipped from Baltimore, or would have a terrapin prepared by a Philadelphia restaurant and delivered in person by its chef. Such living hastened his end, however, for he suffered throughout his career from chronic nephritis, or Bright's disease, and worked at a strenuous pace, taking just one vacation during the 1880s: a whirlwind tour of Romanesque architecture in Europe in the summer of 1882. He died four years later, bloated and fatigued, at the top of his profession and with major buildings rising in Boston; Pittsburgh; Cincinnati, Ohio; Chicago; and St. Louis, Mo. He left it to his successors, the Boston architectural firm of Shepley, Rutan, and Coolidge, to finish these, and to the Chicago architects Sullivan and Wright to carry on in the direction he had initiated.

(J.F.O'G.)

MAJOR WORKS. Brattle Square Church, Boston (1870–72); State Asylum for the Insane, Buffalo (designed 1870–72); Hampden County Courthouse, Springfield, Mass. (1871–73); North Congregational Church, Springfield, Mass. (built 1872–73); Trinity Church, Boston (designed 1872, built 1873–77); Wm. Watts Sherman House, Newport, R.I. (1874–75); New York State Capitol, Albany, completion with Eidlitz (1875); Ames Memorial Library, North Easton, Mass. (1877–79); Winn Memorial Library, Woburn, Mass. (1877–78); Sever Hall, Harvard University (1878–80); Dr. James Bryant House, Cohasset, Mass. (1880); Crane Memorial Library, Quincy, Mass. (1880–83); Ames Gate Lodge, North Easton, Mass. (1880–81); City Hall, Albany, N.Y. (1880–82); Boston & Albany Railroad Station, Auburndale, Mass. (1881); Austin Hall, Harvard University (1881–83); M.F. Stoughton House, Cambridge, Mass. (1882–83); Allegheny County Jail, Pittsburgh (1884–86); Allegheny County Courthouse, Pittsburgh (1884–87); Marshall Field Wholesale Store, Chicago (1885–87); Glessner House, Chicago (1885–87; restored from 1966 and a historical house museum since the mid-1970s).

BIBLIOGRAPHY. Richardson's surviving sketches and drawings are mainly at Houghton Library, Harvard University and Shepley, Bulfinch, Richardson, and Abbott, Boston. M.G. Van Rensselaer, *Henry Hobson Richardson and His Works* (1888), is a contemporary and a fundamental work for the study of Richardson. Henry-Russell Hitchcock, *The Architecture of H.H. Richardson and His Times,* rev. ed. (1961, 1966), is the standard critical study. For Richardson's influence on Sullivan and Wright, see James F. O'Gorman, "Henry Hobson Richardson and Frank Lloyd Wright," *Art Quarterly,* 32:292–315 (1969); another work by James F. O'Gorman, *H.H. Richardson and His Office, A Centennial of His Move to Boston* (1974), has selected drawings.

Richardson, John (b. Oct. 4, 1796, Queenston, Ont.—d. May 12, 1852, New York City), Canadian-born writer of historical and autobiographical romantic novels.

A British volunteer in the War of 1812, Richardson was taken prisoner. After his release he served as a British officer in En-



John Richardson, lithograph by F.W. Lock

By courtesy of the Public Archives of Canada

gland, Barbados, and Spain before returning to Canada in 1838. Richardson's major works are *Écarté* (1829), a sensational novel set in the salons of Paris, and *Wacousta* (1832), a Gothic story about the Indian uprising of 1763 (Pontiac's War). Other works include *Tecumseh* (1828), a metrical romance; *War of 1812* (1842), a historical account based on his personal experiences; and *Eight Years in Canada* (1847), an autobiography.

Richardson, Sir John (b. Nov. 5, 1787, Dumfries, Dumfriesshire, Scot.—d. June 5, 1865, Grasmere, Westmoreland, Eng.), Scottish naval surgeon and naturalist who made accurate surveys of more of the Canadian Arctic coast than any other explorer.

After receiving his medical qualification at Edinburgh University and passing the examination of the Royal College of Surgeons of London (1807), Richardson was commissioned in the Royal Navy, in which he served for 48 years, rising from assistant surgeon to inspector of hospitals and fleets. Between 1807 and 1814 he was assigned to five ships in succession, seeing action at Copenhagen, at the blockade of the Tagus, in convoys to Spain and Quebec, at Madeira, and finally in the Baltic fleet.

Between 1819 and 1822 Richardson was surgeon and naturalist in Sir John Franklin's first overland expedition to the Canadian Arctic coast. From 1824 to 1827 he was surgeon and naturalist and second in command of Franklin's second overland expedition, in the course of which Richardson surveyed some 900 miles (1,449 kilometres) of Canadian Arctic coast between the Mackenzie and Coppermine rivers. He was knighted in 1846. In 1848–49 Richardson, with John Rae as second in command, made an overland journey in search of Franklin's lost third Arctic expedition that had started in 1845. They explored the region between the estuary of the Mackenzie River and Cape Kendall in the Union and Dolphin straits but found no trace of Franklin's ships.

Richardson was also a prolific and important writer in several fields in natural history, especially Arctic biology and general ichthyology.

Richardson, Lewis Fry (b. Oct. 11, 1881, Newcastle upon Tyne, Northumberland, Eng.—d. Sept. 30, 1953, Kilmun, Argyll, Scot.), British physicist and psychologist who was the first to apply mathematical techniques to predict the weather accurately.

Richardson made major contributions to methods of solving certain types of problems in physics, and from 1913 to 1922 he applied his ideas to meteorology. His work, published in *Weather Prediction by Numerical Process* (1922), was not entirely successful at first. The main drawback to his mathematical technique for systematically forecasting the weather was the time necessary to produce such a forecast. It generally took him three months to predict the weather for the next 24 hours. With the advent of electronic computers after World War II, his method of weather prediction, somewhat altered and improved, became practical. The Richardson number, a fundamental quantity involving the gradients (change over a distance) of temperature and wind velocity, is named after him.

Richardson served as chairman of the physics department at Westminster Training College, London, from 1920 to 1929, and principal of the Paisley College of Technology, Paisley, Renfrewshire, from 1929 to 1940. An ardent pacifist, he attempted to use mathematics in the study of the causes of war and published his studies in *Generalized Foreign Politics* (1939), *Arms and Insecurity* (1949), and *Statistics of Deadly Quarrels* (1950). He made contributions to the theory of calculus and the study of diffusion (the intermingling of molecules or other small particles by random thermal motion).

Richardson, Sir Owen Willans (b. April 26, 1879, Dewsbury, Yorkshire, Eng.—d. Feb. 15, 1959, Alton, Hampshire), English physicist, winner of the Nobel Prize for Physics in 1928 for his work on electron emission by hot metals, the basic principle used in vacuum tubes.

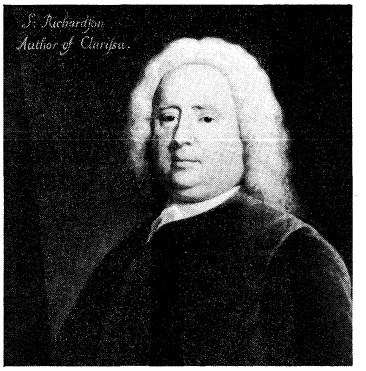
Richardson, a graduate (1900) of Trinity College, Cambridge, and a student of J. J. Thomson at the Cavendish Laboratory, was appointed professor of physics at Princeton University (1906–13). In 1911 he proved that electrons are emitted from hot metal and not from the surrounding air, as some had thought. That same year he proposed a mathematical equation that relates the rate of electron emission to the absolute temperature of the metal. This equation, called Richardson's law or the Richardson-Dushmann equation, became an important aid in electron-tube research and technology. In 1914 Richardson became professor of physics and, 10 years later, director of research at King's College of the University of London, retiring in 1944. He was knighted in 1939.

Richardson, Sir Ralph (David) (b. Dec. 19, 1902, Cheltenham, Gloucestershire, Eng.—d. Oct. 10, 1983, London), British stage and motion-picture actor, knighted in 1947.

Richardson began his acting career at the age of 18 and gained prominence in the 1930s at the Old Vic. His performances on the stage in such roles as Peer Gynt, Petruchio, Falstaff, and Volpone were always the paramount part of his work, though his motion-picture career began in 1933 with a role in *The Ghoul.*

Despite his preference for the stage, Richardson made several motion pictures, specializing in urbane, witty characterizations. His notable vehicles included *The Fugitive* (1939), *The Fallen Idol* (1948), *Our Man in Havana* (1959), *Doctor Zhivago* (1965), and *Watership Down* (1978). He also directed one film in which he starred, *Murder on Monday* (1951; also known as *Home at Seven*).

Richardson, Samuel (baptized Aug. 19, 1689, Mackworth, near Derby, Derbyshire, Eng.—d. July 4, 1761, Parson's Green, near London), English novelist who explored the dramatic possibilities of the novel by his use of the letter form ("epistolary technique"). His major novels were *Pamela* (1740) and *Clarissa* (1747–48).



Samuel Richardson, detail of an oil painting by J. Highmore; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Richardson was 50 years old when he wrote *Pamela,* but of his first 50 years little is known. His ancestors were of yeoman stock. His father, also Samuel, and his mother's father, Stephen Hall, became London tradesmen, and his father, after the death of his first wife, married Stephen's daughter, Elizabeth, in 1682. A temporary move of the Richardsons to Derbyshire accounts for the fact that the novelist was born in Mackworth. They returned to London when Richardson was 10. He had at best what he called "only Common School-Learning," but at age 13 he said he had gained the reputation among the girls in his London neighbourhood of being a good storyteller and ready to write love letters for them, marked with some of the same obliquity that later led Samuel Johnson to say of Clarissa that "there is always something which she prefers to truth."

Richardson was bound apprentice to a London printer, John Wilde. Sometime after completing his apprenticeship he became associated with the Leakes, a printing family whose presses he eventually took over when he set up in business for himself in 1721 and married Martha Wilde, the daughter of his master. Elizabeth Leake, the sister of a prosperous bookseller of Bath, became his second wife in 1733, two years after Martha's death. His domestic life was marked by tragedy. Of the six children of his first marriage, four died within a year of birth, and the others at the ages of two and three. By his second wife he had four daughters who survived him, but two other children (one of them the fourth son to be named after him) died in infancy. These and other bereavements contributed to the nervous ailments of his later life.

In his professional life Richardson was hard-working and successful. With the growth in prominence of his press went his steady increase in prestige as a member, an officer, and later master, of the Stationers' Company (the guild for those in the book trade). During the 1730s his press became known as one of the three best in London, and with prosperity he moved to a more spacious London house and leased the first of three country houses in which he entertained an admiring group of young girls and a circle of friends that included Dr. Johnson, the painter William Hogarth, the actors Colley Cibber and David Garrick, Edward Young (many of whose poems he printed, including the celebrated *Night Thoughts*), and Arthur Onslow, speaker of the House of Commons, whose influence in 1733 helped to secure for Richardson lucrative contracts for government printing that later included the journals of the House.

In this same decade he began writing in a modest way, undertaking some editing and producing what he called "a few other little things of the Pamphlet kind." More importantly he was commissioned to write a collection of letters that might serve as models for "country readers," a volume that has become known as *Familiar Letters on Important Occasions.* Occasionally he hit upon continuing the same subject from one letter to another, and, after a letter from "a father to a daughter in service, on hearing of her master's attempting her virtue," he supplied the daughter's answer. This was the germ of his novel *Pamela.* With a method supplied by the letter writer and a plot by a story that he remembered of an actual serving maid who preserved her virtue and was rewarded by marriage, he began writing the work in November 1739 and published it as *Pamela: or, Virtue Rewarded,* a year later.

On the death of Pamela's mistress, Richardson relates, her son, Mr. B, begins a series of mild stratagems designed to end in Pamela's seduction, but, these failing, he abducts her and renews his siege in earnest. Pamela preserves her virtue, and halfway through the novel Mr. B offers marriage. In the second half Richardson shows Pamela winning over those who had disapproved of the misalliance. Though the novel was immensely popular, Richardson was adversely criticized by those who thought his heroine a calculating minx or his own morality dubious. Actually his heroine is a blend of the artful and the artless. She is a sadly perplexed girl of 15, with a divided mind, who faces a real dilemma because she

wants to preserve her virtue without losing the man with whom she has fallen in love. Since Richardson wrote the novel from Pamela's point of view, it is less clear that Mr. B's problem arises from his having fallen in love with a servant, who, traditionally, would have been merely a target for seduction. The author resolved the conflicts of both characters too facilely, perhaps, because he was firmly committed to the plot of the true story he had remembered. When the instantaneous popularity of *Pamela* led to a spurious continuation of her story, he wrote his own sequel, *Pamela in her Exalted Condition* (1742), a two-volume work that did little to enhance his reputation.

By 1744 Richardson seems to have completed a first draft of his second novel, *Clarissa. Or, The History of a Young Lady,* but he spent three years trying to bring it within the compass of the seven volumes in which it was published. He first presents the heroine, Clarissa Harlowe, when she is discovering the barely masked motives of her family, who would force her into a loveless marriage to improve their fortunes. Outside the orbit of the Harlowes stands Lovelace, nephew of Lord M and a romantic who held the code of the Harlowes in contempt. In her desperate straits, Clarissa appraises too highly the qualities that set Lovelace beyond the world of her family, and, when he offers protection, she runs off with him. She is physically attracted by if not actually in love with Lovelace and is responsive to the wider horizons of his world, but she is to discover that he wants her only on his own terms. In Lovelace's letters to his friend Belford, Richardson shows that what is driving him to conquest and finally to rape is really her superiority. In the correspondence of Clarissa and her friend Anna Howe, Richardson shows the distance that separates her from her confidant, who thinks her quixotic in not accepting a marriage, but marriage as a way out would have been a sacrifice to that same consciousness of human dignity that had led her to defy her family. As the novel comes to its long-drawn-out close, she is removed from the world of both the Harlowes and the Lovelaces, and dies, a child of heaven. In providing confidants for his central characters and in refusing to find a place in the social structure into which to fit his sorely beset heroine Richardson made his greatest advances over *Pamela.*

In the years after writing *Pamela,* Richardson broadened his circle of correspondents, and his third novel was his bow to the requests for the hero as a good man, a counter-attraction to the errant hero of Henry Fielding's *Tom Jones* (1749). Fielding had been among those who thought Pamela a scheming minx, as he had shown in his parody, *An Apology for the life of Mrs. Shamela Andrews* (1741), and in the opening of his *Joseph Andrews* (1742). At the time Fielding had thought Colley Cibber to be the author of the anonymously published *Pamela,* but in spite of Fielding's critical praise of *Clarissa* and the friendship that later developed between Richardson and Fielding's sister, Sarah, Richardson never forgave the author of what he stigmatized as "that vile Pamphlet Shamela." In *The History of Sir Charles Grandison* he provides a hero who is a model of benevolence. He faces little that a good heart cannot remedy and extricates himself from the nearest thing to a dilemma that he has to encounter: a "divided love" between an English woman, Harriet Byron, and an Italian, Signora Clementina. He is saved for Harriet by the last-minute refusal of the Roman Catholic Clementina to marry a firmly committed English churchman. The uneasy minds of Clementina and Harriet are explored with some penetration, but Sir Charles faces nothing in his society or within himself that requires much of a struggle. Furthermore his dilemma is not so central to the novel as were those of Pamela and Clarissa. He is surrounded with a large cast of characters who have their parts to play in social comedy that anticipates the novel of manners of the late 18th century.

Richardson had disciples when he died. Some of them show the influence of *Clarissa,* which seems to have been most responsible for the cult of Richardson that arose on the Continent. It was *Grandison,* however, that set the tone of most of Richardson's English followers and for Jane Austen, who was said to have remembered "every circumstance" in this novel, everything "that was ever said or done." By the end of the 18th century, Richardson's reputation was on the wane both in England and abroad, but the 20th century has begun to awaken to the psychological subtleties of *Pamela* and *Clarissa.* (W.M.S.)

MAJOR WORKS. *Novels. Pamela: or, Virtue Rewarded,* 2 vol. (1740, dated 1741); *Clarissa. Or, the History of a Young Lady,* 7 vol. (1747–48, dated 1748); *The History of Sir Charles Grandison,* 7 vol. (1753–54, dated 1754).

Other works. Letters Written to and for particular friends, on the Most Important Occasions: Directing Not Only the Requisite Style and Forms To Be Observed in writing 'Familiar Letters', but How to Think and Act Justly and Prudently, in the Common Concerns of Human Life (1741), known as *Familiar Letters on Important Occasions,* a collection of model letters; issue no. 97 (1751) of the literary periodical, *The Rambler,* its subject being advice to unmarried ladies.

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Richardson, Tony, original name CECIL ANTONIO RICHARDSON (b. June 5, 1928, Shipley, Yorkshire, Eng.), English theatrical and motion-picture director whose experimental productions stimulated a renewal of creative vitality on the British stage during the 1950s.

In 1953, after graduating from Oxford University, where he had been an active member of the dramatic society, Richardson became a director for the British Broadcasting Company. Two years later, he joined the British Stage Company as associate artistic director and, within a year, was a full director. His reputation was established with his Royal Court Theatre production of John Osborne's *Look Back in Anger* (1956), the play that became the representative work of Britain's post-World War II generation of "Angry Young Men." Under his leadership the Theatre became a centre of creative activity that not only involved a reinterpretation of the classics but also included the presentation of the experimental plays of Eugène Ionesco, Samuel Beckett, and other playwrights of the Theatre of the Absurd. His Broadway productions of Osborne's *Entertainer* (1958) and Shelagh Delaney's *Taste of Honey* (1960) won popular and critical acclaim. Richardson also directed plays such as *Pericles* (1958) and a production of *Othello* (1959) starring the American Negro singer and actor Paul Robeson at the Shakespeare Memorial Theatre, Stratford-upon-Avon.

Richardson's first film, *Momma Don't Allow,* was a short subject sponsored by the British Film Institute's Experimental Film Fund. In 1958 he formed Woodfall Film Productions, Ltd.,with the playwright John Osborne. His films dealing with the British urban working class include the screen adaptations of his stage successes *Look Back in Anger* (1958), *The Entertainer* (1959), and *A Taste of Honey* (1961), as well as *The Loneliness of the Long Distance Runner* (1962), based on the short story by Alan Sillitoe. He also produced Sillitoe's novel *Saturday Night and Sunday Morning* (1960), directed by Karel Reisz. One of his greatest successes was in directing Osborne's adaptation of Henry Fielding's novel *Tom Jones* (1963), a rousing evocation of the crudeness and vigour of 18th-century English life. Among the films he later directed were *The Loved One* (1965), *The Charge of the Light Brigade* (1968), *Ned Kelly* (1970), *A Delicate Balance* (1972), and *Joseph Andrews* (1977). Richardson was married to the actress Vanessa Redgrave from 1962 to 1967.

Articles are alphabetized word by word, not letter by letter

Richardson number, parameter that can be used to predict the occurrence of fluid turbulence and, hence, the destruction of density currents in water or air. It was defined by the British meteorologist Lewis Fry Richardson, a pioneer in mathematical weather forecasting. Essentially the ratio of the density gradient (the change in density with depth) to the velocity gradient, the Richardson number is defined as

$$R_i = \frac{g}{\rho}\frac{\partial \rho}{\partial z} \Big/ \left(\frac{\partial u}{\partial z}\right)^2,$$

in which g is gravity, ρ is density, u is velocity, and z is depth. The Richardson number, or one of several variants, is of practical importance in weather forecasting and in investigating density and turbidity currents in oceans, lakes, and reservoirs.

Richborough, site of a Roman port (Rutupiae) in Dover district, county of Kent, England, located just north of Sandwich. After the Roman invasion of Britain in AD 43, Rutupiae was established to guard the Wantsum Channel, which then separated the Isle of Thanet from the mainland. Extant remains of Richborough Castle include the north wall of a Saxon Shore fort, possibly built in the 3rd century. Two miles to the north in Thanet is the site of the landing of the Saxon leaders Hengist and Horsa in AD 449. The port decayed subsequently with silting of the Wantsum Channel, and the site is now inland.

Richelieu, Armand-Emmanuel du Plessis, duc de (duke of) (b. Sept. 25, 1766, Paris—d. May 17, 1822, Paris), French nobleman, soldier, and statesman who, as premier of France (1815–18 and 1820–21), obtained the

withdrawal of the Allied occupation army from France. Earlier, he had served Russia as governor of Odessa and was notable for his progressive administration there.



Duc de Richelieu, engraving by E.-F. Lignon, 1824, after a portrait by Sir Thomas Lawrence

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

The son of Louis-Antoine-Armand du Plessis, duc de Fronsac, and grandson of Louis-François-Armand de Vignerot du Plessis, duc de Richelieu and marshal of France, Armand took over his grandfather's duties at court as first gentleman of the bedchamber (1785). On a visit to Germany and Austria in 1790 he joined the Russian army, fighting against the Turks at Izmail, and then visited Russia. Succeeding his father as duc de Richelieu (1791), he fought with the royalists under the Prince de Condé (1792) and with the Austrians (1793–94). Visiting Russia in 1795, Richelieu was appointed lieutenant colonel of the Cuirassiers of St. George, and later Tsar Alexander I appointed him governor of Odessa (1803) and governor general of New Russia, the area between the Dniester River and the Caucasus (1805). After cleaning up a corrupt administration, Richelieu transformed the Black Sea village of Odessa into a modern city. He constructed port facilities and encouraged agriculture and commerce.

Richelieu returned to France in 1814, but on Napoleon's return from Elba in 1815 he joined the Tsar's forces against Napoleon. He succeeded Talleyrand as prime minister with control of foreign affairs in September 1815. His friendship with the Tsar helped him to mitigate the demands of the Allies on France, and at the Congress of Aix-la-Chapelle (1818) he obtained the withdrawal of the Allied occupying army and the inclusion of France into the Quadruple Alliance. He resigned in 1818, became prime minister again in 1820, but was forced by political opponents to resign again in 1821.

Richelieu, Armand-Jean du Plessis, cardinal et duc de (cardinal and duke of), byname THE RED EMINENCE, French L'ÉMINENCE ROUGE (b. Sept. 9, 1585, Richelieu, Poitou, Fr.—d. Dec. 4, 1642, Paris), chief minister to King Louis XIII of France from 1624 to 1642. His major goals were the establishment of royal absolutism in France and the end of Spanish-Habsburg hegemony in Europe.

Heritage, youth, and early career. The family of du Plessis de Richelieu was of insignificant feudal origins but by intermarriage with the legal and administrative classes had risen to some prominence and had acquired the seigneury of Richelieu in Poitou. Armand-Jean's father, François du Plessis, seigneur de Richelieu, was grand provost (chief magistrate) to Henry III, and his mother, Suzanne de la Porte, was the daughter of a councillor of the Parlement of Paris (the supreme judicial assembly). In his intelligence, administrative competence, and instinct for hard work, he resembled his middle-class ancestors.

He was five years old when his father died, leaving estates that had been ruined by inflation and mismanagement during the Wars of Religion (1562–98), and he was conscious from his earliest years of the threat of penury. This inspired in him the ambition to restore the honour of his house and evoked in him the sense of grandeur he was to attribute vicariously to France. His provident mother, with three boys and two girls, set about reorganizing the family's precarious resources. The principal of these was the benefice of the bishopric of Luçon near La Rochelle, which had been granted by Henry III to the Richelieus under the Concordat of 1516. Unrest of the cathedral chapter threatened a revocation of the grant, and it became necessary for a member of the family to be consecrated bishop as soon as possible. Henri, the eldest son, was heir to the seigneury of Richelieu; and Alphonse, the second son, had become a Carthusian monk; so the obligation fell on Armand-Jean, who was a student.

The prospect of a career in the church was not displeasing to the thin, pale, and at times sickly boy, for he had an inclination toward learning, a facility for debate, and a relish for the prospect of governing the lives of others. Because he was below the canonical age for consecration upon the completion of his studies, he needed a papal dispensation. To gain it he went to Rome, where Paul V fell victim to



Cardinal de Richelieu, detail of a portrait by Philippe de Champaigne; in the Louvre, Paris

Giraudon—Art Resource/EB Inc.

the young man's skill as a charmer. On April 17, 1607, at the age of 22, he was ordained priest and consecrated to the see of Luçon. He found on his arrival a diocese ruined by the Wars of Religion, a hostile chapter, and a demoralized clergy, but his opponents quickly succumbed to the unaccustomed authority that radiated from the episcopal palace.

Richelieu was the first bishop in France to implement in his diocese the reforms decreed by the Council of Trent, and he was also the first theologian to write in French and to establish the conventions of vernacular theological exposition. He was a hard-working, conscience-stricken man, combatting forces dedicated to divisive political and social ends—a man obsessed with order as a superior moral end.

Rise to power. The France on which the Bishop of Luçon pondered gave every indication of falling again into the disorder of the Wars of Religion. The assassination of Henry IV in 1610 released separative forces that were endemic in the administrative system. The government of the queen mother, Marie de Médicis, as regent for Louis XIII, was corrupt, and the magnates of the realm, motivated by personal self-interest, struggled to control it. Their disobedience was accompanied by predatory expeditions of armed men and complex negotiations with the court, and on one of these occasions the Bishop of Luçon found himself an intermediary, which led to his being elected one of the representatives of the clergy of Poitou to the States General of 1614. He put all his energy into persuading the assembly of his talents and the court of his support for royal authority. In a clash between the clergy and the Third Estate (the middle classes, artisans, and peasants) on the subject of the relationship between the crown and the papacy he played a conciliatory role, and he was prominent in moves of the clergy to persuade the Third Estate that the decrees of the Council of Trent should be promulgated.

Some months later he was appointed chaplain to the new queen, Anne of Austria, which held the promise of eventual entry into the royal council, which, Richelieu had argued at the States General, should accord first place to prelates of distinction. Clever negotiations with another disobedient faction led to his appointment as a secretary of state in 1616.

Up to this time Richelieu had had no insight into international relations, and the regard for Spain with which he was credited was probably genuine because he had had no occasion to question Spain's ambitions. His year of office, however, coincided with war between Spain (ruled by a Habsburg dynasty) and Venice, which invoked its alliance with France. The resultant involvement persuaded Richelieu of the vulnerability of France to Habsburg political and economic encirclement, the domestic ramifications of various European movements in the religious controversy between Catholics and Protestants, and the dependence of the small states in France's borderlands upon an equilibrium of power between France and Spain.

Richelieu's tenure of office was terminated in April 1617 when a palace revolution overthrew the regency of Marie de Médicis. Richelieu was banished to Luçon and then exiled to the papal city of Avignon, where he sought distraction from his melancholy in writing. A rebellion of the princes, gravitating this time to Marie de Médicis as the focus of opposition to the royal council, led in 1619 to the King recalling Richelieu to his mother's entourage on the assumption that he would exercise a moderating influence. The ascendency that he gained over her, however, did not lead to her submission. There followed four years of intricate negotiation and even overt hostilities during which the King's nomination of Richelieu for a cardinal's hat became one of the issues involved in a settlement. A revolt of the Huguenots and the death of the King's favourite brought about Marie de Médicis' recall to the council and Richelieu's promotion.

First minister of France. In 1624 another crisis, over the Valtellina in northern Italy, led to a ministerial reconstruction and to the Cardinal's appointment as secretary of state for commerce and marine and chief of the royal council. Four years later the title of first minister was to be created for this office. The controversy occurred when the Protestant Swiss canton of Grisons invoked a treaty of protection with France against Spanish ambitions in the Valtellina valley. The struggle had ramifications throughout Europe as the Protestants made common cause with Grisons and the Catholics with the Habsburgs. Richelieu recognized that vacillation would threaten domestic stability, and so he struck, expelling the papal troops. It was an action that gained for Richelieu an instant reputation for decision and ruthlessness. It also disillusioned

those who had seen in him a defender of Catholic interests and of a Franco-Spanish alliance.

From his first days in office Richelieu was the object of conspiracies to remove him, and the success of his security organization in ferreting out the disaffected and his manipulation of state trials made him misunderstood, feared, and detested. Yet according to the standards of the age his administration of justice did not depart from the moral principles that he believed to underlie all government.

The goals that Richelieu set himself were to counter Habsburg hegemony in Europe, which threatened France's independence of action, and "to make the King absolute in his kingdom in order to establish therein order," but at no time was Richelieu powerful enough to achieve his domestic ends by overt measures. A respecter of law and history, he accepted the necessity of working with the traditional framework of administration. His sense of the feasible and his gift for seeing both sides of a question resulted in a pragmatism in practice that often contradicted his proclaimed theories, and he confused his critics by unexpected compromise and moderation.

Richelieu's great intellectual capacity enabled him to penetrate to the essence of events, and his tremendous will power drove him to incessant work. In his theory of politics he shared the rationalism of contemporary philosophers, believing in "the light of natural reason." While he did not doubt the capacity of the mind to know what is naturally enjoined, he participated in the prevailing pessimism about man's will to act accordingly. A twofold view of moral causes, the natural and divine, provided a philosophical axiom for state supervision of conduct in both the secular and the spiritual spheres. Sin and civil disobedience were, to Richelieu, but two aspects of disorder.

The gravest divisive factor in French society was religion. To Richelieu the Huguenots constituted a state within a state, with the civil government of major cities in their hands and considerable military force at their disposal. Yet Richelieu was prepared to tolerate this religious dissent so long as it did not amount to a political challenge. In this attempt to preserve social harmony at the expense of confessional difference he failed at first, for the Huguenot community was foolishly drawn into the intrigues of the Protestant magnates, who instigated England to war with France. Richelieu laid siege in 1628 to La Rochelle, the Huguenot centre, but it took a year to reduce the city, during which time Spain took advantage of the distraction to extend its hegemony in northern Italy at the expense of France's allies. While promising Richelieu help to combat the Protestants, Spain in fact subsidized their leaders in order to keep the French government preoccupied, and seized the strategic fortress of Casale in northern Italy. Again Richelieu acted with surprising vigour. The moment La Rochelle fell he led the army in winter over the Alps and checked the Spanish design. This reverse was countered by the Habsburgs with the introduction of imperial garrisons into parts of the duchy of Lorraine, which were claimed as fiefs of France. There followed intricate diplomatic manoeuvres, culminating in Richelieu's dramatic refusal to ratify the peace Treaty of Regensburg in 1630, and the Habsburgs' appeal to Pope Urban VIII to excommunicate Louis XIII for this supposed breach of faith.

This was Richelieu's moment of greatest political insecurity. His relationship with the King was distant, and Catholic zealots provoked Marie de Médicis into a state of hysteria concerning the man who she believed had deprived her of influence. On Richelieu's return from Italy in 1630, she tried to influence her son to dismiss his minister. The King, however, perceived that the issue was his own independence or his mother's domination and that there was no one but Richelieu who could relieve him of the responsibility of decisions at a moment of bewildering complications. After a day of suspense, he supported the Cardinal and thereafter did not waver in his support. Marie de Médicis and the King's brother Gaston fled to the Spanish Netherlands, there to constitute a focus of sedition that Richelieu countered by a fatal involvement with the enemies of the Habsburgs. The central objective of his foreign policy was to restore the equilibrium in the empire that Habsburg victories had disturbed. Although Bavaria was disposed to seek French protection, the Emperor's military successes and the Edict of Restitution occasioned a new mutual antagonism of Catholics and Protestants, which made neutrality of the Catholic League an impossibility.

Richelieu's German policy fell into ruins when Sweden became embroiled with the armies of the Catholic League, consolidating the imperial and Catholic cause. The war spilled over the Rhine, and France's client states were by degrees drawn into the Habsburg orbit. The seizure by Spain in 1635 of the Archbishop of Trier, who was under French protection, led to France's alignment with the Protestant powers in the Thirty Years' War.

This involvement on behalf of the Protestants was regarded by many Catholics in his own time and subsequently as a betrayal of the church by one of its princes, and Richelieu has been criticized for intensifying a war whose horrors have rarely been equalled. That Richelieu was drawn unwillingly by events into the vortex is clear, just as it is clear that the cost paid in social suffering and economic decline, leading to more frequent agrarian revolts, was high. Almost as soon as war broke out with Spain in 1635, Richelieu initiated secret peace negotiations and renewed them repeatedly. Richelieu's justification for war was the same as that for rigorous domestic discipline: only the statesman, furnished with all available information and equipped for judicious appraisal of events, is competent to judge policy.

In economic matters Richelieu was an amateur. He committed war expenditure with little regard for the difficulties of raising revenue, and he was given to economic improvisation that was often unsound, but he eschewed doctrinaire views and retained flexibility of mind. Whereas he was early influenced by the theories of the economist Antoine de Montchrestien, who argued for economic self-sufficiency so as to conserve specie, he was later persuaded that the drain of specie could be compensated for by trade. He promoted products and industries that could give France an export advantage and discouraged imports of luxury goods. Glass making, tapestry and silk, sugar, and the extractive industries attracted his interest. He planned canal systems and promoted overseas trading companies, in which he was a shareholder and which began the process of French colonization in Canada and the West Indies, and he gained economic footholds in Morocco and Persia.

His vast horizon reflected in part his concern with the French religious missions, which spread in Africa, the Middle East, and America and which extended French influence and created a vast intelligence network that fostered his political and economic designs. He laid the foundations for the French Navy by buying ships from the Dutch, and, though he failed to have much influence on seapower, he developed shipping connections with the Baltic. The legal reforms of his period were spasmodic and often frustrated by the Parlement, and how much of their content is due to him is questionable. The Code Michaud of 1629—which regulated industry and trade, companies, public offices, the church, and the army and standardized weights and measures—was promulgated under his authority, although he may not have been its architect.

Later years in the church. In his last years Richelieu found himself involved in religious conflict, in opposition to the Pope, and in a struggle with the French church over the allocation of revenues to the financing of the war. His relationship with Urban VIII became strained over diplomatic grievances, church administration, and his own ambitions to extend French political influence by acquiring benefices for himself in the Holy Roman Empire. In spite of these conflicts, Richelieu remained orthodox in his views on the relationship between church and state and resisted the Gallican challenge to the absolutism of papal authority.

The theocratic concept of the state that resulted from his notion of kingship caused Richelieu to regard heresy as political dissidence, and he harried the apparently unorthodox, such as the first Jansenists, on the ground that they disturbed the spiritual and secular orders, just as he harried the recalcitrant nobles and stamped out duelling. Although there were canonical irregularities in his life, notably in the matter of pluralism (the multiplication of ecclesiastical benefices), there is no evidence of a serious departure from the principles or practices of the church. His accumulation of wealth was excessive even by the standards of the age, but it was largely dedicated to public service and to patronage of the arts and of the University of Paris. Richelieu was a playwright and musician of some talent, and his establishment of the French Academy is one of his best remembered achievements.

His last months were agitated by the most dangerous of all the conspiracies against his life, that of the youthful royal favourite Cinq-Mars, who was exposed by Richelieu's secret service and died on the block. The Cardinal's health, bad for some years, had deteriorated, and it was virtually from his deathbed that he was compelled to dictate to the King five propositions respecting royal behaviour toward ministers that he considered essential for proper government. He died in 1642 and was buried in the chapel of the Sorbonne, which he had financed.

Assessment. While in detail he was only moderately successful, Richelieu in substance attained his goals of orderly government under the royal authority and the defeat of Habsburg hegemony. Whether the centrifugal forces in Germany that he promoted—and which the Peace of Westphalia institutionalized—were advantageous to Europe in the long run is questionable, but the political fragmentation of the empire and the military eclipse of Spain made possible the grandeur of France that Richelieu foresaw and his successors realized. This mystical aspect of his designs is difficult to articulate but is essential to his greatness.

(D.P.O'C./Ed.)

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Richelieu, Louis-François-Armand du Plessis, duc de (duke of) (b. March 13, 1696, Paris—d. Aug. 8, 1788, Paris), marshal of France, and grand-nephew of Cardinal de Richelieu.

As ambassador to Vienna (1725–29) Louis settled in 1727 the preliminaries of peace and in 1733–34 he served in the Rhine campaign. He fought with distinction at Dettingen and Fontenoy; three years afterward he made a brilliant defense of Genoa. In 1756 he expelled the English from Minorca by the capture of the San Felipe fortress, and in 1757–58 he closed his military career by those pillaging campaigns in Hanover that procured him the sobriquet of *Petit Père de la Maraude* ("Little Father of Marauding"). In his early days he was thrice imprisoned in the Bastille: in 1711 at the instigation of his stepfather, in 1716 in consequence of a duel, and in 1719 for his share in Alberoni's conspiracy against the regent Orléans.

Richelieu River, French RIVIÈRE RICHELIEU, river in Montréal region, southern Quebec province, Canada, rising from Lake Champlain, just north of the Canada–U.S. border, and flowing northward for 75 mi (120 km) to join the St. Lawrence River at Sorel. Explored in 1609 by Samuel de Champlain and named in 1642 in honour of the Cardinal de Richelieu, chief minister of the French king Louis XIII, it served repeatedly as an attack route between the warring French and English colonists and later as a logging route and commercial fishing stream. The river is still a transportation link; a canal between Saint-Jean and Chambly and a lock at Saint-Ours, built in the mid-19th century, enable shallow-draft vessels and barges to navigate between Montreal and New York City via the St. Lawrence and Richelieu rivers, Lake Champlain, and the Hudson River. Saint-Jean, Iberville, Chambly, Beloeil, and Sorel are the main communities situated along the river.

Richemont, Arthur, constable de, also called EARL OF RICHMOND, or (1457–58) ARTHUR III, DUKE OF BRITTANY, French ARTHUR, CONNÉTABLE DE RICHEMONT, or COMTE DE RICHEMONT, or ARTHUR III, DUC DE BRETAGNE (b. 1393, Brittany—d. Dec. 26, 1458), constable of France (from 1425) who fought for Charles VII under the banner of Joan of Arc and later fought further battles against the English (1436–53) in the final years of the Hundred Years' War. In childhood (1399) he had been given the English title of earl of Richmond, styled in French as comte de Richemont. In 1457 he became duke of Brittany.

Early career. A younger son of John IV, duke of Brittany, Arthur was given the English title of earl of Richmond by his older brother, Duke John V, in 1399. The marriage of their mother, Joanna, to Henry IV of England after her first husband's death had reestablished Brittany's connection with the English crown, but Richemont's primary interests remained in French affairs. In the bitter and divisive feud between the houses of Orléans and Burgundy—branches of the Valois dynasty—Richemont fought on the side of the former faction, shortly to be renamed Armagnac. During this same period, Arthur also became the intimate friend and partisan of the dauphin Louis, son of the French king Charles VI.

Richemont fought at Agincourt in 1415, where he was wounded and captured by the English victors, who, allied with the Burgundians, sought to unite France and England under the English crown. Richemont remained a prisoner in England until 1420, when he was released on parole and threw his support to the English side. He was now influential in persuading his brother John to support the Treaty of Troyes under which Henry V of England became "Heir of France." Henry rewarded Richemont with the French county of Ivry. Richemont's connection with the Anglo-Burgundian faction was further sealed in 1423 by his marriage to Margaret of Burgundy, widow of the dauphin Louis, who had died young. This match made Richemont the brother-in-law of Philip, duke of Burgundy, and John, duke of Bedford, the English regent of France. Richemont was well on his way toward a high position in the ruling circles around Bedford and Burgundy when an unexplained quarrel broke out between him and the English regent. Richemont now deserted the English cause and returned to his initial French allegiance. Appointed constable of France by Charles VII in March 1425, he attempted to assume control of France's battered and unreliable military forces. He now totally supported the French cause, persuading his brother to sign the Treaty of Saumur with France in October 1425.

Constable of France. The new constable quickly made himself unpopular by his rough manners and his grim insistence upon a vigorous prosecution of the war. His political power was therefore overshadowed by that of Charles VII's incompetent favourites, especially Georges de La Trémoille. Richemont's influence at court was further weakened by Brittany's return to the English cause. A treaty between John V and the regent Bedford in September 1427 caused the expulsion of the Constable from the French court. Richemont joined Joan of Arc at Orléans in 1429, fighting under her banner in several victorious engagements against the English until the influence of La Trémoille forced him out of the army once again. Despite the favourite's power, Richemont was able to bring Brittany and Charles VII together once again in the Treaty of Rennes, but it was not until La Trémoille's final overthrow in 1432 that the Constable was able to return to court.

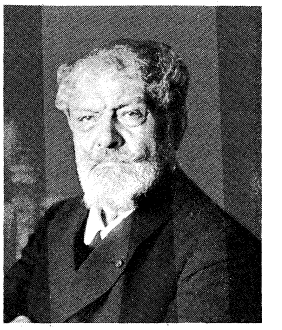
Using his Burgundian connections, Richemont was able to arrange the Treaty of Arras (Sept. 21, 1435), which ended the long quarrel between Duke Philip of Burgundy and the French king. Arras was the political and diplomatic turning point of the Hundred Years' War, as well as an important milestone in Richemont's own career.

Conclusion of the war. The military task of winning the war, however, still remained. In April 1436 Richemont marched into Paris as the city rose against the English garrison, but the poorly organized French armies were unable to make much headway in the years that followed. Richemont now determined upon a total reform of the French Army, along with a reorganization of the financial structure of the French state in order to provide the revenues necessary for its support. Strongly supported by Charles VII and given a steady source of revenue by the taxes upon hearths and salt, Richemont now reorganized the French cavalry into the regular and highly professional *gens d'armes d'ordonnance.* These regular companies enabled Richemont to renew the war with overwhelming success after a brief truce had been concluded in 1444. In this final act of the long struggle, the Constable de Richemont played an active role, driving the English from the Cotentin Peninsula in September and October of 1449 and taking a decisive part in the climactic Battle of Formigny in April 1450. The conquest of Normandy followed in short order and that of Guyenne in the succeeding two years.

France had finally won the Hundred Years' War, and Richemont's active career now drew to a close. Succeeding his nephew Peter II, he became duke of Brittany in September 1457. He died a year later, leaving no legitimate children. (R.Br.)

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Richepin, Jean (b. Feb. 4, 1849, Médéa, Alg.—d. Dec. 11, 1926, Paris), French poet, dramatist, and novelist who examined the lower levels of society in sharp, bold language. As Émile Zola revolutionized the novel with his Naturalism, Richepin revolutionized French poetry during the same period.



Richepin, *c.* 1925
Harlingue—H. Roger-Viollet

The son of a physician, Richepin began the study of medicine but gave it up in order to study literature at the École Normale. He left school without a degree and for a time wandered about France. His first book of poetry, *La Chanson des gueux* ("Song of the Poor"), was published in 1876. Local authorities responded to its coarse language by sentencing him to a month in prison.

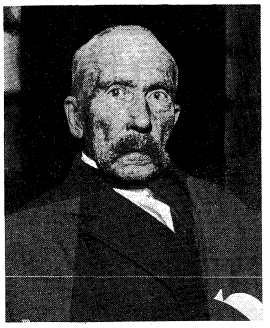
Despite criticism, Richepin continued to write in his tough style. He defended his choice of language by saying it could be argued that it was unnecessary and repugnant but it was not immoral. His works of poetry include *Les Caresses* (1877), *Les Blasphèmes* (1884), and *La Mer* (1886). He wrote three novels and a number of successful plays. Elected to the Académie Française in 1908, he later became a director.

Richer, Jean (b. 1630—d. 1696, Paris), French astronomer whose observations at Cayenne, French Guyana, contributed to both astronomy and geodesy. The French government sent Richer to Cayenne to measure the parallax of Mars at its perigee. Comparison of his observations with those made elsewhere made it possible to determine the distances of Mars and the Sun from the Earth, leading to the first reasonably accurate calculation of the dimensions of the solar system.

Richer's observations also led to a discovery about the shape of the Earth. Through experimentation, Richer discovered that the beat of a pendulum is slower at Cayenne than at Paris, which is at a different latitude. He concluded that gravity must be weaker at Cayenne than at Paris and thus that Cayenne must be farther than Paris from the centre of the Earth. Newton and Huygens used this discovery to prove that the Earth is not a sphere but an oblate spheroid.

Richet, Charles (Robert) (b. Aug. 26, 1850, Paris—d. Dec. 4, 1935, Paris), French physiologist who won the 1913 Nobel Prize for

Physiology or Medicine for his work on anaphylaxis, his term for the sometimes fatal re-



Richet
Harlingue—H. Roger-Viollet

action by a sensitized individual to a second injection of an antigen. His research helped to elucidate problems of hay fever, asthma, and other allergic reactions to foreign substances and explained some cases of intoxication and sudden death not previously understood.

From 1887 to 1927 Richet taught at the University of Paris. For a time he was co-director of the *Revue Scientifique.* He is known for his investigations into the physiology of respiration and digestion, as well as epilepsy, the regulation of body heat, and a wide array of other subjects. A man of many interests, he was distinguished as a bacteriologist, pathologist, medical statistician, poet, novelist, and playwright.

Richier, Germaine (b. Sept. 16, 1904, Grans, near Arles, Fr.—d. July 31, 1959, Montpellier), French sculptor of provocative, biomorphic figures.

Richier studied in Montpellier and then in Paris (1925–29) under Antoine Bourdelle. In 1934 she began producing classical busts, torsos, and figures, but by the 1940s her figures had become hybridized and allegorical, as in the "bat-men" and "tree-men." Her fascination with insect forms and night creatures is exemplified in "Praying Mantis" (1946).

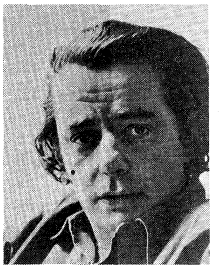
Though she worked also in ceramics, mosaic, and printmaking, Richier's unique personal imagery is strongest in her sculptures of seemingly battered and tortured human forms. In the early 1950s she produced primeval figures with large hollow spaces or the mere suggestion of parts—*e.g.,* "Water" (1953–54; bronze).

Later, Richier experimented with coloured glass and lead figures and sculptures set against abstract backgrounds created by painters Vieiria da Silva, Hans Hartung, and Zao Wou-ki. An important exhibition of her work was held at the Musée National d'Art Moderne in Paris in 1956.

Richland, city, Benton County, south central Washington, U.S., situated at the juncture of the Yakima and Columbia rivers, with Kennewick and Pasco forming a tri-city area. Named in 1905 for Nelson Rich, a local landowner and state legislator, it was incorporated in 1908 and remained a farming village (pop. about 250) until 1942 when, with the development of the atomic bomb, it became part of the 400,000-ac (160,000-ha) reservation of the Hanford Atomic Works. Developed by the federal government, it was administered by the U.S. Army Corps of Engineers and E.I. du Pont de Nemours and Company. The Atomic Energy Commission (later the Energy Research and Development Administration [ERDA], subsequently the Department of Energy) and the General Electric Company assumed control in 1947, and Richland was reincorporated as a city in 1958 with transfer of property to private ownership. The surrounding area supports irrigated farming (vineyards, orchards, hop fields) and ranch activities, and by the 1980s a more diversified economy was being achieved. The Hanford Science Center, in the Federal Building, has intricate displays on the uses of atomic energy. Pop. (1980) city, 33,578; (1982 est.) Richland–Kennewick–Pasco metropolitan area (SMSA), 153,600.

Richler, Mordecai (b. Jan. 27, 1931, Montreal), prominent Canadian novelist whose works are intellectually incisive and penetrating explorations of fundamental human dilemmas and values.

Richler attended Sir George Williams University, Montreal (1950–51), then lived in Paris (1951–52), where he was influenced and stimulated by Existentialist authors. Returning to Canada (1952), Richler published the novel *The Acrobats* (1954). Set in Spain, it deals with the experiences of a young Canadian painter with a group of disillusioned



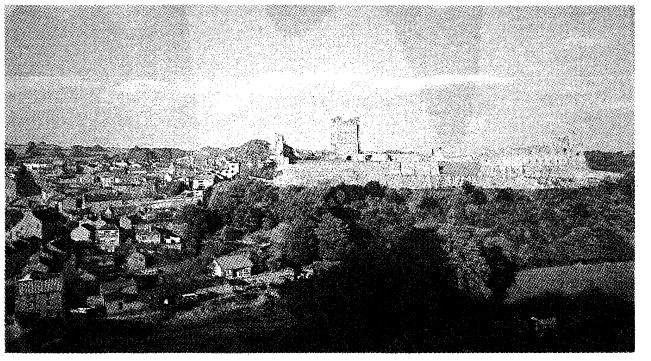
Richler
By courtesy of McClelland and Stewart Publishers

expatriates and revolutionaries. Shortly afterward, Richler settled in England. He returned to Montreal in the 1970s. His subsequent novels, which manifest evidence of the poverty and anti-Semitism he experienced during his early years, include *Son of a Smaller Hero* (1955) and *A Choice of Enemies* (1957), both dealing with angry, confused modern heroes; *The Apprenticeship of Duddy Kravitz* (1959), a bawdy and sometimes farcical account of a Jewish boy in Montreal and his transformation into a ruthless and amoral businessman, which was made into a film from his screenplay in 1974; and *The Incomparable Atuk* (1963), which contains amusing descriptions of the powerful men who control the communications industries. *Cocksure* (1968) is concerned with an American attempt to takeover a British publishing house. *St. Urbains Horsemen* (1971) concerns a Canadian director's trial for sodomy and assault in London. Other works include a collection of humourous essays, *Notes on an Endangered Species and Others* (1974); a children's book, *Jacob Two-Two Meets the Hooded Fang* (1975); and a novel, *Joshua Then and Now* (1980).

Richmond, town, part of Richmond–Windsor urban area, east central New South Wales, Australia, on the Hawkesbury River. It is situated on a hill, was named in 1789 after the Duke of Richmond by Gov. Arthur Phillip, and was chosen in 1810 for settlement by Gov. Lachlan Macquarie as safe from flood damage. Proclaimed a municipality in 1872, Richmond has since become a suburb of Sydney (35 mi [56 km] southeast). Fertile riverine flats surrounding the town yield vegetables, corn (maize), turf, and dairy products, much of which is processed in Richmond. Hawkesbury Agricultural College (founded 1888) and a Royal Australian Air Force airfield are nearby. Pop. (1981) including Windsor, 15,491.

Richmond, town, southeastern Tasmania, Australia, situated on Coal River at the head of Pitt Water lagoon. In 1815 Tasmania's first flour mill was built in the area, and by 1823 a bridge (Australia's oldest existing bridge) was built across the river to provide access from Hobart (16 mi [26 km] southwest) and to the east coast and Tasman Peninsula. Two years later, the government founded the town. Prospering from wheat farming during the 1830s, Richmond was declared a municipality in 1861, but it declined after 1872 when bypassed by causeways across Pitt Water. It remains a service centre for local sheep, dairy, and mixed farms. St. John's (1836–37) in Richmond is Australia's oldest Roman Catholic church. Richmond is one of Australia's best preserved historic towns and has become a popular attraction for tourists. Pop. (1981) 587.

Richmond, parish (town), Richmondshire district, county of North Yorkshire, England, situated on the left bank of the River Swale, where its dale (upland valley) opens into the plain. It grew up in the shelter of a Norman castle (*c.* 1071), only the keep of which remains, and became the main military centre and market of a large district of northwest Yorkshire. It is the hometown of the Catterick garrison, with its camp nearby on a Roman site, and now prospers as the main tourist centre for the Yorkshire Dales National Park. It has a restored 18th-century theatre. Pop. (1981 prelim.) 7,731.



Richmond Castle, North Yorkshire
A.F. Kersting

Richmond, port city, Contra Costa County, western California, U.S., on the northeastern shore of San Francisco Bay, connected to Marin County by the Richmond–San Rafael Bridge. The site of ancient Indian shell mounds, it became part of Rancho San Pablo settled by Don Francisco Castro in 1823. Ferry service was established to San Francisco in 1900 when Point Richmond became the western terminus of the Santa Fe Railroad. Deepwater harbour facilities encouraged development as an oil-refining centre, and wartime naval construction greatly stimulated growth (shipbuilding ceased in 1946). Diversified manufactures include petroleum, chem-

icals, auto parts, and aerospace components. Inc. 1905. Pop. (1982 est.) 75,927.

Richmond, city, seat (1873) of Wayne County, east central Indiana, U.S., on the East Fork of Whitewater River, 68 mi (109 km) east of Indianapolis at the Ohio border. Settled in 1806 by migrating North Carolina Quakers, it was first called Smithville and in 1818 amalgamated with neighbouring Coxborough and incorporated as Richmond, a name supposedly indicative of the richness of local soil. Richmond has remained a centre of Quaker influence and organizations. The publications and general offices of the Friends United Meeting (Quakers) are located there, and group sessions are held regularly. The city is the seat of Earlham College (1847; Quaker-controlled) and Indiana University East (1971). An early manufacturing centre in a fertile area, Richmond is still important in agricultural marketing and processing. Industries include the manufacture of machinery, transportation equipment, and fabricated metals. An annual (June) rose festival reflects the city's large greenhouse rose-growing industry. Inc. city, 1840. Pop. (1982 est.) 40,752.

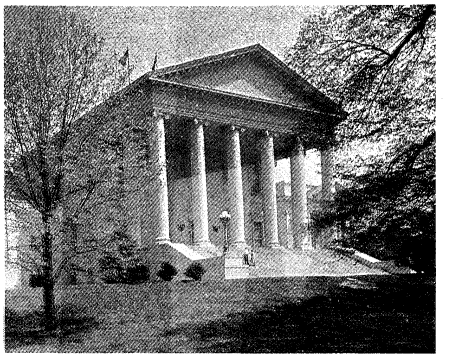
Richmond, city, seat (1798) of Madison County, east central Kentucky, U.S., in the outer Bluegrass region, near the Cumberland foothills. The city, on the old Wilderness Road, 24 mi (39 km) south-southeast of Lexington, was settled in 1784 by Col. John Miller, who served at the Siege of Yorktown. Its name honours the Virginia city. Richmond was contested throughout the American Civil War and the state's first Confederate victory took place there on Aug. 29–31, 1862, when Gen. Edmund Kirby-Smith's forces defeated the troops of the Union general William Nelson, capturing the city and forcing the enemy to retreat north. The courthouse (1849) was used as a hospital during the war.

Richmond now is an agricultural trading and shipping centre for tobacco, livestock, and corn (maize), and has some light industry. It is the home of Eastern Kentucky University, founded in 1906. Natural Bridge State Park is nearby, to the east. White Hall State Shrine, 5 mi north, is the restored home (1799) of Cassius M. Clay, the Abolitionist. Pop. (1982 est.) 21,752.

Richmond, county (area 58 sq mi [48 sq km]), southeastern New York, U.S., coextensive with Staten Island Borough (*q.v.*), which comprises Staten Island and part or all of several smaller islands in New York Harbor. The borough is linked to Brooklyn by the Verrazano-Narrows Bridge. The first permanent settlement was made under Dutch authority in 1661 at Oude Dorp (Old Town). Three years later the British took control. Richmond County (named for Charles Lennox, 1st duke of Richmond and natural son of Charles II) was organized in 1683.

Richmond, capital of Virginia, U.S., seat of Henrico County, situated in the eastern part of the state at the head of navigation of the James River. Politically independent of the county, it is the centre of a metropolitan area including the rest of Henrico County and Chesterfield and Hanover counties. The English first explored the site in 1607, when a party led by Christopher Newport and John Smith sailed upriver shortly after the founding of Jamestown. A trading post was established (1637) by Thomas Stegg at the fall of the James, and in 1644 Ft. Charles was built. In 1733 William Byrd of Westover named the settlement for Richmond upon Thames, Eng., and the town was laid out four years later by Maj. William Mayo on a site that became known as Church Hill.

The Virginia convention of 1774, forming a



State Capitol, Richmond, Va., designed by Thomas Jefferson, 1785–89

By courtesy of the Virginia State Travel Service, Richmond

standing body of anti-British sentiment, met there. In 1779 Richmond replaced Williamsburg as the state capital. During the American Revolution the town was pillaged by the British (1781). Construction of the present capitol building, designed by Thomas Jefferson, began in 1785. In 1840 the city was linked to Lynchburg by the James River and Kanawha Canal, and by 1860 it was served by six railroads. Following the secession of Virginia (April 1861) at the outbreak of the Civil War, the capital of the Confederacy was moved from Montgomery, Ala., to Richmond in July. It thus became a major Federal military target. In 1862 Gen. George B. McClellan's Army of the Potomac approached the city but was driven away in the Seven Days' Battle (June 26–July 2). It was not again seriously threatened until the siege of Richmond and Petersburg (June 1864). Finally, on April 3, 1865, Gen. Ulysses S. Grant broke the Confederate defense and took the city; much of the business district was burned during its evacuation. Richmond recovered rapidly during the Reconstruction era, due mainly to its prosperous tobacco industry.

Tobacco remains important economically; printing and publishing and the manufacture of chemicals, textiles, pharmaceuticals, metals, and wood and paper products are also significant. The University of Richmond (Baptist) was founded as Dunlora Academy in 1830; other educational institutions include Union Theological Seminary (1812), Virginia Union University (1865), Virginia Commonwealth University (formed in 1968 by the merger of Richmond Professional Institute [1917] and Medical College of Virginia [1838]), and J. Sargeant Reynolds Community College (1972). Among its historic buildings are St. John's Church (1741), where Patrick Henry delivered his "Liberty or Death" address; the home (1790) of Chief Justice John Marshall; the Confederate White House (1818; now a museum); Robert E. Lee House (1844); Edgar Allan Poe Museum (Poe edited the *Southern Literary Messenger* in Richmond from 1834 to 1837); Valentine Museum (1812; depicting Richmond's history); and Battle Abbey of the Virginia Historical Society (1913). The nearby Richmond National Battlefield Park (established 1944) commemorates Civil War events. Many notable Southerners, including U.S. presidents John Tyler and James Monroe and Confederate president Jefferson Davis, are buried in the city's Hollywood Cemetery. The Virginia Museum of Fine Arts was America's first state-supported art museum. Inc. city, 1782. Pop. (1984 est.) city, 219,056; (1984 est.) Richmond–Petersburg metropolitan area (MSA), 796,100.

Richmond, EARLS AND DUKES OF, titled English nobility of several creations, grouped below chronologically and indicated by the symbol •.

• **Richmond, John of Gaunt, earl of:** *see* John of Gaunt, duke of Lancaster.

• **Richmond, John of Montfort, earl of:** *see* John IV (or V) *under* John (Brittany).

• **Richmond, Arthur, earl of:** *see* Richemont, Arthur, constable de.

• **Richmond, Henry Tudor, earl of:** *see* Henry VII *under* Henry (England).

• **Richmond, Charles Lennox, 1st duke of,** 1ST DUKE OF LENNOX, EARL OF MARCH, EARL OF DARNLEY, BARON OF SETTRINGTON, LORD OF TORBOULTOUN (b. July 29, 1672, London—d. May 27, 1723, Goodwood, Sussex, Eng.), son of Charles II of England by his mistress Louise de Kéroualle, duchess of Portsmouth. He was aide-de-camp to William III from 1693 to 1702 and lord of the bedchamber to George I from 1714 to 1723.

Charles II awarded a number of peerages (duchies, earldoms, and baronies) to his infant son in 1675; Louis XIV of France also gave him the duchy of Aubigny in remainder to the mother. Richmond held several titular posts during his childhood; and, when his father died and his uncle James II came to the throne (1685), he and his mother repaired to Paris, where he formally accepted Roman Catholicism and served in the French armies. In 1692, however, after the Protestant revolution in Britain, he secretly made his way back to England, where he renounced Catholicism, accepted Anglicanism, befriended William III, and served in the British forces. He was later lord of the bedchamber and privy councillor in the reign of George I.

Richmond is an ancestor of Diana Spencer, princess of Wales (from 1981).

To make the best use of the Britannica, consult the INDEX *first*

• **Richmond, Charles Lennox, 3rd duke of,** 3RD DUKE OF LENNOX, DUC D'AUBIGNY, EARL OF MARCH, EARL OF DARNLEY, BARON OF SETTRINGTON, LORD OF TORBOULTOUN (b. Feb. 22, 1735, London—d. Dec. 29, 1806, Goodwood, Sussex, Eng.), one of most progressive British politicians of the 18th century, being chiefly known for his advanced views on parliamentary reform.

He succeeded to the peerage in 1750 (his father, the 2nd duke, having added the Aubigny title to the Richmond and Lennox titles in 1734). He was British ambassador extraordinary in Paris in 1765 and in the following year became a secretary of state in the Marquess of Rockingham's administration, resigning office on the accession to power of William Pitt the Elder. In the debates on the policy that led to the United States War of Independence Richmond was a firm supporter of the colonists; and he initiated the debate in 1778 calling for the removal of the troops from America, during which Pitt was seized by his fatal illness. He also advocated a policy of concession in Ireland, with reference to which he originated the phrase "a union of hearts," which long afterward became famous when his use of it had been forgotten. In 1780 the Duke embodied in a bill his proposals for parliamentary reform, which included manhood suffrage, annual parliaments, and equal electoral areas.

Richmond sat in Rockingham's second cabinet as master-general of ordnance, and in 1784 he joined the ministry of William Pitt the Younger. He now developed strongly Tory opinions, and his alleged desertion of the cause of reform led to a violent attack on him by the 8th Earl of Lauderdale in 1792, which nearly led to a duel between the two noblemen.

Richmond and Lennox, Frances Teresa Stuart, duchess of, byname LA BELLE STUART, Stuart also spelled STEWART (b. July 8, 1647—d. Oct. 15, 1702), a favourite mistress of Charles II of Great Britain.

The daughter of Walter Stuart (or Stewart), a physician in the household of Queen Hen-

rietta Maria when in exile after the death of her husband, Charles I, in 1649, Frances Stuart was brought up in France and was sent to England in 1663 to become maid of honour to Catherine of Braganza, queen of Charles II. Charles became infatuated with her, and it is stated that in 1667 he was considering the possibility of obtaining a divorce in order to make her his wife. This was at a time when he feared to lose her as his mistress, since her hand was sought in marriage by Charles Stuart, duke of Richmond and Lennox.

The Duchess of Cleveland, the premier mistress who was losing her hold on the King's affections, is reported to have led the King to Frances Stuart's apartment at midnight when Richmond was closeted with her, and the Duke was immediately expelled from court. In March 1667 the lady eloped from Whitehall Palace with the Duke of Richmond and married him secretly in the country. The Duchess of Richmond, however, soon returned to court, where she remained for many years; and, although she was disfigured by smallpox in 1668, she retained her hold on the King's affections.

Richmond River, principal river of the North Coast district, New South Wales, Australia, rising on Mt. Lindesay, in the McPherson Range, and flowing southeast through Casino and Coraki, at which point it is joined by the Wilson River. The river then turns northeastward, entering the Pacific Ocean at Ballina, 360 mi (580 km) north of Sydney. With a total length of 163 mi, it is navigable as far upstream as Casino. Henry Rous, a British naval officer, was the Richmond's first European explorer (1828). The river crosses a district first settled by lumbermen and pastoralists in the 1840s. The area, also drained by the Clarence and Tweed rivers, yields sugarcane, bananas, dairy products, corn (maize), millet, and timber.

Richmond upon Thames, outer borough of Greater London, covering an area of 21 sq mi (55 sq km). The borough lies on each side of the River Thames with a frontage of 12 mi (19 km), extending from Hammersmith to Sunbury-on-Thames in Surrey. The area is primarily residential in character, although small riverside industries, including yards for the building and repair of small craft, are also found there, primarily in the older parts.

The borough contains a large amount of public open space, including Richmond Park, Bushy Park, Barnes Common, Sheen Common, Ham Common, Marble Hill Park, and Old Deer Park. Twickenham, the headquarters for the Rugby Football Union, lies within the borough on the north side of the river. Notable houses include Hampton Court Palace (home of Henry VIII); the former Richmond Palace (used by Elizabeth I); White Lodge, Richmond Park; and Strawberry Hill (built in the 18th century by Horace Walpole in Gothic style). The Royal Botanic Gardens at Kew are world famous. Kew Observatory, in use until 1981, was built in 1768 for George III. The National Physical Laboratory and the Admiralty Research Laboratory are at Teddington. Pop. (1984 est.) 160,600.

Richmondian Stage, division of Ordovician time in North America; the Richmondian is the last stage of the Upper Ordovician Cincinnatian Series of rocks (the Ordovician Period began about 500,000,000 years ago and lasted about 70,000,000 years). In the northeastern regions of the continent, the progressive coarsening of Richmondian sediments as well as the presence of the reddish sediments, as seen in the Queenston and Juniata formations, record a withdrawal of the seas and rising highlands. Limestones are abundant elsewhere.

Richmondshire, district, county of North Yorkshire, England, comprising the towns of Swaledale and Wensleydale. The district has an area of 508 sq mi (1,317 sq km). The upper dales are sparsely populated sheep-rearing country, but as they open eastward, livestock farming opportunities become greater. Swaledale gives its name to a well-known breed of hardy sheep, and Wensleydale is known for its cheese, now factory-processed at Hawes. The stone farmhouses and small towns, which include former lead-mining centres such as Hawes and Askrigg, are frequented by tourists who come only by road now that the dale railway lines have been closed. Richmond is the main tourist and service centre, though Leyburn in Wensleydale has the largest livestock market. Reeth serves Swaledale as an auxiliary service centre. Pop. (1984 est.) 47,200.

Richter, Burton (b. March 22, 1931, Brooklyn, N.Y., U.S.), American physicist who was awarded the 1976 Nobel Prize for Physics in 1976, jointly with Samuel C.C. Ting, for his discovery of a new subatomic particle.

Richter studied at the Massachusetts Institute of Technology, Cambridge, where he received his doctorate in 1956. That same year Richter became a research associate at Stanford University, Stanford, Calif., becoming a full professor in 1967. He immediately undertook experiments that confirmed the validity of quantum electrodynamics at very short distances. In collaboration with David Ritson and with financial support from the Atomic Energy Commission, in 1973 he completed construction of the Stanford Positron-Electron Asymmetric Ring, a colliding-beam accelerator with which he discovered a new subatomic particle that he called the psi-particle (now usually called the J-particle), the first of a new class of very massive, long-lived mesons. Mr. Ting, cowinner of the Nobel Prize, had made the same discovery independently.

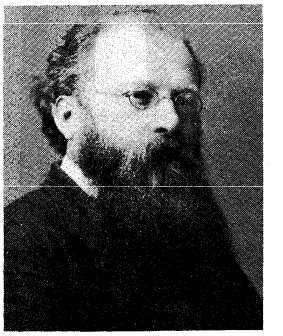
Richter, Charles Francis (b. April 26, 1900, near Hamilton, Ohio, U.S.—d. Sept. 30, 1985, Pasadena, Calif.), American physicist and seismologist who helped develop the Richter scale (*q.v.*) for measuring the magnitude of earthquakes.

Born on an Ohio farm, Richter and his mother moved to Los Angeles in 1916. He attended the University of Southern California (1916–17) and then studied physics at Stanford University (A.B., 1920) and the California Institute of Technology (Ph.D., 1928). Richter was on the staff of the Seismological Laboratory of the Carnegie Institution of Washington, Pasadena, Calif. (1927–36), and then both taught physics and seismology at the California Institute of Technology (1937–70) and worked at its Seismological Laboratory (founded in 1936).

With Beno Gutenberg (1889–1960), a German-born Caltech professor, he developed in 1935 the scale that came to be associated with his name, replacing an older "Mercalli scale," which unreliably measured an earthquake's intensity at the seismic measuring station rather than at the epicentre of the earthquake. Richter also mapped out quake-prone areas in the United States but tended to disparage attempts at earthquake prediction. He wrote (with Beno Gutenberg) *Seismicity of the Earth and Associated Phenomena* (1949; rev. ed. 1954) and *Elementary Seismology* (1958).

Richter, Hans (German), Hungarian JÁNOS RICHTER (b. April 4, 1843, Raab, Hung.—d. Dec. 5, 1916, Bayreuth, Ger.), Hungarian conductor, one of the greatest conductors of his era who was particularly esteemed for his performances of the works of Wagner and Brahms.

Richter studied at the Vienna Conservatory. In 1867, recommended by Wagner, he became conductor of the Munich Opera, where he was associated with Hans von Bülow. In 1876 he conducted the *Ring des Nibelungen* at Bayreuth and later became principal conductor of the Wagner festivals there. In 1877 he shared the conductorship of the Wagner festival in London with the composer, and in



Hans Richter, 1876

By courtesy of the Richard Wagner Archiv, Bayreuth, W.Ger.

1882 he gave the first London performances of *Die Meistersinger* and *Tristan und Isolde.* In London he directed the annual Orchestral Festival Concerts (later known as the Richter Concerts) until 1897, when he became conductor of the Hallé Orchestra in Manchester; under his direction this orchestra acquired its high reputation. Richter gave the first performances of many of Brahms's works, and of Elgar's *Enigma Variations, Dream of Gerontius,* and *First Symphony.* He last conducted at Bayreuth in 1912.

Richter, Johann Paul Friedrich: *see* Jean Paul.

Richter, Sviatoslav, Russian SVYATOSLAV TEOFILOVICH RIKHTER (b. March 20, 1915, Zhitomir, Ukraine, Russian Empire), Soviet pianist known for outstanding technique and a comprehensive repertoire.

His early piano training was self-taught, and by the age of 18 Richter was an accompanist and assistant conductor for the Odessa Opera; he was already noted for his sight-reading of full orchestral scores. He gave his concert debut in 1935 in Odessa, and entered the Moscow Conservatory in 1937 to begin formal studies with Heinrich Neuhaus. After winning the U.S.S.R. Music Competition in 1945 and the Stalin Prize in 1949, his reputation spread quickly. He performed as soloist with the Philadelphia Orchestra during its Soviet tour and in 1957 gave concerts in China. Western performance tours during the 1960s included the United States, Great Britain, Italy, France, and Germany, where his public and critical success was instantaneous. He was later associated with the festivals at Aldeburgh (England) and Spoleto (Italy), and the French Fêtes Musicales.

Richter scale, widely used quantitative measure of the magnitude of an earthquake, introduced in 1935 by the seismologists Beno Gutenberg and Charles Francis Richter (*q.v.*).

The scale was originally devised to measure the magnitude of local earthquakes in southern California as recorded by a certain kind of seismograph. The weakest earthquakes that had been detected up to that time were assigned scale values close to zero, and the scale was arranged so that each increase of one unit represents a 10-fold increase in the magnitude of an earthquake (*i.e.,* the numbers on the Richter scale are proportional to the common [base 10] logarithms of the magnitudes). Later and more sensitive seismographs can detect earthquakes even fainter than the ones that were originally chosen to define magnitude zero; their magnitudes are accommodated on the Richter scale by the use of negative numbers. Although the scale has no theoretical upper limit, the largest earthquakes have not

exceeded a scale value of 9. The scale was refined by Richter and Beno Gutenberg to remove the restrictions of distance and type of seismograph used.

richterite, also called SODA TREMOLITE, amphibole mineral, a sodium silicate of calcium and magnesium or manganese. It occurs in thermally metamorphosed limestones and skarns or as a hydrothermal product in alkaline igneous rocks. Richterite is related to tremolite by the substitution of sodium for calcium in richterite's chemical composition. For chemical formula and detailed physical properties, *see* amphibole (table).

Richthofen, Ferdinand Paul Wilhelm, Freiherr von (baron of) (b. May 5, 1833, Carlsruhe, Upper Silesia, Prussia [now in Poland]—d. Oct. 6, 1905, Berlin), German geographer and geologist who produced a major work on China and contributed to the development of geographical methodology. He also helped establish the science of geomorphology, the branch of geology that deals with land and submarine relief features.

After making his reputation with geological investigations in the Dolomite Alps and in Transylvania, Richthofen was invited in 1860 to serve as geologist with a German economic mission to the Far East. He visited Ceylon, Japan, Formosa (Taiwan), the Celebes, Java, and the Philippines and traveled from Bangkok to Moulmein, Burma. From there he went to California, where he remained from 1863 to 1868 and conducted geological investigations, some of which led to the discovery of goldfields. He returned to the Orient, and, on a series of journeys, he visited virtually every part of China, gathering material for his great work, *China, Ergebnisse eigener Reisen und darauf gegründeter Studien,* 5 vol. and atlas (1877–1912; "China, the Results of My Travels and the Studies Based Thereon"). Other of Richthofen's writings include *Aufgaben und Methoden der heutigen Geographie* (1833; "Task and Methods of Present-day Geography") and *Treibkräfte und Richtungen der Erdkunde im neunzehnten Jahrhundert* (1903; "Impulses and Directions of Geography in the 19th Century").



Ferdinand Paul Wilhelm, Freiherr von Richthofen
Bruckmann—Art Reference Bureau

Richthofen, Manfred, Freiherr von (baron of), byname THE RED BARON, German DER ROTE FREIHERR, or DER ROTE KAMPFFLIEGER ("The Red Airman") (b. May 2, 1892, Breslau, Ger. [now Wrocław, Pol.]—d. April 21, 1918, Vaux-sur-Somme, Fr.), Germany's top aviator and leading ace in World War I.

Members of a prosperous family, Richthofen and his younger brother Lothar followed their father into military careers. In 1912 Richthofen became a lieutenant in the 1st Uhlan Cavalry Regiment of the Prussian Army. As a member of this regiment, he fought in Russia after the outbreak of World War I and then participated in the invasion of Belgium and France. When trench warfare settled in and the cavalry became sidelined, Richthofen joined the infantry. In 1915 he transferred to the Imperial Air Service and in September 1916 entered combat as a fighter pilot. He became commander of Fighter Group I (Jagdgeschwader 1), which, because of its fancifully decorated, scarlet planes, came to be known as "Richthofen's Flying Circus"; and he personally was credited with shooting down 80 enemy aircraft. He was killed in his red Fokker triplane when caught in a barrage of Australian enemy ground fire during a battle near Amiens. According to another account, he was shot down by Captain A. Roy Brown, a Canadian in the Royal Air Force. His eventual successor as commander of the fighter group was Hermann Göring.



Manfred, Freiherr von Richthofen
Pictorial Parade—EB Inc.

Ricimer, in full FLAVIUS RICIMER (d. Aug. 18, 472), general who acted as kingmaker in the Western Roman Empire from 456 to 472.

Ricimer's father was a chief of the Suebi (a Germanic people) and his mother was a Visigothic princess. Early in his military career he befriended the future emperor Majorian. After turning back an attempted Vandal invasion of Sicily at Agrigentum (modern Agrigento) in 456, Ricimer was appointed master of the soldiers. On October 17 of the same year he deposed the Western emperor Avitus after defeating him at Placentia (now Piacenza), Italy. Appointed patrician (the highest military title) on Feb. 28, 457, Ricimer elevated Majorian to the Western throne a month later and was made consul in 459. But Majorian would not allow himself to be dominated. When he returned to Italy after the disastrous failure of his campaign against the Vandals, he fell into Ricimer's hands, at Dertona (now Tortona), on Aug. 2, 461. He was deposed and executed five days later. On Nov. 19, 461, Ricimer appointed Libius Severus as Western emperor.

During the next several years Ricimer maintained his power despite serious threats to his position from the general Aegidius and from Marcellinus, who ruled a virtually independent state in Dalmatia (in modern Yugoslavia).

On Aug. 15, 465, Severus died; almost two years passed before Anthemius was appointed to rule the West by the Eastern emperor Leo I. Ricimer acquiesced in the choice when it was arranged that he should marry Anthemius' daughter. But upon the total defeat of a vast expedition planned jointly by Anthemius and Leo against Vandal Africa, Anthemius incurred Ricimer's displeasure. Hence, in April 472, Ricimer elevated Olybrius to the throne and besieged Anthemius in Rome. The patrician crushed his opponent's forces outside the city and on July 11, 472, captured and beheaded him. Ricimer, however, died soon afterward.

As an Arian Christian and a barbarian, Ricimer could not hope to have himself recognized as emperor. Instead he sought to rule through puppet emperors. He was successful throughout his ascendancy in defending Italy against the Vandals and the provinces against the Ostrogoths and the Alani.

ricinus oil: *see* castor oil.

Rickard, Tex, byname of GEORGE LEWIS RICKARD (b. Jan. 2, 1870/71, Kansas City, Mo., U.S.—d. Jan. 6, 1929, Miami Beach, Fla.), American gambler and fight promoter who made boxing fashionable and highly profitable. His promotions featuring Jack Dempsey, world heavyweight champion from 1919 to 1926, attracted the first five "million-dollar gates" ($1,000,000 or more in ticket receipts).

After being a cattleman and a town marshal in Texas and then a gold miner and a professional gambler in the Yukon, Rickard in 1903 established a casino in the mining town of Goldfield, Nev. To publicize the community, he promoted a world lightweight title fight in which Joe Gans defeated Oscar (Battling) Nelson on a foul in 42 rounds on Sept. 3, 1906. He then promoted Jack Johnson's successful defense of the heavyweight championship against former titleholder James J. Jeffries at Reno, Nev., on July 4, 1910.

In 1920 Rickard gained control of Madison Square Garden, New York City. On July 2, 1921, at Jersey City, N.J., he staged the first boxing match to attract a million-dollar crowd: Dempsey's four-round knockout of Georges Carpentier. In Chicago on Sept. 22, 1927, Dempsey's unsuccessful attempt to regain the heavyweight title from Gene Tunney drew for Rickard the only $2,000,000 gate in boxing history before the mid-1970s. Throughout his career, Rickard's promotions appealed to prejudice: black against white (Gans versus Nelson, Johnson versus Jeffries), draft dodger against World War I hero (Dempsey versus Carpentier), and American against "foreigner" (Dempsey versus Luis Angel Firpo of Argentina). Much of his press agentry was aimed at women, and he sought socially prominent patrons by organizing numerous bouts for charity. He was probably the first boxing impresario to prove expert at handling large crowds.

rickardite, copper telluride mineral with the formula Cu_4Te_3, the purple-red masses of which resemble tarnished bornite. It was discovered at Vulcan, Colo., where it is accompanied by weissite, another copper telluride (Cu_5Te_3). For chemical formulas and detailed physical properties, *see* sulfide mineral (table).

Rickenbacker, Edward Vernon, byname EDDIE RICKENBACKER (b. Oct. 8, 1890, Columbus, Ohio, U.S.—d. July 23, 1973, Zürich), pilot, industrialist, and the most celebrated U.S. air ace of World War I.



Rickenbacker
EB Inc.

Rickenbacker developed an early interest in internal-combustion engines and automobiles, and, by the time the United States entered World War I, he was one of the country's top three racing drivers. He entered the army

in 1917 as a driver attached to General John J. Pershing's staff and drove a car for Colonel William ("Billy") Mitchell, the noted advocate of tactical air power.

With Mitchell's help, he became a fighter pilot and was assigned to the 94th Aero Pursuit Squadron. He accumulated 26 air victories and numerous decorations, including the Medal of Honor. His war exploits are published in his book *Fighting the Flying Circus* (1919).

Rickenbacker returned to work in the automobile industry after the war, first with his own company and later with the Cadillac Motor Car Company. He joined American Airways in 1932, moving to North American Aviation, Inc., in 1933, and finally, to Eastern Air Lines in 1935. Rickenbacker became president, general manager, and director of Eastern three years later.

During World War II he served as a special representative of the U.S. Secretary of War and while on an inspection trip in 1942 was stranded on a raft in the Pacific Ocean for 23 days, an ordeal he related in *Seven Came Through* (1943).

rickets, also called VITAMIN D DEFICIENCY, disease of infancy and childhood characterized by defective bone growth and caused by a dietary lack of vitamin D, a nutrient found in some dairy products (especially irradiated milk), in liver, and in fish oils and also synthesized from its precursor, the steroid alcohol ergosterol, in human skin under the influence of sunlight.

Vitamin D plays an important role in the metabolism of calcium and phosphorus; in its absence, the deposition in the bones of the inorganic salt calcium phosphate (responsible for bone rigidity) does not proceed normally, and the softened bones become curved and stunted. Unless treatment is begun early, rickets may produce such conditions as bowlegs, knock-knees, and a beady appearance of the ribs ("rachitic rosary") at their juncture to the breastbone. A narrowed chest and pelvis may be responsible later in life for increased susceptibility to lung diseases and difficulties in childbearing.

Common early symptoms of rickets include restlessness, profuse sweating, lack of muscle tone in the limbs and abdomen, softening of the bones of the skull, delay in learning to sit, crawl, and walk, and delay in the eruption of the teeth. Tetany (spasms of the hands and feet and cramps and twitching of the muscles) may also occur. Rickets is effectively treated with vitamin D concentrates or fish-liver oils, with exposure to sunlight, and with a well-balanced diet. Vitamin D supplement, usually with milk, has been important in preventing the incidence of rickets in the northern and temperate climates. The disorder is uncommon in the tropics, where people are exposed to strong sunlight the year round, and in areas of the far north where fish is eaten in abundance.

Recognition of the therapeutic effects of cod-liver oil and of sunlight in preventing and curing rickets in humans came in the 18th century or earlier. The existence of a vitamin responsible for the effects of cod-liver oil was indicated in experimental animals in 1918. In 1924 it was demonstrated that curative effects of ultraviolet light resulted from formation of vitamin D by such irradiation. Pure vitamin D_2 was first isolated from irradiated ergosterol in 1930–31 in England and in Germany.

A rare form of rickets called familial hypophosphatemia, or vitamin D-resistant rickets, is an inherited metabolic disorder that does not respond well to vitamin D therapy. Familial hypophosphatemia is apparently caused by an increased rate of phosphate clearance from the body by the renal tubules of the kidneys, resulting in the loss of bone mineral and, in severe cases, in rickets-type deformities and dwarfism. The disease, which is usually a sex-linked dominant trait, tends to start slightly later in life than vitamin D deficiency rickets and is treated with massive doses of vitamin D and supplementary phosphate and calcium. A number of similar but little understood syndromes characterized by rickets deformities and renal tubule defects are grouped together under the name de Toni-Fanconi syndrome.

Ricketts, Howard T(aylor) (b. Feb. 9, 1871, Findlay, Ohio, U.S.—d. May 3, 1910, Mexico City), American pathologist who discovered the causative organisms and mode of transmission of Rocky Mountain spotted fever and epidemic typhus (known in Mexico, where Ricketts worked for a time and died of typhus, as *tabardillo*).

Ricketts was graduated in medicine from Northwestern University, Chicago, and in 1902 joined the faculty of the University of Chicago. In the spring of 1906 he demonstrated that Rocky Mountain spotted fever could be transmitted to a healthy animal by the bite of a certain tick. Two years later he described the causative microorganism; he found it in the blood of the infected animals and also in the ticks and their eggs.

In 1909 Ricketts and his assistant, Russel M. Wilder, went to Mexico City to study epidemic typhus. They found that it was transmitted by the body louse (*Pediculus humanus*) and located the disease-causing organism both in the blood of the victim and in the bodies of the lice. Before he succumbed to typhus later that year, Ricketts showed that the disease could be transmitted to monkeys, which, after recovering, would develop immunity to the disease.

In memory of Ricketts, the genus *Rickettsia* was established for the causative organisms that he had identified. Rickettsia is also used as a generic term for a number of organisms that cause rickettsia-like diseases.

rickettsia, any of a number of rod-shaped or variably spherical, nonfilterable bacteria (family Rickettsiaceae) that are natural parasites of certain arthropods (notably lice, fleas, mites, and ticks) and that can cause serious diseases—usually characterized by acute, self-limiting fevers—in humans and other animals.

The rickettsias have affinities with both bacteria and viruses but, because of closer resemblances to bacteria, are currently grouped with them in Division II of the kingdom Procaryotae. The rickettsias range in size, being roughly 0.3 to 0.7 micrometre (μm) by 1.0 to 2.0 μm (1 $\mu m = 10^{-6}$ metre); the largest rickettsias are thus about the size of the smallest nonrickettsial bacteria, but like viruses virtually all rickettsias can reproduce only within animal cells.

Rickettsias are usually transmitted to humans by bite from an arthropod carrier. Because certain species can withstand considerable drying, transmission of rickettsia can also occur when arthropod feces are inhaled or enter the skin through abrasion. Three genera of the family Rickettsiaceae (namely *Rickettsia, Coxiella,* and *Rochalimaea*) cause the majority of known human rickettsial diseases. Of these, the genus *Rickettsia* is the largest. *Rickettsia* is generally divided into the typhus group (three species), the spotted fever group (at least eight species), and the scrub typhus group (one species). This genus alone is responsible for a number of diseases including Rocky Mountain spotted fever, epidemic typhus, Brill–Zinsser disease, scrub typhus (or tsutsugamushi disease) and a number of other infectious diseases.

Coxiella burnetii, the infectious agent that causes Q fever, differs significantly from *Rickettsia* in a number of ways—from its usual route of infection (aerosol) to its heat response (heat resistant). The organism that causes the rickettsial disease known as trench fever, *Rochalimaea quintana* (formerly *Rickettsia quintana*), can grow in an artificial medium, unlike most other rickettsias. *See also* Q fever; Rocky Mountain spotted fever; trench fever; typhus.

Other genera of the family Rickettsiaceae include *Ehrlichia,* which is chiefly an agent of the tick-borne rickettsioses of dogs, cattle, sheep, and goats. *Ehrlichia sennetsu* (formerly *Rickettsia sennetsu*) has also been noted in humans, but its mode of transmission is as yet imperfectly understood. *Cowdria ruminantium,* also tick-borne, causes heartwater of cattle, sheep, and goats. *Neorickettsia helminthoeca* is a fluke-borne rickettsiosis of canines, including dogs.

Protective measures against these disease agents include control of arthropod carriers when necessary and immunization. Animals that recover from a rickettsiosis exhibit long-lasting immunity. Artificial immunity, as a preventive, is variably effective, typhus and the spotted fevers being among the easiest to immunize against. The most effective treatment of most rickettsioses includes the timely and prolonged administration of large amounts of antibiotics such as tetracycline and, if tetracycline cannot be used, chloramphenicol.

Rickey, Branch (Wesley) (b. Dec. 20, 1881, Stockdale, Ohio, U.S.—d. Dec. 9, 1965, Columbia, Mo.), American professional baseball executive who devised the farm system of training ballplayers (1919) and hired the first black players in organized baseball in the 20th century (1945).

Rickey started his professional playing career while studying at Ohio Wesleyan University, spent two seasons (1906–07) in the American League as a catcher, and was graduated from the University of Michigan Law School in 1911. After serving as field manager of the St. Louis Browns (1913–15), he began a long association with the St. Louis Cardinals—as club president (1917–19), field manager (1919–25), and general manager (1925–42).

Dismayed at the inability of the Cardinals to bid successfully for promising minor-league players, he persuaded club owner Sam Breadon to buy stock in the Houston (Texas) and Fort Smith (Arkansas) minor-league teams so that St. Louis would have first choice of their players. The Cardinals won nine National League championships with players signed during Rickey's tenure. He left the Cardinals to become president and general manager of the Brooklyn Dodgers (1943–50).

In the spring of 1945 Rickey founded the United States League for black players, who were excluded by unwritten law from organized baseball, and was criticized for encouraging continued segregation in sports. In October of that year, however, he signed two blacks, one of whom was infielder Jackie Robinson, for the Dodgers' minor-league organization. Robinson's success with the Dodgers from 1947 led other owners to seek black talent. Rickey later was vice president, general manager (1950–55), and chairman of the board (1955–59) of the Pittsburgh Pirates.

Rickmansworth, locality, Three Rivers district, county of Hertfordshire, England, situated at the confluence of the Rivers Colne, Gade, and Chess, on the borders of Buckinghamshire and the outer London borough of Hillingdon. Since World War I, Rickmansworth has developed from a small market town into a large residential district, spreading into the river valleys and surrounding woodland. The High Street contains some red-brick Georgian buildings, including Basing House, the home of William Penn and now the council offices. To the east lies Moor Park, an 18th-century mansion with 400 acres (160 hectares) of parkland, now belonging to the council. Pop. (1981) 15,948.

Rickover, Hyman G(eorge) (b. Jan. 27, 1900, Makov, Russia—d. July 8, 1986, Arlington, Va., U.S.), American naval officer and engineer who developed the world's first nuclear-powered engines and the first atomic-powered submarine, the USS *Nautilus,* launched in 1954; he then went on to supervise plans for harnessing nuclear energy for peaceful purposes.

Brought up in Chicago, Rickover graduated from the U.S. Naval Academy at Annapolis, Md., in 1922. He studied electrical engineering at Columbia University (M.S., 1929) and then took submarine training at New London, Conn. After serving on various submarines and on the battleship USS *New Mexico,* he was given command of the USS *Finch,* a minesweeper, in 1937. In 1939 he was assigned to Washington, D.C., to the Electrical Section of the Navy Department's Bureau of Ships; he later headed this section throughout World War II. In 1945 and 1946 he held posts in Okinawa and in San Francisco.



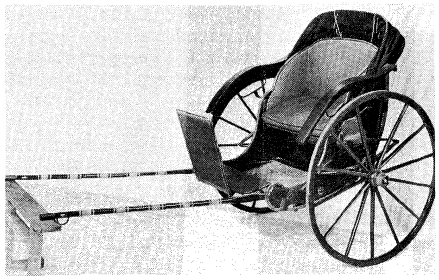
Rickover, 1955
By courtesy of the U.S. Navy

In June 1946 Rickover went to Oak Ridge, Tenn., for further instruction in nuclear physics and engineering as part of the old Manhattan Project, which had developed the atom bomb. Returning to the Bureau of Ships in September 1947, he began to manage the Navy's nuclear-propulsion program. His energy, frequently unorthodox methods, and ability to elicit almost fanatical devotion from his team of specialists were key factors in the development and early delivery of the *Nautilus,* whose keel was laid in June 1952 and which was launched on Jan. 21, 1954.

While continuing his duties with the Navy, Rickover also took charge of research on reactor development for the Atomic Energy Commission, helping to develop the first U.S. full-scale, civilian-use nuclear power plant, at Shippingport, Pa. (1956–57). He was promoted to the rank of rear admiral (1953), vice admiral (1959), and admiral (1973) and was also awarded a gold medal for his achievements. Throughout his career Rickover was a controversial figure because of his outspoken and even abrasive demeanour and his single-minded insistence on the development of nuclear power. He retired from the Navy in 1982, after serving as an officer for 63 years, a record made possible by an act of Congress that specially exempted him from having to retire at the age normal for senior admirals.

ricksha, also spelled RICKSHAW, also called JINRIKISHA, or JINRICKSHAW (Japanese: "human-powered vehicle"), two-wheeled vehicle with a doorless, chairlike body and a collapsible hood, that holds one or two passengers and is drawn by a man between two shafts. It was used widely in the Orient but was largely superseded by the pedicab (*q.v.*), a ricksha driven by bicycle.

The name of its inventor remains uncertain, but it was first used in Japan in the 19th century and is similar to the old French brouette.



Ricksha, *c.* 1875; in the Museum of Carriages, Maidstone, Kent, Eng.
By courtesy of the Museum of Carriages, Maidstone, Kent; photograph, Sloman and Pettitt

Many were built in the United States for export by American carriage builder James H. Birch of Burlington, N.J.

Ricoeur, Paul (b. Feb. 27, 1913, Valence, Fr.), French phenomenologist philosopher and historian who described events and symbols of human will, freedom, and evil and studied various linguistic and psychoanalytic theories of interpretation.

Educated at the Lycée de Rennes and at the University of Paris, Ricoeur served on the faculties of a number of institutions (1933–48) before becoming professor successively at the universities of Strasbourg (1948–56) and Paris (from 1956). He supervised the Louvain Archives. Among his principal publications are *Philosophie de la volonté,* 3 vol. (1950–60; *Philosophy of the Will*); *Histoire et vérité* (1955; *History and Truth*); *De l'interprétation; Essai sur Freud* (1965; *Freud and Philosophy; An Essay on Interpretation*); *La Métaphor vive* (1975; "The Living Metaphor"); and *La Sémantique de l'action* (1977; "The Semantics of Action").

riddah, Arabic RIḌA ("apostasy"), series of politico-religious uprisings in various parts of Arabia *c.* AD 632 during the caliphate of Abū Bakr (reigned 632–634).

Despite the traditional resistance of the Bedouins to any restraining central authority, by 631 Muḥammad was able to exact from the majority of their tribes at least nominal adherence to Islām, payment of the *zakāt,* a tax levied on Muslims to support the poor, and acceptance of Medinan envoys. In March 632, in what Muslim historians later called the first apostasy, or *riddah,* a Yemeni tribe expelled two of Muḥammad's agents and secured control of Yemen. Muḥammad died three months later, and dissident tribes, eager to reassert their independence and stop payment of the *zakāt,* rose in revolt; they refused to recognize the authority of Abū Bakr, interpreting Muḥammad's death as a termination of their contract, and rallied instead around at least four rival prophets.

Most of Abū Bakr's reign was consequently occupied with *riddah* wars, which under the generalship of Khālid ibn al-Walīd not only brought the secessionists back to Islām but also won over many who had not yet been converted. The major campaign was directed against Abū Bakr's strongest opponent, the prophet Musaylimah and his followers in al-Yamāmah. It culminated in a notoriously bloody battle at 'Aqrabā' in eastern Najd (May 633), afterward known as the Garden of Death. The encounter cost the Muslims the lives of many ansar (disciples of the Prophet) who were invaluable for their knowledge of the Qur'ān, which had been revealed to the Prophet, recited to his disciples, and memorized by them but not yet written down. Musaylimah was killed, the heart of the *riddah* opposition was destroyed, and the strength of the Medinan government was established. Sometime between 633 and 634 Arabia was finally reunited under the caliph, and the energy of its tribes was diverted to the conquest of Iraq, Syria, and Egypt.

Ridder, Alfons de (Flemish novelist): *see* Elsschot, Willem.

riddle, deliberately enigmatic or ambiguous question requiring a thoughtful and often witty answer. The riddle is a form of guessing game that has been a part of the folklore of most cultures from ancient times. Western scholars generally recognize two main kinds of riddle: the descriptive riddle and the shrewd or witty question.

The descriptive riddle usually describes an animal, person, plant, or object in an intentionally enigmatic manner, to suggest something different from the correct answer. "What runs about all day and lies under the bed at night?" suggests "A dog," but the answer is "A shoe." The description usually consists of one general and one specific element. The general element stands first and is to be understood metaphorically. Thus, in this English rhyming riddle

> Little Nancy Etticoat
> In a white petticoat
> And a red nose:
> The longer she stands
> The shorter she grows

a girl seems to be described. The second element, to be understood literally, appears to contradict the first. Nancy Etticoat grows shorter the longer she stands because she is a lighted candle. An apparently late development is the use of puns: *e.g.,* "What's black and white and red all over?"—"A newspaper," in which both "red" and "all over" are to be understood also in the sense of "read" and "everywhere," respectively.

Descriptive riddles deal with appearance, not function. Thus, an egg is "A little white house without door or window," not something to eat or something from which a chicken hatches. Paradoxical riddles provide descriptions in terms of action. Common examples of these are: "What grows bigger the more you take from it?"—"A hole"; and "The man who made it did not want it; the man who bought it did not use it; the man who used it did not know it"—"A coffin."

Descriptive riddles are universal, but they rarely occur in folktales or ballads. An unusual example of one in a folktale is that asked by the Sphinx, the monster that terrorized the Boeotian Thebans of ancient Greece: "What has one voice, and walks on four legs in the morning, two at noon, and three in the evening?" The answer was given by Oedipus: "A man, who crawls on all fours in infancy, walks on two feet when grown, and leans on a staff when aged."

Lacking a generic name in English, shrewd or witty questions are classed with riddles. They are of ancient origin. A classical Greek example that has been widely translated is "What is the strongest of all things?"—"Love: iron is strong, but the blacksmith is stronger, and love can subdue the blacksmith."

Shrewd questions may be classified by subject and form. Those dealing with letters of the alphabet, words, and symbols are generally statements calling for interpretation: *e.g.,* "ICUR YY 4 me" ("I see you are too wise for me"); "What is in the middle of Paris?"—"R"; "Spell 'dry grass' with 3 letters?"—"Hay." The influence of the classroom in such riddles (sometimes called "catch riddles") is clear.

Questions such as "What is the difference between . . . and . . . ?" or "Why is . . . like . . . ?" usually contain puns and are probably modern. Such catch questions as these seem to be known only in European cultures. *See also* Exeter Book.

Rideau Canal, canal, southeastern Ontario, Canada, linking Ottawa on the Ottawa River with Kingston on Lake Ontario. For nearly 125 mi (200 km) it follows the Rideau River southwest from Ottawa to its summit at Rideau Lake (406 ft [124 m]), continuing via

the Cataraqui River to Lake Ontario. It has 47 locks (each 134 ft long and 33 ft wide) and a depth of 5½ ft; the 7-mi-long Tay branch, with two locks, links Rideau Lake with Perth. The canal was built (1826–32) as a military transport route but never served that purpose. In the 19th century, before commercial use, it was used to carry settlers.

Ridge and Valley, geographical region in the eastern United States, part of the Appalachian Highlands and bordered on the east by the Blue Ridge and Piedmont regions and on the west by the Appalachian Plateau. As its name implies, the region is a series of alternating ridges and valleys extending for nearly 1,200 mi (1,930 km) from the St. Lawrence Valley in upstate New York to the Coastal Plain of central Alabama and with a width varying from 14 to 80 mi (23 to 130 km). The Shenandoah Valley of northern Virginia is a well known part of the Ridge and Valley region.

Ridgewood, residential village, Bergen County, northeastern New Jersey, U.S., on the Saddle River, just northeast of Paterson. The Old Paramus Reformed Church, a Dutch Colonial structure built about 1800 and remodelled in 1875, is on the site of an earlier church where Aaron Burr and the widow Prevost were married (1782) and where Gen. Charles Lee was court-martialled after his retreat at the Battle of Monmouth (1778). George Washington with 5,000 men of the Continental Army paused to rest near the church after the battle. In 1810 the community was called Newton, but was changed to Godwinville in 1829 to honour a Revolutionary War hero, Abraham Godwin. It was renamed Ridgewood in 1866 and was incorporated in 1895. Pop. (1980) 25,208.

Ridgway, Matthew B(unker) (b. March 3, 1895, Ft. Monroe, Va., U.S.), U.S. Army officer who planned and executed the first major airborne assault in U.S. military history with the attack on Sicily (July 1943).

A 1917 graduate of the U.S. Military Academy at West Point, N.Y., Ridgway served in various staff positions before World War II. After the engagement in Sicily, he was



Ridgway, 1951

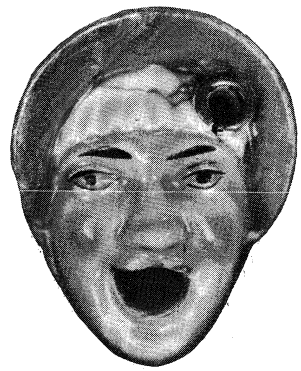
By courtesy of the U.S. Army

appointed commander of the 82nd Airborne Division and parachuted with his troops into Normandy in 1944; he subsequently led the 18th Airborne Corps in action in The Netherlands, Belgium, and Germany.

Assuming command of the U.S. 8th Army in Korea during the Chinese Communist offensive in late 1950, Ridgway rallied the United Nations forces and initiated a counteroffensive that drove the enemy out of South Korea. Assigned in 1951 as the overall Allied commander in the Far East, succeeding the ousted Gen. Douglas MacArthur, he continued the successful defense of the Republic of Korea and assisted in the continued rehabilitation of Japan.

In 1952 Ridgway succeeded Gen. Dwight D. Eisenhower as supreme commander of the Allied forces in Europe and the next year was appointed chief of staff of the U.S. Army. He retired in 1955 as a general. Ridgway's war memoirs, *Soldier,* appeared in 1956.

Ridgway ware, type of Staffordshire pottery first produced by the brothers Job and George Ridgway in 1792 at the Bell Works



Ridgway porcelain inkpot, a caricature of Job Ridgway's wife, factory uncertain, Staffordshire, England, *c.* 1810; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London; photograph, EB Inc.

at Shelton, Hanley, North Staffordshire, Eng. Despite family tensions, the Ridgways continued to produce their high-quality earthenware with blue printed designs well into the 20th century. The Ridgways made tea, dessert, and dinner services of a hard-wearing type of porcelain to compete with Minton ware, the designs of which they emulated as well as those of Worcester, Rockingham, and Spode.

Riding, Laura, *née* REICHENTHAL, married name JACKSON, pseudonyms BARBARA RICH, MADELEINE VARA, and LAURA RIDING GOTTSCHALK (b. Jan. 16, 1901, New York City), American poet, critic, novelist, and short-story writer. In the mid-1930s the Anglo-American poet W.H. Auden referred to her as "the only living philosophical poet."

Riding, daughter of a naturalized Austrian-Jewish tailor and his wife, was educated in the public schools of New York City and at Cornell University, where she mixed with the resident group of writers and critics. At the urging of the British poet Robert Graves, she visited England in 1926, the year her first book of poems, *The Close Chaplet,* was published. Riding and Graves collaborated on *A Survey of Modernist Poetry* (1927, reprinted 1977) and *A Pamphlet Against Anthologies* (1928, reprinted 1970), jointly operated Seizin Press, and encouraged other young poets. Riding edited *Epilogue,* a journal of critical miscellany, and wrote such prose works as *Contemporaries and Snobs* (1928, reprinted 1971) and *Progress of Stories* (1935, rev. ed. 1982), as well as eight additional volumes of verse that were then gathered and published as *Collected Poems* (1938, rev. ed. 1980) before she returned to the United States in 1939.

Two years after Riding's marriage to poet and critic Schuyler B. Jackson in 1941, they moved to Florida, where she renounced poetry as "humanly inadequate." She worked with Jackson until his death in 1968, engaging in lexicographical inquiries intended to intensify a person's consciousness of word meanings. Riding's later books include such prose works as *The Telling* (1972), *Description of Life* (1980), and *Some Communications of Broad Reference* (1983).

Ridler, Anne (Barbara) (b. July 30, 1912, Rugby, Warwickshire, Eng.), English poet and dramatist noted for her devotional poetry and for verse drama that shows the influence of the later work of T.S. Eliot. She wrote on domestic themes with quiet and telling skill and assurance. Her volumes include *Poems* (1939), *Selected Poems* (1961), and *Some Time After* (1972). Among her verse plays are *Cain* (1943), *The Shadow Factory: A Nativity Play* (1946), *The Trial of Thomas Cranmer* (1956), *The Jesse Tree: A Masque in Verse* (1970), *The King of the Golden River* (1975), and *The Lambton Worm* (1978).

Ridley, Henry Nicholas (b. Dec. 10, 1855, West Harling Hall, Norfolk, Eng.—d. Oct. 24, 1956, Kew, Surrey), English botanist who was largely responsible for establishing the rubber industry in the Malay Peninsula.

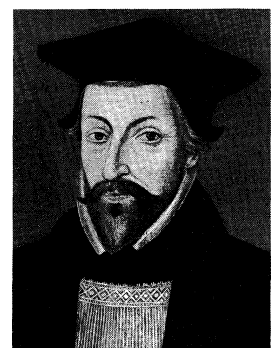
After receiving a science degree at Exeter College, Oxford, in 1877, Ridley took a botanical post at the British Museum. He remained there until 1888, when he went to Singapore to take charge of the forest administration of the Straits Settlements and the Botanic Gardens in Singapore. There he conducted experiments with Para rubber trees (*Hevea brasiliensis*) that convinced him of the enormous economic potential of rubber as a plantation crop. After developing a more efficient tapping method, he began a campaign to establish a rubber industry. Despite considerable initial opposition among planters, he persisted, and by 1896 the first rubber estates were planted using his seeds. From this beginning the rubber industry grew into one of the economic mainstays of the Malay states.

Ridley also carried out an extensive study of plants of the Malay Peninsula, especially monocotyledons, and published many articles as well as a five-volume *Flora of the Malay Peninsula* (1925). After his retirement in 1912, he spent the remainder of his exceptionally long life continuing research and writing.

Ridley, Nicholas (b. *c.* 1503, South Tynedale, Northumberland, Eng.—d. Oct. 16, 1555, Oxford), Protestant martyr, one of the finest academic minds in the first generation of leaders of the English Reformation.

Ridley attended Pembroke Hall, Cambridge, and was ordained a priest (*c.* 1524). After a period of study in France, he returned to Cambridge, where he settled down to a scholarly career. About 1534 Ridley began to show sympathies with Protestant doctrines, and in 1537 he became one of the chaplains to the prominent Reformer Thomas Cranmer, archbishop of Canterbury. Elected master of Pembroke Hall, Cambridge, in 1540, he took a leading part in transforming the university into a Reformist seminary that would soon contribute greatly to the intellectual life of English Protestantism. Meanwhile, he became canon of Canterbury (1541) and of Westminster (1545).

Ridley came to be suspected of heresy when a Catholic reaction set in during the last years of the reign of King Henry VIII (ruled 1509–47). Nevertheless, with the rapid advance toward Protestantism after the accession of King Edward VI (ruled 1547–53), Ridley was ap-



Nicholas Ridley, detail of a portrait by an unknown artist, 1555; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

pointed bishop of Rochester. In 1550 he became bishop of London, replacing the deposed conservative Edmund Bonner. Under Ridley the see of London was rapidly made into a showpiece of Reformed England. In particular, he created an uproar with his campaign for the use of a plain table for communion instead of the altar. He denied the doctrine of transubstantiation—that Christ's natural body is present in the bread of the Eucharist after consecration. He supported the claim of the Protestant Lady Jane Grey to be Edward VI's successor and hence was arrested (July 1553) upon the accession of the rightful heir, Queen Mary Tudor, a Roman Catholic. Ridley and another Protestant notable, Hugh Latimer, both of whom had refused to recant, were burned at the stake in October 1555. J.G. Ridley's biography, *Nicholas Ridley,* was published in 1957.

Ridolfi, Roberto, also called ROBERTO DI RIDOLFO (b. Nov. 18, 1531, Florence—d. Feb. 18, 1612, Florence), Florentine conspirator who attempted in 1570–71 to overthrow Queen Elizabeth I of England in favour of Mary Stuart, Queen of Scots, who then was to be married to Thomas Howard, 4th duke of Norfolk. Ridolfi intended to secure these results by the murder of Elizabeth and a Spanish invasion of England.

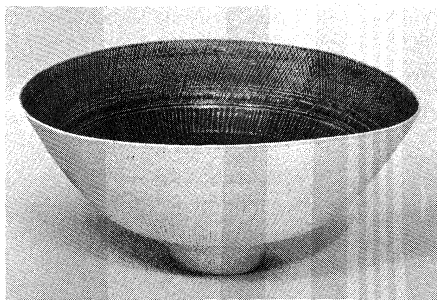
A member of the prominent Florentine family of Ridolfi di Piazza, Ridolfi was trained as a merchant and banker. He went to London as a business agent about 1555, during the reign of the Catholic queen of England, Mary I (died 1558), whose husband, the future king Philip II of Spain, later figured in Ridolfi's plan. Although he was trusted and employed by Elizabeth's government, Ridolfi's ardent Catholicism led him into political activity on behalf of discontented English Catholics. After the failure of revolts in the north of England (1569–70) in which he was involved, Ridolfi and John Leslie, Catholic bishop of Ross, concluded that foreign military backing was essential. Ridolfi left England in March 1571 to obtain assistance from Pope Pius V, Philip II of Spain, and the Duque de Alba, Spanish governor general of the Netherlands. With some difficulty he procured from Norfolk a written statement that the Duke was a Catholic and would lead an English revolution supported by Spain.

Ridolfi's plot was exposed in April 1571 when his messenger, Charles Baillie, was arrested at Dover, Kent. Baillie's confession and the letters that he was carrying incriminated many conspirators, including Leslie, who was imprisoned for two years, and Norfolk, who was executed for treason (June 2, 1572). Only Elizabeth's forbearance saved Mary Stuart, then in captivity in England, from death at that time. Ridolfi, who was still abroad when the plot was discovered, returned to Italy, becoming a Florentine senator in 1600.

Rie, Lucie, *née* GOMPERZ (b. March 16, 1902, Vienna), Austrian-born British studio potter. Her unique and complex slip-glaze surface treatment and inventive kiln-processing influenced an entire generation of younger British ceramists.

Rie was educated at the Vilnus Gymnasium and at the Kunstgewerbe Schule. Her early ceramics incorporate late Neoclassicism, Jugendstil, modernism, and Japonism. She settled in England in 1938 and, in order to survive during World War II, produced and sold fine ceramic buttons. In 1947 she was joined in her studio by the German-born Hans Coper.

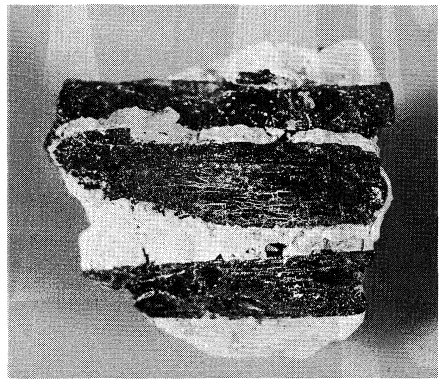
Rie had her first one-man show as a potter in 1949, was in the Arts Council Retrospective of 1967, showed with Coper in Rotterdam in 1967 and Hamburg in 1972, and was given



White porcelain bowl with sgraffito ("scratched") decoration by Lucie Rie, 1950s
By courtesy of The British Council

major exhibitions in Düsseldorf, W.Ger., in 1978, and in London at Sainsbury Place and the Victoria and Albert Museum in 1981–82. She was made Commander of the Order of the British Empire in 1981.

riebeckite, amphibole mineral commonly found in acidic igneous rocks, such as granites and syenites. A fibrous variety, crocidolite (*q.v.*), is of metamorphic origin and is used as an asbestos. Riebeckite is a sodium silicate that contains both ferrous and ferric iron; the iron is replaced by magnesium and

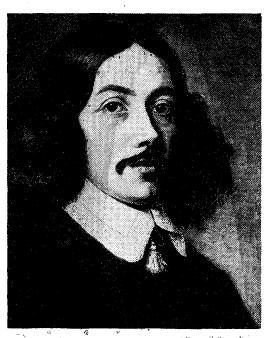


Riebeckite from St. Peters Dome, Colorado
B.M. Shaub

by both magnesium and aluminum to form magnesioriebeckite and glaucophane (*q.v.*), respectively. Magnesioriebeckite has properties between those of glaucophane and riebeckite; like glaucophane, it is found in low-grade metamorphic rocks. For chemical formula and detailed physical properties, *see* amphibole (table).

Riebeeck, Jan (Anthonisz) van (b. April 21, 1619, Culemborg, Neth.—d. Jan. 18, 1677, Batavia [now Jakarta], Dutch East Indies), Dutch founder in 1652 of Cape Town, thus opening South Africa for white settlement.

Riebeeck was sent to the Cape by the Dutch East India Company to build a fort and establish a provisioning station for ships travelling to East India. His expedition arrived in Table Bay on April 6, 1652. Work began on the fort, but crop failures and disorderliness caused



Riebeeck, portrait by an unknown artist

setbacks. Riebeeck reported in 1655 that his mission would fail unless free burghers, working their own farms, were introduced. Accordingly, in 1657, former company servants were granted "letters of freedom" that protected company interests. Riebeeck also encouraged the importation of slaves and exploration of the interior and fought a war with the Hottentots (1659–60).

Riebeeck had joined the East India Company as an assistant surgeon and sailed to Batavia in April 1639. From there he went to Japan; in 1645 he took charge of the company trading station at Tongking (Tonkin; now in Vietnam). He was dismissed, having defied the ban on private trading, but was reinstated to command the South African expedition. In 1665 he became secretary to the Council of India. His *Daghregister (Journal)* was edited and published in Dutch and English (3 vol., 1952–58).

Riecke's principle, in geology, statement that a mineral grain has a greater solubility under high stress than it does under low stress. According to this principle, stressed grains in a rock will dissolve more readily than unstressed grains in the same rock, and material may be transported between the two. Further, if the stress is non-isotropic (*i.e.,* not the same in all planes), the points of a mineral grain under the greatest stress will be dissolved; the removed material may then be redeposited on those parts of the grain under lower stress. The principle is used to explain recrystallization in metamorphic rocks when minerals become oriented with their long dimensions parallel. Usually, mineral deformation in a metamorphic rock is caused by a combination of slippage along minute fractures, strain of the crystal lattice, and recrystallization according to Riecke's principle.

Ried, also called RIED IM INNKREIS, town, *Bundesland* Oberösterreich (federal province of Upper Austria), northern Austria, located west of Wels. It has a museum of folklore and a parish church (1721–33) with two 17th-century altars. The town is the market and administrative centre for the fertile Innviertel (Inn District); it is a rail junction and manufactures skis, shoes, and stockings. The town is well known for its biennial agricultural shows, and nearby oil wells have been in production since 1959. Pop. (1981) 10,952.

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Riedel thyroiditis, also called STRUMA FIBROSA, or LIGNEOUS THYROIDITIS, extremely rare form of chronic inflammation of the thyroid gland, in which the glandular tissues assume a densely fibrous structure, interfering with production of thyroid hormone and compressing the adjacent trachea and esophagus. The thyroid becomes enlarged, often asymmetrically, to form a firm, hard mass of scar tissue that may be confused with cancer of the thyroid. Other organs may also be involved, including the parotid (salivary) glands, the lungs, and the bile ducts of the liver; the fibrosis may also spread beyond the thyroid to surrounding tissues. The cause of the disease, which occurs most commonly in middle-aged and older individuals, is unknown, but there is some evidence that it may be genetically transmitted as an autosomal dominant trait. Treatment is largely symptomatic and may include thyroid replacement if hypothyroidism (deficiency of thyroid hormone) occurs. Surgery to remove the affected tissue may also be needed to relieve pressure on surrounding organs.

Riefenstahl, Leni, original name BERTA HELENE AMALIE RIEFENSTAHL (b. Aug. 22, 1902,

Berlin), German motion-picture actress, producer, photographer, and director who is best known for her documentary films of the 1930s dramatizing the power and pageantry of the Nazi movement.

Riefenstahl studied painting and ballet in Berlin, and, from 1923 to 1926, she appeared in dance programs throughout Europe. Beginning her motion-picture career as an actress in "mountain films," a type of German film in which nature, especially the mountain landscape, plays an important role, she eventually became a director in the genre. In 1931 she formed a company, Leni Riefenstahl-Produktion, and the following year wrote, directed, produced, and starred in *Das blaue Licht* (1932; *The Blue Light*).

With the support of the Nazi Party, she directed films that extolled the values of physical beauty and Aryan superiority. They include *Sieg des Glaubens* (1933; *Victory of Faith*), a short subject commissioned by Adolf Hitler; *Triumph des Willens* (1935; *Triumph of the Will*), an important documentary study of the 1934 Nazi Party Convention at Nürnberg that emphasized the unity of the party, introduced the leaders to the German people, and exhibited Nazi power to the world; and *Olympische Spiele* (1938; *Olympia*), a two-part film, *Fest der Völker* (*Festival of the Nations*) and *Fest der Schönheit* (*Festival of Beauty*), on



Leni Riefenstahl, 1938

By courtesy of Deutsches Institut fur Filmkunde, Wiesbaden, W.Ger.

the Olympic games of 1936 that was praised for the effectiveness of its studio-created music and sound effects. Riefenstahl's films were acclaimed for their rich musical scores, for the cinematic beauty of the scenes of dawn, mountains, and rural German life, and for brilliant editing.

Because her films had aided the Nazi cause, she was blacklisted after World War II. She returned to work in 1952, however, after being officially cleared of complicity in Nazi war crimes, and completed *Tiefland* ("Lowland"), the production of which had been interrupted by the war. *Die Nuba* (*The Last of the Nuba*), a book of her African photographs, was published in 1973.

Rieger, František Ladislav (b. Dec. 10, 1818, Semily, Bohemia, Austrian Empire—d. March 3, 1903, Prague), politician and leader of the more conservative Czech nationalists who was the principal spokesman for Bohemian autonomy within the Habsburg Empire.

In April 1848 Rieger headed the national deputation that presented Czech demands to the Austrian government, and he was a leading Czech delegate to the Kremsier (Kroměříž) Parliament of 1848–49 that produced a short-lived constitutional draft for the Habsburg Empire. With the onset of reaction, he retired to France in voluntary exile but returned home in 1861. Thereafter, he brought out the first encyclopaedia in Czech (*Slovník naučný*) and in 1861 founded the important newspaper *Národní listy* ("National Daily"). From 1861



Rieger, detail from a lithograph by J. Bekel, 1849, after a portrait by Josef Mánes

By courtesy of the National Gallery, Prague

he was also the leader of the Czech party in the Bohemian diet and in the lower house of the new Austrian Reichsrat (parliament); in June 1863 he initiated the boycott of the house by Czech delegates, which remained in effect almost without interruption until 1879. A series of political blunders that included his espousal of a Russian-led branch of Pan-Slavism at the Pan-Slavist congress in Moscow in 1867 and his flirtations with France during 1869–70 offended important elements within the Habsburg Empire, however, and eventually alienated the younger members of his own party.

After the Czech deputies' return to the Reichsrat in 1879, Rieger found his conservative national program, based on historic rights (*Staatsrecht*), calling for Bohemian autonomy within the empire and loyalty to the Habsburg crown, continually challenged by his young Czech critics; finally, in 1891, under a torrent of abuse, he lost his parliamentary seat and retired from politics. Despite the opposition he evoked, he was the most influential and effective advocate of the Czech national cause among his contemporaries. He also took great interest in the municipal government of Prague and helped promote the establishment of a national theatre and a Czech university in the city.

Riegger, Wallingford (b. April 29, 1885, Albany, Ga., U.S.—d. April 2, 1961, New York City), prolific U.S. composer of orchestral works, modern dance and film scores, and teaching pieces and choral arrangements.

Riegger moved with his family first to Indianapolis, Ind., and then at age 15 to New York City. In 1900 he began playing cello in the family ensemble. He studied music theory with the noted teacher Percy Goetschius at the Institute of Musical Art (graduated 1907) and later in Germany with the composer Max Bruch at the Berlin Hochschule für Ausübende Tonkunst.

He conducted opera in Germany (1915–17), returning to the United States to teach at Drake University, Des Moines, Iowa (1918–22). His earliest works survive from this period, conservative, lush scores that won him the Paderewski Prize (1921). From 1924 he taught in New York City; in that year he won the E.S. Coolidge Award for *La Belle dame sans merci* (to the poem by Keats), a score for four solo voices and chamber orchestra. His *Study in Sonority* (1927) for 10 violins, or any multiple of 10, marked a transition toward a dissonant, contrapuntal style. He then became an early U.S. adaptator of 12-tone technique in *Dichotomy* (1932), based on his study of Arnold Schoenberg's music.

Riegger's free use of the 12-tone style is expressive and lyrical at the same time that it is technically advanced. His *Third Symphony* (1948), which combines 12-tone and conventional writing, brought him wide attention. His later works use strict forms such as canon and fugue and incorporate traditional with experimental material (*Variations* for violin and orchestra, *Quintuple Jazz,* both 1959).

Riehl, Wilhelm Heinrich (b. May 6, 1823, Biebrich, Nassau—d. Nov. 16, 1897, Munich), German journalist and historian whose early emphasis on social structures in historical development were influential in the rise of sociological history.

After entering the University of Marburg to study theology in 1841, Riehl transferred to the University of Tübingen in 1842 to continue in philosophy. He edited journals at Frankfurt, Karlsruhe, Wiesbaden, and Augsburg from 1845 to 1853, when he began teaching at Munich. He returned to journalism briefly, directing the *Neue Münchener Zeitung* from 1856 until he took the chair in cultural history at the University of Munich in 1859.

Riehl's best known work is *Die Naturgeschichte des deutschen Volkes als Grundlage einer deutschen Socialpolitik,* 4 vol. (1851–69; "The Natural History of the German People as a Foundation of German Social Politics"), in which he emphasized geographical factors, social conditions, and German local life and culture. In the third volume, *Die Familie* (1854; "The Family"), he analyzed the family unit as the basis of all social development. He developed a systematic theory of natural forces and conditions as molding society and culture. He contended that two forces, inertia and movement, are fundamental to society—inertia from the social conservatism of the peasants and movement from the progressive attitudes of urban dwellers. His theories have been criticized for their unprofessional and subjective generalizations, but they were nevertheless crucial to the development of cultural and social history in Germany.

Riehl's other works include *Kulturstudien* (1873; "Studies of Culture"); *Die Deutsche Arbeit* (1884; "German Labour"); *Kulturhistorische Novellen* (1864; "Cultural Historical Novellas"); *Geschichten aus alter Zeit* (1863–65; "Tales of Olden Times"); and several novels.

Riel, Louis (b. Oct. 23, 1844, St. Boniface, Assiniboia—d. Nov. 16, 1885, Regina, District of Assiniboia, Can.), Canadian leader of the Métis (persons of both European, especially French, and Indian descent) in western Canada.



Riel

By courtesy of the Archives Nationales du Quebec

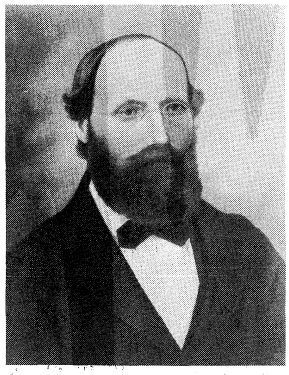
Riel studied law in Montreal and worked at various jobs, including a brief period as a clerk in St. Paul, Minn. In 1869 arrangements to transfer to the Dominion the territorial rights of the Hudson's Bay Company in western Canada and the expected influx of English-speaking settlers alarmed the Métis population. Riel assumed leadership and his followers managed to halt the Canadian surveyors and prevent the governor-designate, William McDougall, from entering Red River. They then seized Ft. Garry (now Winnipeg), the headquarters of the company, and es-

tablished a provisional government with Riel as president to negotiate acceptable terms of union with Canada.

In May 1870 the Canadian Parliament passed the Manitoba Act, establishing the province of Manitoba and promising amnesty to the insurgents. Riel's government, meanwhile, court-martialled and executed an English-speaking Canadian, thus arousing all English-speaking Canada. The promised amnesty was thereupon refused, and military forces were sent out against Riel and his followers. When Ft. Garry was recaptured in August 1870, the insurrection ended and Riel fled. A year later he urged his followers to join with other Canadians in repulsing a threatened attack by American Fenians (Irish revolutionaries), for which he received public thanks. In 1873 he became a member of the Dominion Parliament for Provencher; he took the oath in Ottawa but did not sit. The following year he was expelled from the House but was quickly reelected for Provencher. In February 1875 Riel was officially outlawed for five years. He spent a year as a mental patient (1877–78), and in 1879–84 he lived in Montana, becoming a U.S. citizen in 1883; there he endeavoured to organize the American Métis on behalf of the Republican Party.

In 1884 the Métis of Saskatchewan appealed to Riel to represent their land claims to the Canadian government. At first proceeding legally, he later established a provisional government (March 1885). A rising followed, but it was crushed by the Canadians, and Riel surrendered. He was found guilty of treason and hanged. His death led to fierce outbreaks of racialism in Quebec and Ontario and marked the beginning of the nationalist movement.

Riemann, (Georg Friedrich) Bernhard (b. Sept. 17, 1826, Breselenz, Hanover—d. July 20, 1866, Selasca, Italy), German mathematician whose work widely influenced geometry and analysis. In addition, his ideas concern-



Riemann, lithograph after a portrait, artist unknown, 1863

Archiv fur Kunst und Geschichte, West Berlin

ing geometry of space had a profound effect on the development of modern theoretical physics and provided the foundation for the concepts and methods used later in relativity theory.

Riemann was the second of six children of a Lutheran pastor, who gave him his first instruction. He obtained a good education with the encouragement of a happy and devout family. At the local *Gymnasium* (high school), he quickly progressed in mathematics beyond the guidance of his teachers, mastering calculus and the *Théorie des nombres* ("Theory of Numbers") of Adrien-Marie Legendre. In 1846–51 he studied at the universities of Göttingen and Berlin, where he was interested in problems concerning the theory of prime numbers, elliptic functions, and geometry. Following studies in experimental physics and *Naturphilosophie,* which sought to derive universal principles from all natural phenomena, he concluded that mathematical theory could secure a connection between magnetism, light, gravitation, and electricity, and he suggested field theories, in which the space surrounding electrical charges may be mathematically described. Thus, during his student days he began to develop original ideas that were to become important to modern mathematical physics.

In 1851 he obtained the doctorate at Göttingen with a dissertation on the "Grundlagen für eine allgemeine Theorie der Functionen einer veränderlichen complexen Grösse" ("Foundations for a General Theory of Functions of a Complex Variable"). Function theory, which treats the relations between varying complex numbers, is one of the major achievements of 19th-century mathematics. Riemann based his treatment on geometrical ideas rather than algebraic calculation alone. His work, which earned the rare praise of the renowned mathematician Carl Friedrich Gauss, led to the idea of the Riemann surface—a multilayered surface—on which a multivalued function of a complex variable can be interpreted as a single-valued function. This idea, in turn, contributed to methods in topology, which deals with position and place instead of measure and quantity. His probationary essay (*Habilitationsschrift*) for admission to the faculty in 1853 was "On the Representation of a Function by Means of a Trigonometrical Series."

While continuing to develop unifying mathematical themes in the laws of physics, Riemann also prepared in 1854 for his inaugural lecture at Göttingen, required for admission to the faculty as a *Privatdozent,* an unpaid lecturer dependent entirely on student fees. He listed three topics, from which Gauss, representing the faculty, chose "Über die Hypothesen, welche der Geometrie zu Grunde liegen" ("On the Hypotheses That Form the Foundations of Geometry"). Gauss himself had devoted long, profound speculations to this difficult subject. In this lecture, one of the most celebrated in the history of mathematics, Riemann developed a comprehensive view of geometry. With a thorough understanding of the limitations of ordinary, Euclidean geometry, which is based on the postulate of parallels, he independently formulated a non-Euclidean geometry. In so doing, he was apparently unaware that Nikolay Lobachevsky and János Bolyai had already shown the possibility of devising a consistent geometry without this postulate. Riemann's non-Euclidean geometry was an alternative to theirs and to that formulated by Gauss. He postulated that, through a point outside a line, there are no parallels to that line, a physical example of which can be seen in the fact that two ships on a meridian must meet at a pole. He correctly perceived that his ideas would benefit physics, as indeed they did when Einstein drew upon them to build his model of space-time in relativity theory.

Beginning in 1855, Riemann received a small stipend that represented unusual academic progress at the time and removed him from the ranks of the hardship cases. In 1857 he became professor extraordinarius (associate professor) and in 1859 professor, succeeding the mathematician Peter Gustav Lejeune Dirichlet, who had succeeded Gauss four years earlier. Riemann was beset by overwork, deaths in his family, and his own faltering health. He continued, however, to produce original papers, which, though few in number—some were published posthumously—contained many rich ideas, such as his work on partial differential equations. A measure of his influence is the extensive list of methods, theorems, and concepts that bear his name: the Riemann approach to function theory, the Riemann–Roch theorem on algebraic functions, Riemann surfaces, the Riemann mapping theorem, the Riemann integral, the Riemann–Lebesgue lemma on trigonometrical integrals, the Riemann method in the theory of trigonometrical series, Riemannian geometry, Riemann curvature, Riemann matrices in the theory of Abelian functions, the Riemann zeta functions, the Riemann hypothesis, the Riemann method of solving hyperbolic partial differential equations, and Riemann–Liouville integrals of fractional order. In 1859 he wrote the paper "Über die Anzahle der Primzahlen unter einer gegebenen Grösse" ("On the Number of Primes in a Given Magnitude"), in which he partially described the asymptotic frequency of primes (positive integral numbers that have no other factors except one and themselves, as 2, 3, 5, . . .).

Riemann's growing reputation finally earned him a permanent post in 1859 at Göttingen as the second successor to Gauss. In 1862 he married Elise Koch, and, for a time, the conditions of his life improved. Then he fell ill with pleurisy, which was complicated by tuberculosis. His strength gradually ebbed, despite several visits to Italy for recuperation. He died, in the Lutheran faith of his childhood, in 1866.

BIBLIOGRAPHY. Riemann's collected works (all in German), ed. by Heinrich Weber and Richard Dedekind, were published in one volume in 1876, including an extensive biography by Dedekind. A second edition was published in 1892, and a supplement, containing a large amount of previously unpublished material, appeared in 1902. The collected works were published in the United States in 1953; in addition to the 1892 German edition and the 1902 supplement, it contained an excellent article by Hans Lewy.

Riemann, (Karl Wilhelm Julius) Hugo (b. July 18, 1849, near Sondershausen, Schwarzburg-Sondershausen—d. July 10, 1919, Leipzig), German musicologist whose works on music harmony are considered to have been the foundation of modern music theory.

Riemann's early musical training was in piano and theory, and he later studied law, philosophy, and history before returning to his musical studies at the Leipzig Conservatory. Riemann obtained his Ph.D. at Göttingen in 1873 and was then active as a conductor and teacher at Bielefeld until 1878, when he became a lecturer on music at the University of Leipzig. During 1880–81 he taught at Bromberg, then at the Hamburg Conservatory until 1890. He returned to the Sondershausen Conservatory for a short time, then taught at the Wiesbaden Conservatory until 1895, when he resumed his lectures at Leipzig. In 1905 he was made a full professor there and three years later he was appointed director of the newly organized Collegium Musicum, a musicological institute created by him. In 1914 he also founded and became the director of the Forschungsinstitut für Musikwissenschaft.

Riemann's immense output covers every aspect of musical scholarship and is a monument to his enormous intellect. He is perhaps best known for his *Musiklexikon* (1882), which was reprinted in many subsequent editions.

Riemann zeta function, function useful in number theory for investigating properties of primes. Written as $\zeta(x)$, it was originally defined as the infinite sum $\zeta(x) = 1 + (1/2)^x + (1/3)^x + (1/4)^x + \ldots$ etc. When $x = 1$, this series is called the harmonic series, which has no finite sum. For values of x larger than 1, the series adds up to a finite number. If x is less than 1, the sum is again infinite. The zeta function was known to the Swiss mathematician Leonhard Euler in 1737 and was studied more extensively by the German mathematician Bernhard Riemann (for whom it was named) in 1859.

A more complicated function can be defined (by a continuation process) that equals this

series for values of x greater than 1, but has finite values for any real or complex number the real part of which is different from 1. This is the zeta function that is studied and discussed in the literature. One of the first questions asked about a function by mathematicians is for what values it is equal to zero, and this question is still not answered for the zeta function. It is known that the function equals zero when x is -2, -4, -6, . . . , and that it has an infinite number of zero values for the set of complex numbers the real part of which is between zero and one, but it is not known exactly for what complex numbers these zeros occur. Riemann conjectured that these zeros probably occur for those complex numbers the real part of which equals ½, but this is still unproven. The investigations of this difficult problem have resulted, as is often the case in mathematics, in an enrichment of the knowledge of the properties of complex numbers.

Riemannian geometry, also called ELLIPTIC GEOMETRY, one of the non-Euclidean geometries that completely rejects the validity of Euclid's fifth postulate and modifies his second postulate. Simply stated, Euclid's fifth postulate is: through a point not on a given line there is only one line parallel to the given line. In Riemannian geometry, there are no lines parallel to the given line. Euclid's second postulate is: a straight line of finite length can be extended continuously without bounds. In Riemannian geometry, a straight line of finite length can be extended continuously without bounds, but all straight lines are of the same length. The tenets of Riemannian geometry, however, admit the other three Euclidean postulates (*compare* hyperbolic geometry).

Although some of the theorems of Riemannian geometry are identical to those of Euclidean, most differ. In Euclidean geometry, for example, two parallel lines are taken to be everywhere equidistant. In elliptic geometry, parallel lines do not exist. In Euclidean, the sum of the angles in a triangle is two right angles; in elliptic, the sum is greater than two right angles. In Euclidean, polygons of differing areas can be similar; in elliptic, similar polygons of differing areas do not exist.

The first published works on non-Euclidean geometries appeared around 1830. Such publications were unknown to the German mathematician Bernhard Riemann who, in 1866, extended the concepts from two to three or more dimensions. Another German mathematician, Felix Klein, later discriminated between elliptical space (polar) and double-elliptical space (antipodal).

Riemenschneider, Tilman (b. *c.* 1460, Heilgenstadt or Osterode, Domain of the Teutonic Order [Germany]—d. July 7, 1531, Würzburg), master sculptor whose wood portrait carvings and statues made him one of the major artists of the late Gothic period in Germany; he was known as the leader of the Lower Franconia school.

Riemenschneider was the son of the mint master of Würzburg, and the younger Riemenschneider opened a highly successful workshop there in 1483. As a civic leader he was councillor (1504–20) and burgomaster (1520–25). During the Peasants' Revolt (1525), he sympathized with the revolutionaries and was imprisoned for a short time, during which he temporarily lost his civic responsibilities and patrons.

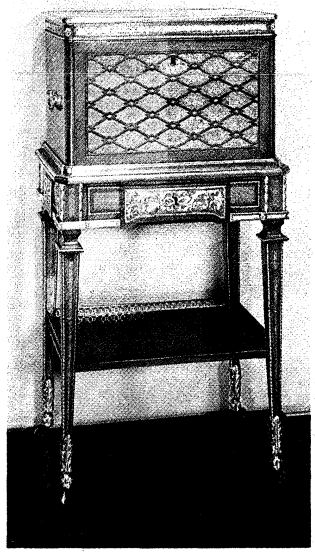
His first documented work was the altar for the Münnerstadt parish church (1490–92), which was later dismantled. He had a continuous flow of commissions; his major work, the "Altar of the Virgin" (*c.* 1505–10) in Herrgotts Church at Creglingen, is a wood altar, 32 feet (10 m) high, depicting the life of Mary. Riemenschneider employed numerous assistants on the massive monument, but he executed the dominant life-size figures himself. Other major works are "Adam and Eve," stone figures from the Würzburg Lady Chapel; the "Altar of the Holy Blood" (1501–05), in St. Jakob, Rothenburg; and the "Tomb of Henry II and Kunigunde" (1499–1513), in Bamberg cathedral.

Although wood was his major medium, he also created pieces in marble, limestone, and alabaster. The sharply folded, flowing drapery on Riemenschneider's figures make his work easily identifiable. His later years in Kitzingen were actively spent restoring altarpieces and carving.

Rienzo, Cola di (Italian popular leader): *see* Cola di Rienzo.

Riesa, city, Saxony *Land* (state), eastern Germany. It lies along the Elbe River, northwest of Dresden. It originated around a Benedictine monastery founded in 1111 and received its municipal charter in 1623 but lost it shortly thereafter. With the development of industry and railways in the 19th century, Riesa became commercially important and was rechartered in 1859. A convent was built there in 1170 and was secularized in 1542. The town hall was built in the 16th century as a castle. The junction of the Berlin–Chemnitz and Leipzig–Dresden rail lines and the chief river port in northern Saxony, it is also a busy industrial centre with steelworks, rolling mills, a cotton mill, an oil refinery, and factories for tires, wood products, and foodstuffs. Pop. (1989 est.) 48,366.

Riesener, Jean-Henri (b. July 4, 1734, Gladbeck, Münster [Germany]—d. Jan. 6, 1806, Paris, Fr.), best-known cabinetmaker in France during the reign of Louis XVI.



Jewel casket on a stand, veneered with mahogany, sycamore, and purplewood, by Riesener, *c.* 1780; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London

Riesener was the son of an usher in the law courts of the elector of Cologne. After moving to Paris he joined the workshop of Jean-François Oeben in 1754, and, when Oeben died in 1763, Riesener was put in charge of the workshop and later married his master's widow. He made his name by completing and delivering to Louis XV the famous *bureau du roi* ("king's desk"), begun by Oeben. In 1774 he was made royal cabinetmaker and from then onward was the regular supplier of furniture to the queen, Marie-Antoinette. Although he was one of the most versatile of cabinetmakers, his services were in little demand during the French Revolutionary period.

Riesener used both European and exotic woods, with a preference for mahogany; he occasionally used lacquer and mother-of-pearl to enrich the surfaces of his works. His finished style was pure Louis XVI, with its rectilinear side view and harmoniously distributed ornamentation.

Riesengebirge (Czechoslovakia–Poland): *see* Giant Mountains.

Riesman, David (b. Sept. 22, 1909, Philadelphia, Pa., U.S.), American sociologist and author most noted for *The Lonely Crowd* (with Reuel Denney and Nathan Glazer, 1950), a work dealing primarily with the social character of the urban middle class. The title of this work became a catchphrase denoting the alienation of the individual in modern urban society. Also entering common speech were the labels he applied to two of the three character types that he identified in the book: "inner-directed" and "other-directed."

Educated at Harvard University (A.B., 1931; LL.B., 1934), Riesman served as clerk to U.S. Supreme Court justice Louis D. Brandeis (1935–36) and taught law at the University of Buffalo (now State University of New York at Buffalo, 1937–41). He was a professor of social sciences at the University of Chicago (1946–58) and subsequently taught at Harvard until his retirement in 1980. Among his other writings are *Faces in the Crowd* (with Glazer, 1952), comprising interviews on various issues raised in *The Lonely Crowd,* and *Abundance for What? and Other Essays* (1964), a collection of essays elaborating some of those issues, with particular reference to the sociological effects of the Cold War.

According to Riesman's theory, in preindustrial societies having a high potentiality for population growth (*e.g.,* medieval Europe and modern Africa), the typical individual is "tradition-directed," his personal values being determined by the traditions of the entire community or its major divisions, such as castes or clans. When the population is growing but has not reached the stage of crowding (*e.g.,* western Europe from the Renaissance to the early 20th century), the "inner-directed" individual predominates. His personal values are determined early by his immediate family, are not necessarily related to any wider social purpose, and are likely to remain unchanged. In heavily industrialized societies, where the population is dense and perhaps beginning to decline and where consumption rather than production is the chief problem of economic organization, the "other-directed" individual emerges. His life is largely shaped by "peer groups" of persons whom he resembles in age, social class, or otherwise, and his values change as theirs do.

Riesz, Frigyes (b. Jan. 22, 1880, Györ, Austria-Hungary [now in Hungary]—d. Feb. 28, 1956, Budapest), Hungarian mathematician and pioneer of functional analysis, which has found important applications to mathematical physics.

Riesz taught mathematics at the University of Kolozsvár (Cluj) from 1911 and in 1922 became editor of the newly founded *Acta Scientiarum Mathematicarum,* which quickly found a position of distinction among the mathematical journals of the world. He was appointed professor of mathematics at the University of Budapest in 1945.

Many of Riesz's fundamental findings in functional analysis were incorporated with those of Stefan Banach of Poland. The Riesz–Fischer theorem of 1907, concerning the equivalence of the Hilbert space of sequences of convergent sums of squares with the space of functions of summable squares, formed the mathematical basis for demonstrating the

equivalence of matrix mechanics and wave mechanics, a major breakthrough in early quantum theory. He made notable contributions in numerous other areas, including ergodic theory, orthonormal series, the theory of partially ordered vector spaces, and topology. His *Leçons d'analyse fonctionnelle* (1952; "Lessons of Functional Analysis") is doubtless one of the most readable introductions to functional analysis ever published.

Rieti, Latin RIETE, city, capital of Rieti province, Lazio (Latium) region, central Italy, on the Velino River in the Abruzzi Apennines, just southeast of Terni. The ancient town was first settled by the Sabines and then became the Roman Reate. It belonged to the Lombard Duchy of Spoleto in the early Middle Ages and later passed to the Papal States (popes often resided there). Surrounded by 13th-century walls, its notable buildings include the 12th-century Romanesque cathedral (much rebuilt), the episcopal palace (1283), and the Palazzo Comunale with a museum and picture gallery. Rieti is a road junction for Rome (53 mi [87 km] southwest), Terni, and L'Aquila. It has woollen and rayon mills and a beet-sugar refinery; manufactures olive oil, fertilizers, and quarrying machinery; and is the site of an experimental wheat culture station. Nearby is the holiday resort of Terminillo. Pop. (1983 est.) mun., 43,520.

Rietveld, Gerrit Thomas (b. June 24, 1888, Utrecht, Neth.—d. June 25, 1964, Utrecht), Dutch architect and furniture designer notable for his application of the tenets of the de Stijl movement. He was an apprentice in his father's cabinetmaking business from 1899 to 1906 and later studied architecture in Utrecht.

Rietveld began his association with the de Stijl movement in 1918. At about the same time he created his famous red-and-blue armchair, which, in its emphasis on geometry and in its use of primary colours, was a realization of de Stijl principles. In 1921 he designed a small Amsterdam jewelry shop, one of the first examples of the application of these principles to architecture. His masterpiece is the Schroeder House in Utrecht (1924), remarkable for its interplay of right-angle forms, planes, and lines, and for its use of primary colours. His mass-produced houses at Utrecht (1931–34) were closely related in style. He remained associated with the de Stijl group until it was dissolved in 1931.

From 1936 until after World War II, Rietveld devoted himself to furniture design. After the war he received a number of important architectural commissions, including the De Ploeg Textile Works (1956), Bergeik; a housing development (1954–56), Hoograven; and the art academy (1962), Arnhem.

Consult the INDEX *first*

Rievaulx, ruined Cistercian abbey, Ryedale district, county of North Yorkshire, England. It lies in the seclusion of a deep valley to which it has given its name, in the North York Moors National Park. The monastery was the mother church of the Christianizing mission of St. Bernard of Clairvaux in northern England. Of the great 12th-century church, 125 yd (115 m) long, the chancel and transept walls still stand to full height and exhibit some of the best English Gothic architecture extant. On the eastern terrace overlooking the abbey are two classical temples built in 1750–60 by Thomas Duncombe, a local landowner, to decorate his estate.

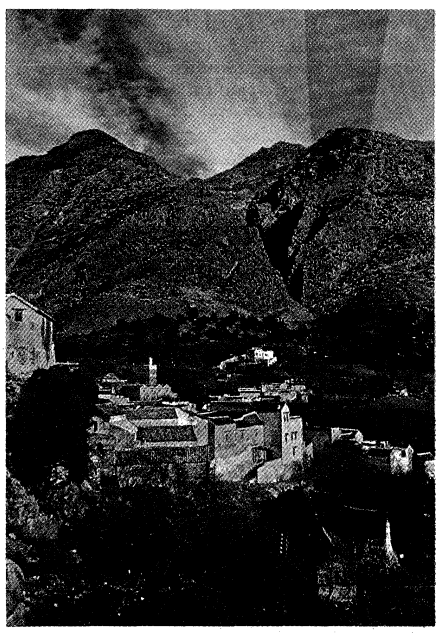
Rif, also spelled RIFF, or RIFFI, any of the Berber tribes occupying a part of northeastern Morocco known as er-Rif, an Arabic word meaning "edge of cultivated area." The Rif are divided into 19 tribes: 5 in the west along the Mediterranean coast, 7 in the centre, 5 in the east, and 2 in the southeastern desert area. One central tribe is Arabic-speaking, as are sections of the five western tribes. The others speak Rif, a regionally variable Berber language. Many also speak Spanish and Arabic. The Rif are Muslims.

The land of the Rif is a combination of mountains, rolling fields, and deserts, bordered by two rivers and 145 miles of coastline. Their material culture is based on cultivation, herding, and sardine-seining.

Before their loss of independence in 1926 (*see* Rif War), the Rif were organized by kinship and residence into graded units. Each unit elected or appointed a council of men who were renowned fighters. Although internally at peace since their pacification by the French and Spanish in 1926 and the restoration of Moroccan sovereignty in 1956, the Rif have often served in French and Spanish regiments, maintaining their reputation as one of the world's great warrior peoples.

RIF (Talmudic scholar): *see* Alfasi, Isaac ben Jacob.

Rif, er-, English RIF, or RIF MOUNTAINS, mountain range of northern Morocco, extending from Tanger (Tangier) to the Oued (river) Moulouya valley near the Moroccan–Algerian frontier. For most of its 180-mi (290-km) length the range hugs the Mediterranean, leaving only a few narrow coastal valleys suitable for agriculture or urban settlement. The higher peaks, including Jebel (mount) Tidirhine, which at 8,059 ft (2,456 m) is the loftiest, are snowcapped in winter. Although they are highly mineralized, only iron ore is mined on a large scale. Attracted to the region's ruggedness and remoteness, Berber tribes led by Abd el-Krim (1882–1963) resisted Franco-Spanish occupation there in the 1920s. Since Moroccan independence in 1956, communications across the Rif have been improved with a summit road and the Route de l'Unité (from Fès to Kétama).



Er-Rif mountain village, Morocco
Shostal—EB Inc.

Rif War, Rif also spelled RIFF, also called WAR OF MELILLA (1919–26), war fought between the Spanish and the Moroccan Rif and Jibala tribes.

By the Treaty of Fez (1912) Spain had been awarded the mountainous zones around Melilla and Ceuta, in Morocco. The two zones had few, if any, roads and were separated by the Bay of Alhucemas, making communications and development difficult. In 1920 the Spanish commissioner, Gen. Dámaso Berenguer, decided to conquer the eastern zone's Jibala tribes and thus incorporate their lands into those already controlled by Spain. At the same time, he ordered Manuel Fernández Silvestre, commander of the western sector, to subdue the Rif tribes and their leader, Abd el-Krim ('Abd al-Karīm). Berenguer's overall goal was to unite the two sectors. The forces of Abd el-Krim, however, inflicted a disastrous defeat on the Spanish troops, pushing them back to the walls of Melilla, and for five years sporadic warfare continued. Spanish losses were heavy, partly because of their ineffective leadership and partly because of their inadequate arms.

In 1925 the French joined the war on the side of Spain and attacked from the south. The Spanish fleet secured Alhucemas Bay and began an offensive from the north. Abd el-Krim, then leader of both the tribes, surrendered, and in 1926 the Spanish Sahara was decisively retaken.

One of the Spanish generals who most distinguished himself in the Rif War was Francisco Franco.

Rifā', ar-, also spelled RIFA'A, municipality in the state and emirate of Bahrain, on north central Bahrain island, in the Persian Gulf. It is on the north rim of the island's central depression, site of the country's chief oil fields. The municipality is an agglomeration of four originally distinct population clusters, now united in administration and economic interests. Ar- Rifā' ash-Sharqī (East Rifā') and ar-Rifā' al-Gharbī (West Rifā') are the two historic settlements; smaller and newer are ar-Rifā' ash-Shamālī (North Rifā') and ar-Rifā' al-Gharbī Camp, which is only 1 mi (1½ km) west of the huge refinery of the Bahrain Petroleum Company (Bapco). The camp was built by the company to house its Indian and Pakistani refinery workers.

Ar-Rifā' al-Gharbī and ar-Rifā' ash-Sharqī predate the ruling Āl Khalīfah dynasty in Bahrain (1783); the latter site, with its fortified castle commanding a prospect of most of the island, was long the seat of the rulers of Bahrain, even under Persian rule in the 18th century. Neighbouring ar-Rifā' al-Gharbī, however, has been favoured in modern times; Shaykh Salmān ibn Ḥamad Āl Khalīfah (ruled 1942–61) built a palace there before his accession. The settlement is still commonly regarded as the residence of Bahrain's ruler though there are other palaces in Manama, the capital, and elsewhere in the country. Ar-Rifā' al-Gharbī is also the headquarters of the Bahraini Defense Force. Both places have long been owned or governed by members of the ruling dynasty.

In the first decade of the 20th century the ar-Rifā' villagers made a poor living by transporting pure drinking water on camelback from their fine wells to the city of Manama. There was virtually no other economic activity. The experience of ar-Rifā' since 1932 provides a case study in the economic revolution brought about by the petroleum industry, because most of the inhabitants are employed by Bapco, either at the nearby refinery or at the oil fields farther south on the island. This industrial base has brought ar-Rifā' improved housing, municipal government, electric power via high-tension lines (1950s), and centrally supplied piped water (early 1960s). The large aluminum smelter of the Aluminium Bahrain Company (Alba), completed in 1972 and running at capacity in 1976, processes ore imported from Australia. It is located to the southeast of ar-Rifā' as are secondary aluminum industries including an atomizer, an extrusion plant, and a rolling mill. Pop. (1981) 22,408.

Rifā'ah Rāfi' aṭ-Ṭahṭāwī: *see* Ṭahṭāwī, Rifā'ah Rāfi' aṭ-.

Rifāʿīyah, fraternity of Muslim mystics (Ṣūfīs), known in the West as howling dervishes, found primarily in Egypt and Syria and in Turkey until outlawed in 1925. An offshoot of the Qādirīyah established in Basra, Iraq, by Aḥmad ar-Rifāʿī (d. 1187), the order preserved his stress on poverty, abstinence, and self-mortification. It also performed the ritual prayer (*dhikr*) essential to all Ṣūfī orders in a distinct manner: members link arms to form a circle and throw the upper parts of their bodies back and forth until ecstasy is achieved. Then the mystics fall on a dangerous object, such as sword or snake, though such extremes, as well as thaumaturgical practices, probably appeared under Mongol influence during their 13th-century occupation of Iraq and have always been rejected by orthodox Islām.

The Syrian branch of the order, the Saʿdīyah (or Jibāwīyah), was given its form by Saʿd ad-Dīn al-Jibāwī in Damascus sometime in the 14th century. Among the Saʿdīyah, ecstasy was induced by physical motion—whirling around on the right heel—and the *shaykh,* or head of the order, rode on horseback over the prone bodies of the members. They also once specialized in the cure of insanity by fasting and potions and were thought to have special powers over snakes.

Rifʿat, Tall (Syria): *see* Arpad.

Rifbjerg, Klaus (b. Dec. 15, 1931, Copenhagen), Danish poet, novelist, playwright, and editor.

Rifbjerg first attracted public notice with an ironic collection of autobiographical prose poems, *Under vejr med mig selv* (1956; "Findings about Myself"). His search for his own past was to become more problematic in *Efterkrig* (1957; "After the War"), which contains much of his earliest poetry. His first novel, *Den kroniske uskyld* (1958; "Chronic Innocence"), continued the search for his past and described his school years. Of great importance for Danish poetry of the 1960s are the poems in *Konfrontation* (1960), in which Rifbjerg attempts to create new forms of language to record the relentless confrontation between the ego and the world around it. The same innovative technique is applied on a larger scale in *Camouflage* (1961) and *Portraet* (1963), where the ego is perceived as a system of experiences and connections branching from man's historical past to the present.

Rifbjerg was editor-in-chief for the literary periodical *Vindrosen* (1959–63) and wrote a number of satirical revues for the Student Association in Copenhagen in collaboration with Jesper Jensen. His interest in media forms such as the revue, film, radio, and television reflected his concern for the ordinary man and the dilemmas confronting him in the modern world.

Riff (people): *see* Rif.

Riff War: *see* Rif War.

rifle, firearm with a rifled bore—*i.e.,* having shallow spiral grooves cut inside the barrel to impart a spin to the projectile. The name, most often applied to a weapon fired from the shoulder, may also denote a rifled cannon; but though field guns, howitzers, pistols, and machine guns have rifled barrels, they are not normally referred to as rifles.

Rifled firearms date back at least to the 15th century. As some of the earliest had straight rather than spiral grooves, it is thought the purpose may have been to receive the powder residue or fouling that was a problem with early firearms. Gunmakers soon discovered, however, that spiral grooves made bullets spin and that spinning improved their range and accuracy. The effect increased when spherical balls were superseded by somewhat elongated projectiles.

In early muzzle-loading rifles, ramming the bullet down the bore was difficult, as it had to fit the rifling tightly. Such rifles could not be loaded as rapidly as smoothbore muskets. This problem was solved first by the Minié ball, a cylindroconoidal-shaped projectile with a hollow base that expanded slightly from the impact of the propelling charge, thereby fitting tightly into the grooves of the rifling. Somewhat later, breech-loading speeded up the loading process and also permitted the development of metallic cartridges containing both projectile and charge. Most breech-loading rifles were bolt operated (Springfield, Enfield, Mauser, and Krag-Jörgenson), but World War II saw the introduction of the semiautomatic Garand (M1) rifle (*q.v.*). In the 1960s the assault rifle, a light, medium-range weapon with a switch allowing fully automatic fire, came into military prominence.

Bolt-action rifles similar to military weapons of 1890 to 1940 are still the most common type for hunting. Bolt action is efficient, reliable, and easy to manufacture, and most weapons of this type have magazines to hold cartridges for quick reloading after each shot. Lever-action and slide- or pump-action weapons are less common, but after World War II semiautomatic rifles for hunting became popular, especially the Calibre .22 rimfire.

A rifle is usually classified on the basis of the type of action it employs and on the size or calibre of ammunition it fires. Calibre is the diameter of the bore in inches or millimetres and the full title of a rifle gives other information, *e.g.,* Cal. .30—30 means a rifle with a bore diameter of .30 inch and a cartridge case designed to hold 30 grains of black powder. Power and performance also depend on the weight and shape of the bullet and its velocity. For instance, a Cal. .257 Weatherby—the name of the inventor of the rifle and the cartridge—is considerably more powerful than weapons with larger bore diameters like the Cal. .30—30, because the Weatherby bullet travels faster.

rifleman, any of certain bird-of-paradise (*q.v.*) species; also, a New Zealand wren of the family Xenicidae (*q.v.*).

Rift Valley (Africa): *see* East African Rift Valley.

rift valley, any elongated trough formed by the subsidence of a segment of the Earth's crust between dip-slip, or normal, faults. Such a fault is a fracture in the terrestrial surface in which the rock material on the upper side of the fault plane has been displaced downward relative to the rock below the fault. A rift valley constitutes a type of tectonic valley and, as such, differs from river and glacial valleys, which are produced by erosional forces.

A brief treatment of rift valleys follows. For full treatment, *see* MACROPAEDIA: Continental Landforms.

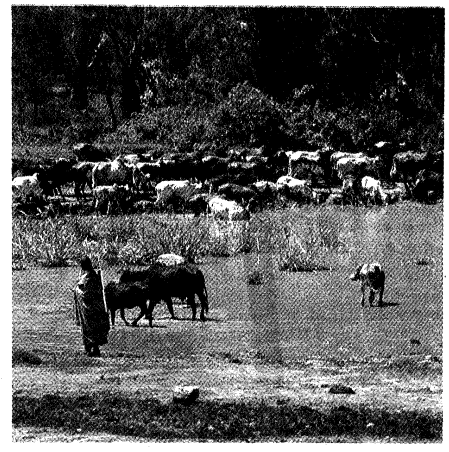
Rift valleys are usually narrow and long, some measuring hundreds of kilometres in length. Their floors are relatively flat, owing in large part to volcanic deposition and marine or lacustrine sedimentation. The sides of rift valleys drop steeply away in the form of steps and terraces. At their margins, the valleys may have a relief of thousands of feet. The central depression is commonly referred to as a graben, though the term is sometimes applied to smaller, down-faulted valleys that occur in the main trough or diverge from it.

Rift valleys are found both on the continents and on the floor of ocean basins. In terms of the prevailing theory of plate tectonics (*q.v.*), they occur in divergence zones, belts where two of the various lithospheric plates that make up the Earth's surface are separating. Numerous submarine rift valleys have been discovered along the crests of the large ridges that run the length of the Atlantic and Indian oceans. These ridges are thought to be areas where the oceanic crust is splitting apart and new crust is being formed by magma welling up from the mantle (the region of the terrestrial interior that lies beneath the lithosphere and above the core).

The distribution of rift valleys on the continents is irregular and relatively sparse, but they seem to occur at sites of incipient plate spreading. Many have volcanic cones on their floors or are occupied by deep lakes. The most extensive of the continental rift valleys are those of East Africa, which extend northward all the way to the Red Sea and eastward to the mid-oceanic ridge system. Other notable examples include the Baikal Rift Valley (U.S.S.R.), the Rhine Rift Valley (Germany), and the Great Valley of California (U.S.).

Rift Valley fever, generalized, febrile illness of short duration marked by headache, intolerance to light (photophobia), muscle pain, loss of appetite, and prostration and caused by a mosquito-borne virus found chiefly in East and South Africa. Human infection results not only from mosquito bite but also from contact with tissues and secretions of infected animals and from handling the virus in the laboratory. Recovery from the fever is ordinarily uncomplicated; rarely, there may be encephalitis or a fatal hemorrhagic state, or ocular involvement resulting in permanent visual impairment. There is no specific therapy. An attenuated strain of the causative virus has been used effectively to immunize sheep and cattle, and a vaccine for humans is under study.

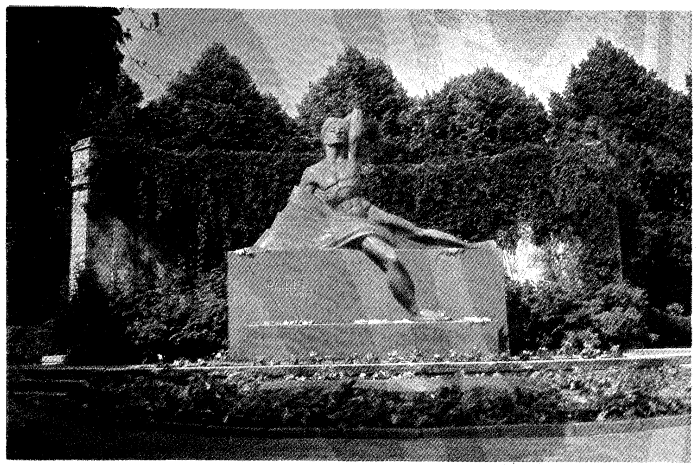
Rift Valley Province, province, western Kenya, East Africa, occupying an area of 66,251 sq mi (171,589 sq km), including 1,430 sq mi (3,706 sq km) of Lake Rudolf and several smaller lakes, and with a low population density (less than 35 per sq mi). The dominant physical feature is the Rift Valley, which cuts a canyon 40 to 60 mi wide (65 to 100 km) through the country. The valley floor is studded with inactive volcanoes, the craters of some being the basis for a north–south chain of lakes. In the south central part of the province, the Mau Escarpment interrupts the valley and provides a fertile highland area, which, although forested, supports a mixed agriculture of wheat, sisal, and corn (maize). North of the escarpment is the 25,000-sq-mi Turkana district, a grassland area inhabited primarily by pastoralists. South of the escarpment is an agricultural region, principally occupied by the seminomad pastoral Masai.



Watering Masai cattle at Narok in Rift Valley Province, Kenya
Ralph Gates—FPG/EB Inc.

The provincial capital, Nakuru (*q.v.*), and the other major towns of the province are near the escarpment. Pop. (1983 est.) 3,547,800.

Riga, Latvian RĪGA, city and capital of the Latvian Soviet Socialist Republic, on both banks of the Western Dvina River, 9 mi (15 km) above its mouth on the Gulf of Riga. An ancient settlement of the Livs where the Ridzene River joins the Western Dvina, Riga was founded in 1201 by Bishop Albert I of Livonia, who had landed at the mouth of the Western Dvina two years earlier with 23 ships of crusaders. He made Riga the seat of his bishopric (raised to an archbishopric in 1253) and founded there the Brothers of the Sword (1201; attached as a branch unit to the Teutonic Knights in 1237). Riga joined the Hanseatic League in 1282 and became one of the most important centres of trade on the Baltic. Its episcopal privileges allowed the town to act with considerable independence; but on the dissolution of the Teutonic Knights in 1561, the surrounding territory passed to Poland, and Riga itself passed to Poland in 1581. In 1621 Gustavus II Adolphus of Sweden captured Riga, but both Poles and Swedes granted Riga autonomy of government. In 1709–10 the Russians took Riga, and Sweden formally ceded the city by the Treaty of Nystadt in 1721. Under Russian rule, its trade grew considerably.



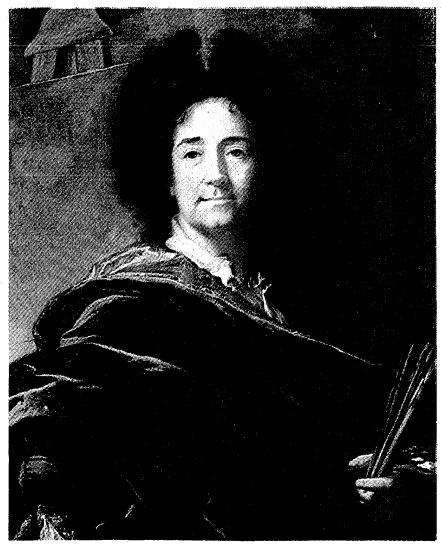
Monument commemorating the Latvian poet and dramatist Rainis (Jānis Pliekšāns) in Riga, Latvian S.S.R.
Vance Henry—Globe

By 1914 Riga was the third largest city of Russia, but in 1918 it became capital of independent Latvia until its occupation by the Russians and incorporation into the Soviet Union in 1940. Together with other parts of Latvia, Riga suffered in 1940–41 from the Soviet deportations and executions of thousands of Latvian citizens. From 1941 to 1944 the city underwent German occupation and sustained heavy damage, especially in the old central city, destroying the medieval Church of St. Peter and the 14th-century headquarters of the Brothers of the Sword. Soviet deportations resumed after the war and again in 1948–49. Russian immigration filled the vacuum left by forced removal of Latvians and a low Latvian birth rate. Only 45 percent of Riga's population was ethnically Latvian in 1959, and by 1970 it had fallen to 41 percent.

Many historical buildings survived, however, including the castle on the waterfront, the Doma Cathedral, dating from *c.* 1215, and several medieval merchants' houses and warehouses. The canal around the old town was the medieval moat, though the former fortifications have been replaced by boulevards. Modern Riga is a major administrative, cultural, and industrial centre and port, although ice in the Gulf of Riga disrupts port activity from December to April. The city's many engineering industries build ships and manufacture electrical and electronic equipment, machine tools, rolling stock, diesel engines, streetcars, and other items. The chemical, glass, and textile industries are important, and there are varied consumer-goods and food-processing industries. Riga's cultural institutions include an academy of sciences; a university (founded 1919), a Polytechnic Institute, and other institutions of higher education; a conservatory; the Latvian Open-Air Ethnographical Museum; and eight theatres. Along the Gulf of Riga is the resort suburb of Rīgas Jūrmala. Pop. (1983 est.) 867,000.

Riga, Gulf of, Latvian RĪGAS JŪRAS LĪCIS, Russian RIZHSKY ZALIV, large gulf of the Baltic Sea, bounded by the northern coast of Latvia and the western coast of Estonia, about 7,000 sq mi (18,000 sq km) in area. The gulf is separated from the Baltic Sea proper by Estonia's Muhu archipelago, but navigation is possible through several straits. The gulf, icebound from December until April, has a maximum depth of 177 ft (54 m). The coasts are mostly low and sandy, and several important rivers, including the Western Dvina, reach the sea there. There are several ports and resorts on the shores of the gulf, particularly Riga itself.

Rigaud, Hyacinthe, original name HYACINTHE FRANÇOIS HONORÉ MATHIAS PIERRE ANDRÉ JEAN RIGAU Y ROS (baptized July 18, 1659, Perpignan, Fr.—d. Dec. 29, 1743, Paris), one of the most prolific and successful French portrait painters of the Baroque period. He was trained at Montpellier before moving to Lyon and finally to Paris in 1681, where he devoted himself to portraiture. By 1688, when he received his first royal commission, he already had a considerable reputation among the wealthier bourgeoisie of Paris. From 1690 onward, his work, primarily for the court, consisted almost entirely of portraits. A private ambition was realized when he gained admission to the academy as a historical painter in January 1700.



Rigaud, self-portrait, oil painting; in the Uffizi, Florence
SCALA—Art Resource/EB Inc.

He excelled in the great formal portrait, as in his famous painting of Louis XIV in robes of state (1701; now in the Louvre).

rigaudon, also spelled RIGADOON, sprightly 17th-century French folk dance for couples. Its hopping steps were adopted by the skillful dancers of the French and English courts, where it remained fashionable through the 18th century. Conjecture assigns its origins to Provençal sailors and its name to a Marseille dance master, Rigaud, who reputedly introduced the dance to Parisian society in 1630. As a court dance, it was performed by dancers who ran, turned, and repeated in place a series of jumping steps.



Rigaudon, engraving by J.G. Puschner, 1716, from G. Lambranzi's *Theatralische Tanzschule*
By courtesy of the Victoria and Albert Museum, London

Its music, "rustic" in character, is written in $\frac{2}{2}$ or $\frac{4}{4}$ time. As a musical form the rigaudon occasionally appears in the suite; *e.g.,* in Rameau's *Suite in E Minor* for harpsichord.

Rigault de Genouilly, Charles (b. April 12, 1807, Rochefort, Fr.—d. May 4, 1873, Barcelona), admiral who initiated the French invasion of Vietnam in 1858 and the subsequent conquest of Cochinchina, now southern Vietnam.

Rigault de Genouilly entered the navy in 1827 and attained the rank of ensign three years later. In 1841 he was promoted to captain and was given command of the ship "Victorieuse" bound for the Far East, where he participated in an attack (1847) upon the port of Tourane (now Da Nang) on the pretext of protecting the French Catholic mission there. Shortly thereafter, he was rebuked by his government for an unauthorized intervention in Korea. He fought bravely in the siege of Sevastopol in the Crimean War, and by 1854 he had attained the rank of rear admiral.

Rigault de Genouilly took command of French naval forces in China and Cochinchina and in 1857 held Canton with the British, who had joined France in declaring war on China. The following year, as vice admiral, he once again attacked Tourane; he was told to secure it with the forces at his disposal and he was not to negotiate with the Vietnamese. On Sept. 1, 1858, he took the city and would have proceeded to the capital at Hue, but his ships

could not navigate the shallow river inland; instead, he turned south to conquer Saigon and achieved his objective with the help of Spanish troops, Feb. 17, 1859. With his men debilitated by the climate and disease, his supplies low, and no reinforcements forthcoming, he could neither consolidate his conquests nor bring the Vietnamese to surrender. The following October 20 he asked to be relieved of his post.

Back in France, Rigault de Genouilly became a senator (1860), was promoted to admiral (1864), and was named minister of the marine and of the colonies (1867). In the Franco-German War (1870–71), he rejected his appointment as commander in chief of an expedition to the Baltic Sea and went to Spain to live out his years.

Rigdon, Sidney (b. Feb. 19, 1793, Piny Fork, Pa., U.S.—d. July 14, 1876, Friendship, N.Y.), American churchman, an early convert to Mormonism (1830) and first counselor to its founder, Joseph Smith.

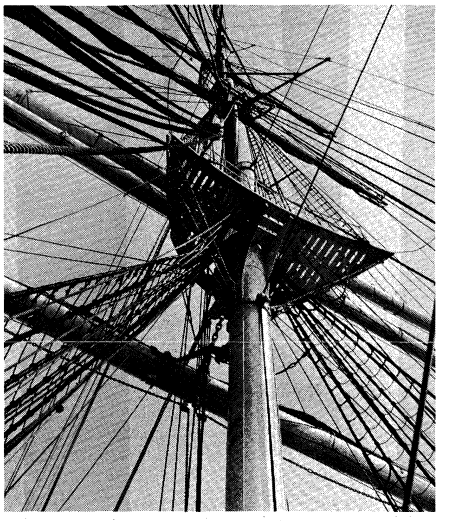
After the Mormons moved to Missouri (1838) and then to Nauvoo, Ill. (1839), Rigdon became estranged from Smith. When Smith was murdered (1844), however, Rigdon attempted to become head of the Mormon church. Defeated by Brigham Young, he was excommunicated. He then went to Pittsburgh and in 1845 was declared prophet and leader of a small group of Mormons who were formally organized as the Church of Jesus Christ (Bickertonites) by William Bickerton in 1862. Some historians believe that Rigdon, rather than Smith, wrote the *Book of Mormon,* but proof is lacking.

Rigel, also called BETA ORIONIS, one of the brightest stars in the sky, intrinsically as well as in appearance. A blue-white supergiant in the constellation Orion, Rigel is probably about 600 light-years from the Sun and is about 25,000 times as luminous. A companion star, also bluish white, is of the sixth magnitude. The name Rigel derives from an Arabic term meaning "the left leg of the giant," referring to the figure of Orion.

Rīgestān, also spelled REGISTAN (Persian: "country of sand"), arid plateau region in southwestern Afghanistan. Rīgestān is, for the greater part, a sandy desert with ridges and small, isolated hills of red sand. The sand ridges and dunes, reaching heights of between 50 and 100 feet (15 and 30 m), alternate with windblown sand-covered planes, devoid of vegetation and changing in some parts into barren gravel and clay. In the local language the Rīgestān is often called the *chol* ("desert"). Some gypsum is mined at Galeh Chad, and Baluchi and Pashtun nomads, herders of sheep, goats, and camels, use portions of the Rīgestān near the Helmand and Arghandab rivers as winter pasture.

rigging, the sails, masts, booms, yards, stays, and lines of a sailing vessel, or its cordage only.

The basis of all rigging is the mast, which may be composed of one or many pieces of wood or metal. The mast is supported by stays and shrouds that are known as the standing rigging because they are made fast; the shrouds also serve as ladders to permit the crew to climb aloft. The masts and forestays support all the sails. The ropes by which the yards, on square riggers, the booms of fore-and-aft sails, and sails, such as jibs, are manipulated for trimming to the wind and for making or shortening sail are known as the running rigging. The running rigging is subdivided into the lifts, jeers, and halyards (haulyards), by which the sails are raised and lowered, and the tacks and sheets, which hold down the lower corners of the sails. The history of the development of rigging over the centuries is obscure, but the combination of square and fore-and-aft sails in the full-rigged ship created



Standing and running rigging showing mainmast, yards, and junctions with shrouds and ratlines
F.B. Grunzweig—Photo Researchers/EB Inc.

a highly complex, interdependent set of components.

Steam and motor ships commonly carry rigging in the form of masts for supporting hoists, carrying radio antennae, providing lookout mounts, and displaying lights and visual signals.

right, petition of, legal petition asserting a right against the English crown, the most notable example being the Petition of Right of 1628, which Parliament sent to Charles I complaining of a series of breaches of law. The term also referred to the procedure (abolished in 1947) by which a subject could sue the crown.

At common law the crown, or the sovereign in his official capacity, could not be sued in the king's courts. Since the king was, historically, the supreme lord of those courts, administering justice in them between his subjects, he was not subject to their jurisdiction. Hence it became a practice, whenever a subject's real or personal property had come into the possession of the king or his servants without legal right, for the subject to petition the king in council for its restoration. The king then might or might not, at his discretion, refer the suppliant's petition to one of his courts, usually to the old Court of Exchequer, with a writ directing the judges to do what was just (*fiat justitia*). In the late 19th century the tasks of deciding whether there was cause for action and of issuing the *fiat justitia* were left, respectively, to the attorney general and the home secretary.

Although judgment was given in the ordinary manner, the execution of the judgment presented certain difficulties because the courts could not decree execution against the crown and its servants. By the end of the 19th century, judgments in favour of the suppliant were certified by the court to the treasury with the stipulation that they be satisfied out of public funds. In 1947 a new pattern for remedies against the crown was established, doing away with the petition of right.

right ascension, in astronomy, the east–west coordinate by which the position of a celestial body is ordinarily measured; more precisely, it is the angular distance of a body's hour circle east of the vernal equinox, measured along the celestial equator. It is often expressed in units of time rather than degrees of arc. Right ascension and declination define the position of a celestial object. The symbol for right ascension is α, the Greek letter *a* (alpha). *See also* hour angle.

right-to-work law, in the United States, any state law forbidding various union-security measures, particularly the union shop, under which workers are required to join a union within a specified time after they begin employment. The Taft–Hartley Act of 1947 outlawed not the union shop but the closed shop (which can hire union members only) everywhere in the United States. But section 14(b) of the act did encourage the passage of state right-to-work laws by allowing state laws against union-security measures to supersede the federal law.

The strongest support of right-to-work laws generally has come from small business; the 19 states with right-to-work laws in 1966 were concentrated in the South and West and did not include any major industrial state. Indiana was the only industrial state to pass a right-to-work law, but it repealed it in 1965.

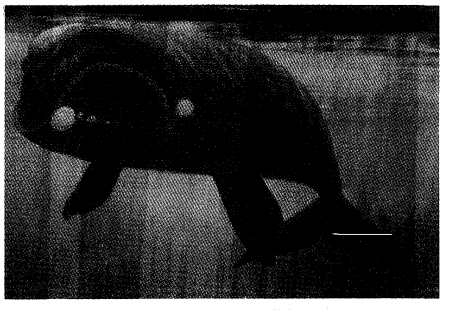
Right-to-work laws have periodically become important political issues; in 1966 the Lyndon B. Johnson administration attempted to eliminate such laws by seeking repeal of section 14(b); the effort was thwarted in the Senate with a filibuster led by Senator Everett Dirksen of Illinois.

Supporters of right-to-work laws maintain that they guarantee a person's right to work without being forced to join a union. In addition, they argue that such laws do not weaken the bargaining power of unions but merely permit a worker to bargain on an individual basis if he so chooses. Opponents contend that the name right-to-work law is misleading because such laws do not guarantee employment to anyone. On the contrary, they maintain that such laws tend to reduce workers' job security by weakening the bargaining power of unions.

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right whale, any of three species of baleen whales of the genera *Balaena* and *Caperea,* family Balaenidae. Right whales are stout-bodied animals with enormous heads. Their upper jaws are strongly arched, and their lower lips curve upward along the sides, giving the lower jaw a scooplike form. There is no dorsal fin except in the pygmy right whale (*Caperea marginata*), a small, seldom-seen whale of the Southern Hemisphere.

The name right whale originally referred to the Greenland, or bowhead, and black right whales (*Balaena mysticetus* and *B. glacialis*); both were once considered the "right" whales to hunt because of their value, slowness, and buoyancy after death.



Black right whale (*Balaena australis*)
Illustration by Larry Foster

The Greenland right whale, an inhabitant of Arctic and north temperate waters, is black with a white chin, throat, and, sometimes, underparts. It can grow to a length of about 18 m (60 feet), about one-third of which is head. The black right whale, found in the northern and southern latitudes, is estimated

to reach a maximum length of about 18 to 21 m. It is black, with or without white on the undersides, and is similar to the Greenland form but has a smaller, less strongly arched head. It may also have a "bonnet," a horny growth infested with parasites, on its snout. It is placed by some authorities in the genus *Eubalaena.* It is often considered as three species: *B. glacialis* of the North Atlantic, *B. sieboldii* of the North Pacific, and *B. australis* of the Southern Hemisphere.

The Greenland and black right whales were once of considerable value because of their oil and long, strong, elastic baleen. They were virtually exterminated by uncontrolled hunting and are now considered endangered species. They have been completely protected by international agreement since 1946.

Rights, Bill of, formally AN ACT DECLARING THE RIGHTS AND LIBERTIES OF THE SUBJECT AND SETTLING THE SUCCESSION OF THE CROWN (1689), one of the basic instruments of the British constitution, the result of the long 17th-century struggle between the Stuart kings and the English people and Parliament. It incorporated the provisions of the Declaration of Rights, acceptance of which had been the condition upon which the throne, held to have been vacated by James II, was offered to the Prince and Princess of Orange, afterward William III and Mary II. With the Toleration Act (1689), granting religious toleration to all Protestants, the Triennial Act (1694), ordering general elections to be held every three years, and the Act of Settlement (1701), providing for the Hanoverian succession, the Bill of Rights provided the foundation on which the government rested after the Revolution of 1688. It purported to introduce no new principles but merely to declare explicitly the existing law. The Revolution settlement, however, made monarchy clearly conditional on the will of Parliament and provided a freedom from arbitrary government of which most Englishmen were notably proud during the 18th century.

The main purpose of the act was unequivocally to declare illegal various practices of James II. Among such practices proscribed were the royal prerogative of dispensing with the law in certain cases, the complete suspension of laws without the consent of Parliament, and the levying of taxes and the maintenance of a standing army in peacetime without specific parliamentary authorization. A number of clauses sought to eliminate royal interference in parliamentary matters, stressing that elections must be free and that members must have complete freedom of speech. Certain forms of interference in the course of justice were also proscribed. The act also dealt with the proximate succession to the throne, settling it on Mary's heirs, then on those of her sister, afterward Queen Anne, and then on those of William, provided they were Protestants.

Rights, Bill of, in the United States, the first 10 amendments to the U.S. Constitution, which were adopted as a single unit on Dec. 15, 1791, and which constitute a collection of mutually reinforcing guarantees of individual rights and of limitations on federal and state governments.

The Bill of Rights derives from the Magna Carta, the English Bill of Rights, the colonial struggle against king and Parliament, and a gradually broadening concept of equality among the American people. Virginia's 1776 Declaration of Rights, drafted chiefly by George Mason, was a notable forerunner. Besides being axioms of government, the guarantees in the Bill of Rights have binding legal force. Acts of Congress in conflict with them may be voided by the U.S. Supreme Court when the question of the constitutionality of such acts arises in litigation.

The Constitution in its main body forbids suspension of the writ of habeas corpus except in cases of rebellion or invasion (Article I, section 9); prohibits state or federal bills of attainder and ex post facto laws (I, 9, 10); requires that all crimes against the United States be tried by jury in the state where committed (III, 2); limits the definition, trial, and punishment of treason (III, 3); prohibits titles of nobility (I, 9) and religious tests for officeholding (VI); guarantees a republican form of government in every state (IV, 4); and assures each citizen the privileges and immunities of the citizens of the several states (IV, 2).

Popular dissatisfaction with the limited guarantees of the main body of the Constitution expressed in the state conventions called to ratify it, led to demands and promises that the first Congress of the United States satisfied by submitting to the states 12 amendments drafted by James Madison. Ten were ratified. Individual states being subject to their own bills of rights, these amendments were limited originally to restraining the federal government. The Senate refused to submit Madison's amendment (approved by the House of Representatives) protecting religious liberty, freedom of the press, and trial by jury against violation by the states.

Under the First Amendment, Congress can make no law respecting an establishment of religion or prohibiting its free exercise, or abridging freedom of speech or press or the right to assemble and petition for redress of grievances. Hostility to standing armies found expression in a guarantee of the people's right to bear arms and in limitation of the quartering of soldiers in private houses.

The Fourth Amendment secures the people against unreasonable searches and seizures and forbids the issuance of warrants except upon probable cause and directed to specific persons and places. The Fifth Amendment requires grand jury indictment in prosecutions for major crimes and prohibits double jeopardy for a single offense. It provides that no person shall be compelled to testify against himself, forbids the taking of life, liberty, or property without due process of law or the taking of private property for public use without just compensation. By the Sixth Amendment, an accused person is to have a speedy public trial by jury, to be informed of the nature of the accusation, to be confronted with prosecution witnesses, and to have the assistance of counsel. Excessive bail or fines and cruel or unusual punishment are forbidden by the Eighth Amendment. The Ninth Amendment protects unenumerated residual rights of the people, and by the Tenth, powers not delegated to the United States are reserved to the states or the people.

After the Civil War, slavery was abolished, and the Fourteenth Amendment (1868) declared that all persons born or naturalized in the United States and subject to its jurisdiction are citizens thereof. It forbids the states to abridge the privileges or immunities of citizens of the United States, or to deprive any person of life, liberty, or property without due process of law. The due process clause is construed as guaranteeing that many of the same rights that are protected from federal violation be also protected from violation by the states. The clause makes effective the major portion of Madison's unaccepted 1789 proposal.

For the text of the Bill of Rights, *see* Constitution of the United States of America.

rights of ———: *see under* substantive word (*e.g.*, accused, rights of the; privacy, rights of), except as below.

Rights of Man and of the Citizen, Declaration of the, French DECLARATION DES DROITS DE L'HOMME ET DU CITOYEN, one of the basic charters of human liberties, containing the principles that inspired the French Revolution. Its 17 articles, adopted between Aug. 20 and Aug. 26, 1789, by France's National Assembly, served as the preamble to the Constitution of 1791. It also served as the preamble to the Constitution of 1793 (retitled simply Declaration of the Rights of Man) and to the Constitution of 1795 (retitled Declaration of the Rights and Duties of Man and the Citizen).

The basic principle of the Declaration was that "all men are born free and equal in rights" (Article 1), which were specified as the rights of liberty, private property, the inviolability of the person, and resistance to oppression (Article 2). All citizens were equal before the law and were to have the right to participate in legislation directly or indirectly (Article 6); no one was to be arrested without a judicial order (Article 7). Freedom of religion (Article 10) and freedom of speech (Article 11) were safeguarded within the bounds of "public order" and "law." The document reflected the interests of the bourgeois who wrote it: property was given the status of an inviolable right, which could be taken by the state only if an indemnity were given (Article 17); offices and position were opened to the middle class (Article 6).

The Declaration was derived from the constitutions of certain North American states, such as Virginia and New Hampshire. Its notion of the separation of powers came from Montesquieu, its doctrine of natural rights from the *Encyclopédie* and John Locke, its theory of the general will and of the Sovereignty of the nation from Jean-Jacques Rousseau. From Voltaire came the idea that the individual must be safeguarded against arbitrary police or judicial action and from the Physiocrats the doctrine of the inviolability of private property. The whole Declaration is characteristic of 18th-century French thought, which strove, before making practical rules, to isolate and specify principles that are fundamental to man and therefore universally applicable.

On the other hand, the Declaration is also explicable as an attack on the pre-Revolutionary monarchical regime. Equality before the law was to replace the system of privileges that characterized the old regime. Judicial procedures were insisted upon to prevent abuses by the king or his administration, such as the *lettre de cachet,* a private communication from the king, often used to give summary notice of imprisonment.

Despite the limited aims of the framers of the Declaration, its principles (especially Article 1) could be extended logically to mean political and even social democracy. The Declaration of the Rights of Man and of the Citizen came to be, as was recognized by the 19th-century historian Jules Michelet, "the credo of the new age." For the text of the Declaration, *see* page 71.

Rigna, SAINT, also spelled RIGNAN: *see* Ninian, Saint.

Rigord (b. *c.* 1150, Languedoc, Toulouse—d. *c.* Nov. 27, 1207, Saint-Denis, near Paris), chronicler, who is best known for a biography of King Philip II Augustus of France.

Initially a physician, Rigord left the medical profession in 1189 and joined the monastic order at the abbey of Saint-Denis, in the north of France. Impressed with King Philip's territorial conquests, Rigord probably conceived the idea of writing the King's biography *c.* 1186–90. The first section of the *Gesta Philippi Augusti* (1196; "The Deeds of Philip Augustus") began with Philip's coronation in 1179 and showed enthusiastic partiality toward him. An addition to the work, continuing to 1207, marked a shift in Rigord's attitude to one of rather severe censure, probably a result of Philip's adulterous marriage to Agnès de Méran in 1196.

Rigord was the first to endow Philip with the

Bill of Rights [1689]

An Act Declaring the Rights and Liberties of the Subject and Settling the Succession of the Crown

Whereas the Lords Spiritual and Temporal and Commons assembled at Westminster, lawfully, fully and freely representing all the estates of the people of this realm, did upon the thirteenth day of February in the year of our Lord one thousand six hundred eighty-eight* present unto their Majesties, then called and known by the names and style of William and Mary, prince and princess of Orange, being present in their proper persons, a certain declaration in writing made by the said Lords and Commons in the words following, viz.:

Whereas the late King James the Second, by the assistance of divers evil counsellors, judges and ministers employed by him, did endeavour to subvert and extirpate the Protestant religion and the laws and liberties of this kingdom;

By assuming and exercising a power of dispensing with and suspending of laws and the execution of laws without consent of Parliament;

By committing and prosecuting divers worthy prelates for humbly petitioning to be excused from concurring to the said assumed power;

By issuing and causing to be executed a commission under the great seal for erecting a court called the Court of Commissioners for Ecclesiastical Causes;

By levying money for and to the use of the Crown by pretence of prerogative for other time and in other manner than the same was granted by Parliament;

By raising and keeping a standing army within this kingdom in time of peace without consent of Parliament, and quartering soldiers contrary to law;

By causing several good subjects being Protestants to be disarmed at the same time when papists were both armed and employed contrary to law;

By violating the freedom of election of members to serve in Parliament;

By prosecutions in the Court of King's Bench for matters and causes cognizable only in Parliament, and by divers other arbitrary and illegal courses;

And whereas of late years partial corrupt and unqualified persons have been returned and served on juries in trials, and particularly divers jurors in trials for high treason which were not freeholders;

And excessive bail hath been required of persons committed in criminal cases to elude the benefit of the laws made for the liberty of the subjects;

And excessive fines have been imposed;

And illegal and cruel punishments inflicted;

And several grants and promises made of fines and forfeitures before any conviction or judgment against the persons upon whom the same were to be levied;

All which are utterly and directly contrary to the known laws and statutes and freedom of this realm;

And whereas the said late King James the Second having abdicated the government and the throne being thereby vacant, his Highness the prince of Orange (whom it hath pleased Almighty God to make the glorious instrument of delivering this kingdom from popery and arbitrary power) did (by the advice of the Lords Spiritual and Temporal and divers principal persons of the Commons) cause letters to be written to the Lords Spiritual and Temporal being Protestants, and other letters to the several counties, cities, universities, boroughs and cinque ports, for the choosing of such persons to represent them as were of right to be sent to Parliament, to meet and sit at Westminster upon the two and twentieth day of January in this year one thousand six hundred eighty and eight,* in order to such an establishment as that their religion, laws and liberties might not again be in danger of being subverted, upon which letters elections having been accordingly made;

And thereupon the said Lords Spiritual and Temporal and Commons, pursuant to their respective letters and elections, being now assembled in a full and free representative of this nation, taking into their most serious consideration the best means for attaining the ends aforesaid, do in the first place (as their ancestors in like case have usually done) for the vindicating and asserting their ancient rights and liberties declare

That the pretended power of suspending of laws or the execution of laws by regal authority without consent of Parliament is illegal;

That the pretended power of dispensing with laws or the execution of laws by regal authority, as it hath been assumed and exercised of late, is illegal;

That the commission for erecting the late Court of Commissioners for Ecclesiastical Causes, and all other commissions and courts of like nature, are illegal and pernicious;

That levying money for or to the use of the Crown by pretence of prerogative, without grant of Parliament, for longer time, or in other manner than the same is or shall be granted, is illegal;

That it is the right of the subjects to petition the king, and all commitments and prosecutions for such petitioning are illegal;

That the raising or keeping a standing army within the kingdom in time of peace, unless it be with consent of Parliament, is against law;

That the subjects which are Protestants may have arms for their defence suitable to their conditions and as allowed by law;

That election of members of Parliament ought to be free;

That the freedom of speech and debates or proceedings in Parliament ought not to be impeached or questioned in any court or place out of Parliament;

That excessive bail ought not to be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted;

That jurors ought to be duly impanelled and returned, and jurors which pass upon men in trials for high treason ought to be freeholders;

That all grants and promises of fines and forfeitures of particular persons before conviction are illegal and void;

And that for redress of all grievances, and for the amending, strengthening and preserving of the laws, Parliaments ought to be held frequently.

And they do claim, demand and insist upon all and singular the premises as their undoubted rights and liberties, and that no declarations, judgments, doings or proceedings to the prejudice of the people in any of the said premises ought in any wise to be drawn hereafter into consequence or example; to which demand of their rights they are particularly encouraged by the declaration of his Highness the prince of Orange as being the only means for obtaining a full redress and remedy therein. Having therefore an entire confidence that his said Highness the prince of Orange will perfect the deliverance so far advanced by him, and will still preserve them from the violation of their rights which they have here asserted, and from all other attempts upon their religion, rights and liberties, the said Lords Spiritual and Temporal and Commons assembled at Westminster do resolve that William and Mary, prince and princess of Orange, be and be declared king and queen of England, France and Ireland and the dominions thereunto belonging, to hold the crown and royal dignity of the said kingdoms and dominions to them, the said prince and princess, during their lives and the life of the survivor of them, and that the sole and full exercise of the regal power be only in and executed by the said prince of Orange in the names of the said prince and princess during their joint lives, and after their deceases the said crown and royal dignity of the said kingdoms and dominions to be to the heirs of the body of the said princess, and for default of such issue to the Princess Anne of Denmark and the heirs of her body, and for default of such issue to the heirs of the body of the said prince of Orange. And the Lords Spiritual and Temporal and Commons do pray the said prince and princess to accept the same accordingly.

And that the oaths hereafter mentioned be taken by all persons of whom the oaths of allegiance and supremacy might be required by law, instead of them; and that the said oaths of allegiance and supremacy be abrogated.

I, A.B., do sincerely promise and swear that I will be faithful

and bear true allegiance to their Majesties King William and Queen Mary. So help me God.

I, A.B., do swear that I do from my heart abhor, detest and abjure as impious and heretical this damnable doctrine and position, that princes excommunicated or deprived by the Pope or any authority of the see of Rome may be deposed or murdered by their subjects or any other whatsoever. And I do declare that no foreign prince, person, prelate, state or potentate hath or ought to have any jurisdiction, power, superiority, pre-eminence or authority, ecclesiastical or spiritual, within this realm. So help me God.

Upon which their said Majesties did accept the crown and royal dignity of the kingdoms of England, France and Ireland, and the dominions thereunto belonging, according to the resolution and desire of the said Lords and Commons contained in the said declaration. And thereupon their Majesties were pleased that the said Lords Spiritual and Temporal and Commons, being the two Houses of Parliament, should continue to sit, and with their Majesties' royal concurrence make effectual provision for the settlement of the religion, laws and liberties of this kingdom, so that the same for the future might not be in danger again of being subverted, to which the said Lords Spiritual and Temporal and Commons did agree, and proceed to act accordingly. Now in pursuance of the premises the said Lords Spiritual and Temporal and Commons in Parliament assembled, for the ratifying, confirming and establishing the said declaration and the articles, clauses, matters and things therein contained by the force of a law made in due form by authority of Parliament, do pray that it may be declared and enacted that all and singular the rights and liberties asserted and claimed in the said declaration are the true, ancient and indubitable rights and liberties of the people of this kingdom, and so shall be esteemed, allowed, adjudged, deemed and taken to be; and that all and every the particulars aforesaid shall be firmly and strictly holden and observed as they are expressed in the said declaration, and all officers and ministers whatsoever shall serve their Majesties and their successors according to the same in all times to come. And the said Lords Spiritual and Temporal and Commons, seriously considering how it hath pleased Almighty God in his marvelous providence and merciful goodness to this nation to provide and preserve their said Majesties' royal persons most happily to reign over us upon the throne of their ancestors, for which they render unto him from the bottom of their hearts their humblest thanks and praises, do truly, firmly, assuredly and in the sincerity of their hearts think, and do hereby recognize, acknowledge and declare, that King James the Second having abdicated the government, and their Majesties having accepted the crown and royal dignity as aforesaid, their said Majesties did become, were, are and of right ought to be by the laws of this realm our sovereign liege lord and lady, king and queen of England, France and Ireland and the dominions thereunto belonging, in and to whose princely persons the royal state, crown and dignity of the said realms with all honours, styles, titles, regalities, prerogatives, powers, jurisdictions and authorities to the same belonging and appertaining are most fully, rightfully and entirely invested and incorporated, united and annexed. And for preventing all questions and divisions in this realm by reason of any pretended titles to the crown, and for preserving a certainty in the succession thereof, in and upon which the unity, peace, tranquillity and safety of this nation doth under God wholly consist and depend, the said Lords Spiritual and Temporal and Commons do beseech their Majesties that it may be enacted, established and declared, that the crown and regal government of the said kingdoms and dominions, with all and singular the premises thereunto belonging and appertaining, shall be and continue to their said Majesties and the survivor of them during their lives and the life of the survivor of them, and that the entire, perfect and full exercise of the regal power and government be only in and executed by his Majesty in the names of both their Majesties during their joint lives; and after their deceases the said crown and premises shall be and remain to the heirs of the body of her Majesty, and for default of such issue to her Royal Highness the Princess Anne of Denmark and the heirs of her body, and for default of such issue to the heirs of the body of his said Majesty; and thereunto the said Lords Spiritual and Temporal and Commons do in the name of all the people aforesaid most humbly and faithfully submit themselves, their heirs and posterities for ever, and do faithfully promise that they will stand to, maintain and defend their said Majesties, and also the limitation and succession of the crown herein specified and contained, to the utmost of their powers with their lives and estates against all persons whatsoever that shall attempt anything to the contrary. And whereas it hath been found by experience that it is inconsistent with the safety and welfare of this Protestant kingdom to be governed by a popish prince, or by any king or queen marrying a papist, the said Lords Spiritual and Temporal and Commons do further pray that it may be enacted, that all and every person and persons that is, are or shall be reconciled to or shall hold communion with the see or Church of Rome, or shall profess the popish religion, or shall marry a papist, shall be excluded and be for ever incapable to inherit, possess or enjoy the crown and government of this realm and Ireland and the dominions thereunto belonging or any part of the same, or to have, use or exercise any regal power, authority or jurisdiction within the same; and in all and every such case or cases the people of these realms shall be and are hereby absolved of their allegiance; and the said crown and government shall from time to time descend to and be enjoyed by such person or persons being Protestants as should have inherited and enjoyed the same in case the said person or persons so reconciled, holding communion or professing or marrying as aforesaid were naturally dead; and that every king and queen of this realm who at any time hereafter shall come to and succeed in the imperial crown of this kingdom shall on the first day of the meeting of the first Parliament next after his or her coming to the crown, sitting in his or her throne in the House of Peers in the presence of the Lords and Commons therein assembled, or at his or her coronation before such person or persons who shall administer the coronation oath to him or her at the time of his or her taking the said oath (which shall first happen), make, subscribe and audibly repeat the declaration mentioned in the statute made in the thirtieth year of the reign of King Charles the Second entituled, *An Act for the more effectual preserving the king's person and government by disabling papists from sitting in either House of Parliament.* But if it shall happen that such king or queen upon his or her succession to the crown of this realm shall be under the age of twelve years, then every such king or queen shall make, subscribe and audibly repeat the said declaration at his or her coronation or the first day of the meeting of the first Parliament as aforesaid which shall first happen after such king or queen shall have attained the said age of twelve years. All which their Majesties are contented and pleased shall be declared, enacted and established by authority of this present Parliament, and shall stand, remain and be the law of this realm for ever; and the same are by their said Majesties, by and with the advice and consent of the Lords Spiritual and Temporal and Commons in Parliament assembled and by the authority of the same, declared, enacted and established accordingly.

II. And be it further declared and enacted by the authority aforesaid, that from and after this present session of Parliament no dispensation be *non obstante* of or to any statute or any part thereof shall be allowed, but that the same shall be held void and of no effect, except a dispensation be allowed of in such statute, and except in such cases as shall be specially provided for by one or more bill or bills to be passed during this present session of Parliament.

III. Provided that no charter or grant or pardon granted before the three and twentieth day of October in the year of our Lord one thousand six hundred eighty-nine shall be any ways impeached or invalidated by this Act, but that the same shall be and remain of the same force and effect in law and no other than as if this Act had never been made.

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*Old style date.

title "Augustus." Rigord's *Gesta* was detailed and exact, though his style was mediocre. The chronicle was continued to 1215 by Guillaume le Breton, Philip's chaplain, and was first published in 1596. Rigord's only other work was a short chronicle of the French kings, written some time after the *Gesta Philippi.*

Rigveda, also spelled ṚGVEDA, collection of hymns that forms part of the ancient sacred literature of India known as the Vedas. *See* Veda.

Riihimäki, city, Hämeen *lääni* (Häme province), southern Finland, southeast of Hämeenlinna and north of Helsinki. The city serves as a rail junction connecting Lahti, Tampere, and Hämeenlinna in the north to the ports of Helsinki and Porvoo (Borgå) to the south. Local industry includes a glassworks, the largest in Finland, and textile mills. The city has a glass museum and a museum of railroad signalling. Pop. (1982 est.) mun., 24,005.

Riis, Jacob A(ugust) (b. May 3, 1849, Ribe, Den.—d. May 26, 1914, Barre, Mass., U.S.), U.S. newspaper reporter, social reformer, and photographer who shocked the U.S. conscience in 1890 by factual description of slum conditions in his book *How the Other Half Lives.*



Riis

By courtesy of the Library of Congress, Washington, D.C.

Emigrating to the United States at the age of 21, Riis held various jobs, gaining a firsthand acquaintance with the ragged underside of city life. In 1873 he became a police reporter, assigned to New York City's Lower East Side, where he found that in some tenements the infant death rate was one in 10. Riis employed the newly invented flashbulb technique in photographing the rooms and hallways of these buildings in order to dramatize his lectures and books.

How the Other Half Lives made Riis famous. The response of the future U.S. president Theodore Roosevelt was: "I have read your book, and I have come to help." The book stimulated the first significant New York legislation to curb tenement house evils. The illustrations were largely line drawings based on Riis's photographs. A reprint in 1971 included 30 photographs on which the original illustrations were based and 70 related Riis photographs.

Of Riis's many other books, the most noteworthy was his autobiography, *The Making of an American* (1901).

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Rijeka, Italian FIUME, city, major port and industrial, commercial, and cultural centre of

Declaration of the Rights of Man and of the Citizen [1789]

Adopted by the National Assembly during the French Revolution on August 26, 1789, and reaffirmed by the constitution of 1958.

Preamble

The representatives of the French people, formed into a National Assembly, considering ignorance, forgetfulness or contempt of the rights of man to be the only causes of public misfortunes and the corruption of Governments, have resolved to set forth, in a solemn Declaration, the natural, unalienable and sacred rights of man, to the end that this Declaration, constantly present to all members of the body politic, may remind them unceasingly of their rights and their duties; to the end that the acts of the legislative power and those of the executive power, since they may be continually compared with the aim of every political institution, may thereby be the more respected; to the end that the demands of the citizens, founded henceforth on simple and uncontestable principles, may always be directed toward the maintenance of the Constitution and the happiness of all.

In consequence whereof, the National Assembly recognizes and declares, in the presence and under the auspices of the Supreme Being, the following Rights of Man and of the Citizen.

Article first—Men are born and remain free and equal in rights. Social distinctions may be based only on considerations of the common good.

Article 2—The aim of every political association is the preservation of the natural and imprescriptible rights of man. These rights are Liberty, Property, Safety and Resistance to Oppression.

Article 3—The source of all sovereignty lies essentially in the Nation. No corporate body, no individual may exercise any authority that does not expressly emanate from it.

Article 4—Liberty consists in being able to do anything that does not harm others: thus, the exercise of the natural rights of every man has no bounds other than those that ensure to the other members of society the enjoyment of these same rights. These bounds may be determined only by Law.

Article 5—The Law has the right to forbid only those actions that are injurious to society. Nothing that is not forbidden by Law may be hindered, and no one may be compelled to do what the Law does not ordain.

Article 6—The Law is the expression of the general will. All citizens have the right to take part, personally or through their representatives, in its making. It must be the same for all, whether it protects or punishes. All citizens, being equal in its eyes, shall be equally eligible to all high offices, public positions and employments, according to their ability, and without other distinction than that of their virtues and talents.

Article 7—No man may be accused, arrested or detained except in the cases determined by the Law, and following the procedure that it has prescribed. Those who solicit, expedite, carry out, or cause to be carried out arbitrary orders must be punished; but any citizen summoned or apprehended by virtue of the Law, must give instant obedience; resistance makes him guilty.

Article 8—The Law must prescribe only the punishments that are strictly and evidently necessary; and no one may be punished except by virtue of a Law drawn up and promulgated before the offense is committed, and legally applied.

Article 9—As every man is presumed innocent until he has been declared guilty, if it should be considered necessary to arrest him, any undue harshness that is not required to secure his person must be severely curbed by Law.

Article 10—No one may be disturbed on account of his opinions, even religious ones, as long as the manifestation of such opinions does not interfere with the established Law and Order.

Article 11—The free communication of ideas and of opinions is one of the most precious rights of man. Any citizen may therefore speak, write and publish freely, except what is tantamount to the abuse of this liberty in the cases determined by Law.

Article 12—To guarantee the Rights of Man and of the Citizen a public force is necessary; this force is therefore established for the benefit of all, and not for the particular use of those to whom it is entrusted.

Article 13—For the maintenance of the public force, and for administrative expenses, a general tax is indispensable; it must be equally distributed among all citizens, in proportion to their ability to pay.

Article 14—All citizens have the right to ascertain, by themselves, or through their representatives, the need for a public tax, to consent to it freely, to watch over its use, and to determine its proportion, basis, collection and duration.

Article 15—Society has the right to ask a public official for an accounting of his administration.

Article 16—Any society in which no provision is made for guaranteeing rights or for the separation of powers, has no Constitution.

Article 17—Since the right to Property is inviolable and sacred, no one may be deprived thereof, unless public necessity, legally ascertained, obviously requires it, and just and prior indemnity has been paid.

Croatia, Yugoslavia, located on the Kvarner (a gulf of the Adriatic Sea). It is the major port of all Yugoslavia. The city is situated on a narrow flatland between the Julian Alps and the Adriatic, spreading up the slopes and onto the landfills on the seafront. The name, dating from the 13th century, refers to the river called Rječina in Serbo-Croatian and Fiumara, or Eneo, in Italian. The port is the primary base for the Yugoslav Navy and a point of departure for coastal shipping. The coastal section of the Adriatic Highway begins at Rijeka, which also has rail connections to Trieste, Ljubljana, and Zagreb. Shipyards and repair facilities, major oil refineries, a paper factory, and a diesel-engine works (in which in 1866 the English owner Robert Whitehead invented the torpedo) are major industries.

A Roman settlement, Tarsatica, dating from the 3rd century, is thought to have been destroyed by Charlemagne about 800. Avars and Slavs had begun to settle there in the 6th–7th centuries, and a recognizable settlement (Starigrad, meaning Old City) had developed on the right bank of the Rječina by the 10th century. In 1471 it was incorporated into Austria, and it was made a free port in 1717, united to Croatia in 1776, and declared an autonomous



Monument to Independence overlooking the harbour at Rijeka, Yugos.
Salmer—Plessner International

city of the Hungarian crown in 1779. The French occupied it in the years 1809–14, after which the English expelled the French. Until after World War I, it was alternately under Austrian, Hungarian, and Croatian rule, during which period the buildup of the port and rail connections took place.

After 1918, Fiume-Rijeka became a major issue of the peace settlements. At first yielded to the new Yugoslav state, it was returned to Italy in 1924 after Benito Mussolini assumed power, and the agreement for a free state was reneged upon. Yugoslavia retained the suburb of Sušak and certain port privileges, but the port declined under Italian management.

In 1943, during World War II, the Germans took over Rijeka, which suffered extensive damage from Allied air raids. In May 1945, the Yugoslavs liberated the city after heavy fighting, but not before the Germans had blown up port installations. Its postwar development has been so extensive that expanded port facilities at Ploče and Bar are designed to provide relief for Rijeka.

Rijeka has many Baroque buildings, a 13th-century castle with later additions, several early churches (14th century), and a university (1973). The city is the terminus of an oil pipeline running from Yugoslav oil fields in the northeastern part of the country. Pop. (1981 prelim.) mun., 193,044.

Rijkel, Denys van: *see* Dionysius the Carthusian.

Rijksmuseum (Dutch: "State Museum"), national art collection of The Netherlands in Amsterdam. The galleries originated with a royal museum erected in 1808 by Napoleon's brother Louis Bonaparte, then king of Holland; and the first collection consisted of paintings that had not been sent to France from the Nationale Kunst-Galerij, an art museum established in 1800. After the Bonapartes were ousted, the collection was installed in the Trippenhuis and was opened to the public in 1815 as the Rijksmuseumte Amsterdam. A new building was designed by P.J.H. Cuypers in the Gothic Revival style and was opened in 1885.

Though particularly strong in 17th-century Dutch art, the Rijksmuseum also has major collections of other schools of western European painting and sculpture, Oriental art, and the decorative arts. Associated with the museum is the Rijksprentenkabinet, which has one of Europe's finest collections of prints and drawings, as well as of illuminated manuscripts.

Rijksmuseum Kröller-Müller: *see* Kröller-Müller State Museum.

Rijksmuseum voor de Geschiedenis van der Natuurwetenschappen en van de Geneeskunde (Leiden, Neth., museum): *see* Boerhaave Museum.

rijsttafel (Dutch: "rice table"), an elaborate meal of Indonesian dishes developed during the Dutch colonial era. Because of its political overtones, the rijsttafel is seldom served today in Indonesia but is popular in The Netherlands and at both Dutch and Indonesian restaurants abroad.

In essence the rijsttafel consists of rice and foods to accompany it: curried meats, fish, chicken, vegetables, fruits, relishes, pickles, sauces, condiments, nuts, eggs, and so on. The diner is served a plate of rice and chooses from among the side dishes to achieve a balance of salty, spicy, sweet, and sour accompaniments. A rijsttafel of 40 dishes was not uncommon, the meal sometimes taking three to four hours to consume.

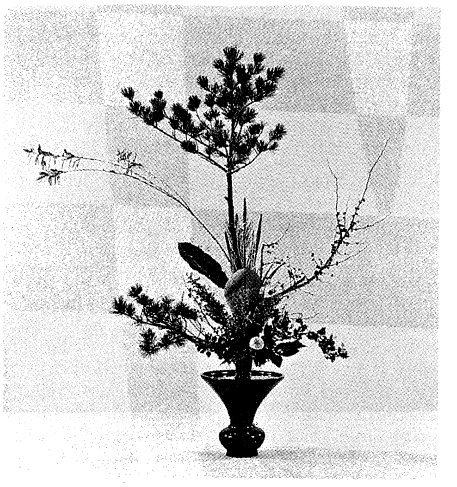
Rijswijk, English RYSWICK, *gemeente* (municipality), Zuidholland *provincie* (province), western Netherlands, on the southeastern outskirts of The Hague ('s-Gravenhage). It is traversed by the Rotterdam highway and the Vliet River. The Reformed Church dates from the 14th century, and there are some 17th-century houses. Although primarily residential, the town has oil wells, laboratories, and an important fruit-auction market. IJpenburg airfield is nearby.

The town is famous in history for the Treaties of Rijswijk (Sept. 20–21 and Oct. 30, 1697), which ended the War of the Grand Alliance between the France of Louis XIV on one side and England, the United Provinces of the Netherlands, Spain, and the Holy Roman Emperor (Leopold I) on the other. The treaties largely restored conditions that had existed before the war. The event is commemorated by a 69-ft (21-m) obelisk, erected in 1792 on the site of the former Nieuwburg Castle, where the signing took place. Pop. (1984 est.) 49,790.

Rikaze (Tibet): *see* Jih-k'a-tse.

Rikham (Hebrew grammarian): *see* Kimhi, Joseph.

rikka (Japanese: "standing flowers"), in classical Japanese floral art, a highly conventionalized and formal style of flower arranging. It is difficult to say when *rikka* became a distinct, recognized form, because it evolved over several centuries. The first rules for *rikka* arrangements may be traced back as far as the early 7th century, to the formulations of the Buddhist priest Ono no Imoko. However, *rikka* is often dated from the late 15th century, by which time it had clearly become a separate discipline through the influence of Senkei, a Buddhist priest and master of the Ikenobō school.



Rikka arrangement of the Ikenobō school
By courtesy of the International Society for Educational Information, Tokyo

Rikka arrangements were originally seven-branched structures symbolizing the mythical Mt. Meru of Buddhist cosmology; the branches represented its peak (*ryō*), waterfall (rō), hill (*gaku*), valley behind the mountain (*bi*), and the town (*shi*), and the whole structure was divided into *in* ("shade") and *yō* ("sun"). *Rikka* later became a nine-branched, then eleven-branched, style with a basic three-element structure characteristic of all Japanese floral arrangements. The three main branches, *shin* ("truth"), *soe* ("supporting"), and *nagashi* ("flowing"), were placed so that their tips formed a scalene triangle.

The huge arrangements (5 to 15 feet [1.5 to 4.5 metres] high) were constructed of evergreens, foliage, flowers, and bare branches representing the natural landscape; *e.g.*, white holly blossoms symbolized snow-capped mountains, and cascades of white chrysanthemums stood for waterfalls.

The art of *rikka* was later modified into a less formal, more sweeping style popular in the homes of Japanese nobles. It was eventually supplanted by the *shōka* style that retained a classical feeling but employed an asymmetrical structure.

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Rikken Seiyūkai, English FRIENDS OF CONSTITUTIONAL GOVERNMENT, the dominant Japanese political party from its inception in 1900 until 1940, when all parties were absorbed into the government-controlled Taisei Yokusankai (Imperial Rule Assistance Association).

The Rikken Seiyūkai was founded by one of the leading government bureaucrats, Itō Hirobumi, in an attempt to secure his own power base. In some respects, the Rikken Seiyūkai was a liberal force and stood for increased parliamentary participation in the Japanese government. The party was supported by the landlord class and *zaibatsu* business interests. In general the Rikken Seiyūkai stood for a more conservative political program than its chief rival, the Minseitō (*q.v.*; Democratic Party). Both parties steadily lost influence to the military during the 1930s. After 1945, many former members of the Rikken Seiyūkai helped to organize the Liberal Party.

Riksdag (Swedish: "Day of the Realm"), the Swedish states general from 1435 to 1865,

unique in Europe because it included the peasantry as the fourth state.

The Riksdag had the power to elect kings, to tax, and to declare war. Adroit kings were able to play off the states against each other, but the Riksdag remained a check on their powers. In 1720–72 it was able to subordinate the monarchy. The Riksdag became an organ of near-parliamentary government, with two proto-political parties vying for control of the body. In the 19th century, after losing its prerogatives for a time (1772–1809), the Riksdag exhibited a strong liberal bent. Against the efforts of the King and conservative elements, it voted for its own abolition in 1865 in favour of a modern parliamentary system. The new parliament, however, was called the Riksdag.

Rila, Bulgarian RILA PLANINA, highest mountain range in Bulgaria and in the Balkan Peninsula, and one of the highest ranges in Europe. A northwestern section of the Rhodope Mountains, it has an area of 1,015 sq mi (2,629 sq km) and extends for about 50 mi (80 km) between the Gornotrakiyska Nizina (Thracian Plain) at central Bulgaria and the Struma River. It rises to 9,596 ft (2,925 m) at Musala peak and contains the headstreams of the Iskŭr, Maritsa, and Mesta rivers. Scattered mineral deposits include lead, copper, zinc, magnetite, oil shale, and marble (near Pernik).

Riley, Bridget (Louise) (b. April 24, 1931, London), English artist whose vibrant optical pattern paintings were central to the Op art movement of the 1960s.

She attended the Royal College of Art (1952–55) and, until 1960, painted primarily impressionistic landscapes and figures. Her study of the Pointillists led to experiments in colour juxtaposition, and under the influence of Victor Vasarely her work took on a geometric abstraction, in which intricate patterns of black and white or alternating colours are calculated to produce illusions of movement, colour, and topography. She won a first prize at the Venice Biennale in 1968. Notable works include "Drift No. 2" (1966) and "Nineteen Greys" (1968).

Riley, Charles Valentine (b. Sept. 18, 1843, Chelsea, London—d. Sept. 14, 1895, Washington, D.C.), U.S. entomologist who contributed much to the advancement of the systematic study of insects of economic significance in the United States and helped to establish the Division of Insects (later called Entomology Research Division) of the U.S. Department of Agriculture. In addition, his well-documented and vividly illustrated studies were instrumental in making farmers aware for the first time of the importance of insect pest control in crop production.

In 1868, eight years after having immigrated to the United States, Riley was appointed state entomologist of Missouri. In 1876 he became chairman of the U.S. Entomological Commission, formed to study the Rocky Mountain locust that had devastated vegetation in the Midwestern and Western states since 1874. The success of the commission in dealing with that plague resulted in Riley's appointment as entomologist of the U.S. Department of Agriculture in 1878, and he served in that capacity, with one brief interruption, until 1893. Under his direction, considerable progress was made in the development of arsenic-based insecticides, kerosene emulsions, and other means of controlling insects injurious to agriculture.

Riley, James Whitcomb (b. Oct. 7, 1849, Greenfield, Ind., U.S.—d. July 22, 1916, Indianapolis, Ind.), poet remembered for nostalgic dialect verse and often called "the poet of the common people."

His boyhood experience as an itinerant sign painter, entertainer, and assistant to patent-medicine vendors gave him the opportunity to compose songs and dramatic skits, to gain skill as an actor, and to come into intimate touch with the rural populace of Indiana. His reputation was gained first by a series in Hoosier dialect ostensibly written by a farmer, Benj. F. Johnson, of Boone, contributed to the *Indianapolis Daily Journal* and later published as *The Old Swimmin' Hole and 'Leven More Poems* (1883). Riley was briefly local editor of the *Anderson* (Ind.) *Democrat*, but his later life was spent in Indianapolis.

Among Riley's numerous volumes are *Pipes o' Pan at Zekesbury* (1888), *Old-Fashioned Roses* (1888), *The Flying Islands of the Night*



James Whitcomb Riley, 1898
By courtesy of the Library of Congress, Washington, D.C.

(1891), *A Child-World* (1896), and *Home Folks* (1900). His best known poems included "When the Frost Is on the Punkin," "Little Orphant Annie," "The Raggedy Man," and "An Old Sweetheart of Mine." His poems were collected in *Complete Works,* 10 vol. (1916).

Riley–Day syndrome, also called DYSAUTONOMIA, in medicine, abnormal functioning of the autonomic nervous system, an inherited disorder occurring almost exclusively in Jews, the results of which include emotional instability; decrease in tear production during crying; low blood pressure upon standing up, a phenomenon called postural hypotension; excessive sweating, with blotching of the skin, during excitement and eating; difficulty in swallowing; and poor motor coordination.

Rilke, Rainer Maria, original name RENÉ MARIA RILKE (b. Dec. 4, 1875, Prague—d. Dec. 29, 1926, Valmont, Switz.), Austro-German poet who became internationally famous with such works as *Duino Elegies* and *Sonnets to Orpheus.* His poetry celebrates itself as a plea to value poetry "as poetry."



Rilke, 1925
By courtesy of the Swiss National Library

Early life. Rilke was the only son of a not too happy marriage. His father, Josef, a civil servant, was a man frustrated in his career; his mother, the daughter of an upper middle-class merchant and imperial councillor, was a difficult woman, who felt that she had married beneath her. She had a penchant for the nobility and high society and liked to dress in the manner of aristocratic dowagers. She left her husband in 1884 and moved to Vienna so as to be close to the imperial court.

Rilke's education was ill planned and fragmentary. It had been decided that he was to become an officer to assure him the social standing barred to his father. Consequently, after some years at a rather select school run by the Piarist brothers of Prague, he was enrolled in the military lower *Realschule* of Sankt Pölten (Austria) and four years later entered the military upper *Realschule* at Mährisch-Weisskirchen (Bohemia). These two schools were completely at variance with the needs of this highly sensitive boy, and he finally was forced to leave the school prematurely because of poor health. In later life he called these years a time of merciless affliction, a "primer of horror." After another futile year spent at the Academy of Business Administration at Linz (1891–92), Rilke, with the energetic help of a paternal uncle, was able to straighten out his misguided educational career. In the summer of 1895, he completed the course of studies at the German *Gymnasium* (a school designed to prepare for the university) of the Prague suburb of Neustadt.

By the time he left school, Rilke had already published a volume of poetry (1894), and he had no doubt that he would pursue a literary career. Matriculating at Prague's Charles University in 1895, he enrolled in courses in German literature and art history and, to appease his family, read one semester of law. But he could not become really involved in his studies, and so in 1896 he left school and went to Munich, a city whose artistic and cosmopolitan atmosphere held a strong appeal. Thus began his mature life, of the restless travels of a man driven by inner needs, and of the artist who managed to persuade others of the validity of his vision. The European continent in all its breadth and variety—Russia, France, Spain, Austria, Switzerland, and Italy—was to be the physical setting of that life.

Maturity. In May 1897 Rilke met Lou Andreas-Salomé, who shortly became his mistress. Lou, 36 years of age, was from St. Petersburg, the daughter of a Russian general and a German mother. In her youth she had been wooed by, and refused, the philosopher Friedrich Nietzsche; 10 years before her meeting with Rilke she had married a German professor. Rilke's affair with Lou was a turning point in his life. More than mistress, she was surrogate mother, the leading influence in his *éducation sentimentale* and, above all, the person who introduced Russia to him. Even after their affair ended, Lou remained his close friend and confidante. In late 1897 he followed her to Berlin to take part in her life as far as possible.

Russia was a milestone in Rilke's life. It was the first and most incisive of a series of "elective homelands," leaving a deeper mark than any of his subsequent discoveries, with the possible exception of Paris. He and Lou visited Russia first in the spring of 1899 and then in the summer of 1900. There he found an external reality that he saw as the ideal symbol of his feelings, his inner reality. Russia for him was imbued with an amorphous, elemental, almost religiously moving quality—a harmonious, powerful constellation of "God," "human community," and "nature"—the distillation of the "cosmic" spirit of being.

Russia evoked in him a poetic response that he later said marked the true beginning of his serious work: a long three-part cycle of poems written between 1899 and 1903, *Das Stunden-Buch,* (1905). Here the poetic "I" presents himself to the reader in the guise of a young monk who circles his god with swarms of prayers, a god conceived as the incarnation of "life," as the numinous quality of the in-

nerworldly diversity of "things." The language and motifs of the work are largely those of Europe of the 1890s: Art Nouveau, moods inspired by the dramas of Henrik Ibsen and Maurice Maeterlinck, the enthusiasm for art of John Ruskin and Walter Pater, and, above all, the emphasis on "life" of Nietzsche's philosophy. Yet, the self-celebratory fervour of these devotional exercises, with their rhythmic, suggestive power and flowing musicality, contained a completely new element. In them, a poet of unique stature had found his voice.

Soon after his second trip to Russia, Rilke joined the artists' colony of Worpswede, near Bremen, where he hoped to settle down among congenial artists experimenting with developing a new life-style. In April 1901 he married Clara Westhoff, a young sculptor from Bremen who had studied with Auguste Rodin. The couple set up housekeeping in a farm cottage in nearby Westerwede. There Rilke worked on the second part of the *Stunden-Buch* and also wrote a book about the Worpswede colony. In December 1901 Clara gave birth to a daughter, and soon afterward the two decided on a friendly separation so as to be free to pursue their separate careers.

Rilke was commissioned by a German publisher to write a book about Rodin and went to Paris, where the sculptor lived, in 1902. For the next 12 years Paris was the geographic centre of Rilke's life. He frequently left the city for visits to other cities and countries, beginning in the spring of 1903, when, to recover from what seemed to him the indifferent life of Paris, he went to Viareggio, Italy. There he wrote the third part of the *Stunden-Buch.* He also worked in Rome (1903–04), in Sweden (1904), and repeatedly in Capri (1906–08); he travelled to the south of France, Spain, Tunisia, and Egypt and frequently visited friends in Germany and Austria. Yet Paris was his second elective home, no less important than Russia, for both its historic, human, "scenic" qualities and its intellectual challenge.

Rilke's Paris was not the *belle époque* capital steeped in luxury and eroticism; it was a city of abysmal, dehumanizing misery, of the faceless and the dispossessed, and of the aged, sick, and dying. It was the capital of fear, poverty, and death. His preoccupation with these phenomena combined with a second one: his growing awareness of new approaches to art and creativity, an awareness gained through his association with Rodin. Their friendship lasted until the spring of 1906. Rodin taught him his personal art ethic of unremitting work, which stood in sharp contrast to the traditional idea of artistic inspiration. Rodin's method was one of dedication to detail and nuance and of unswerving search for "form" in the sense of concentration and objectivization. Rodin also gave Rilke new insight into the treasures of the Louvre, the Cathedral of Chartres, and the forms and shapes of Paris. Of the literary models, the poet Charles Baudelaire impressed him the most.

During those Paris years Rilke developed a new style of lyrical poetry, the so-called *Ding-Gedicht* ("object poem"), which attempts to capture the plastic essence of a physical object. Some of the most successful of these poems are imaginative verbal translations of certain works of the visual arts. Other poems deal with landscapes, portraits, and biblical and mythological themes as a painter would depict them. These *Neue Gedichte* (1907–08) represented a departure from traditional German lyric poetry. Rilke forced his language to such extremes of subtlety and refinement that it may be characterized as a distinct art among other arts and a language distinct from existing languages. The worldly elegance of these poems cannot obscure their inherent emotional and moral engagement. When Rilke, in letters about Paul Cézanne written in the autumn of 1907, defines the painter's method as a "using up of love in anonymous labour," he doubtless was also speaking of himself. In a letter to Lou Salomé written in July 1903, he had defined his method with this formulation: "making objects out of fear."

Die Aufzeichnungen des Malte Laurids Brigge (1910; *The Notebook of Malte Laurids Brigge,* 1930), on which he began work in Rome in 1904, is a prose counterpart to the *Neue Gedichte.* That which hovered in the background in the poems, behind the perfection of style, is in the foreground of the prose work: the subjective, personal problems of the lonely occupant of a Paris hotel room, the "fear" that is the inspiration for the creation of "the objects." If the poems seem like a glorious affirmation of the Symbolists' idea of "pure poetry," the *Aufzeichnungen* reads like a brilliant early example of Existentialist writing. It is an artfully assembled suite of descriptive, reminiscent, and meditative parts, supposedly written by Malte, a young Danish expatriate in Paris who refuses to abide by the traditional chronology of narrative exposition but, instead, presents his themes as "simultaneous" occurrences set against a background of an all-encompassing "spatial time." Here are found all of Rilke's major themes: love, death, the fears of childhood, the idolization of woman, and, finally, the matter of "God," which is treated simply as a "tendency of the heart." The work must be seen as the description of the disintegration of a soul—but a disintegration not devoid of a dialectic mental reservation: "Only a step," writes Malte, "and my deepest misery could turn into bliss."

The price Rilke paid for these masterpieces was a writing block and depression so severe that it led him to toy with the idea of giving up writing. Aside from a short poetry cycle, *Das Marienleben* (1913), he did not publish anything for 13 years. The first works in which he transcended even his *Neue Gedichte* were written early in 1912—two long poems in the style of elegies. He did not undertake their immediate publication, however, because they promised to become part of a new cycle. He wrote these two poems while staying at Duino Castle, near Trieste.

At the outbreak of World War I Rilke was in Munich, where he decided to remain, spending most of the war there. In December 1915 he was called up for military service with the Austrian army at Vienna, but by June 1916 he had returned to civilian life. The social climate of these years was inimical to his way of life and to his poetry, and when the war ended he felt almost completely paralyzed. He had only one relatively productive phase: the fall of 1915, when, in addition to a series of new poems, he wrote the "Fourth Duino Elegy."

Late life. Rilke spent the next seven years in Switzerland, the last of his series of elective homes. He once more came into full command of his creative gifts. In the summer of 1921 he took up residence at the Château de Muzot, a castle in the Rhône Valley, as the guest of a Swiss patron. In February 1922, within the space of a few days of obsessive productivity, he completed the Duino cycle begun years earlier and, unexpectedly and almost effortlessly, another superb cycle of 55 poems, in mood and theme closely related to the *Elegies*—his *Sonette an Orpheus* (*Sonnets to Orpheus*).

The *Duineser Elegien* (*Duino Elegies*) are the culmination of the development of Rilke's poetry. That which in the *Stunden-Buch* had begun as a naively uncertain celebration of "life," as a devotional exercise of mystical worship of God, and which in *Malte* led him to assert that "this life suspended over an abyss is in fact impossible" in the *Elegies* sounds an affirmative note, in panegyric justification of life as an entity: "The affirmation of life and death prove to be identical in the *Elegies,*" wrote Rilke in 1925. These poems can be seen as a new myth that reflects the condition of "modern" man, the condition of an emancipated, "disinherited" consciousness maintaining itself as a counterpart to the traditional cosmic image of Christianity. Like Nietzsche, Rilke opposes the Christian dualism of immanence and transcendence. Instead, he speaks out for an emphatic monism of the "cosmic inner space," gathering life and death, earth and space, and all dimensions of time into one all-encompassing unity. This Rilkean myth is articulated in an image-laden cosmology that, analogous to medieval models, sees all of reality—from animal to "angel"—as a hierarchical order. This cosmology in turn results in a systematic, consistent doctrine of life and being in which man is assigned the task of transforming everything that is visible into the invisible through the power of his sensory perceptions: "We are the bees of the invisible." And this ultimate fate of man is concretized in the activity that alternately is called "saying," "singing," "extolling," or "praising." Thus the poet is turned into the protagonist of humanity, its representative "before the Angel" (the pseudonym of God), as in the "Ninth Elegy," and even more strikingly in the *Sonnets to Orpheus.* This message of the late Rilke has been celebrated by some as a new religion of "life" and rejected by others as the expression of an unbridled aestheticism and an attempt on the part of the poet at "self-redemption" by virtue of his personal gift.

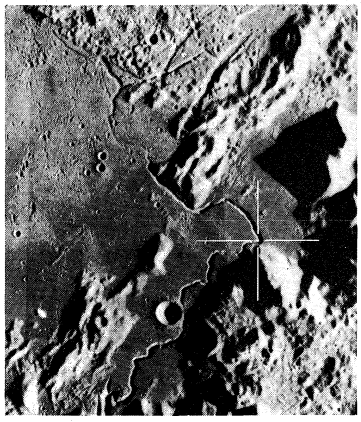
The triumphant breakthrough of February 1922 was Rilke's last major contribution, yet both thematically and stylistically some of his late poems go beyond even the *Elegies* and the *Sonnets* in their experimentation with forms that no longer seem at all related to the nature of the poetic language of the 1920s. In addition to these late works he also wrote a number of simple, almost songlike poems, some short cycles, and four collections in French, in which he pays homage to the landscape of Valais.

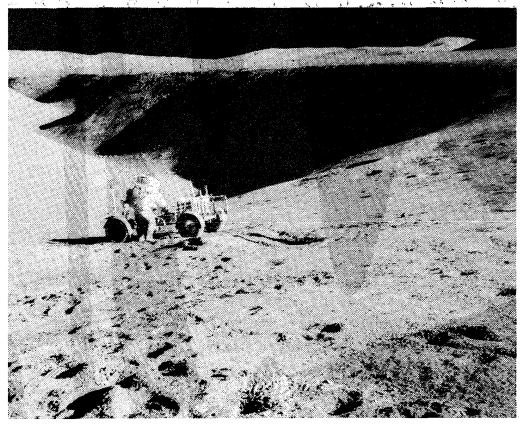
Muzot remained his home, but he continued his travels, mostly within Switzerland, devoting himself to his friends and his vast, superbly articulate correspondence. Early in 1925 he again went to Paris, with whose literary life he had remained in close touch. He was royally received by such old friends as André Gide and Paul Valéry as well as by new admirers; for the first and only time in his life he was at the centre of a literary season in a European metropolis. But the strain of this visit proved too much for his frail health. On August 18, unannounced, he slipped out of Paris. He had been ill since 1923, but the cause of his debility, a rare form of incurable leukemia, was not diagnosed until a few weeks before his death in 1926. He died at a sanatorium above Territet, on Lake Geneva. (H.E.H.)

MAJOR WORKS. *Verse. Leben und Lieder. Bilder und Tagebuchblätter* (1894); *Wegwarten* (1896); *Larenopfer* (1896); *Im Frühfrost (1897); Traumgekrönt* (1897); *Advent* (1898); *Mir zur Feier* (1899; republished with alterations as *Die frühen Gedichte,* 1909); *Das Buch der Bilder* (1902; 2nd ed., with 37 additional poems, 1906); *Das Stunden-Buch* (1905), consisting of *Das Buch vom mönchischen Leben, Das Buch von der Pilgerschaft,* and *Das Buch von der Armut und vom Tode* (*The Book of Hours,* trans. by A.L. Peck, 1961); *Neue Gedichte,* 2 vol. (1907–08; *New Poems,* trans. by J.B. Leishman, 1964); *Requiem* (1909; *Requiem and Other Poems,* trans. by J.B. Leishman, 2nd ed., 1949); *Das Marienleben* (1913; *The Life of the Virgin Mary,* trans. by Stephen Spender, 1951); *Duineser Elegien* (1923; *Duino Elegies,* trans. by J.B. Leishman and Stephen Spender, 4th ed., 1963); *Die Sonette an Orpheus* (1923; *Sonnets to Orpheus,* trans. by J.B. Leishman, 2nd ed., 1946); *Späte Gedlichte* (1934; *Later Poems,* trans. by J.B. Leishman, 1938); *Poèmes français* (1935; partial

Eng. trans., *The Roses and the Windows* [1979] by A. Poulin, Jr.); *Aus dem Nachlass des Grafen C.W.* (1950; *From the Remains of Count C.W.*, trans. by J.B. Leishman, 1952). Other translations by J.B. Leishman include: *Selected Works*, vol. 2, *Poetry* (1954–60); *Poems 1906–26*, 2nd ed. (1959); and *Possibility of Being: Selected Poems* (1977). *Selected Poems* (1981), trans. by Robert Bly, also has five essays by the translator.

Prose. *Vom lieben Gott und Anderes* (1900; *Stories of God*, 1932); *Worpswede* (1903); *Auguste Rodin* (1903; Eng. trans. 1919); *Die Weise von Liebe und Tod des Cornets Christoph Rilke* (1906; *The Tale of the Love and Death of Cornet Christopher Rilke*, trans. by M.D. Herter Norton, 1932); *Die Aufzeichnungen des Malte Laurids Brigge* (1910; *The Notebook of Malte Laurids Brigge*, trans. by John Linton, 1930); *Aus der Frühzeit Rainer Maria Rilkes. Vers. Prosa. Drame. 1894–1899* (1921); *Ewald Tragy* (1927–28); *Erzählungen und Skizzen aus der Frühzeit* (1928). Other translations of Rilke's prose are in *Selected Works*, vol. 1, *Prose*, by G. Craig Houston (1954–60).





(Left) Hadley Rille, near vertical view (north at top) from the Apollo 15 spacecraft in orbit; cross indicates site from which photograph at right was taken, of north view along Hadley Rille near St. George Crater

By courtesy of the National Aeronautics and Space Administration

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Biography and criticism. Because there is not yet a comprehensive, scholarly Rilke biography, the following may be recommended as sources of information: Hans E. Holthusen, *Rainer Maria Rilke in Selbstzeugnissen and Bilddokumenten* (1967; *Portrait of Rilke*, 1971), an illustrated biographical-critical essay; Ingeborg Schnack (ed.), *Rilkes Leben und Werk im Bild* (1956), a biographical survey in photographic documents; and Jean R. de Salis, *Rainer Maria Rilkes Schweizer Jahre* (1952; *Rainer Maria Rilke: The Years in Switzerland*, 1964), which treats only the last part of Rilke's life in detail. Memoirs that can be designated as classic are Marie von Thurn und Taxis, *Errinerungen an Rainer Maria Rilke* (1933); and the brilliant essays of Rudolf Kassner in *Buch der Erinnerung* (1938), *Umgang der Jahre* (1949), and *Geistige Welten* (1958). Two earlier monographs by friends of the poet are Lou Andreas-Salomé, *Rainer Maria Rilke* (1928); and Nora Wydenbruck, *Rilke, Man and Poet* (1949). Among the critical works on Rilke in English, the following are prominent: Eliza M. Butler, *Rainer Maria Rilke*, 2nd ed. (1945); E.C. Mason, *Rilke, Europe, and the English-Speaking World* (1961) and *Rilke* (1963); also, H.W. Belmore, *Ril's Craftmanship* (1954), a special investigation interested in formal questions. A comprehensive presentation from the psychoanalytic point of view is Erich Simenauer, *Rainer Maria Rilke: Legende und Mythos* (1953). So far as the extensive German Rilke literature is concerned, after the enthusiasm of the 1930s and 1940s, it passed through a phase of disillusionment, indeed even of devaluation. At the end of the 1960s, however, in books such as Jacob Steiner, *Rilkes Duineser Elegien*, 2nd ed. (1969); and Kaete Hamburger (ed.), *Rilke in neuer Sicht* (1971), a younger generation of scholars came forth with new arguments on the classical merit of Rilke. Later works include Frank Baron, Ernst S. Dick, and Warren R. Mauer, *Rilke: The Alchemy of Alienation* (1981), a collection of 14 essays.

rille (German: "furrow"), any of various valleys or trenches observed on the surface of the Moon. The term was introduced by early telescopic observers—probably Johann Schröter around 1800—to denote such lunar features. Rilles measure several kilometres wide and as much as a few hundred kilometres long. They are often classified into two main types: straight rilles and sinuous rilles. Those of the first variety are flat-floored and relatively straight; they are occasionally associated with crater chains and sometimes arranged in an echelon pattern. These structures are thought to be grabens formed by floor collapse between parallel faults. The sinuous rilles resemble winding river valleys. They may be similar to flow channels created by lava flows on the Earth. Apollo 15 astronauts visited the sinuous Hadley Rille and found a V-shaped valley apparently filled with rubble from lava-stratified walls; their observations, however, did not clarify its origin.

Rímac, quarter and district of the Lima–Callao metropolitan area, north of central Lima. Created a district in 1921, the site was settled in early colonial days. The Puente de Piedras (Bridge of Stone) was built in 1610. Notable colonial landmarks include the promenade and Monastery of the Descalzos (Barefoot Brethren); a building claimed to be the Palace of "La Perricholi" (Micaela Villegas, the mistress of an 18th-century viceroy), which now houses the Museum of the Viceroys; and the Acho bullring, oldest in the Americas.

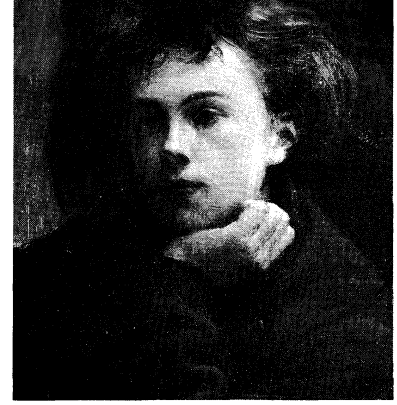
Outside its historic area, Rímac is essentially a lower-income, residential district with small commercial, industrial, and service establishments. The lower slopes of the surrounding Andean foothills are increasingly covered with *pueblos jóvenes* ("young towns"), some developing into communities and others stagnating as slums. One large sector of Rímac is occupied by military garrisons and housing. The National University of Engineering (1955) is located in the district. Overlooking historic Rímac and downtown Lima is Cerro (hill) San Cristóbal. Pop. (1981 prelim.) district, 188,-164.

Rimbaud, (Jean-Nicolas-)Arthur (b. Oct. 20, 1854, Charleville, Fr.—d. Nov. 10, 1891, Marseille), French poet and adventurer identified with the Symbolists and, for a time, associated with Paul Verlaine.

Childhood. Rimbaud was born in the Ardennes, in northeastern France, the second son of an army captain and a local farmer's daughter: his brother was a year older, and there were two younger sisters. In 1860 Captain Rimbaud and his wife separated, and the children were brought up by their mother, who hoped to keep her sons from following the example of her two wastrel brothers. Arthur, who early displayed unusual intellectual ability, showed a gift for writing at the age of eight. Later, he was the most brilliant pupil at the Collège de Charleville. He had a particular talent for Latin verse and in August 1870 won the first prize for a Latin poem at the Concours Académique. His first published poem had appeared in January 1870 in *La Revue pour Tous*.

The outbreak of the Franco-German War (July 1870) ended his formal education. In August he ran away to Paris but was arrested for travelling without a ticket and spent some days in prison. His former schoolmaster paid his fine and had him sent to Douai, where he joined the national guard. In October he disappeared again, wandering through northern France and Belgium in the wake of the invading armies. Again, he arrived at Douai, where he made fair copies of the poems composed during his two weeks of freedom, hunger, and rough living. These express an innocent joy in life and liberty and are his first wholly original works. His mother had him brought back by the police, but in February 1871 he sold his watch and again went to Paris, where for a fortnight he lived in great poverty.

Revolt and poetic vision. In early March he returned home on foot, a completely changed character. He repudiated his early verses as false and wrote some of his most violent and blasphemous poems, expressing a disgust with life, a desire to escape into a world of innocence, and a sense of struggle between good and evil. His behaviour matched his poetic mood—he refused to work and spent his days drinking in cafés, in conscious revolt against religion, morality, and every kind of discipline. At the same time, he read books on occult philosophy, Kabbalism, magic, and alchemy and formulated his new aesthetic doctrine, expressed in two letters (May 13 and 15, 1871), later called "Lettres du voyant." This title is based on the belief that the poet must become



Rimbaud, detail from "Un Coin de table," oil painting by Henri Fantin-Latour, 1872; in the Louvre, Paris

Giraudon—Art Resource/EB Inc.

a seer, a "*voyant*," who can penetrate infinity and who, by breaking down the restraints and controls that make up the conventional conception of individual personality, must be-

come the instrument for the voice of the eternal.

At the end of August 1871, on the advice of a literary friend in Charleville, Rimbaud sent to the poet Paul Verlaine specimens of his new poetry, among them the sonnet "Voyelles" in which he attributes to each vowel a different colour. Verlaine, impressed by the brilliance of the poems, summoned Rimbaud to Paris and sent the money for his fare. In a burst of self-confidence, Rimbaud composed "Le Bateau ivre." Although traditional in versification, it is a poem of astonishing verbal virtuosity and of daring choice of images and metaphors, inspired by a deep emotional and spiritual experience. In this masterpiece, Rimbaud reached one of the highest peaks of his art.

Arriving in Paris in September 1871, he stayed for three months with Verlaine and his wife and met most of the well-known poets of the day but antagonized them all—except Verlaine himself—by his arrogance, boorishness, and obscenity. Requested to leave, he embarked upon a life of drink and debauch and became involved in a homosexual relationship with Verlaine that gave rise to scandal. In March he returned to Charleville so that Verlaine could attempt a reconciliation with his wife but was recalled in May by his friend, who vowed that he could not live without him.

During this period (September 1871–July 1872), Rimbaud composed the last of his poems in verse, which show a marked advance in technical freedom and originality. At this time he also composed the work that Verlaine called his masterpiece, "La Chasse spirituelle" ("The Spiritual Hunt"), the manuscript of which disappeared when Verlaine and Rimbaud went to England. Some critics also assign to this creative period the transcendental prose poems *Illuminations,* none of which was dated by Rimbaud himself.

In July 1872 Verlaine abandoned his wife and fled with Rimbaud to London, where they lived in Soho. Rimbaud may there have composed some of his *Illuminations.* He returned home for Christmas but was recalled (January 1873) by Verlaine, who dramatized an illness to play on his sympathy. In April Rimbaud went to the farm at Roche, near Charleville, where his mother and sisters were staying, and began to write what he called his "Livre païen, ou Livre nègre," which eventually became *Une Saison en enfer.* A month later, Verlaine, who was staying nearby, persuaded Rimbaud to accompany him to London. Rimbaud's sense of guilt at yielding to an influence from which he had wished to escape caused him to treat Verlaine with sadistic cruelty, varied by remorseful kindness. Finally, at the beginning of July, after one of their frequent quarrels, Verlaine abandoned Rimbaud and went to Belgium. Failing, however, to effect a reconciliation with his wife, he sent for Rimbaud and begged him to return with him to London. When Rimbaud tried to leave, Verlaine shot him, wounding him in the wrist, and threatened to do so again. Verlaine was arrested, jailed, and later sentenced to two years' imprisonment. Rimbaud soon returned to Roche, where he finished *Une Saison en enfer,* an account of his spiritual descent into hell and of his failure in art and love. It was printed in Belgium in the autumn of 1873. Discouraged by its reception in Paris and unable to pay the printers, he abandoned the whole edition and is said to have burned his manuscripts and papers at Charleville. The bales of the book were discovered in 1901 by the Belgian bibliophile Léon Losseau, who withheld the news of his discovery until 1915.

In February 1874 Rimbaud returned to London with Germain Nouveau, a wild bohemian poet. There they earned a precarious living in menial employment; Rimbaud may also have been composing some of the *Illuminations.* Nouveau returned to Paris in June; and Rimbaud seems to have fallen ill or to have suffered acutely from poverty. At the end of July he took up a post at a coach office at Reading, Berkshire, but went home for Christmas, never to return.

Rimbaud's last encounter with Verlaine, early in 1875, ended in a violent quarrel. It was probably at this time that Rimbaud gave Verlaine the manuscript of *Illuminations.*

Traveller and trader. During 1875–76, Rimbaud learned German, Arabic, Hindustani, and Russian and set out to see the world. By June 1879 he had crossed the Alps on foot, joined and deserted the Dutch colonial army in the Indies, apparently joined a German circus bound for Scandinavia, visited Egypt, and worked as a labourer in Cyprus, in every instance suffering setbacks of illness or other hardship.

It was during a struggle with typhoid fever through the winter of 1879 that he apparently decided to abandon his life of wandering and to plan for the future. Returning to Cyprus in the spring, he found work as a builder's foreman but soon set out again; in the service of a coffee trader at Aden, he became the first white man to journey into the Ogaden region of Ethiopia. His report of this expedition, in the proceedings of the Société de Géographie (February 1884), aroused some interest.

In October 1885 Rimbaud decided to risk his savings on an expedition to sell arms to Menelik II, king of Shewa (Shoa), who was at the time engaged in a contest for power with the Ethiopian emperor, Yohannes IV. It was not until mid-1888, however, that he was successfully established, and after Yohannes IV was killed in March of the next year and Menelik became emperor, the profits from gunrunning declined.

While in Ethiopia, he lived as simply as the poorest native, spending as little as possible in order to save money so that he could one day retire and live at leisure. His meanness to himself was matched by unobtrusive generosity to others, and the little house where he lived with a native woman became the meeting place of the Europeans in Ethiopia.

His gift for languages and his humane treatment of the Ethiopians made him popular with them, and by his honesty and sincerity he even managed to win the confidence of the chiefs and of Menelik's nephew, the Governor of Harer, who became his close friend. His letters to his mother from this period reveal a desire for affection and intellectual companionship; in the spring of 1891 he planned to go home for a holiday in order to look for a wife.

During this period of expatriation, he had become known as a poet in France. Verlaine had written about him in *Les Poètes maudits* (1884) and had published a selection of his poems. These had been enthusiastically received, and in 1886, unable to discover where Rimbaud was or to get an answer from him, Verlaine published the prose poems, under the title *Illuminations,* and further verse poems, in the Symbolist periodical *La Vogue,* as the work of "the late Arthur Rimbaud." It is not known whether Rimbaud ever saw these publications. But he certainly knew of his rising fame after the appearance of *Les Poètes maudits,* for, in August 1885, he had received a letter from an old schoolmate, Paul Bourde, who told him of the vogue of his poems—especially the sonnet "Voyelles"—among avant-garde poets. Also, he did preserve—for it was found among his papers—a letter received in July 1890 from a review inviting him to return to France and put himself at the head of the new literary movement, but he does not seem to have answered it.

In February 1891 he developed a tumour on his right knee, and, when he left Harer in early April, he had to be carried by stretcher for the week's journey to the coast. At Aden, treatments failed, and he was sent back to France. Shortly after he arrived at Marseille his right leg had to be amputated. His mother's presence offered little consolation, and in letters to his sister Isabelle, he poured out his sense of frustration and despair; when, in July, he returned to Roche, it was she who looked after him.

He still hoped to marry and return to Ethiopia, but his health grew steadily worse. In August 1891 he set out on a nightmare journey to Marseille, where his disease was diagnosed as cancer; Isabelle, who had accompanied him, was told that his case was hopeless. Rimbaud himself, however, still believed that he might be cured and endured agonizing treatment. Shortly before he died, Isabelle persuaded him to make his confession to a priest. This conversion seemed to bring him new peace and to reawaken the poetic imagination of his early youth so that he became once more a *voyant,* seeing visions that, according to his sister, surpassed in depth and beauty those that had inspired the *Illuminations.* For this account, however, one has only the word of Isabelle, who in other respects (notably in her "emendations" of some of Rimbaud's letters from Ethiopia) has been proved a false witness.

Assessment. Few poets have been the object of more passionate study or have exercised greater influence on modern poetry. It is in the prose poems *Illuminations* that he reached the highest peak of his originality, and this is the form best suited to his elliptical and esoteric style. He stripped the prose poem of all the anecdotal, narrative, and even descriptive content of his predecessors and, by divesting words of their dictionary meaning or logical content, endowed the poem with a quasi-magical power intended to evoke a state of mind—"*état d'âme,*" the Symbolists were to say. He also showed how much rich material for poetry exists in the subconscious mind and in the half-remembered sensations of childhood. His writings are still capable of expressing intensely modern revolt and recoil from the very essence of life in a so-called civilized society. (En.S./Ed.)

MAJOR WORKS. "Le Bateau ivre" (written 1871, first published in complete collection, 1898; *The Drunken Boat; 36 Poems,* trans. by B. Hill, 1952); "La Chasse spirituelle" considered by Verlaine his masterpiece—the manuscript written 1871–72 disappeared; *Une Saison en enfer* (1873; *A Season in Hell,* trans. and introduction by G.F. Lees, 1932; trans. by L. Varèse, 1945; and by N. Cameron, 1949); *Illuminations* (1886; *Illuminations, and Other Prose Poems,* trans. by H. Rootham, 1932; and by L. Varèse, 1957; also *Rimbaud's Illuminations: A Study in Angelism,* trans. by Wallace Fowlie, 1953, reprinted 1971); see also the *Oeuvres complètes* (1948); *Selected Verse Poems of Arthur Rimbaud,* trans. by N. Cameron (1942); *Rimbaud,* introduced and ed. by O. Bernard, with plain prose translation of each poem (1962); and *Rimbaud: Complete Works, with Selected Letters,* trans. and introduction by Wallace Fowlie (1966).

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Rimbaud, 1870–1875, 5th ed. (1931). Important, newly discovered letters were published in *Arthur Rimbaud, Correspondance, 1888–1891,* with preface and notes by Jean Voellmy (1965).

Biography. The indispensable biography for English readers is Enid Starkie, *Arthur Rimbaud,* rev. ed. (1968). It may be supplemented by Henri Matarasso and Pierre Petitfils, *Vie d'Arthur Rimbaud* (1962). Of the earlier notices one cannot ignore the authentic insights of Paul Verlaine in *Les Poètes maudits* (1884); but the first complete biography, albeit of dubious frankness, is that of Paterne Berrichon, *La Vie de Jean-Arthur Rimbaud* (1897).

Criticism. In the vast corpus of literary criticism the reader may first consult Edgell Rickword, *Rimbaud, the Boy and the Poet,* new ed. (1963); and the authoritative work by Rolland de Renéville, *Rimbaud le voyant,* rev. ed. (1947). The legend of Rimbaud is magisterially surveyed by the eminent critic René Étiemble in *Le Mythe de Rimbaud,* 2 vol. (1952–54; new ed., 1961–68). Subsequent studies include Henry de Bouillane de Lacoste, *Rimbaud et le problème des "Illuminations"* (1949); Jacques Gengoux, *La Pensée poétique de Rimbaud* (1950); Charles Chadwick, *Études sur Rimbaud* (1960); W.M. Frohock, *Rimbaud's Poetic Practice: Image and Theme in the Major Poems* (1963); J.P. Houston, *The Design of Rimbaud's Poetry* (1963); C.A. Hackett, *Autour de Rimbaud* (1967); Jacques Plessen, *Promenade et poésie, l'expérience de la marche et du mouvement dans l'oeuvre de Rimbaud* (1967); Marcel Ruff, *Rimbaud* (1968), in French; and Robert G. Cohn, *The Poetry of* Rimbaud (1974).

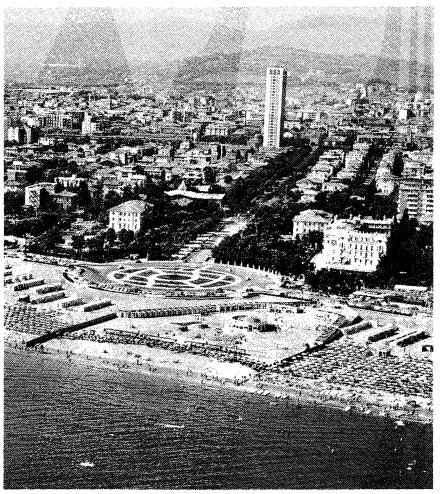
rime, white, opaque, granular deposit of ice consisting of small pellets. It forms when supercooled water droplets (water droplets at a temperature lower than 0° C [32° F]) strike an object that is also at a temperature below freezing. When the droplets are so small that they freeze almost immediately upon contact with the object, a layer or deposit of rime forms. The layer of rime is composed of small ice particles with air pockets between them; this structure causes the typical white appearance and granular structure. Because of the rapid freezing of each individual supercooled droplet, there is relatively poor cohesion between the neighbouring ice particles, and the deposits may easily be shattered or removed from objects they form on. Thus, rime is not normally a serious problem to aircraft. *See also* frost; precipitation.

rime (in poetry): *see* rhyme.

rime royal (poetry): *see* rhyme royal.

Rimini, Latin ARIMINUM, town, Forlì province, in the Emilia-Romagna region of northern Italy. It is located on the Riviera del Sole of the Adriatic at the mouth of the Marecchia River, just northeast of the Monte Titano and the Republic of San Marino. The Romans called it Ariminum from Ariminus, the old name of the Marecchia, and, according to the 1st-century BC Greek historian Strabo, it belonged to the Umbro-Etruscan civilization. The site was occupied in 268 BC by the Romans and a Latin colony was established there on the boundary of Aemilia and Umbria. As the junction of the great Roman roads the Via Aemilia and the Via Flaminia, it became a Roman municipium (community) and was later sacked by the dictator Sulla. In 359 the town was host to the Council of Rimini, which failed to resolve the Arian controversy over the divinity of Christ. Rimini passed to the Byzantines, and from them to the Goths, from whom it was recaptured by the Byzantine general Narses, and then to the Lombards and Franks.

The town was long an object of papal–imperial rivalry, particularly after it became an independent commune in the 12th century. The Guelf (papal) leader Malatesta da Verucchio was made *podestà* ("mayor") in 1239, but strife prevailed until members of the Malatesta family were recognized as lords of the town in 1334. It was in this period that Gianciotto (Malatesta) the Lame killed his wife Francesca da Polenta and his brother Paolo, her secret lover; the tragedy was immortalized in Dante's *Inferno* and in Silvio Pellico's *Francesca da Rimini.*



Rimini, Italy
By courtesy of the Rimini Tourist Office

The most renowned of the Malatesta lords was Sigismondo Pandolfo (1417–68), man of letters, patron of the arts, and soldier, who was responsible for Rimini's 15th-century fortifications and for its best known monument, the Malatesta Temple, designed to glorify his love for Isotta degli Atti. Sigismondo was accused of having killed his first and second wives in order to marry Isotta. This suspicion and his quarrels with other rulers and with the papacy led to Pope Pius II's indictment of him in 1461. Sigismondo was compelled to submit and yielded most of his territory to the pope, keeping only Rimini and a few lands. Sigismondo was succeeded by his illegitimate son Roberto, who got rid of the legitimate heirs and later was reconciled with the pope, becoming the commander of the papal army. Roberto's son Sigismondo failed to defend his lands against Cesare Borgia, and Rimini passed to the Papal States in 1509. Except for a brief period of French domination during the Napoleonic Wars, the city remained under papal control until it was annexed to the Kingdom of Italy in 1860.

In the 19th century Rimini expanded beyond its walls and became a beach resort, a development that was accelerated by the establishment of seaside suburbs south of the city after 1920. Despite widespread destruction by Allied bombardment in World War II, the city recovered. Its coastal resorts stretch for nearly 10 mi (16 km) between Torre Pedrera and Miramare.

Roman remains include the Arch of Augustus, erected in 27 BC and completed in AD 22 by the emperor Tiberius; the bridge built by Augustus over the river and also completed by Tiberius (AD 21); and the ruins of a Roman amphitheatre. The Malatesta Temple, converted from the old Gothic church of S. Francesco and designed by Leon Battista Alberti, is decorated with exquisite reliefs of a frankly pagan character and with the intertwined initials S and I (for Sigismondo and Isotta). Only ruins remain of the castle (1446) and town walls built by Sigismondo Pandolfo. Other noteworthy buildings include the restored Palazzo dell'Arengo (1204), the picture gallery, the civic library, and several medieval and Renaissance churches.

Rimini is a road centre and important railway junction of lines to Brindisi, Venice and Trieste, and Bologna and Turin and has sea links with Ancona, Ravenna, Venice, and Trieste; there is an airport at Miramare. The district produces cereals and fruit, and the town has processing factories and railway repair shops. The main source of income, however, is tourism. The gently sloping beaches backed by promenades and hotels attract tourists, as do Rimini's international shows, sporting events, and concerts. Pop. (1981 prelim.) mun., 127,860.

Rimini, Council of: *see* Ariminum, Council of.

Rîmnicu Vîlcea, city, capital of Vîlcea *judeţ* (district), south central Romania, on the Olt River. Documented as a town in the late 14th century, it was a local market town during the Middle Ages. Historic buildings include the house of Anton Pann, folklorist and writer; a fortified church, Cetăţuia; and the district museum, with art and history sections. Since World War II the city has grown rapidly with new industries, including factories producing chemicals, processing timber, and making oil-drilling machinery. Pop. (1982 est.) 78,667.

Rimniksky, Aleksandr Vasilyevich Suvorov, Graf (Count): *see* Suvorov, Aleksandr Vasilyevich.

Rimouski, city, seat of Rimouski-Neigette regional county and of Bas-Saint-Laurent-Gaspésie region, eastern Quebec province, Canada. The city lies on a hillside sloping gently toward its deepwater port (sheltered by the Île Saint-Barnabé) on the south shore of the St. Lawrence River. The land was granted to Augustin Rouer de la Cardonnière in 1688. Germain Lepage was the first settler (1696), and Recollet missionaries and Jesuits followed in 1701. The name was probably derived from a Micmac Indian word meaning "land of the moose." About half of the city was destroyed by fire in 1950, but it has since been rebuilt. Rimouski's diversified economy includes food processing and the manufacture of lumber, pulpwood, mattresses, carpeting, leather, and footwear. It is also a transportation and service centre for the Lower St. Lawrence and Gaspésie areas. Educational institutions include an agricultural college, a seminary, a branch of the Université du Québec, and a marine institute. Saint-Germain is the seat of a bishop. Inc. town, 1869; city, 1963. Pop. (1981) 29,120.

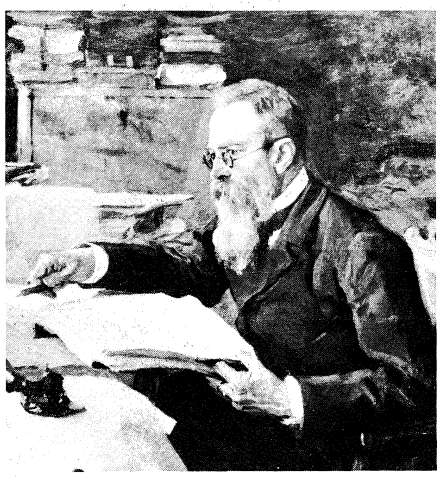
To make the best use of the Britannica, consult the INDEX *first*

Rimsky-Korsakov, Nikolay (Andreyevich) (b. March 18 [March 6, old style], 1844, Tikhvin, near Novgorod, Russia—d. June 21 [June 8, O.S.], 1908, Lyubensk), Russian composer, teacher, and editor, known particularly for his advancement of the cause of Russian national music. Among his most famous works are the operas *Snow Maiden* (1882), *Sadko* (1898), *The Legend of the Invisible City of Kitezh and the Maiden Fevronia* (1907), and *Le Coq d'or* (1909); the symphonic suite *Scheherazade* (1888); *Capriccio espagnol* (1887); and *The Russian Easter Festival* overture (1888).

Early life and naval career. Rimsky-Korsakov's father was a government official of liberal views; his mother was well educated and could play the piano. His uncle was an admiral in the Russian Navy and his elder brother a marine officer; from them Rimsky-Korsakov acquired his abiding love for the sea. When he was 12 years old the family moved to St. Petersburg (now Leningrad), where he entered the naval academy. At the age of 15 he began taking piano lessons with Théodore Canillé, a professional pianist, who

also taught him the rudiments of composition. In 1861 he met the composer Mily Balakirev, a man of great musical culture, and under the older man's guidance he began to compose a symphony. In 1862 he was graduated from the naval academy. Soon afterward he sailed on the clipper ship "Almaz" on a long voyage, the vessel anchoring in New York City, Baltimore, and Washington, D.C., at the height of the U.S. Civil War. The Russian sailors were cordially welcomed there, since Russia was politically sympathetic toward the North. Subsequent ports of call were Brazil (where Rimsky-Korsakov was promoted to the rank of midshipman), Spain, Italy, France, England, and Norway. The ship returned to its Russian home port in Kronstadt in May 1865. For young Rimsky-Korsakov the voyage confirmed a fascination with the sea. Aquatic scenes abound in his operas and symphonic works: the ocean in *Scheherazade, Sadko,* and *The Tale of Tsar Saltan,* the lake in *The Legend of the Invisible City of Kitezh and the Maiden Fevronia.*

On his return to St. Petersburg, he completed the symphony begun before his voyage, and it was performed with gratifying success in St. Petersburg on Dec. 31, 1865, when the composer was only 21 years old. It was an



Rimsky-Korsakov, detail of a portrait by V.A. Serov; in the Tretyakov Museum, Moscow
H. Roger-Viollet

auspicious beginning to his career; it was also the first performance of a full-fledged symphony by a Russian. His next important work was *Fantasy on Serbian Themes* for orchestra, first performed at a concert of Slavonic music conducted by Balakirev in St. Petersburg, on May 24, 1867. The occasion was of historic significance, for, in reviewing the concert, the critic Vladimir Stasov proudly proclaimed that henceforth Russia, too, had its own "mighty little heap" (*moguchaya kuchka*) of native composers. The title caught on quickly and found its way into music history books, with specific reference to Rimsky-Korsakov, Balakirev, Aleksandr Borodin, César Cui, and Modest Mussorgsky, who became collectively known as "The Five," and whose purpose was to assert the musical independence of Russia from the West. Of "The Five," Rimsky-Korsakov was the most learned and the most productive; his works embrace all genres, but he excelled mostly in the field of opera.

Teacher, conductor, and editor. So high was Rimsky-Korsakov's reputation that in 1871, still as a very young man, he was engaged to teach composition at the St. Petersburg Conservatory. In his autobiographical *Chronicle of My Musical Life* he frankly admitted his lack of qualifications for this important position; he himself had never taken a systematic academic course in musical theory, even though he had profited from Balakirev's desultory instruction and by Tchaikovsky's professional advice. Eager to complete his own musical education, he undertook in 1873 an ambitious program of study, concentrating mainly on counterpoint and the fugue. He ended his studies in 1875 by sending 10 fugues to Tchaikovsky, who found them impeccable. In 1873 he left the naval service and assumed charge of military bands as inspector and conductor. Although he lacked brilliance as an orchestral leader, he attained excellent results in training inexperienced instrumentalists. His first professional appearance on the podium took place in St. Petersburg on March 2, 1874, when he conducted the first performance of his *Third Symphony.* In the same year he was appointed director of the Free Music School in St. Petersburg, a post that he held until 1881. He served as conductor of concerts at the court chapel from 1883 to 1894. Between 1886 and 1900 he was chief conductor of the Russian symphony concerts. In 1889 he led concerts of Russian music at the Paris World Exposition; in the spring of 1907 he conducted in Paris two Russian historic concerts in connection with Sergey Diaghilev's Ballets Russes.

Rimsky-Korsakov rendered an inestimable service to Russian music as the de facto editor and head of a unique publishing enterprise financed by the Russian industrialist Belayev and dedicated exclusively to the publication of music by Russian composers. After Mussorgsky's death, Rimsky-Korsakov edited his scores for publication, making radical changes in what he considered Mussorgsky's awkward melodic and harmonic progressions, and he practically rewrote Mussorgsky's opera *Khovanshchina.* His edited and altered version of *Boris Godunov* evoked sharp criticism as a pedantically professorial arrangement of a great innovating masterpiece; but his masterly handling of the materials cannot be denied. Mussorgsky's score was later published in 1928 and had several performances in Russia and abroad, but ultimately the more effective Rimsky-Korsakov version prevailed in opera houses. Rimsky-Korsakov also edited (with the composer Glazunov) the posthumous works of Borodin.

Accomplishments. A strict disciplinarian in artistic matters, he was also a severe critic of his own music. He made constant revisions of his early compositions, in which he found technical imperfections. As a result, double dates, indicating early and revised versions, frequently occur in his catalog of works. He was at his best and most typical in descriptive orchestration, in suggesting a place or an ambience. With two exceptions (*Servilia* and *Mozart and Salieri*), the subjects of Rimsky-Korsakov's operas are taken from Russian or other Slavonic fairy tales, literature, and history. The most important among them are *Snow Maiden, Sadko, The Tsar's Bride, The Tale of Tsar Saltan, The Legend of the Invisible City of Kitezh and the Maiden Fevronia,* and *Le Coq d'or.* Although these operas are part of the regular repertory in Russian opera houses, they are rarely heard abroad; only *Le Coq d'or* enjoys occasional production in western Europe and America.

Of the composer's orchestral works, the best known are *Capriccio espagnol* (1887), the symphonic suite *Scheherazade* (1888), and *Russian Easter Festival* overture (1888). "The Flight of the Bumble Bee" from *The Tale of Tsar Saltan* and the "Song of India" from *Sadko* are perennial favourites in a variety of arrangements. Rimsky-Korsakov's songs are distinguished by simple elegance and fine Russian prosody; his chamber music is of less importance. He also wrote a piano concerto. As professor of composition and orchestration at the St. Petersburg Conservatory from 1871 until the end of his life (with the exception of a brief period in 1905 when he was dismissed by the reactionary directorate for his defense of students on strike), he taught two generations of Russian composers, and his influence, therefore, was pervasive. Igor Stravinsky studied with him privately for several years. His *Practical Manual of Harmony* (1884) and *Fundamentals of Orchestration* (posthumous, 1913) are still used as basic musical textbooks in the Soviet Union. (N.Sl.)

MAJOR WORKS. *Operas.* Sixteen, including *Pskovityanka* (first performed 1873; *The Maid of Pskov*); *La Nuit de Mai* (1880; *May Night*); *Snegurochka* (1882; *Snow Maiden*); *Sadko* (1898); *Mozart et Salieri* (1898; *Mozart and Salieri*); *La Fiancée du tsar* (1899; *The Tsar's Bride*); *Skazka o tsare Saltane* (1900; *The Tale of Tsar Saltan*); *Servilia* (1902); *Kashchey Bessmertny* (1902; *Kashchey the Immortal*); *Skazaniye o nevidimom grade Kitezhe i deve Fevroniy* (1907; *The Legend of the Invisible City of Kitezh and the Maiden Fevronia*); *Le Coq d'or* (1909; *The Golden Cockerel*).

Choral works. Song of Oleg the Wise, after Pushkin, for tenor, bass, male chorus, and orchestra (composed 1899); various settings of folk songs.

Orchestral. Symphonies: *No. 1 in E Flat Minor* (1861–65, rev. 1884); *No. 2, Antar* (1868, rev. 1876); *No. 3 in C Major* (1874, rev. 1886). Other orchestral music: *Overture on Russian Themes* (1866); *Piano Concerto in C Sharp Minor* (1882–83); *Fantasy on Russian Themes* for violin and orchestra (1886); *Fantasy on Serbian Themes* (1867); *Capriccio espagnol* (1887); symphonic suite *Scheherazade* (1888); overture, *Russian Easter Festival* (1888).

Chamber music. String Quartet in F Major (1875); *String Sextet in A Major* (1876); *Quintet for Piano and Winds in B Flat Major* (1876); *String Quartet in G Major* (1897).

Songs. More than 80 songs, mostly written in sets of four.

BIBLIOGRAPHY. The primary source is Rimsky-Korsakov's posthumously published *My Musical Life* (1972; Eng. trans. from the 5th rev. Russian ed.). The most important documentary study was compiled by Rimsky-Korsakov's son Andrey, *N.A. Rimsky-Korsakov, zhizn i tvorchestvo,* 5 fasc. (1933–46). A useful compendium is A. Solovtzov, *Zhizn i tvorchestvo N.A. Rimskogo-Korsakova* (1964). See also Gerald Abraham, *Rimsky-Korsakov: A Short Biography* (1945, reprinted 1972).

rimu, also called NEW ZEALAND RED PINE, or IMOU PINE (*Dacrydium cupressinum*), coniferous timber tree of the family Podocarpaceae, native to New Zealand. The rimu tree may attain a height of 45 metres (150 feet) or more. The wood is reddish brown to yellowish brown, with a distinctive figuring, or marking, of light and dark streaks. It is made into furniture and interior fittings and is used in general construction. The bark contains a tanning agent that colours leather red.

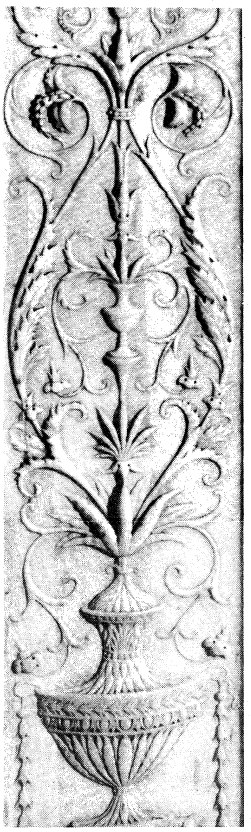
rímur (Icelandic: "rhymes"), Icelandic metrical romances produced from the 14th to the 19th century. They combine an end-rhymed metrical form derived from Latin hymns with the techniques of syllable counting, alliteration, and internal rhyme used by the earlier Norse court poets, the skalds. *Rímur* also preserve the skald's elaborate diction but in a stereotyped fashion as though the original meaning of complex epithets had been lost. Most *rímur* are long narratives based on native tradition or foreign romances. Often a long prose saga was converted into a *rímur* cycle. Either the first *ríma* or all the *rímur* were prefaced by a *mansöngr,* originally a courtly love poem, but, later, sometimes by a dedication to a patron or a comment on the story. Though not high in literary quality, *rímur* are important for preserving the skaldic diction and the content of lost sagas.

Rin-chen-bzang-po, also spelled RICHEN ZAMPO (b. 958—d. 1055), Tibetan Buddhist

monk, called the "Great Translator," known primarily for his extensive translations of Indian Buddhist texts into Tibetan, thus furthering the subsequent development of Buddhism in Tibet. First sent to India in the late 10th century under Tibetan royal patronge, Rin-chen-bzang-po eventually succeeded in bringing back to Tibet a number of Indian Buddhist monks with whom he then collaborated in both the new translation of Indian Buddhist texts and in the revision of old 8th-century translations. His life's work includes more than 150 translations, encompassing both canonical works and exegetical treatises.

Rinaldo DEI SEGNI: *see* Alexander IV *under* Alexander (Papacy).

rinceau, in architecture, decorative border or strip, featuring stylized vines with leaves and



Detail of rinceau ornament from the church of SS. Annunziata, Florence, by Michelozzo, 1455

Alinari—Art Resource/EB Inc.

often with fruit or flowers. It first appears as a decorative motif in classical antiquity. Roman rinceau most often consisted of an undulating double vine growing from a vase. Branches, vines, and thistles are mixed together in Gothic rinceaux, and in Renaissance examples tiny animals or human heads appear.

During the 17th century the rinceau returned to the simpler classic style, and in the 18th century it was treated far more freely, with less rigid repetition of identical forms. In classical Greco-Roman architecture the rinceau is generally found in a frieze, the middle element of an entablature, immediately beneath the cornice.

Rincon, Emanuele Gioacchino Cesare: *see* Astorga, Emanuele (Gioacchino Cesare Rincon, barone) d'.

rinderpest, also called STEPPE MURRAIN, CATTLE PLAGUE, OR CONTAGIOUS BOVINE TYPHUS, a viral disease of ruminant animals, primarily cattle, common in North Africa, India, and parts of Southeast Asia. It has occurred in Brazil and Australia but was quickly eradicated. Rinderpest has not been reported in the United States. It is an acute, highly contagious disease characterized by sudden development and high mortality.

After an incubation period of three to nine days, depression and loss of appetite occur, accompanied by fever. Discharges from the eyes and nose and salivation, mouth ulcers, and a disagreeable fetid odour are characteristic. Other symptoms include diarrhea, emaciation, and dehydration, often with dysentery, and eventually marked straining to evacuate. In many cases a skin eruption (streptothricosis) develops on the back and flanks. Prostration, coma, and death come usually after four to eight days.

Eradication of rinderpest depends on control of the disease in wild animals and elimination of infected domestic animals. Immunization by vaccine combined with quarantine appears to be the most promising method of control.

Rinehart, Mary Roberts, *née* ROBERTS (b. Aug. 12, 1876, Pittsburgh—d. Sept. 22, 1958, New York City), novelist and playwright best known for her mystery stories.

After receiving nurse's training, in 1896 she married Stanley M. Rinehart, a physician. During the depression in 1903, she turned to writing. Her work proved highly popular almost from the beginning. *The Man in Lower Ten*, serialized in 1907, was followed by her first book, *The Circular Staircase* (1908). In addition to detective stories, she wrote a long series of comic tales about a dauntless spinster named Tish and her adventures with two friends; these appeared in *The Saturday Evening Post* through many years. Of her plays, mostly written in collaboration with Avery Hopwood, the most successful was *The Bat* (1920). She also wrote romances and several books of travel, some of which reflected



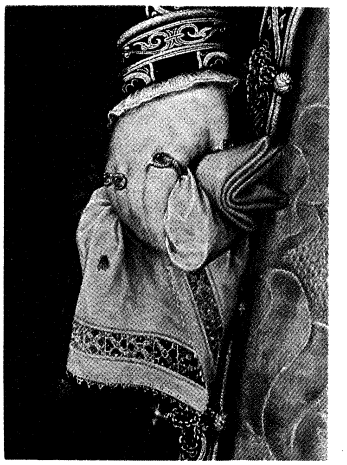
Mary Roberts Rinehart

EB Inc.

her experiences as a war correspondent during World War I.

ring, circular band worn on the finger or toe. The symbolic significance of the ring is based on its being considered substantially a magic circle. Originating as a sign of authority, it was also a symbol of the bond between a sovereign and his people or between the upper hierarchies of the church and God, as well as a symbol of marital unity and fidelity. From the Gothic period onward, the ring was also used as an ornament.

Basically, the ring consists of three parts: the circle, the shoulders, and the bezel. The circle can have a circular, semicircular, or square cross-section, or it can be shaped as a flat band. The bezel shoulders can be constituted by a thickening or enlargement wide enough to receive a gem, can be extended into a cone or pyramid, or can consist of modelled decoration with floral or figure motifs such as caryatids or animals. The bezel can be created



Rings on the hand of Catherine of Austria, detail of portrait by Antonio Moro, 1552; in the Prado, Madrid

By courtesy of the Museo del Prado, Madrid

within the thickened part of the shoulders; it can be a round, oval, or spool-shaped piece fastened atop the circle and sometimes raised considerably above it; it can also rotate on pins placed at the ends of an open circle; and it can sometimes be opened.

The earliest rings were made of gold and had a round, oval, or (rarely) rectangular bezel, sometimes of gold with engraved or embossed figures, sometimes a hard stone engraved with figures or a seal. In Egypt, rings used the same symbolic motifs as did other jewelry—the lotus flower, Isis knot, Horus eye, falcon, serpent, vulture, sphinx, and scarab (*q.v.*). In the Hellenistic period the bezel began to be used to hold individual cabochon stones, such as carnelians and garnets, or vitreous pastes.

During the Roman era, the serpentine shape was widely used, as were bezels set with coins. Rings were also fastened so that the two fingers on which they were worn were held together. The most characteristic rings of the Byzantine period are openworked bands or rings with a hollow spheroid bezel pierced with a very fine design. Teutonic tribes produced rings with a rhombohedral rotating bezel, the upper surfaces of which were coloured with various vitreous pastes. In the north, under the influence of Scythian and Celtic art, rings bore the interlaced figures of animals modelled in gold. In the early and late Middle Ages, until the Gothic era, a type of ring was developed with a very protuberant bezel that was conically shaped or decorated with leaves and heraldic animals. During the late Gothic period, hexagonal rings were also fashionable, as were those with lovers' inscriptions and those formed from two circles, each of which bears a hand so placed that, when the two circles are fitted together, the hands are clasped. The Renaissance ring, sometimes worn on the thumb, is modelled in high relief and has complicated decorations based on architectural motifs; it is almost always embellished with enamelling, tiny pearls, and stones of different colours. Rings with bezels that opened may have held sentimental keepsakes in miniature or, like a ring in the Museo Poldi Pezzoli in Milan, a tiny heart, realistically modelled and coloured with enamel; according to romantic tradition, they also may have held poison. The enormous papal ring, or Fisherman's Ring—made of gilded bronze and bearing the image of St. Peter fishing—was used as a seal for pontifical documents.

Rings of the 17th and 18th centuries, like other jewelry, were enriched with precious stones, and the bezel became long and oblong shaped (marquise). Influenced by Greco-Roman models, late 18th-century rings were ornamented with engraved stones or cameos surrounded by brilliants. In the 19th century there were rings of all kinds, nearly always inspired by past styles. The bezel often bore new minerals, imported from distant countries. There was an ever greater preference for emeralds, rubies, and diamonds.

In India, rings were worn on the toes as well as the fingers, a custom also adopted in many regions of Africa. In pre-Columbian America, however, the ring was entirely unknown.

ring, in mathematics, a set having an addition that must be commutative ($a + b = b + a$ for any a, b) and associative [$a + (b + c) = (a + b) + c$ for any a, b, c], and a multiplication that must be associative [$a(bc) = (ab)c$ for any a, b, c]. There must also be a zero, an identity element, negatives of all elements, and a distributive law relating addition and multiplication [$a(b + c) = ab + ac$ and $(a + b)c = ac + bc$ for any a, b, c]. A commutative ring is a ring in which multiplication is commutative—*i.e.*, $ab = ba$ for any a, b.

Ring Nebula (catalog numbers NGC 6720 and M 57), bright nebula in the constellation Lyra, several thousand light-years from the Earth. It was discovered in 1779 by the French astronomer Augustin Darquier. Like other nebulae of its type, called planetary nebulae, it is a sphere of glowing gas thrown off by a central star. Seen from a great distance, such a sphere appears brighter at the edge than at the centre and thus takes on the appearance of a luminous ring. It is a popular object for amateur astronomers.

ring-necked duck (species *Aythya collaris*), diving duck (family Anatidae), a popular game bird considered excellent table fare. The ring-necked duck is about 43 cm (17 inches) long. The male has a purplish black, iridescent head, a black back, and gray sides with a vertical wedge-shaped white patch in front of the wing. The female is brown with a white eye ring. Both sexes have an inconspicuous brown neck ring, but the two white rings on the bill are distinct. It breeds mainly in the prairie provinces of Canada and prefers to winter on fresh water. The ring-necked duck is a plant eater, but it feeds at shallower depths than those frequented by other diving ducks and will return to favourite feeding grounds even when hunted there. The nest, built of flattened reeds, often floats on vegetation in shallow water.

ring-necked snake (*Diadophis punctatus*), sole species of snake in the genus *Diadophis* of the family Colubridae. There are about a dozen subspecies. Ring-necked snakes grow to a length of 60 cm (24 inches) and are usually found under logs or rocks in the western United States and across the Mexican plateau. Ring-necked snakes feed on insects, worms, frogs, lizards, salamanders, and smaller snakes. When disturbed, the ring-necked snake coils up into a ball with its head in the centre and raises its tail to show the red or yellow underside, which simulates a more dangerous head.

ring-ouzel (bird): *see* ouzel.

Ringan: *see* Ninian, Saint.

Ringatu, oldest and most spiritual Maori prophetic movement in New Zealand. It was founded in 1867 by the Maori guerrilla leader Te Kooti (1830–93) while he was imprisoned on the Chatham Islands. His deep Bible study produced a new, gentle Maori religion that included traditional taboos and faith healing. The movement spread after his escape to the mainland in 1868 and his pardon in 1883.

Services are held in tribal meetinghouses on Saturdays and on the 12th day of each month, when a love feast and a communion without bread or wine is celebrated. The entirely memorized liturgy includes thematic medleys of Bible verses, songs, chants, and prayers and ends with all members raising their right hands in homage (hence the name Ringatu, or "Upraised Hand"). Te Kooti is celebrated as prophet and martyr, and Ringatu identified with suffering Israel. The liturgy was first printed in the 1960s as *The Book of the Eight Covenants of God and Prayers of the Ringatu Church.*

ringed seal (species *Pusa,* sometimes *Phoca, hispida*), nonmigratory, earless seal (family Phocidae) of North Polar seas and a few freshwater lakes in Europe and on Baffin Island. Named for the characteristic pale rings on its grayish or yellowish coat, the ringed seal grows to about 1.5 m (5 feet) in length and 90 kg (200 pounds) in weight. It lives near the pack ice and feeds on crustaceans, mollusks, and some fish. The female bears a single white-coated pup each year in a den dug into the snow. A common species, the ringed seal is important to the Inuit (Eskimos) as a source of leather, oil, and meat.

Ringerike, *kommune* ("commune") and geographic region, Buskerud *fylke* (county), southeastern Norway, just northwest of Oslo. The region covers a total area of 600 square miles (1,553 square km) adjacent to the northern shore of Tyri Lake and northward to Rands Lake. The Ringerike was inhabited as early as AD 200 and existed as a petty kingdom in the 8th and 9th centuries. During the 10th century Norway's greatest early kings, Olaf I Trygvasson and Olaf II Haraldsson, grew up at Bønsnes in Ringerike. When Christianity was established in the region during that century, a form of art emerged known as Ringerike style, a unique style of ornamentation on wood, stone, and metal that used plant forms as the basis of the designs. The Ringerike had a flourishing timber industry that peaked in the 17th century. Throughout the 19th and early 20th centuries, lead mining was carried out in the region, and by 1870 one-seventh of the world's lead came from local mines. Today, agriculture, lumbering, and wood-pulp mills are the main economic activities; ample hydroelectric power is produced by the Begna and Rands rivers. Pop. (1989 est.) 27,133.

Ringer's solution, one of the first laboratory solutions of salts in water shown to prolong greatly the survival time of excised tissue; it was introduced by the physiologist Sidney Ringer in 1882 for the frog heart. The solution contains sodium chloride, potassium chloride, calcium chloride, and sodium bicarbonate in the concentrations in which they occur in body fluids. Mammalian Ringer's solution (Locke's, or Ringer-Locke's, solution) differs in that it contains glucose and more sodium chloride than the original solution.

ringing: *see* change ringing.

Ringkøbing, *amt* (county), Denmark, covering a rectangular area (1,874 square miles [4,853 square km]) bounded by the smooth dune and lagoon coast of western Jutland between Nissum Bay in the north and Ringkøbing Fjord in the south, and extending about 40 miles (65 km) inland. The soil is mainly sandy and poor with tracts of unreclaimed heath but supports mixed agriculture. The principal cities, Herning and Holstebro, lie inland. Struer, Lemvig, and Ringkøbing (the county seat, founded in the 14th century) are minor ports and resorts. Pop. (1988 est.) 266,554.

Ringling Brothers, original surname RÜNGELING, family of American circus proprietors who created the Ringling Brothers circus empire in the late 19th century.

The members active in founding and running the family's circus enterprises were all brothers: Albert C. (1852–1916), Otto (1858–1911), Alfred T. (1861–1919), Charles (1863–1926), John (1866–1936), and occasionally August G. (1854–1907) and Henry (1869–1918) Ringling.

The sons of August Rüngeling, a German-born harness maker, Charles, Albert, Otto, Alfred, and John in 1882 formed a song-and-dance troupe, the Classic and Comic Concert Co., and went on the road with it for two seasons. They began adding circus acts to their show, and in 1884 they organized their first small circus and opened it in their hometown, Baraboo, Wis., from which they toured the Midwest. Their progress was slow until they acquired their first elephant in 1888, after which the circus expanded rapidly. Charles was the guiding managerial force behind the



John Ringling
Keystone—EB Inc.

circus for many years. In 1890 the Ringling Brothers first began loading their circus wagons on railway cars, enabling them to make a much longer tour. By 1900 the Ringling Brothers were actively competing with the Barnum & Bailey Circus, and they subsequently started buying up other circuses. They acquired the Forepaugh-Sells Circus in 1906, and, after Bailey's death in 1906, they bought the Barnum & Bailey Circus in 1907, thus becoming the leading circus in the country.

After Charles' death in 1926, John ran the empire alone for ten years. In 1929 he bought the American Circus Corporation, thus bringing a total of 11 major circuses under Ringling control. By this time the Ringling Brothers and Barnum & Bailey Circus had a maintent seating capacity of 10,000. John died in 1936, and the circus finally passed out of the Ringling family's hands in 1967.

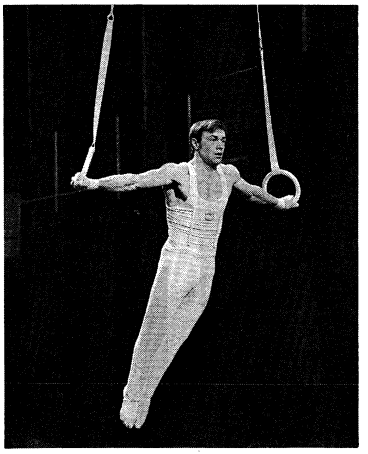
The Ringling Museum of the Circus is in Sarasota, Fla. Many of their original circus wagons have been restored and are exhibited at the Circus World Museum in Baraboo, Wis.

Ringo, Johnny, byname of JOHN RINGO (d. July 14, 1882, Tombstone, Ariz., U.S.), American Western outlaw, a loner, noted for his deadly fast draw.

Not much is known of Ringo, not even his birthplace. He showed up first in Mason county, Texas, in 1875, where he was suspected of cattle rustling and arrested for a double murder. He escaped from jail, was rearrested, and was released. He appeared next in Galeyville, N.M., in 1879, already possessing a reputation as a killer. In 1881 he was in Tombstone, Ariz., where he was apparently among those opposed to the faction led by Wyatt Earp and Doc Holliday. On July 14, 1882, in Tombstone, he was discovered dead, apparently a suicide, after a long bout of drinking and despondency. Other accounts suggest that he was murdered, perhaps by a

drinking crony, Frank Leslie, or by Wyatt Earp.

rings, also called STILL RINGS, or STATIONARY RINGS, gymnastic apparatus consisting of two small circles that are suspended by straps from an overhead support and grasped by the gymnast while he performs various exercises. The rings were invented in the early 19th century by the German Friedrich Jahn, known as the father of gymnastics. They require the most strength of any gymnastic event, although



Iron cross performed on the rings
Stewart Fraser—Colorsport

since the 1960s the trend in competition, for men only, has been toward a style of performance that emphasizes swinging, somewhat diminishing the demand of strength.

The rings are made of wood or of metal and are 28 mm (1.1 inch) in thickness and with 18 cm (7.1 inches) inside diameter. They are suspended by straps mounted 5.5 m (18 feet) above the floor with the rings themselves hanging 2.5 m (8.2 feet) above the floor and 50 cm (19.7 inches) apart.

Competitive exercise on the rings must be performed with the rings in a stationary position (without swinging or pendulum movement of the rings). It combines swinging movements of the body, strength, and holding of positions. There must be at least two handstands in an exercise, one attained by strength and the other utilizing swing. Typical strength movements on the rings include the cross, or iron cross (holding the body vertical with the arms fully stretched sideways), and the lever (hanging with straight arms with the body stretched out horizontally). *See* Sporting Record: *Gymnastics. See also* Olympic Games.

Ringsaker, town, Hedmark *fylke* (county), southeastern Norway. It lies along the eastern shore of Mjøsa, the largest lake in Norway. Situated along the main road and rail line between Oslo and Trondheim, Ringsaker lies in a rich agricultural and lumbering region. Tourism is based mainly on the scenery of the lake area, a 12th-century church, and a nearby 13th-century castle. Pop. (1989 est.) mun., 30,960.

ringtail: *see* raccoon.

ringtailed cat, carnivorous mammal, a species of cacomistle (*q.v.*).

Ringuet: *see* Panneton, Philippe.

ringworm, superficial skin lesions caused by certain fungi that live and multiply on the surface of the skin and feed on keratin, the horny protein constituting the major part of the outermost layer of the skin and of the hair and nails. The fungi produce responses in the skin that vary from slight scaling to blistering and marked disruption of the keratin layer. The lesions are usually round or ring shaped and can be either dry and scaly or moist and covered with vesicles (blisters), depending on the body area and the type of fungus involved.

Ringworm is also referred to as tinea, this word being usually followed by a modifying term indicative of the body area or characteristics of the lesions specifically involved. Thus, ringworm of the scalp, beard, and nails is also referred to as tinea capitis, tinea barbae or tinea sycosis, and tinea unguium (also called onychomycosis), respectively; ringworm of the body, groin, hands, and feet, as tinea corporis, tinea cruris (also called jock itch), tinea manuum, and tinea pedis, respectively. Tinea pedis is commonly referred to as athlete's foot, which may be either of the dry or inflammatory type. In the latter type, the infection may lie dormant much of the time and undergo occasional acute exacerbations, with the development of vesicles (blisters) affecting chiefly the skin folds between the toes; the dry type is a chronic process marked by slight redness of the skin and dry scaling that may involve the sole and sides of the foot as well as the toenails, which become thick and brittle.

Varieties of ringworm that are characterized by specific skin lesions include: Oriental or India ringworm, or tinea imbricata (Latin: "overlapping like tiles"), so called because it occurs chiefly in tropical climates and consists of concentric rings of overlapping scales; crusted, or honeycomb, ringworm, also called favus, a ringworm of the scalp, characterized by the formation of yellow, cup-shaped crusts that enlarge to form honeycomb-like masses; and black dot ringworm, also a ringworm of the scalp, deriving its distinctive appearance and name from the breaking of the hairs at the scalp surface. Except for ringworm of the scalp, which tends to be highly contagious, the contraction of ringworm depends to a large extent on individual susceptibility and predisposing factors, such as excessive perspiration. Ringworm can be effectively treated in many instances with griseofulvin, a fungistatic agent. Limited exposure to ultraviolet radiation may also be helpful.

Rinzai, one of two major Zen Buddhist sects in Japan; it stresses the abrupt awakening of transcendental wisdom, or enlightenment. Among the methods it practices are shouts (*katsu*) or blows delivered by the master on the disciple, question-and-answer sessions (*mondō*), and meditation on paradoxical statements (*kōan*), all intended to accelerate a breakthrough of the normal boundaries of consciousness and to awaken insight that transcends logical distinctions.

The sect was founded in China, where it is known as Lin-chi, in the 9th century by I-hsüan and was transmitted to Japan in 1191 by the priest Eisai. It became important culturally as well as religiously during the Kamakura period (1192–1333) under the patronage of lords and warriors and remained influential during the Ashikaga period (1338–1573). The celebrated master Hakuin was a major reformer of Rinzai during the 18th century.

Modern Rinzai is divided into 15 subsects. Among its great temples are the Tenryū and the Myōshin temples in Kyōto and the Kenchō and the Engaku temples in Kamakura. *See also* Sòtō.

Rio (Brazil): *see* Rio de Janeiro.

Rio Branco, city, capital of Acre *estado* ("state"), western Brazil. It lies on the west bank of the Acre River, and just north where the Branco River (Rio Branco) flows into the Acre. A commercial and distribution centre, Rio Branco exports rubber, metals, medicinal plants, Brazil nuts, and timber. Petroleum and alcohol fuels are processed there. The Federal University of Acre (1971) is located in Rio Branco. The city is linked by road and air routes with Brasília, the federal capital, and Manaus, which is also accessible by river transport. Pop. (1985 est.) 145,486.



Governor's Palace, Rio Branco, Braz.
Epaminondas Carneiro, Lima

Rio Branco Law, also called LAW OF FREE BIRTH, Portuguese LEI DO VENTRE LIVRE, measure enacted by the Brazilian parliament in 1871 that freed children born of slave parents. The law was passed under the leadership of José Maria da Silva Paranhos, Viscount do Rio Branco, premier during 1871–73, and Joaquim Nabuco de Araujo, a leading abolitionist. Although the children were set free, the measure allowed the parents' owners to require such children to work until they reached age 21.

The final success of the Brazilian abolition movement came in 1888, when slavery was finally abolished altogether without compensation to the owners. At that time approximately 700,000 slaves were set free out of a total population of about 15,000,000.

Rio Claro, city, in the highlands of east-central São Paulo *estado* ("state"), Brazil. It is situated at 2,050 feet (625 m) above sea level along the Corumbataí River. Formerly called São João Batista da Beira do Ribeirão Claro and São João Batista do Morro Azul, it was given town status in 1845. Rio Claro is now the trade and processing centre for an agricultural region producing coffee, cotton, rice, sugarcane, and other crops. The city's light industries include the manufacture of machinery, shoes, furniture, and textiles. Goods are transported to São Paulo, the state capital, 112 miles (180 km) southeast, and elsewhere by rail, road, and air. Pop. (1985 est.) 129,859.

Río Cuarto, city, southwestern Córdoba *provincia,* northwestern Argentina. It lies along the Cuarto River between the western reaches of the Pampas and the foothills of the Sierra de los Cóndores and La Grande de Córdoba. The city was inaugurated in 1794 under the sponsorship of Governor Rafael de Sobremonte, the Spanish intendant. It was the site of several skirmishes during the civil wars (1820–30). The city is a rail junction with an agricultural economy (fruit, meat-packing, and flour milling) and some light industrial development. Notable landmarks include the cathedral, dating from 1797, and the Municipal Museum of Fine Arts (1933). Pop. (1980) 110,254.

Rio de Janeiro, *estado* ("state") of southeastern Brazil, bounded by the states of Espírito Santo (north), Minas Gerais (west), and São Paulo (southwest), while to the east lies the Atlantic Ocean. The state's name is derived from the city of Rio de Janeiro, which exerted a strong influence on its formation. The state has an area of 17,092 square miles (44,268 square km), of which

370 square miles (960 square km) consist of coastal lagoons and other internal waters. The capital is the city of Rio de Janeiro.

The history of the state is enmeshed with that of the city of Rio de Janeiro, its chief economic and political centre from the early 16th century until 1834, when the city first became a separate entity. In 1835 Niterói became the capital of the province of Rio de Janeiro. In 1889, when the Brazilian republic was proclaimed, the province became a state, and in 1890 Teresópolis became the capital; in 1902, however, the seat of government returned to Niterói. When the capital of Brazil was moved to the newly established city of Brasília in 1960, the territory that had been the Federal District became the new Guanabara state, which existed as an enclave within Rio de Janeiro state. In 1975 the two states were merged into the reorganized State of Rio de Janeiro. The city of Rio de Janeiro was then made the capital of the reorganized state.

From the time of its territorial formation, the province depended on sugar production, based on slave labour, as the basis of its economy. During the 19th century, coffee replaced sugar as the most commercially significant crop, enriching the landowners of the Paraíba Valley, who constituted the ruling group of the Brazilian Empire until the abolition of slavery in 1888 and the proclamation of the republic in 1889.

The state's relief has three distinct features: the plain, or coastal lowland; the mountainous highland; and the plateau of the interior. The coastal lowland—broken by occasional massifs or rocks that sometimes extend far into the sea, as happens at Cape Frio and Saquarema and along the stretch of coast opposite the offshore island of Grande—is narrower to the west, where the Mar Mountains compress it against the sea. The prevailing climate is hot and humid and is characterized by summer showers. In winter the climate is modified by cold air masses from the south. The average daily temperature is generally above 72° F (22° C).

The mountainous highland comprises part of the Mar Mountain Range and, farther inland, part of the Mantiqueira Range, both of which run parallel to the coast in a roughly southwest-to-northeast direction. Some important tourist and holiday resorts—Petrópolis, Teresópolis, and Nova Friburgo—lie in this region, which is characterized by mild temperatures that average below 68° F (20° C) because of the high elevation. The highest summits are found in the Órgãos Range and in the Massif of Itatiaia, where the Agulhas Negras Peak reaches an elevation of 9,144 feet (2,787 m).

The most important area in the landscape of the plateau is the Paraíba do Sul River valley. Coffee plantations were first developed there in the 19th century. The temperatures remain mild at the highest elevations but grow progressively hotter descending toward the bed of the Paraíba do Sul River, which flows northeastward before turning eastward to drain into the Atlantic in the northeastern part of the state. At the level of the river itself, the climate is tropical and the temperatures are high.

Destruction of the humid tropical forest that originally covered the territory of the present state of Rio de Janeiro began in the 16th century with the introduction of the *queimadas* (slash-and-burn) technique, used by Indians and European settlers alike to clear tracts of land for temporary cultivation. The clearing of the forest cover continued with the cultivation of sugarcane on plantations, was intensified with the expansion of coffee growing, and was completed with the progress of urbanization. In the mid-20th century the Brazilian government undertook reforestation of large areas on the hillsides and massifs, granting the areas protection as national parks and thus helping to preserve remains of the original forest. Part of the area, commonly known as the Forest of Tijuca (8,200 acres [3,300 hectares]), was established by the federal government as a national park in 1961 to help preserve both vegetation and animal life. About 74,000 acres (30,000 hectares) of the Órgãos Mountains have been made a national park, and 29,500-acre (11,900-hectare) Itatiaia National Park was created on the Massif of Itatiaia in the Mantiqueira Range on the border with Minas Gerais state. Trees represented in the parks include jequitibas, perobas, and imbuias, as well as ferns and palm trees.

Apart from these public parks some patches of forest vegetation still survive on a few hillsides near the city of Rio de Janeiro, but these are disappearing as the urbanized area is gradually enlarged. On the Santa Cruz, Campo Grande, and Jacarepaguá plains, grassland prevails, whereas on the muddy coastland red, yellow, and white mangroves flourish.

Animals continue to inhabit the forests, but human predation in earlier periods and the continuing extension of the urban perimeter have forced the animals into the thickest parts of the forest reserves or to a few natural shelters. Still found in these areas are the black-tailed, soft-furred nail monkey, or mico; a type of squirrel called *caxinguelê* (*Sciurus ingrami*); a tinamou (bird) called *macuco* (*Tinamus solitarius*); and the ocelot, as well as more common animals such as parrots, anteaters, armadillos, raccoons, bush dogs, opossums, and snakes.

The state has one of the highest urbanization rates in Brazil, with the overwhelming majority of the population living in the city of Rio de Janeiro and other urban centres. The vast majority of the state's inhabitants are Roman Catholic, with Protestant and Spiritist (believers in spiritualism) minorities.

Medical facilities in the late 20th century were provided by a large number of hospitals and medical centres. The educational system includes public primary and secondary schools and several universities; there also are many independent schools that provide higher education.

A small percentage of the working population of the state is engaged in agriculture, a substantial proportion in manufacturing, and the majority in service industries. Agriculture, however, accounts for only about one-sixth of the state's income, whereas manufacturing produces about one-third and service industries account for a little more than half. The principal industries are metallurgy, printing, shipbuilding, and oil refining, and manufactured products include textiles, foodstuffs, and chemicals. Agricultural products include sugarcane, oranges, and bananas.

Less than one-fifth of the state's roads are paved. The Central do Brasil and the Leopoldina railroads link the state with Brazil's national rail network. The Rio–Niterói Bridge, which is about 9 miles (14.5 km) long, connects the city of Rio de Janeiro with Niterói, located on the east side of Guanabara Bay. Ferry and hydrofoil services also link the two cities. The state has two airports: Santos Dumont, on Guanabara Bay within the city of Rio; and Galeão, on Governador Island in the bay, which was opened in 1977 for international as well as domestic flights.

In the late 20th century the State of Rio de Janeiro had numerous museums, cinemas and theatres, and many broadcasting stations. A large number of daily newspapers were also published in the state. Pop. (1988 est.) 13,556,100.

Rio de Janeiro, byname RIO, city and port of Brazil, and capital of the *estado* ("state") of Rio de Janeiro. Founded in 1565 and laid out as a medieval citadel in 1568, the city is located on the coastal plain and the slopes of coastal mountains on the shores of Guanabara Bay on the Atlantic Ocean. The entrance to the bay is marked by Açúcar ("Sugar Loaf") Mountain. The city has grown to its present size and prosperity for three main reasons: its proximity to the two most economically productive and heavily settled regions of Brazil, São Paulo and Minas Gerais; its status as the capital of Brazil from 1763 to 1960; and its port, one of the best in South America.

A brief treatment of Rio de Janeiro follows. For full treatment, *see* MACROPAEDIA: Rio de Janeiro.

The climate of Rio de Janeiro is humid and tropical and is strongly affected by the city's proximity to the ocean. The average daily winter (mid-June to mid-September) temperature is 68° F (20° C), and the average daily summer (mid-December to mid-March) temperature is about 79° F (26° C); mean annual rainfall totals 44 inches (1,100 mm).

Rio de Janeiro is the second largest manufacturing centre of the country, São Paulo being the largest. The production of pharmaceuticals and clothing and footwear, together with building, metallurgy, food and tobacco processing, glassworking, publishing and printing, and shipbuilding, are the major industries. The service sector, however, is the most important aspect of the economy, and recreation and tourism are important sources of income. A major commercial and financial centre, Rio de Janeiro and its metropolitan area house many corporate headquarters and large banks, and its stock market is one of the most important in the country. The city's port receives and distributes considerable amounts of foreign and national products, serving large regions in southern, northeastern, and southeastern Brazil.

The three main sections of Rio de Janeiro are the Centre and the North and South zones. Skyscrapers, the stock market, municipal and state government buildings, major libraries, museums, and theatres are in the main business district in the Centre, while the South Zone includes some popular beaches (*e.g.*, Copacabana), the statue of Christ the Redeemer on Mount Corcovado, and Rodrigo de Freitas Lake. A significant proportion of the population inhabits shantytowns (*favelas*), located mainly on the steep hillsides and swampy shorelands of the South. The larger North Zone includes the Maracanã soccer stadium, the National Museum of Fine Arts, and the Church of Our Lady of the Rock.

Rio de Janeiro, which has one of the highest literacy rates and educational levels in the country, is the site of several universities, a large number of other institutions of higher education, and many adult-education programs. Other cultural institutions include the Brazilian Academy of Sciences, the Municipal Theatre, the National Library, and the National Museum. The city's well-known annual Carnaval is a major tourist attraction.

Rio de Janeiro is linked by highways, railroads, and air routes with the other major cities of Brazil. Travel in the metropolitan area has been facilitated by the 9-mile (14.5-kilometre) bridge across Guanabara Bay. A subway system (Metrô) opened in 1979. The Galeão International Airport is located on Governador Island. Area city, 452 square miles (1,171 square km); metropolitan area, 2,496 square miles (6,464 square km). Pop. (1980) city, 5,615,149; (1985 est.) metropolitan area, 10,217,269.

Rio de Janeiro, Protocol of (1942), treaty settling possession of the disputed Oriente region on the border of Peru and Ecuador, arranged by a conference of Western Hemisphere foreign ministers held at Rio de Janeiro. Peruvian forces had occupied the area in 1941, defeating the poorly equipped Ecuadorian army. Initial attempts by the United States, Argentina, and Brazil to arrange a peaceful

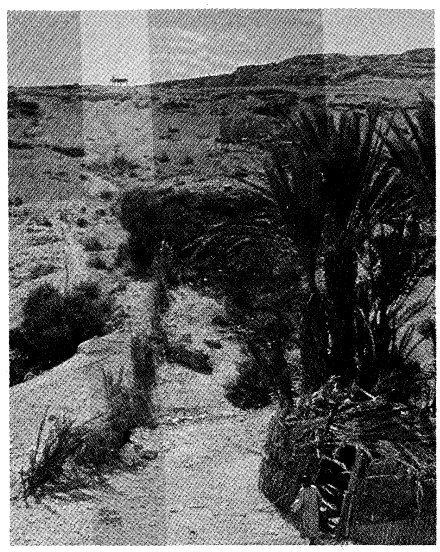
settlement had failed, but at the conference in 1942 these powers, joined by Chile, compelled Ecuador to agree to the settlement, by which it ceded about 77,000 square miles (200,000 square km) of the disputed territory to Peru. The precise border was never established, and in 1960 the president of Ecuador, José María Velasco Ibarra, repudiated the treaty, thus leaving the dispute unresolved.

Río de la Plata, Viceroyalty of the, Spanish VIRREINATO DEL RÍO DE LA PLATA, the final of the four viceroyalties that Spain created during its colonization of Central and South America. Including the territory now comprising Argentina, Uruguay, Paraguay, and Bolivia, the new viceroyalty (established in 1776) controlled an area previously under the administration of the Viceroyalty of Peru. The decision to create a fourth viceroyalty was a result of King Charles III's desire to decentralize the rule of his Spanish-American empire and of a recognition that the area south of Brazil required greater military defenses in view of Portuguese encroachments along the northern shore of the Río de la Plata. Spain also wanted to curtail contraband trade between Portuguese Brazil and Buenos Aires. In addition, by the 1760s the British had made clear their intention to take the Falkland (Malvinas) Islands. Although Spain pressured the British out of temporary possession of the islands, the need for greater military control of the South Atlantic region had become apparent.

In 1776 the first viceroy of Río de la Plata—Pedro de Cevallos—arrived in Montevideo with a large force of men and ships. Cevallos pushed the Portuguese back and organized a new government in Buenos Aires before being supplanted by another viceroy just a few months after taking office. The viceroys following Cevallos—Juan José de Vértiz y Salcedo (1778–84), Nicolás Francisco Cristóbal del Campo, marqués de Loreto (1784–89), and Nicolás de Arredondo (1789–95)—administered the region well, as did four others who served briefly between 1795 and 1804. During these years the viceroyalty in general and the city of Buenos Aires in particular became a flourishing outpost of the Spanish empire. Silver from the Potosí mines, previously exported via Peru, was sent through Buenos Aires. An enormous demand grew for salted meat—especially in Cuba and Brazil and other areas where slaves were fed cheaply—spurring an era of unprecedented prosperity. Hides and other cattle products also brought wealth to the pampas and to Buenos Aires.

In 1804 Rafael, marqués de Sobremonte, assumed the viceregal post. Twice (1806, 1807) during his term the British invaded, and twice he fled. The creole population of Buenos Aires successfully fought off the invaders on both occasions, in the process gaining confidence in their ability to govern and defend themselves. In 1810 the creoles created a provisional junta and exiled the viceroy to the Canary Islands, thereby ending the Viceroyalty of the Río de la Plata and launching the independence movement.

Río de Oro, southern region of Western Sahara, western Africa. It has an area of 71,000 square miles (184,000 square km) and lies between Cape Blanco and latitude 26° N, near Cape Bojador. The climate is very arid, with virtually no rainfall, and there are extreme variations of temperature in the interior, ranging from 32° F (0° C) at night to 149° F (65° C) in the afternoon. Its principal town, Dakhla (formerly Villa Cisneros), has a small port and must rely on imported drinking water. The narrow inlet of the Atlantic Ocean at Dakhla was called by the Portuguese the Río de Oro ("River of Gold"), because the local inhabitants traded the gold dust of western Africa. In 1884 Río de Oro was occupied by a Spaniard, and the Spanish government claimed a protectorate over the adjoining coast. After the



Oasis in Río de Oro, Western Sahara
S-E. Hedin—Ostman Agency

Spanish withdrawal in 1976, the region was under de facto Mauritanian administration in the south and Moroccan occupation in the north. The presence of both countries was contested by guerrillas of the Popular Front for the Liberation of Saguia el Hamra and Río de Oro (Polisario Front). In 1979 the Mauritanian government abandoned any claim to the area, and it was occupied by Morocco. Polisario forces, however, actively campaigned against Moroccan occupation into the late 20th century. The non-European inhabitants are Muslim and largely nomadic Berbers. Pop. (1982) Dakhla, 17,309.

Río Gallegos, city, capital of Santa Cruz *provincia,* extreme southern Argentina, on the southern bank of the estuary of the Gallegos River, inland from the Atlantic Ocean. It is about 40 miles (65 km) north of the Strait of Magellan. Founded in 1885, it was named after Blasco Gallegos, one of Ferdinand Magellan's pilots, who is credited with discovering the river. Prehistoric cave paintings near the city are reminiscent of the Lascaux cave paintings in Dordogne, France. Río Gallegos is the centre of the Patagonian sheep trade and exports frozen mutton, sheepskins, and *gamulanes* (leather coats). The deepwater port of Punta Loyola, at the mouth of the estuary of the Gallegos River, serves as the outlet for Argentina's bituminous coalfields at Río Turbio, 130 miles (209 km) west; petroleum natural gas deposits to the north and south of Río Gallegos are exploited. The city also has a major Argentine air base. Pop. (1980 prelim.) 43,479.

Rio Grande, Spanish RÍO GRANDE DEL NORTE, or (in Mexico) RÍO BRAVO, or RÍO BRAVO DEL NORTE, river, one of the longest of North America, flowing 1,885 miles (3,034 km) from its sources in the southern Rocky Mountains of southwestern Colorado to the Gulf of Mexico and marking the entire border between Texas (U.S.) and Mexico.

A brief treatment of the Rio Grande follows. For full treatment, *see* MACROPAEDIA: North America.

The Rio Grande rises as a clear, snow-fed stream more than 12,000 feet (3,700 m) above sea level in the San Juan Mountains of Colorado and flows southeast and south 175 miles (282 km) in Colorado, south about 470 miles (756 km) across New Mexico, and southeast between Texas and the Mexican states of Chihuahua, Coahuila, Nuevo Léon, and Tamaulipas for about 1,240 miles (1,995 km) to the Gulf of Mexico. Its early course flows through forests of spruce, fir, and aspen into the broad San Luis Valley in Colorado, after which it cuts the Rio Grande Gorge and White Rock Canyon of northern New Mexico and enters the open terrain of the basin and range and the Mexican Highland physiographic provinces. Shortly before entering the Gulf coastal plain, the Rio Grande cuts three canyons between 1,500 and 1,700 feet (457 and 518 m) in depth across the faulted area occupied by the "big bend" region along the Texas–Mexico border. Along the remainder of its course the river wanders sluggishly across the coastal plain to its delta on the Gulf of Mexico.

The principal tributaries of the Rio Grande are the Pecos, Devils, Chama, and Puerco rivers in the United States and the Conchos, Salado, and San Juan in Mexico. The basin of the Rio Grande drains an area of about 172,000 square miles (445,000 square km). The peak flow occurs from about April to October. In the upper reaches of the river the highest water level is usually in May or June because of melting snow and occasional thunderstorms, while in the lower reaches of the river the highest water level is in June or September because of summer rainstorms. It has been estimated that the Rio Grande has an average annual yield of more than 9,000,000 acre-feet (1,000,000 hectare-metres), of which about one-third reached the Gulf of Mexico before the building of the Falcon Dam (1953) upstream from Rio Grande City.

More than 3,000,000 acres (1,200,000 hectares) of farmland are irrigated within the Rio Grande Basin, with about two-thirds of these in the United States. The leading crops raised by irrigation vary from potatoes and alfalfa in Colorado to cotton, citrus fruits, and vegetables along the Lower Rio Grande. After agriculture and animal husbandry, the region's main industries are mining and recreation.

Rio Grande, port city, southeastern Rio Grande do Sul *estado* ("state"), southern Brazil, on the Rio Grande (river), which is the outlet to the Atlantic of the Patos Lagoon. It is built on a low peninsula, barely 5 feet (1.5 m) above sea level and 8 miles (13 km) from the river's mouth. Where it enters the ocean, the river passes over a submerged bar that has been dredged so that oceangoing vessels can dock at Rio Grande or at Pelotas, 20 miles (32 km) northwest.

In 1737 a Portuguese fort called Estreito was built nearby; in 1745 its garrison and settlement were moved to the present site, which became a town in 1751 with the name of São Pedro do Rio Grande do Sul; it received city status in 1835. It was the capital of a captaincy until 1763, when it was occupied by Spanish forces from Buenos Aires.

Rio Grande competes with Pelotas as the outlet for the products of Rio Grande do Sul. Exports, mostly to other parts of Brazil, include *xarque* (jerked beef), hides, lard, wool, rice, wheat, *feijão* (beans), tobacco, and frozen fish and shrimp. In the city are meat-processing plants and vegetable canneries; wool, cotton, and jute textile mills; an oil terminal and a petroleum refinery; and other factories. The city is the seat of the University of Rio Grande (1969). Rio Grande is linked to Pelotas by railway and highway, and it has an airport. Pop. (1980 prelim.) 124,706.

Rio Grande do Norte, *estado* ("state") of northeastern Brazil. A primarily agricultural and salt-producing state and one of the smallest of all Brazilian states, it is bounded by the Atlantic Ocean on the north and east, by the state of Ceará on the west, and by the state of Paraíba on the south. Its area is 20,469 square miles (53,015 square km). The capital is Natal, so named for the date of its official founding, Christmas Day (Natal), 1599.

The coastal strip around Natal and south-

ward is forested, and the salt marshes in this area are economically important (the saltworks produce most of Brazil's crude and refined salt). The northern seaboard, north of Natal, is low and sandy, with dunes and coconut palms; here the deep-sea fishermen common to the Northeast—the *jangadeiros*—ride the waves in rafts formed of lightweight tree trunks and powered by small triangular sails. From this narrow coastland in the north the land rises gradually to some low mesas (*taboleiros*). Inland from Natal and the south, the land rises abruptly to the northern edge of a hilly upland known as Borborema Plateau, which stretches southward into the states of Paraíba and Pernambuco. In the western interior of the state are several mountain ranges.

Except for the coastland from Natal southward, where the prevailing winds from the Atlantic bring abundant rainfall to support a forest, the state is semiarid. The rainfall is usually so slight that the few rivers—mainly the Açu (Piranhas), the Apodi, and the Potengi—flow only intermittently. Average daily temperatures in Natal vary from 77° to 86° F (25° to 30° C), but higher elevations are cooler.

Much of the forests that formerly existed were sacrificed to sugarcane production, but there are vast areas of carnauba trees in the lowlands and coconut palms on the coast, as well as a scattering of various other tropical trees and flora. Animal life is scarce, because hunters have reduced or wiped out most of the native species.

The territory was first settled by the Portuguese in the late 16th century. As early as 1534 the Portuguese crown had considered establishing fiefdoms, or captaincies, in the region, but not until 1598, after successfully repelling local French pirates, did the Portuguese succeed in establishing the Fort of the Three Wise Kings on the future site of Natal and laying the foundation of a government. From then until 1822, when Brazil proclaimed independence, the captaincy was ruled by a succession of Portuguese commanders and governors and, for a while (1633–54), by Dutch invaders. From 1822 the province of Rio Grande do Norte was part of the Brazilian Empire until it became a state in the republic in 1889.

In the colonial period the economy centred chiefly on sugar plantations, ruled by a few wealthy families and manned largely by slaves. Cotton, introduced in the 18th century, became and remains one of the leading crops in an economy that is basically agricultural; sugarcane and cacao are also grown. Other crops include corn (maize), rice, cassava, millet, red beans, potatoes, and coconut. Cattle and horses are also raised.

In addition to the saltworks, there is some mining in the Borborema Mountains, the tungsten mines being the most important in Brazil and furnishing an important export. Other mineral products include gypsum, limestone, marble, monazite, gold, and beryl. Outside of Natal and such towns as Mossoró and Caicó, socioeconomic conditions are poor. In the towns there are factories producing textiles, clothes, oils, leather, furniture, food, tools, plastics, ceramics, paper, and cement. Schools, hospitals, housing, and other welfare services are being expanded. There are universities at Natal and Mossoró.

There are three railroads—from the harbour in Areia Branca to the city of Sousa, Paraíba, from the capital to São Rafael, and from Natal to Recife, the capital of Pernambuco. There are several highways—from Natal (also the site of an international airport) to the south of the country, cutting through various states; from the north of the country to Ceará; and from the coast to the western interior. Pop. (1988 est.) 2,236,200.

Rio Grande do Sul, southernmost *estado* ("state") of Brazil, bordered by the state of Santa Catarina (north), Argentina (west), Uruguay (south), and the Atlantic Ocean (east). It covers about 108,952 square miles (282,184 square km). The capital of Pôrto Alegre is the state's main industrial area and port. Rio Grande do Sul is a major agricultural and livestock region.

The region was originally thinly inhabited by Tupí-Guaraní, Ge, and Guaycurú Indians. It was first explored and colonized by the Portuguese during the late 17th century. Long disputed between Spain and Portugal, the region was the site of intermittent warfare between 1754 and 1870. The region was also wracked by wars of secession during the 19th century.

The north occupies part of the Paraná Plateau, which is composed of outpourings of basaltic lava solidified into sheets of rock known as diabase. The plateau stands between 2,000 and 3,000 feet (600 and 900 m) above sea level. It has been dissected into rolling hills by streams, but its margins are marked by steep cliffs. Cliffs also cap the Geral Mountains, the southern extremity of the Mar Range—the eastern edge of the Brazilian Highlands—along the Atlantic coast. North of Pôrto Alegre, the cliffs turn westward and descend southward along the Jacuí River Valley.

In the south the Jacuí River and its tributary, the Taquari, drain a lowland along the base of the plateau. South of the river gently rolling hills stand between 1,000 and 1,500 feet (300 and 450 m) in elevation. West of Livramento are tabular landforms of diabase; the Uruguay River cuts through the diabase and is broken by rapids. The coast is lined with sandbars and lagoons, including the Patos Lagoon and Mirim Lagoon.

The climate is generally mild. In winter, cold air masses from the south bring heavy rains and occasional snow to the higher elevations. In summer, the prevailing northeast winds bring less precipitation and hot weather, especially inland. Temperatures range from a minimum of 18° F (−8° C) to a maximum of 109° F (43° C), with an annual average of 68° F (20° C). Precipitation measures about 52 inches (1,300 mm) annually.

Most of the state is tall-grass prairie, with pine and tropical forests in the higher elevations and deeper river valleys. Animal life includes deer, rodents, otters, armadillos, monkeys, and porcupines. Coastal and inland waters abound with fish (anchovies, dolphins, kingfish, flatfish, mullet) and shrimp.

The state's inhabitants include descendants of the Portuguese in the Jacuí Valley, Germans on the lower slopes of the Paraná Plateau and above the Jacuí, and Italians on the plateau. There are also descendants of Polish and other European immigrants. A small percentage of the population is composed of blacks and persons of mixed white and black ancestry, and the northwest has some Indians and Asians.

The main language is Portuguese. The vast majority of the people are adherents of Roman Catholicism; other Christian denominations are also represented.

Educational services include primary, secondary, and technical schools and several universities, such as the Federal University of Rio Grande do Sul (founded in 1934) and the Catholic University of Pelotas (1960).

The region was long known as the "Granary of Brazil." A substantial portion of Brazil's rice is raised on the floodplain of the Jacuí and Taquari rivers. Wheat and corn (maize) are grown on the Paraná Plateau and the terraces above the Jacuí. Other crops include grapes and tobacco. The southern plains serve as vast pastures for the state's livestock industry. Herds of cattle and sheep are tended by the gauchos, the herdsmen of the Llanos, whose animals feed across the vast unimproved pasturelands of the plains. Pigs are also raised.

Industrialization did not reach the south until the 1930s, and the state contributes only a small portion of the national industrial output. Industries are concentrated at Pôrto Alegre, Rio Grande, and Pelotas. Coal is mined at São Jerônimo on the Jacuí River and shipped downstream to Pôrto Alegre; it is used to generate electricity and manufacture gas.

The state is served by roads and railways; the main rail line runs west from Pôrto Alegre through Santa Maria and Alegrete to the Argentine border at Uruguaiana.

There are about 800 miles (about 1300 km) of inland waterways on the Jacuí and Taquari rivers and the Patos Lagoon. There is also shipping along the state's 390-mile (628-kilometre) ocean coastline and a busy network of airports.

Folkloric tradition centres upon the near-legendary courage, generosity, and romantic chivalry of the gaucho and his life under the wide skies of the plains. The Julio de Castilhos Museum in Pôrto Alegre contains exhibits of national history and Indian artifacts, and the Oceanographic Museum is located in Rio Grande. Pop. (1988 est.) 8,888,500.

Río Negro, *provincia,* south-central Argentina, lying within the region known as Patagonia and extending westward from the Atlantic to the Andes and the border with Neuquén *provincia.* It has an area of 78,384 square miles (203,013 square km) and is crossed (northwest to southeast) by the Negro River. South of the Negro, most of the land consists of arid tablelands. To the west are the chains of lakes and the forested valleys of the Andes, the site of Nahuel Huapí National Park. The Atlantic coastline has one deep indentation, the Gulf of San Matías, in the northern bend of which is the small port of San Antonio Oeste.



Lake Nahuel Huapí, Río Negro *provincia,* Argentina
Davis Pratt from Rapho/Photo Researchers—EB Inc.

The area was settled in 1782 by the explorer Basilio Villarino and was made a national territory in 1884. It became a *provincia* in 1955.

A dam, built on the Negro River near Neuquén, made possible the irrigation of a large area between the Colorado (the *provincia's* northern boundary) and Negro rivers, where alfalfa is grown, pears and apples are produced for export, and sheep are raised. The Sierra Grande mining and industrial complex was developed during the 1970s. The provincial capital, Viedma (*q.v.*), is located near the mouth of the Negro River and on the railway that runs inland from San Antonio Oeste to San Carlos de Bariloche, a resort on the shore of Lake Nahuel Huapí. Pop. (1986 est.) 477,000.

Rio Nun (Nigeria): *see* Nun River.

Río Salado, Battle of (Oct. 30, 1340), battle fought by the allied Castilian and Portuguese Christian forces against the Muslim Marīnids of North Africa in a final attempt by the latter to invade the Iberian Peninsula. The battle, which interrupted a series of disputes between the Castilian and Portuguese over throne and

territorial rights, represented the final alliance of the two to repulse the Moorish invaders.

The Marīnids had gathered a vast army and destroyed the Castilian fleet in the Strait of Gibraltar. They proceeded inland to the Salado River near Seville, where they met the allies, led by Alfonso XI of Castile and Afonso IV of Portugal. The Marīnids experienced a disastrous defeat and retreated to Africa.

Riobamba, city, central Ecuador, situated in the central highlands at an elevation of about 9,000 feet (2,700 m) in the basin of the Riobamba River, just south of Mount Chimborazo. The town dates from pre-Inca and Inca times; in 1534 the Spanish settled on the site of Cajabamba (12 miles [19 km] south). A landslide in 1797 killed many inhabitants, and the survivors moved the city to its present location. In 1830 the first Ecuadorian constitutional congress met at Riobamba and proclaimed the republic. The Roman Catholic diocese of Riobamba was established in 1863.

Riobamba is in a fertile region and serves as an agricultural trade and processing centre. Small-scale manufacturing industries produce cotton and woolen textiles, carpets, cement, ceramics, and shoes; food processing is economically important. A weekly fair, shifting from one to another of the three main plazas (depending on the products being sold), attracts Indian farmers from the surrounding countryside. The city is an important centre of native artifacts; it is also the headquarters of the Guayaquil–Quito railway. A polytechnic school was established in 1969. Pop. (1982) 75,455.

Ríohacha, capital of La Guajira *departamento,* northern Colombia, on the Caribbean coast at the mouth of the Ranchería River. Founded in 1545, the settlement was known for its pearl industry. After the depletion of the oyster beds in the 18th century, the town declined until it was named capital of La Guajira *departamento* in 1965. It is a relatively minor port, exporting tagua nuts (vegetable ivory), tannin-containing pods of the divi-divi tree, maguey fibre, and fish. A tannin factory is located in the town, and there is cotton ginning in the area. Ríohacha is accessible by highway from Santa Marta and Valledupar, in Colombia, and Maracaibo, in Venezuela, and it has an airport. Pop. (1985) 46,667.

Riom, town, Puy-de-Dôme *département,* Auvergne region, central France, on the Ambène River at the western edge of the fertile Limagne Plain, just north of Clermont-Ferrand. The old town, built around the ancient church of Saint-Amable, is ringed by the wide boulevards that replaced its former ramparts. In the Middle Ages, Riom was the capital of the county of Auvergne. It continued to be the seat of the judiciary when Auvergne came under French sovereignty. During the German occupation in World War II, a supreme court of justice was set up by the Vichy government at Riom. In a noted incident in the annals of French justice, the court tried Édouard Daladier, Paul Reynaud, and Léon Blum, premiers of the Third Republic, and General Maurice Gamelin for responsibility for the defeat of France. Tobacco products and pharmaceuticals are manufactured. Pop. (1982) 17,626.

riot, in criminal law, offense against public order involving three or more people and the use of violence, however slight. Like an unlawful assembly, a riot involves a gathering of persons for an illegal purpose. Unlike an unlawful assembly, however, a riot includes violence. The concept is obviously a broad one, embracing a wide range of group conduct from a bloody clash between picketers and strikebreakers to the behaviour of a street-corner gang.

In Anglo-American legal systems, the offense lies mainly in the breach of peace occasioned by it. Under the continental European codes, the offense requires interference with or resistance to public authority.

In the United States, England, and India, riot is usually a misdemeanour punishable by light sentences. England, however, provides for a harsher penalty when rioters refuse to disperse after they are ordered to do so by a magistrate. In the United States, Canada, and India, the penalty is increased for a riot against public authority, but it is not as harsh as that of England, and the formal presence of a magistrate is not required for the riot to constitute a violation of public authority.

In West Germany, on the other hand, riot is limited to an offense against public authority, and lesser acts of group violence are termed breaches of the public peace. For a disturbance to constitute a riot, an official engaged in the exercise of his duties must be resisted, assaulted, or threatened. The penalty for both riot and breach of the peace is greater under German law if the accused person performed one of the overt acts or was a ringleader. This distinction in penalties is also observed in Japan.

French law does not separately define riot but treats it as a special case of resistance to public authority under the general heading of rebellion. Breach of peace, which is central to the Anglo-American concept of riot, is not treated as an offense in French law.

Riotinto Mines, Spanish MINAS DE RIOTINTO, copper mines, located near the town of Nerva (formerly Riotinto), in Huelva *provincia,* in the autonomous community of Andalusia, southwestern Spain, on the Tinto River. Worked since Phoenician and Roman times, the mines (the name of which means "stained river" and refers to the pollution caused by working them) were leased to a Swede named Wolters in 1725 and to a British syndicate in 1872. Returned to Spanish control in 1954, they are considered to be among the world's most valuable copper mines.

rip current, also called RIPTIDE, narrow jet-like stream of water that flows sporadically seaward for several minutes, in a direction normal or nearly normal to a beach. Such currents are probably the cause of most ocean bathing accidents blamed on undertow. The term riptide is often used but is a misnomer, the currents being related in no way to tides.

Rip currents may have velocities as great as 1 metre per second (3⅓ feet per second, or 2 knots) and extend offshore from 60 to 760 m (200 to 2,500 feet). The energies of the currents may be sufficient to erode shallow channels through offshore bars, and the water may be discoloured by suspended sand. Swimmers caught in a rip current should not attempt to swim shoreward directly against the current. Instead, it is best to swim a short distance parallel to the beach to emerge from the rip current before returning to shore.

Rip currents form at long coasts that are approached by wave trains oriented parallel or nearly parallel to the shoreline. In shallow water the orbital motion in normal waves and swell displaces the water particles small distances shoreward with each passing wave. This mass transport is increased with increasing wave size; and during periods of large waves, water builds up at the beach and cannot escape as longshore currents, which require oblique wave approach. The buildup of water continues until some of the water can escape by surging for several minutes through a low point in a breaker.

riparian right, doctrine in certain areas that governs the use of surface water and gives all owners of land contiguous to streams, lakes, and ponds equal rights to the water, whether the right is exercised or not. Riparian rights are a form of real property and are inherited with the land. The landowner does not own the water itself but rather the right to use it on his riparian land. Some nations regard the water as state property, but in the United States two distinct legal doctrines have evolved regarding such rights. In one, the natural-flow theory, a riparian owner has the right to a water flow of undiminished quantity and unimpaired quality, or as it was in nature; this doctrine prevents most water use. In the other, that of reasonable use, the riparian owner is allowed to use water on riparian land in a reasonable manner and in such a quantity that does not cause suffering to downstream riparian owners. The courts are not in agreement on many aspects of water law, and the laws vary from state to state.

Riperdá, Juan Guillermo Riperdá, duque de (duke of), BARÓN DE RIPERDÁ, original Dutch name JOHAN WILLEM RIPPERDA (b. March 7, 1680/82, Oldehove, Groningen [now in The Netherlands]—d. Nov. 5, 1737, Tétouan, Mor.), political adventurer and Spanish minister during the reign of Philip V.

Apparently born a Roman Catholic of a noble family, he conformed to Dutch Calvinism in order to obtain his election as delegate to the States General from Groningen. In 1715 he was sent by the Dutch government as ambassador to Madrid, where he soon went over to the Spanish side and professed himself a Roman Catholic. He first attached himself to Giulio Alberoni, and after the fall of that minister he became the agent of Isabella Farnese, Philip V's intriguing wife, whose influence over her husband was boundless and who continually schemed to secure the succession to Parma, Piacenza, and Tuscany for her sons. In 1725 Riperdá was created a duke and sent as special envoy to Vienna, where, after 10 months of very strange diplomacy, he secured a treaty by which the emperor Charles VI promised very little, but Spain was bound to pay heavy subsidies, which its exhausted treasury was quite unable to afford. The emperor hoped to obtain money; Isabella Farnese hoped to secure the Italian duchies for her sons; and some vague stipulations were made that Charles VI should give his aid for the recovery by Spain of Gibraltar and Minorca.

When Riperdá returned to Madrid at the close of 1725, he asserted that the emperor expected him to be made prime minister, and the credulous Spanish sovereigns allowed him to grasp the most important posts under the crown. He excited the violent hostility of the Spaniards and entered into a complicated series of intrigues with the French and English governments. It was discovered that Riperdá not only had made promises that he was not authorized to make but had misappropriated large sums of money. The sovereigns who had made him duke and grandee shrank from covering themselves with ridicule by revealing the way in which they had been deceived. Riperdá was dismissed and soon afterward imprisoned in the castle of Segovia. In 1728 he escaped, probably with the connivance of the government, and made his way to Holland. His last years are obscure. It is said that he reverted to Protestantism and then went to Morocco, where he became a Muslim and commanded the Moors in an unsuccessful attack on Ceuta. But this story is founded on his so-called *Memoirs,* an unreliable tale of adventure published at Amsterdam in 1740. All that is really known is that he did go to Morocco and died there.

Ripley, George (b. Oct. 3, 1802, Greenfield, Mass., U.S.—d. July 4, 1880, New York City), journalist and reformer whose life, for half a century, mirrored the main currents of U.S. thought. He was the leading promoter and director of Brook Farm (*q.v.*), the celebrated utopian community at West Roxbury, Mass.,

and a spokesman for the utopian socialist ideas of the French social reformer Charles Fourier (*q.v.*). Ripley became literary critic for the *New York Tribune,* and his articles and reviews were widely syndicated. He was an arbiter of taste and culture for much of the reading public.

Ripley was reared as an orthodox Congregationalist, but he entered the Unitarian ministry after graduating from Harvard Divinity School in 1826. While pastor of Boston's Purchase Street Church, he was a member of the Transcendentalists' Club and an editor of *The Dial,* the prototypal "little magazine."

In 1841 Ripley left the pulpit to found the Brook Farm community. For the next six years he directed Brook Farm and promoted Fourier's ideas. Brook Farm survived until 1847, when financial setbacks forced it to close. Ripley was himself in dire financial straits but determined to pay off the remaining Brook Farm debts; he took a job with Horace Greeley's *New York Tribune* as book reviewer, city news writer, and translator of foreign news dispatches. His financial position remained precarious until the publication of *The Cyclopedia* (1862), a widely acclaimed reference book that he co-edited.

As a literary critic Ripley was cautious, scholarly, and courteous; he was commonly judged the ablest critic of his day. He wrote one of the few popular reviews of Darwin's *On the Origin of Species.* Ripley's popular success lay in his ability to reflect the values, aspirations, and tastes of the educated Americans of the age.

Ripley, W(illiam) Z(ebina) (b. Oct. 13, 1867, Medford, Mass.,—d. Aug. 16, 1941, Boothbay, Maine), U.S. economist and anthropologist whose book *The Races of Europe: A Sociological Study* (1899) directed the attention of U.S. social scientists to the existence of subdivisions of geographical races. Specifically, Ripley pointed out that the European Caucasians can be broadly classified into three local races: the northern (Teutonic) and southern (Mediterranean) populations are probably of extremely ancient origin, but the central (Alpine) group has descended from more recent migrants from Asia.

Ripley was trained in civil engineering at the Massachusetts Institute of Technology, then in Boston, and in political economics at Columbia University, New York City (Ph.D., 1893). He spent most of his career as professor of political economy at Harvard University (1902–33). During World War I he served as administrator of labour standards for the U.S. War Department. In 1920–23 he drew up for the Interstate Commerce Commission (ICC) the Ripley Plan for the regional consolidation of U.S. railways. In 1931–32, while testifying before the U.S. Senate, he advocated close federal restraint on investment trusts and on the financial practices of large business corporations.

Ripon, city, Harrogate district, county of North Yorkshire, England, at the mouth of Wensleydale, the upper valley of the River Ure. St. Eata, abbot of Melrose, founded a Celtic monastery there in about 661. In the 12th century a Benedictine monastery and a church were established, but both were destroyed by the Danes. The crypt of the Anglian church lies under the present cathedral. The town has a spacious market square and is now a local service and tourist centre for the Yorkshire Dales National Park. Pop. (1981) 13,232.

Ripon, city, Fond du Lac County, east central Wisconsin, U.S., 20 mi (32 km) west-northwest of Fond du Lac. In 1844 a group of Fourierites, followers of the 19th-century French socialist philosopher Charles Fourier, organized a communal settlement there known as Ceresco (for Ceres, Roman goddess of agriculture). It was disbanded in 1850 and absorbed by the adjacent (later) settlement of Ripon. The latter, named for Ripon in Yorkshire, Eng., was incorporated in 1858 and became a stronghold of the Abolition movement. In a frame schoolhouse on the campus of Ripon Academy (founded in 1851 and reorganized as a college in 1863), a meeting of Whigs, anti-Nebraska Democrats, and Free-Soilers was held on March 20, 1854, at which was proposed the formation of a "great Northern party," which came to power six years later as the Republican Party under Abraham Lincoln. The so-called Little White Schoolhouse is maintained as a shrine and claimed as the birthplace of the Republican Party (although the convention that actually launched the party took place in Jackson, Mich., on July 6, 1854). Long House, built by the Fourierites, still stands at the city's western edge.

Ripon's economy depends on manufacturing (mainly of washing machines and dryers, advertising specialties, and microscope slides) and food processing. Pop. (1980) 7,111.

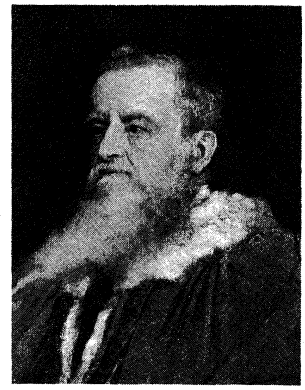
Ripon, Frederick John Robinson, 1st earl of, also called (1827–33) VISCOUNT GODERICH OF NOCTON (b. Nov. 1, 1782, London—d. Jan. 28, 1859, Putney, Surrey, Eng.), prime minister of Great Britain from August 1827 to January 1828. He received from the radical journalist William Cobbett the sardonic nicknames "Prosperity Robinson" (for his unwarranted optimism on the eve of the 1825 economic crisis) and "Goody Goderich."

Educated at Harrow and Cambridge, he began his political career as private secretary to the lord lieutenant of Ireland and rose to be president of the Board of Trade (1818–23) and chancellor of the Exchequer (1823–27). In George Canning's ministry (April–August 1827) he was secretary for war and the colonies and leader of the House of Lords. He succeeded Canning as prime minister but was unsuited to the position and was dismissed. In the ministry (1831–34) of Charles Grey, 2nd earl Grey, he was again secretary for war and the colonies and lord privy seal. He was created earl of Ripon in 1833. In Sir Robert Peel's second ministry he was president of the Board of Trade (September 1841–May 1843) and president of the India Board (May 1843–July 1846).

Ripon, George Frederick Samuel Robinson, 1st marquess and 2nd earl of, also called (until 1859) VISCOUNT GODERICH (b. Oct. 24, 1827, London—d. July 9, 1909, Studley Royal, near Ripon, Yorkshire, Eng.), British statesman who in more than 50 years of public service occupied important Cabinet posts and served as viceroy of India. A liberal administrator acceptable to the Indians, he was thought to have weakened the British Empire but to have built up the Commonwealth.

George Robinson was the only viceroy born in No. 10 Downing Street (his father, then known as Viscount Goderich, was serving briefly as prime minister). He was a member of Parliament for Hull in 1852–53, Huddersfield in 1853–57, and the West Riding of Yorkshire in 1857–59 as a Liberal and under the courtesy title of Viscount Goderich. In January 1859 he succeeded to his father's title of earl of Ripon and in November to that of his uncle, Earl de Grey. Undersecretary for war in 1859–61 and for India in 1861–63, he became Lord Palmerston's secretary for war in 1863, and in 1866 secretary of state for India. On the formation of Gladstone's first administration (1868) he became lord president of the council. He chaired the Joint High Commission on the "Alabama" claims (1871), which arranged the Treaty of Washington and prepared the way for the Geneva Arbitration; his reward was elevation to a marquessate (1871). Installed in 1870 as grand master of the Freemasons of England, he resigned in 1874, converted to Roman Catholicism, and withdrew from public service for six years.

Lord Ripon succeeded Lord Lytton as viceroy of India in April 1880 on Gladstone's return to power. Reversing some policies of his predecessor, he ended the Second Afghan War by recognizing ʿAbdor Raḥmān Khān as amīr of Afghanistan, and evacuating the Indo-British expeditionary forces in 1881. He liberalized the internal administration, lowered the salt tax, expanded powers of local elected governments, and tried unsuccessfully to stabilize land taxes. Repealing the Vernacular Press Act



Lord Ripon, oil painting by George Frederic Watts, 1895; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

of 1878, he allowed local language newspapers equal freedoms with those in English. In 1881 he passed an act providing for some minor improvements in labour conditions. His Ilbert Bill (1883) was passed only after the removal of his controversial provision to allow Indian judges the same rights as European judges to handle cases of European defendants. He resigned in 1884.

Lord Ripon became first lord of the Admiralty (1886) in the third Gladstone ministry, and on the return of the Liberals to power he was appointed secretary for colonies (1892–95). In 1905–08 he was lord privy seal and Liberal leader in the House of Lords. Remembered favourably by Indian nationalists, Lord Ripon had less success with British contemporaries.

Ripperda, Johan Willem: *see* Riperdá, Juan Guillermo Riperdá, duque de.

ripple bug (insect): *see* smaller water strider.

ripple mark, one of a series of small marine, lake, or riverine topographic features, consisting of repeating wavelike forms with symmetrical slopes, sharp peaks, and rounded troughs. Ripple marks are formed in sandy bottoms by oscillation waves, in which only the wave form advances rapidly, the actual water-particle motion consisting of almost closed vertical orbits that migrate landward only very slowly. The orbital motion at the surface is communicated downward with diminishing strength; but if the water depth is less than about one-half of the wave length, water motion is still significant near the bottom. The presence of the bottom restricts the lowermost orbits into nearly flat ellipses, however, and the bottom water moves rhythmically to and fro. If the maximum horizontal velocity of this motion is capable of moving the grains composing the bed, ripple marks develop. Any minor prominence on the bottom determines the position of alternate vortices on either side, and a sharp ridge with symmetrical slopes eventually forms. The crestal spacing of a ripple

train is equal in length to the average length of oscillatory paths near the bed.

riptide: *see* rip current.

Riquet de Bonrepos, Pierre-Paul, Baron (b. 1604, Béziers, Fr.—d. Oct. 1, 1680, Toulouse), French public official and self-made engineer who constructed the epochal 150-mile Canal du Midi (also called the Languedoc Canal) connecting the Garonne River to the Aude, thus linking the Atlantic and the Mediterranean. The canal has been called the greatest civil engineering project in Europe from Roman times to the 19th century.

A tax collector under Louis XIV, Riquet interested himself in the long-discussed problem of a navigable waterway providing a shortcut from the Bay of Biscay to the Mediterranean and in 1662 laid a proposal before Jean-Baptiste Colbert, Louis XIV's finance minister. Through Colbert's influence, Riquet obtained from the province of Languedoc loans that permitted him to carry out the work, which required many locks, a reservoir to provide water for the summit section during the dry season, and the famous Malpas Tunnel, where Riquet became the first engineer to use explosive (black powder) for blasting rock. Worn out by his labours, he died while executing the final work on the harbour of Cette (modern Sète) at the Mediterranean terminus. The canal opened the following year (1681).

Riqueti, André-Boniface-Louis: *see* Mirabeau, André-Boniface-Louis Riqueti, vicomte de (viscount of).

Riqueti, Honoré-Gabriel (French politician): *see* Mirabeau, Honoré-Gabriel Riqueti, comte de.

Riqueti, Victor: *see* Mirabeau, Victor Riqueti, marquis de.

Risaralda, department, west central Colombia, extending from the Andean Cordillera (mountains) Occidental across the Cauca Valley to the Cordillera Central. Created in 1966, it has an area of 1,598 sq mi (4,140 sq km). Agriculture is the predominant economic activity; coffee, sugarcane, beans, corn (maize), bananas, cacao, and tobacco are among the leading crops. There is also some light industry. Considerable forest and mining resources and hydroelectric potential offer good prospects for development.



Pineapple farm, Risaralda department, Colombia
Carl Frank

The department is traversed from north to south by a railroad that passes through Pereira, the departmental capital. Risaralda is also well served by highways (including the Pan-American Highway). Pop. (1981 est.) 558,438.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Risenburgh, Bernard van, II, van Risenburgh also spelled VANRISEMBURGH, or VAN RISEN BURGH (b. *c.* 1700, Paris—d. *c.* 1765), furniture maker of the Louis XV period and a member of a family of Dutch origin that included three generations of Parisian furniture makers.

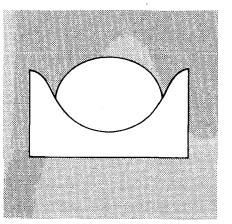
Bernard II served his apprenticeship in the family workshop, setting up his own establishment in 1730 after becoming a master in the furniture maker's guild. His work, stamped with the initials B.V.R.B., was usually sold to clients through middlemen. Probably the first Rococo style craftsman to decorate his work with porcelain plaques, he also used wood marquetry (contrasting pieces inserted to form flat patterns) and lacquer veneers. His son Bernard III (died 1799) continued the family business for several years but never became a master in the guild and eventually worked as a sculptor.

Rishabhanātha (Jaina saint): *see* Ṛṣabhanātha.

Rishon le-Ẕiyyon, city, west central Israel, on the Judaean Plain southeast of Tel Aviv–Yafo. The name (Hebrew: "first to Zion") is derived from a biblical allusion in Isaiah 41:27.

The second oldest Jewish village of Palestine (after Petaḥ Tiqwa), Rishon le-Ẕiyyon was founded in 1882 by Russian-Jewish immigrants. At first unsuccessful, owing to lack of agricultural experience, the colonists were assisted (after 1898) by Baron Edmond de Rothschild (1845–1934), the French-Jewish financier and philanthropist. His experts found the area suitable for viticulture, and extensive vineyards were planted. There, and at Zikhron Ya'aqov (in the north, near Haifa), the Baron built some of the world's largest wine cellars. Ownership and production are in the hands of a growers' cooperative society. Growth was accelerated by a favourable groundwater table and nearness to the Tel Aviv–Yafo conurbation. City status was granted in 1950. There are many citrus groves in and around the city. Industries include brewing and the production of building materials, stainless-steel articles, and electronic equipment. Pop. (1982 est.) 95,500.

rising sun, in Egyptian religion, amulet conveying life and resurrection to its wearer. It was made in the shape of a sun disk rising



Rising sun

on the hilly horizon and was the symbol of Harmakhis, the epithet of Horus as god of the horizon. This amulet, often found with or on the mummy, provided the dead man with the assurance of resurrection in the afterlife.

Rising Sun, Order of the, Japanese KYOKUJITSU-SHŌ, Japanese order founded in 1875 by Emperor Meiji and awarded for exceptional civil or military merit. The order, for males only, was originally the Order of Merit. It consists of eight classes.

The badge comprises a multi-rayed white enamel star with a gold-rimmed cabochon garnet in the centre, all of which is suspended from a spray of three paulownia flowers and leaves. The badge for the seventh class has only the enamel paulownia flowers and leaves, while the one for the eighth class has the flowers and leaves in silver.

risk, in economics and finance, an allowance for the hazard (risk) or lack of risk in an investment or loan. Default risk refers to the chance of a borrower's not repaying a loan. If a banker believes that there is a small chance that a borrower will not repay a loan, the banker will charge the true interest plus a premium for the default risk, the premium depending on the degrees of presumed risk.

All stock investment carries an implicit risk, as there is no guarantee of return on investment. Thus, trading or variability risk is the amount that the return may vary, either up or down, from the expected return from investments.

Risman, Gus, byname of AUGUSTUS JOHN RISMAN (b. March 21, 1911, Cardiff, Glamorgan, Wales), Welsh rugby player who made his debut in 1929. In 1946 he joined the Workington Town club and in 1952 led them to their first trophy as winners of the Rugby League Challenge Cup. His best years, however, were spent at Salford (Lancashire), where he scored 143 tries (touchdowns) and kicked 787 goals. He toured Australia with Great Britain in 1932, 1936, and (as captain) 1946. In his career (1928–55), Risman scored a total of 232 tries and 1,679 goals.

Risorgimento (Italian: Rising Again), 19th-century movement for Italian unification that culminated in the establishment of the Kingdom of Italy in 1861. The Risorgimento was an ideological and literary movement that helped to arouse the national consciousness of the Italian people and led to a series of political events that freed the Italian states from foreign domination and united them politically. Although the Risorgimento has attained the status of a national myth, its essential meaning remains a controversial question. The classic interpretation (expressed in the writings of the philosopher Benedetto Croce) sees the Risorgimento as the triumph of liberalism, but more recent views criticize it as an aristocratic and bourgeois revolution that failed to include the masses.

The main impetus to the Risorgimento came from reforms introduced by the French when they dominated Italy during the period of the French Revolutionary and Napoleonic wars (1796–1815). A number of Italian states were briefly consolidated, first as republics and then as satellite states of the French Empire, and, even more importantly, the middle class grew in numbers and was allowed to participate in government.

After Napoleon's defeat in 1815, the Italian states were restored to their former rulers. Under the domination of Austria, these states took on a conservative character. Secret societies such as the Carbonari opposed this development in the 1820s and 1830s. The first avowedly republican and national group was Young Italy, founded by Giuseppe Mazzini in 1831. This society, which represented the democratic aspect of the Risorgimento, hoped to educate the Italian people to a sense of their nationhood and to encourage the masses to rise against the existing reactionary regimes. Other groups, such as the Neo-Guelfs, envisioned an Italian confederation headed by the pope; still others favoured unification under the House of Savoy, monarchs of the liberal northern Italian state of Piedmont-Sardinia.

After the failure of liberal and republican revolutions in 1848, leadership passed to Piedmont. With French help, the Piedmontese defeated the Austrians in 1859 and united most of Italy under their rule by 1861. The annexation of Venetia in 1866 and papal Rome in 1870 marked the end of the Risorgimento.

Riss Glacial Stage, major division of Pleistocene time and deposits in Alpine Europe (the Pleistocene Epoch began about 2,500,000 years ago and ended about 10,000 years ago). The Riss Glacial Stage, during which mountain glaciers descended from the highlands, followed the Mindel-Riss Interglacial Stage and

preceded the Riss-Würm Interglacial Stage, both periods of relatively moderate climatic conditions. The Riss is correlated with the Gipping Glacial Stage of Great Britain and the Saale Glacial Stage of northern Europe. Like the Saale, the Riss Glacial Stage included two major phases of ice advance separated by a period of more moderate conditions. The Riss Glacial Stage is roughly contemporaneous with the Illinoian Glacial Stage of North America.

Riss-Würm Interglacial Stage, major division of Pleistocene time and deposits in Alpine Europe (the Pleistocene Epoch began about 2,500,000 years ago and ended about 10,000 years ago). The Riss-Würm Interglacial Stage, a period of relatively moderate climatic conditions, followed the Riss Glacial Stage and preceded the Würm Glacial Stage, both periods of deteriorating conditions. The Riss-Würm is correlated with the Eemian Interglacial Stage of northern Europe and the Ipswichian Interglacial Stage of Great Britain. It is broadly equivalent to the Sangamon Interglacial Stage of North America. In the Alps, the Riss-Würm is represented by the Moosburg Gravels.

Risshō-Kōsei-kai (Japanese: Society for Establishing Righteousness and Friendly Relations), lay religious group in Japan based on the teachings of the Nichiren school of Buddhism. The Risshō-Kōsei-kai is an offshoot of the Reiyū-kai, from which it separated in 1938. It was founded by Niwano Nikkyō, a milk dealer, who became its leader, and a devout housewife, Naganuma Myōkō, who died in 1957. Like other sects that follow the teachings of Nichiren, it emphasizes devotion to the *Lotus Sūtra* and the efficacy of chanting its name. Daily services in the Tokyo headquarters of the sect are attended by up to 10,000 people who chant in unison. This service is followed by daily *hōza,* or group counselling sessions, in which the application of faith to the problems of daily life is stressed.

Ristić, Jovan (b. Jan. 16 [Jan. 4, old style], 1831, Kragujevac, Serbia—d. Sept. 4, 1899, Belgrade), statesman who acted as regent of Serbia twice and served as Serbian prime minister four times (1867, 1875, 1877–81, 1887–88).

After studying in France and at Heidelberg University, he held his first important governmental post under Prince Michael Obrenović as Serbia's representative in Constantinople from 1861 to 1867, during which he negotiated the withdrawal of the last remaining Turkish garrisons in Serbia (1867).

On the accession of the young prince Milan Obrenović in 1868, Ristić served as second regent and was largely responsible for the promulgation of a new constitution (1869). When Milan reached his majority (1872), he made Ristić foreign minister and then prime minister. He gained an international reputation as foreign minister on two more occasions (1875, 1876–78) by promoting an expansionist policy that he hoped would make Serbia the nucleus for a strong South Slav state. In the wars with Turkey, in 1876 and 1877–78, his expectations were raised by Russia's support as an ally, but Great Power intervention at the Congress of Berlin (1878) provided Serbia with no more than 3,860 square miles of new territory and a proclamation of complete independence from Turkey.

As the acknowledged leader of the Liberal Party, Ristić formed his third government (1877–81). He was forced to resign when he refused to sign a trade agreement with Austria-Hungary that he believed would make Serbia economically dependent on that country. Returning to power as regent after Milan's abdication (March 1889) in favour of his son Alexander, Ristić worked to improve relations with Russia abroad and to counteract the influence of the rival Radical Party at home. When the Radicals backed King Alexander in his coup to declare his majority (April 1893), Ristić was dismissed as regent, and his opponents were entrusted with the government.

Ristori, Adelaide (b. Jan. 29, 1822, Cividale del Friuli, Austria-Hungary—d. Oct. 8, 1906, Turin, Italy), internationally renowned Italian tragedienne.

The daughter of strolling players, she began as a child actress and at the age of 14 was cast



Adelaide Ristori, detail of an oil painting by Niccolo Schiavoni
Brogi—Art Resource/EB Inc.

in the title role of Silvio Pellico's *Francesca da Rimini.* She joined the Royal Sardinian Company as ingenue and advanced in two years to the position of leading lady. At 18 she attempted the title role in Schiller's *Maria Stuart.* In 1855 she went to Paris, where the devotees of Mlle Rachel, the reigning tragedienne of the Comédie-Française, found that the foreign guest lacked the pure classicism for which the French star was famous. But there were other critics, Alexander Dumas *père* among them, who adored the passionate outbursts and spontaneity of the Italian temperament that broke through the general stateliness of Ristori's grand style. When she played the comic part of Mirandolina in Goldoni's *Locandiera,* the approval of the Parisians was unanimous. She finally triumphed as a tragedienne in Alfieri's *Mirra.* She later appeared in Germany, Vienna, London, Warsaw, and Madrid. Her repertory included Racine's Phèdre, Legouvé's Médée, and Shakespeare's Lady Macbeth. She toured the United States for the first time in 1866, and her successes encouraged her return in 1867, 1875, and 1884. In 1874 the actress embarked upon a professional tour around the world. She retired from the stage in 1885 and three years later published her *Ricordi e studi artistica* ("Memoirs and Artistic Studies"), a volume containing analyses of her outstanding tragic roles.

Ritchie (of Dundee) Charles Thomson Ritchie, 1st Baron (b. Nov. 19, 1838, Hawkhill, Dundee, Scot.—d. Jan. 9, 1906, Biarritz, Fr.), British Conservative politician, notable for his reorganization of local government.

Educated at the City of London School, he went into business and in 1874 was elected to Parliament as Conservative member for the working-class constituency of Tower Hamlets. In 1885 he was made secretary to the Admiralty and from 1886 to 1892 president of the local government board in Lord Salisbury's administration, with a seat in the Cabinet after 1887, sitting as member for St. George's-in-the-East. He was responsible for the Local Government Act of 1888, instituting the county councils; and a large section of the Conservative Party always owed him a grudge for having originated the London County Council. In Lord Salisbury's later ministries, as member for Croydon, he was president of the Board of Trade (1895–1900) and home secretary (1895–1900); and when Sir Michael Hicks Beach retired in 1902, he became chancellor of the Exchequer in Arthur James Balfour's Cabinet. Though in his earlier years he had been a "fair-trader," he was strongly opposed to Joseph Chamberlain's movement for a preferential tariff, and he resigned office in September 1903. In December 1905 he was created a peer.

rite de passage: *see* passage rite.

Ritola, Ville, byname WILLIE RITOLA (b. Jan. 18, 1896, Peräseinäjoki, Fin.—d. April 24, 1982, Helsinki), Finnish long-distance runner who held the world record for the 10,000-metre run (1924).

Ritola ran somewhat in the shadow of his great countryman Paavo Nurmi. Ritola lived and trained in the United States but competed internationally for Finland. In the 1924 Olympic Games at Paris, he won gold medals for the 10,000-metre race and the 3,000-metre steeplechase, later in that year setting a world record for the 10,000 metres for the second time: 30 min 23.2 sec. Nurmi had preceded him as record holder and followed him later in 1924. In the 1928 Olympic Games at Amsterdam, in which the Finnish runners won 10 gold medals, Ritola won the gold medal in the 5,000-metre race and the silver medal in the 10,000, beating Nurmi in the former and being beaten by him in the latter. Ritola ran frequently in the United States between the Olympics with great success. He retired from running after 1928 and from his work as a dock builder in the Bronx, New York City, to Lake Worth, Fla. in the early 1960s.

ritornello (Italian: "return"), also spelled RITORNELLE, OR RITORNEL, plural RITORNELLI, RITORELLOS, RITORNELLES, OR RITORNELS, a recurrent musical section that alternates with different episodes of contrasting material. The repetition can be exact or varied to a greater or lesser extent. In the concerto grosso the full orchestra (tutti) has the ritornello, the solo group (concertino) the contrasting episodes.

In the Middle Ages, the term ritornello referred to the last two lines of a madrigal, as well as to a verse form having three lines, with the first and third rhyming. Its function in 17th-century operas and strophic (stanzaic) songs as an instrumental introduction, interlude, or conclusion derives from the popular practice of round-dances reflected already in the 13th- and 14th-century French rondeau ("little circle"). In the late 18th- and early 19th-century rondo (Italianized form), the ritornello often featured a catchy tune as a sort of refrain alternating with more elaborate instrumental excursions.

Ritschl, Albrecht (b. March 25, 1822, Berlin—d. March 20, 1889, Göttingen, Ger.), German Lutheran theologian who showed both the religious and ethical relevance of the



Albrecht Ritschl
By courtesy of the Niedersachsische Staats und Universitatsbibliothek, Gottingen, West Germany

Christian faith by synthesizing the teaching of the Scriptures and the Protestant Reformation with some aspects of modern knowledge. Most of the results of Ritschl's scholarship were presented in his major work, *Die christliche Lehre von der Rechtfertigung und Versöhnung* ("The Christian Doctrine of Justification and Reconciliation"), published in three volumes (1870–74).

Early life and career. Ritschl was born in Berlin in 1822. His father and grandfather were Lutheran clergymen, and his lifelong interest in the Protestant Reformation was due, in part, to his family background. He completed both his secondary schooling and university theological studies with distinction. Ritschl was apparently well suited for his vocation intellectually, temperamentally, and by virtue of his education. In addition, his father had inculcated in him a strong sense of duty, the fear of God, and humility.

Ritschl was trained in theology and philosophy at the universities of Bonn (1839–41) and Halle (1841–43). He moved gradually from a more conservative, traditional theological position to a more liberal one. This shift was precipitated, in part, by the influence of the philosophy of G.W.F. Hegel upon most of Ritschl's generation. While a student, Ritschl studied the classical theological disciplines and also developed a special interest in the doctrine of the redemptive work of Jesus Christ and, more specifically, the doctrine of the Atonement—that Christ died for man's sins. Other German philosophers, in addition to Hegel, influenced Ritschl: Immanuel Kant (1724–1804) and Friedrich Schleiermacher (1768–1834), the founder of liberal Protestantism. After receiving his doctorate in 1843, Ritschl joined the ranks of the Tübingen school, a dominant theological movement involved in reconstructing the origins of Christianity and the early history of the church and its theology.

Works and significance. Ritschl taught at the University of Bonn (1846–64) and at Göttingen from 1864 until his death. His first significant publication, *Die Entstehung der altkatholischen Kirche* (1850; "The Origin of the Old Catholic Church"; 2nd ed. 1857), revealed both his initial indebtedness to and gradual breach with the Tübingen school, which, in its analysis of the early history of Christianity, he found too indebted to Hegelian presuppositions.

In his interpretation of Christianity, Ritschl interacted with the Scriptures, the whole history of the church and its theology, and, especially, the theology of Martin Luther and the confessions of the Reformation, as well as with the philosophical methodology and ethics of Kant and the theology of Schleiermacher. Virtually all of his research came to fulfillment in his major work, *Die christliche Lehre von der Rechtfertigung und Versöhnung*, which deals with the historical and biblical materials (vols. 1–2) and with Ritschl's own reconstruction (vol. 3). Ritschl depicted Christianity as an ellipse with two focuses: (1) the reconciliation established between God and man through the divine love manifested in the life and death of Jesus and (2) the Kingdom of God as the goal toward which all of God's activities are directed. Ritschl stressed the significance of the Kingdom of God in the teaching of Jesus and was critical of Protestantism's neglect of the Kingdom.

Over against Protestant Pietism, which emphasized the spiritual piety of the individual from a rather antiworldly perspective, Ritschl argued persuasively for the ethical development of man in his individual and corporate life. If man's forgiveness (justification) represents the religious pole of Christianity, reconciliation—which has to do with the practical consequences of justification—represents the ethical pole. Forgiveness of sin should give rise to a new life-style marked by doing God's will in both the personal and social spheres, thereby advancing the growth of the Kingdom of God (the brotherhood of all men united by the love of God) in society.

Ritschl was both esteemed and vilified by critics both during and after his lifetime. The dominant 20th-century Protestant movement known as Neo-orthodoxy, which restated Reformation principles such as justification and grace, attacked Ritschl as an advocate of cultural Christianity—the identification of Christianity with prevailing cultural norms. Contemporary reassessments of 19th-century theology are, however, more appreciative of Ritschl's interpretation of Christianity and the Kingdom of God and of their relevance to man's personal and corporate existence.

(D.L.M.)

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Ritschl, F(riedrich) W(ilhelm) (b. April 6, 1806, Grossvargula, near Erfurt, Prussia—d. Nov. 9, 1876, Leipzig), German classical scholar remembered for his work on Plautus (the largest body of early Latin literature) and as the founder of the Bonn school of classical



F.W. Ritschl, engraving
Historia-Photo

scholarship. Influenced by the textual criticism of the English and German classicists Richard Bentley and Gottfried Hermann, he made exhaustive studies that laid the scholarly foundations for research in archaic Latin.

Following his education at Leipzig and Halle universities, Ritschl was professor at Halle (1832–33) and Breslau (1833–39). He travelled for a year in Italy (1836), gathering materials on Plautus with which he worked for the remainder of his life. He was later appointed professor of Latin at Bonn (1839), and his research on Plautus attracted many students and stimulated Latin studies in Germany. He conceived of a new critical edition based on new manuscript evidence, first editing nine comedies of Plautus, *Plauti Comoedia*, 4 vol. (1848–54; incomplete), and an important prolegomena, *Prolegomena de Rationibus Criticis Grammaticis Emendationis Plautinoe* (1848; "Critical Grammatical Reasons for Correcting Plautus"). The complete text of Plautus' comedies was published in 1871–74 and contains only one translation by Ritschl, the *Trinummus*, the rest having been prepared by his pupils and collaborators.

At Bonn, Ritschl published, with Theodor Mommsen, the *Priscae Latinitatis Monumenta Epigraphica* (1862; "Epigraphical Records of Ancient Latin"), an edition of Latin inscriptions from the earliest times to the end of the republic and a work that established Ritschl as one of the founders of modern epigraphy. He was named successively chief librarian at Bonn (1854) and director of the Museum of Antiquities of the Rhine and was elected to the Institute of France (1867). Ritschl resigned from Bonn (1865) after an academic quarrel with his colleague Otto Jahn and became professor at Leipzig, where he remained until his death. His numerous studies, including papers on early Latin grammar and metre, and the manuscript tradition of Plautus, are collected in his *Opuscula Philologica*, 5 vol. (1867–79; "Philological Works").

Ritsu (Japanese: Regulation), Chinese LÜ-TSUNG, school of Buddhist moral discipline primarily concerned with *vinaya*, or the rules of monastic and religious practice. The school was founded in China in the 7th century by the monk Tao-hsüan on the basis of Hīnayāna texts that emphasized the letter of the law, as compared with the later Mahāyāna texts that relied on the spirit, or essence, of the moral law. The leading centre of ordination in central China is the Pao-hua Shan monastery near Nanking. The monks of Pao-hua Shan are renowned in China for their austerity and their learning.

During the Nara period (710–784) in Japan, the Buddhists felt handicapped by a lack of ordained priests qualified to carry out the formal ceremonies of initiation and sent an invitation to Chien-chen (Japanese Ganjin), a leading Chinese scholar of *vinaya*. Members of the Japanese Imperial family, including the reigning empress, were among the first to be ordained by him, after his arrival in 754.

In the 13th century the priest Eison initiated a reform movement within the Ritsu school, employing more informal, self-imposed vows. As the various sects in Japan developed their own initiation rituals, the Ritsu school declined, and it is no longer an influential force in that country.

Rittenhouse, David (b. April 8, 1732, Germantown, Pa.—d. June 26, 1796, Philadelphia), U.S. astronomer and inventor who was an early observer of the atmosphere of Venus. A clockmaker by trade, he built mathematical instruments and is reputed to have constructed the first telescope in the U.S. He also introduced the use of natural spider webbing to form the reticle (system of cross hairs) in telescope transits and other position-measuring instruments. Rittenhouse was highly esteemed as a surveyor; he supervised the establishment of the boundaries between Pennsylvania and Maryland, New Jersey, New York, and the Northwest Territory; and parts of those between New York and New Jersey and between New York and Massachusetts.

Rittenhouse was elected a member of the American Philosophical Society in 1768, and the next year he observed the transit of Venus across the face of the Sun. During this transit he observed that Venus has an atmosphere. His findings were similar to those of the Russian scientist Mikhail Vasilyevich Lomonosov, who had identified Venus' atmosphere during a transit in 1761. Though both had written about their observations, neither report was published or publicized for more than a century.

Rittenhouse was the treasurer of the state

of Pennsylvania from 1777 to 1789. In 1792 Pres. George Washington appointed him the first director of the U.S. Mint in Philadelphia, a position he held for three years. He was elected a fellow of the Royal Society of London in 1795 and served as president of the American Philosophical Society from 1791 until his death.

Ritter, Carl (b. Aug. 7, 1779, Quedlinburg, Prussia—d. Sept. 28, 1859, Berlin), German geographer who was cofounder, with Alexander von Humboldt, of modern geographical science.

Ritter received an excellent education in the natural sciences and was well versed in history and theology. Guided by the educational principles of the famed Swiss teacher Johann Heinrich Pestalozzi and by the ideas of the German philosopher-theologian Johann Gottfried von Herder on the relation between man and his environment, Ritter became a teacher and philosopher in the field of geography, serving as professor at the University of Berlin from 1820 until the end of his life.



Carl Ritter, lithograph by F. Jentzen from a portrait by F. Krüger
Bruckmann—Art Reference Bureau

Viewing geography as an empirical science, he maintained that its methodology required proceeding from one observation to the next, not from opinion or hypothesis to observation. Though he was convinced that there were laws of geography, he appeared to attach no particular importance to establishing them clearly. He stressed, instead, the importance of utilizing all the sciences to delineate the nature of geography, which was, in his view, unique.

Ritter always regarded Humboldt, who was ten years his senior, as his master and partly based his geographical writings on Humboldt's ideas. He was frequently more a historian than a geographer and wrote what has come to be known as a geographical interpretation of history. The opposition to his ideas that developed after his death arose in part from the contention that he had made geography ancillary to history. Even so, during his later life and for nearly 20 years following his death, his ideas deeply influenced geographical research in Germany.

His first geographical writings, on Europe, were published in 1804 and 1807. His great work, *Die Erdkunde im Verhältniss zur Natur und zur Geschichte des Menschen* ("Earth Science in Relation to Nature and the History of Man"), was intended as a world survey but was never completed. The first volume, on Africa, was published in 1817 and brought him his appointment at the University of Berlin; a revised edition appeared in 1822. Between 1832 and his death he regularly published new volumes, chiefly on Asia. The work, though incomplete, ran to 20,000 pages in 19 volumes.

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Ritter, Johann Wilhelm (b. Dec. 16, 1776, Samitz bei Haynau, Silesia—d. Jan. 23, 1810, Munich), German physicist who discovered the ultraviolet region of the spectrum and thus helped broaden man's view beyond the narrow region of visible light to encompass the entire electromagnetic spectrum from the shortest gamma rays to the longest radio waves.

A pharmacist in Liegnitz, Silesia, from 1791 to 1795, Ritter studied medicine at the University of Jena, where he taught until he gained the patronage of the duke of Saxe–Gotha. In 1800, only months after the English chemist William Nicholson succeeded in decomposing water into hydrogen and oxygen by electrolysis, Ritter duplicated the experiment but arranged the electrodes so that he could collect the two gases separately. Soon thereafter he discovered the process of electroplating.

In 1801 Ritter made the startling discovery that silver chloride, which decomposes in the presence of light, is more rapidly decomposed when exposed to the invisible, theretofore unknown radiation beyond the violet end of the spectrum.

Ritter devoted most of his efforts to the study of electricity and electrochemistry. In 1801 he observed thermoelectric currents and anticipated the discovery of thermoelectricity by Thomas Johann Seebeck. Ritter invented the dry voltaic cell in 1802 and an electrical storage battery the following year.

ritual bath, religious or magic ceremony involving the use of water to immerse or anoint a subject's body. The many forms of baptism (*q.v.*), ranging from total submersion to a symbolic sprinkling, indicate how certain ritual baths can vary in form even while retaining the same purificational meaning. Ritual baths may be taken while the subject is dressed or nude, in churches or other buildings, in rivers, streams, or ponds; but often the bath and the locus have mutually reinforcing symbolic meanings, as in the *tīrthayātrā* (*see tīrtha*), the typical Hindu pilgrimage bath in a holy river or stream, or the *upanayana* (*q.v.*), the Hindu rite of initiation before a young man's guru.

Like many of the surviving great modern faiths, primitive religions used the ritual bath for negative and positive purposes. To bring rain, for example, the Zande of Central Africa poured water over a person accused of delaying or preventing rain. By comparison, the Hebrew *mikvah* (*q.v.*) sought ritual purification through use of prescribed amounts and kinds of water. The Shintō follower practiced water ablution (*q.v.*)—a kind of ritual bath in microcosm—to prepare for a visit to a shrine. The Christian foot-washing (*pedilavium*), signifying humility, traditionally took place in the early church on Maundy, or Holy, Thursday to the accompaniment of chanted hymns.

Many ritual bath forms survive today. They may have undergone changes over the years, but generally they retain their basic meanings.

Ritz, César (b. Feb. 23, 1850, Niederwald, Switz.—d. Oct. 26, 1918, Küssnacht, near Lucerne), founder of the Paris hotel that made his name a synonym for elegance and luxury.

In order to learn the restaurant business, Ritz got a job at the finest restaurant in Paris, the Voisin, until the Siege of Paris of 1870 caused shortages of food and fuel and put an end to Voisin's business. After the Franco-German War, Ritz worked as maitre d'hotel in the Hotel Splendide in Paris, where he again came in contact with the celebrated and the wealthy. He served as a guide to continental taste for such Americans as Cornelius Vanderbilt and J.P. Morgan, who came to Paris in the 1870s.

When fashionable society moved on, Ritz decided to move with them. For the next few years, he worked in hotels in resort areas throughout Europe. From 1877 to 1887, Ritz managed the summer season at the luxurious Grand Hotel National in Lucerne, Switz. He was also general manager of the Grand Hotel in Monte Carlo, where he met the great chef Auguste Escoffier.

Together they opened a restaurant in Baden-Baden in 1887. Impressed by a party at their restaurant, Richard D'Oyly Carte invited Ritz to manage the newly opened Savoy in London. Ritz and Escoffier made London, as banker Otto Kahn put it, "a place worth living in." Ritz converted London society to the practice of dining out. His customers at the Savoy urged him to open a hotel in Paris. With a loan from Marnier La Postelle (who was grateful to Ritz for suggesting the name Grande Marnier for the liqueur that he had invented) Ritz purchased a mansion in Paris and spent two years supervising the furnishing of its 210 rooms. The Ritz Hotel opened in 1898 to a crowd of diners.

By this time, Ritz had a controlling interest in nine other restaurants and hotels including the Carlton in London.

In June 1902, Ritz suffered a nervous collapse. Although he took some part in planning the London Ritz, opened in 1905, he was never able to return to managing the business. He died an invalid after 16 years of illness. His eventual successor was his son Charles.

Rivadavia, Bernardino (b. May 20, 1780, Buenos Aires—d. Sept. 2, 1845, Cádiz, Spain), first president of the Argentine republic. Although one of his country's ablest leaders, he was unable to unite the warring provinces or to control the provincial *caudillos* (bosses).

Active in resistance to British invasion in 1806, he also supported the 1810 movement for independence from Spain, becoming secretary to the revolutionary junta. In 1811 he dominated the revolutionary triumvirate—organizing the militia, disbanding the Spanish courts, freeing the press from censorship, and ending the slave trade. In 1814 he was sent to Europe to secure British aid for the United Provinces of La Plata, the original provinces of Argentina.

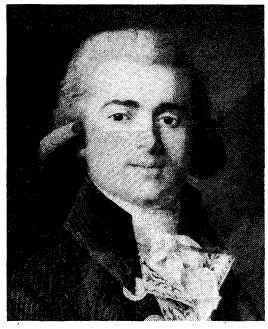
Returning to Buenos Aires after six years in Europe, Rivadavia, in 1821, was appointed a minister in the government of Martín Rodríguez and, in 1826, was elected president of the United Provinces. In Europe he had met and been strongly influenced by Jeremy Bentham and the French utopians Henri de Saint-Simon and Charles Fourier. Adopting some of their ideas, Rivadavia extended the franchise to all males at age 20, organized a Parliament and a system of courts, and supported legislation that guaranteed freedom of the press and secured individual and property rights. He earned the lasting enmity of the church by abolishing ecclesiastical courts and eliminating the compulsory tithe. His efforts to encourage immigration were unsuccessful, and his program of land reform eventually backfired, serving the interests of the landed oligarchy instead of the peasants. His cultural initiatives were perhaps his most lasting achievements: he founded the University of Buenos Aires, supported the establishment of museums, and enlarged the national library.

Despite all these achievements, Rivadavia's administration was often in desperate straits. Involved in war with Brazil over the possession of the territory that later became independent Uruguay, Rivadavia was forced to continue the fruitless conflict because the Argentine people refused to accept the treaty that gave Brazil hegemony in that area. He was also constantly embroiled with the powerful provincial *caudillos,* from whom he was unable to win acceptance for his centralist constitution of 1826. Resigning his office in 1827, he left for exile in Europe, returning to Buenos Aires in 1834 to face charges brought by his political enemies. Sentenced to immediate exile, he went first to Brazil and then to

Spain. His remains were repatriated in 1857, and in 1880 his birthday was decreed a national holiday.

Rivarol, Antoine Rivaroli, comte de (count of) (b. June 26, 1753, Bagnols-sur-Cèze, Fr.—d. April 11, 1801, Berlin), French publicist, journalist, and epigrammatist and a would-be nobleman whose works supported monarchy and traditionalism in the era of the French Revolution.

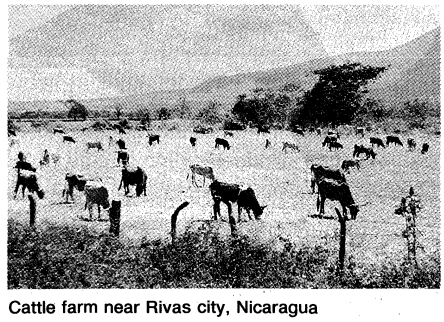
He assumed the title of comte de Rivarol, claiming to come of a noble Italian family, but is said to have been an innkeeper's son. His first important work was a treatise, *De l'universalité de la langue française* (1784), whose sweeping title, "On the Universality of the French Language," is almost justified by the prestige won by French culture throughout Europe in the 18th century. Rivarol's satirical gift is displayed to the full in his *Le Petit Almanach de nos grands-hommes* (1788; "The Little Almanac of Our Great Men") in



Rivarol, detail of an oil painting by an unknown artist
H. Roger-Viollet

which he lampoons all the authors of the day. On the outbreak of the revolution, Rivarol enlisted his journalistic talents in the Royalist cause. Emigrating from France in 1792, he settled for a time in Brussels before moving on to London, Hamburg, and Berlin.

Rivas, city, southwestern Nicaragua, on a narrow strip of land between Lake Nicaragua and the Pacific Ocean. Founded in 1736 and formerly known as Nicaragua, Rivas gained fame



Cattle farm near Rivas city, Nicaragua
Walter Aguiar—EB Inc.

as a town on the "Vanderbilt Road," over which Americans joining the California Gold Rush traveled from the adjoining lake port of San Jorge to the Pacific port of San Juan del Sur. In 1856 a battle in the war against the American filibuster William Walker was fought there. Rivas is a commercial and manufacturing centre in an agricultural area; tanneries, dairies, and plants manufacturing rubber items are located in the city. It lies on the Pan-American Highway, which links it to Managua, the national capital.

Most of the inhabitants of the surrounding region are concentrated in the region's central valleys. The valleys are important for livestock raising and sugarcane, coffee, cacao, corn (maize), beans, rice, and tobacco. Pop. (1985 est.) 19,564.

Rivas, Angel de Saavedra (Ramírez de Baquendano), duque de: *see* Saavedra (Ramírez de Baquendano), Angel de, duque de Rivas.

Rive, Richard (Moore) (b. March 1, 1931, Cape Town—d. June 4/5, 1989, Cape Town), South African writer, literary critic, and teacher whose short stories, dominated by the ironies and oppression of apartheid and by the degradation of slum life, have been widely anthologized and translated into more than a dozen languages. He was considered to be one of South Africa's most important short-story writers.

Rive grew up in Cape Town and with scholarship help attended high school and the University of Cape Town (graduated 1949). He taught at Hewat Training College and at a large Cape Town high school, where he was also athletic coach (he was himself a hurdling champion). In 1962 he traveled widely in Africa and Europe, teaching and lecturing and absorbing recent trends in African literature in English.

Quartet: New Voices from South Africa (1963; a selection of 16 short stories by four writers including Rive), *African Songs* (1963; Rive's own short stories), *Modern African Prose* (1964; an anthology edited by Rive and designed for use by students), and *Emergency* (1964; a novel about the events of the Sharpeville massacre and state of emergency in 1960) were published soon after his return to South Africa. Rive received an M.A. (1966) from Columbia University in New York City and a D.Phil. from Magdalen College, Oxford, in 1974. *Selected Writings,* a collection of essays, short stories, and plays, was published in 1977. In 1981 he published *Writing Black: An Author's Notebook.* Rive's short stories are characterized by great imaginative and technical power, a skillful use of leitmotifs, and realistic dialogue.

Rivea, a genus of five or six species of plants, native in tropical America and Southeast Asia, belonging to the morning glory family (Convolvulaceae). Of special interest is the woody stemmed perennial climber known to the ancient Aztecs as ololiuqui (*R. corymbosa*), the white seeds of which were used by priests to induce visions.

The plant, native in tropical Mexico, has stalked, heart-shaped leaves (5 cm [2 inches] long), from the axils of which clusters of white, funnel-shaped flowers are produced. It is known among the Zapotec Indians as *badoh* and elsewhere as *loquetico* ("little crazy one"). The seeds contain derivatives of the hallucinogenic drugs *d*-lysergic and *d*-isolysergic acids, both related to LSD.

river, any natural stream of water that flows in a channel with more or less defined banks; modern usage includes multichanneled, intermittent, and ephemeral streams, as well as those in bankless channels. The concept of channeled surface flow, however, remains central. The word stream is often preferred in technical writing, where it is used as an inclusive term that refers to all natural waterways from the largest rivers to the smallest creeks.

A brief treatment of rivers follows. For full treatment, *see* MACROPAEDIA: Rivers. For coverage of the life forms that inhabit rivers, *see* Ecosystems.

Rivers constitute a fundamental link in the hydrologic cycle, the circulation of water from the oceans through the atmosphere (evaporation) to the land via precipitation and back to the oceans by way of rivers and, to a lesser degree, groundwater discharge. As one of the most important geomorphic agents, rivers play a major role in shaping the surface features of the Earth. Even apparently arid desert regions are greatly influenced by fluvial action when periodic floodwaters surge down usually dry watercourses.

Throughout history, rivers have provided one of the easiest and, in some areas of the world, the only means of entry and passage for explorers, traders, conquerors, and settlers. Rivers assumed great importance, for example, in Europe after the fall of the Roman Empire and the decay of its road system. Rivers in medieval Europe supplied the water that sustained the growth of cities and were widely used as sources of power. Western European history records the rise of more than a dozen national capitals on sizable rivers, exclusive of seawater inlets. In modern history, both in North America and northern Asia, natural waterways dictated in large part the lines of exploration, conquest, and settlement.

River flow is sustained by the difference between water input and output. Rivers are nourished by overland runoff, by groundwater seepages, and by meltwater released along the edges of snowfields and glaciers. Direct precipitation also contributes to river flow, but generally in very small amounts. Losses of river water result from percolation into layers of porous and permeable rock, gravel, or sand, evaporation, and ultimately outflow into the ocean.

The shape of a river system provides evidence of the geological and topographical factors that have been involved in its formation and development. In a dendritic river system, for example, the absence of a particular pattern of tributaries indicates that the system has had undisturbed growth, with the composition and structure of the underlying rock exerting no discernible influence on the stream course. A river pattern characterized by sharp right-angled bends, however, is one that is following the joints in the underlying bedrock. A river system may be trellised, displaying the influence of alternately hard and soft bands of bedrock. Sometimes there may be few tributary streams, strongly suggesting that, as in the case of limestone, the bedrock is permeable and drainage is going underground. Rivers, especially those in humid regions, can be considered as branching systems of often innumerable tributaries.

Seasonal variations in discharge define the regime of a river. Variations in the amount of precipitation can cause significant changes in discharge. The annual floods on the Nile, for example, reflect high summer rainfall in the highlands of Ethiopia. Rivers that rise in mountainous areas with perennial snow cover will also show peak flows relating to seasonal snow and glacier melt. Some rivers in the high northern latitudes have diminished flows in winter as their catchments freeze over. Rivers in humid equatorial areas, however, vary only slightly throughout the year.

The ability of a river to alter the landscape is demonstrated most clearly in the channel it cuts. A river may erode its channel by dissolving the rock over which it flows. Most riverine erosion is caused by abrasion. Particles transported by the flowing water, which range in size from silt to small boulders, collide with the river bed and break off other pieces; the cumulative action of these particles can be likened to a file gradually smoothing a surface. The effectiveness of abrasion depends on the rate of water flow and the amount of the load that a river carries.

The net effect of channel erosion is to carve a valley. Channel erosion tends to cut downward, but few river valleys remain steep-sided, V-shaped ravines. The form of a river valley is significantly affected over time by other processes such as weathering and mass-wasting (movement of mantle rock) as well as by the cumulative effect of erosion by tributary channels and the lateral movement of the main channel. Small steep-sided valleys, commonly called canyons and gorges, usually

Longest rivers of the world

name	outflow	length* miles	length* kilometres
World			
Nile	Mediterranean Sea	4,132	6,650
Amazon-Ucayali-Apurimac	South Atlantic Ocean	4,000	6,400
Yangtze	East China Sea	3,915	6,300
Mississippi-Missouri-Red Rock	Gulf of Mexico	3,710	5,971
Yenisey-Baikal-Selenga	Kara Sea	3,442	5,540
Huang Ho (Yellow)	Gulf of Chihli	3,395	5,464
Ob-Irtysh	Gulf of Ob	3,362	5,410
Parana	Río de la Plata	3,032	4,880
Congo	South Atlantic Ocean	2,900	4,700
Amur-Argun	Sea of Okhotsk	2,761	4,444
Africa			
Nile	Mediterranean Sea	4,132	6,650
Congo	South Atlantic Ocean	2,900	4,700
Niger	Bight of Biafra	2,600	4,200
Zambezi	Mozambique Channel	2,200	3,500
Kasai	Congo River	1,338	2,153
Orange	South Atlantic Ocean	1,300	2,100
White Nile (al-Bahr al-Abyaḍ)	Nile River	1,295	2,084
Lualaba	Congo River	1,100	1,800
Limpopo	Mozambique Channel	1,100	1,800
Jubba (Juba)	Indian Ocean	1,030	1,658
Sénégal	South Atlantic Ocean	1,020	1,641
Okavango (Kubango)	Okavango Swamp	1,000	1,600
Lomami	Congo River	930	1,500
Blue Nile (al-Bahr al-Azraq)	White Nile River	907	1,460
Chari (Shari)	Lake Chad	870	1,400
Ubangi-Uele	Congo River	870	1,400
Awash	Lake Abē	750	1,200
America, North			
Mississippi-Missouri-Red Rock	Gulf of Mexico	3,710	5,971
Mackenzie-Slave-Peace	Beaufort Sea	2,635	4,241
Missouri-Red Rock	Mississippi River	2,533	4,076
St. Lawrence-Great Lakes	Gulf of Saint Lawrence	2,500	4,000
Mississippi	Gulf of Mexico	2,348	3,779
Missouri	Mississippi River	2,315	3,726
Yukon-Nisutlin	Bering Sea	1,979	3,185
Rio Grande	Gulf of Mexico	1,885	3,034
Yukon	Bering Sea	1,875	3,018
Nelson-Saskatchewan	Hudson Bay	1,600	2,575
Arkansas	Mississippi River	1,459	2,348
Colorado	Gulf of California	1,450	2,333
Ohio-Allegheny	Mississippi River	1,306	2,102
Red	Mississippi River	1,270	2,044
Columbia	North Pacific Ocean	1,243	2,000
Saskatchewan	Lake Winnipeg	1,205	1,939
Peace	Slave River	1,195	1,923
Snake	Columbia River	1,038	1,670
Churchill	Hudson Bay	1,000	1,609
Ohio	Mississippi River	981	1,579
Canadian	Arkansas River	906	1,456
Tennessee-French Broad	Ohio River	900	1,448
Upper Columbia	Columbia River	890	1,432
Brazos	Gulf of Mexico	870	1,400
South Saskatchewan	Saskatchewan River	865	1,392
Fraser	Strait of Georgia	850	1,368
Colorado (of Texas)	Matagorda Bay	840	1,352
St. Lawrence	Lake Ontario	800	1,287
North Saskatchewan	Saskatchewan River	800	1,287
Ottawa	St. Lawrence	790	1,271
North Canadian	Canadian River	760	1,223
Pecos	Rio Grande	735	1,183
Kuskokwim	Bering Sea	680	1,094
America, South			
Amazon-Ucayali-Apurimac	South Atlantic Ocean	4,000	6,400
Paraná	Río de la Plata	3,032	4,880
Madeira-Mamoré-Guaporé	Amazon River	2,082	3,350
Jurua	Amazon River	2,040	3,283
Purus	Amazon River	1,995	3,211
São Francisco	South Atlantic Ocean	1,811	2,914
Japurá (Caquetá)	Amazon River	1,750	2,816
Ucayali-Apurimac	Amazon River	1,701	2,738
Orinoco	South Atlantic Ocean	1,700	2,736
Tocantins	Pará River	1,677	2,699
Araguaia	Tocantins River	1,632	2,627
Paraguay	Paraná River	1,584	2,550
Pilcomayo	Paraguay River	1,550	2,500
Negro (Guainia)	Amazon River	1,400	2,253
Xingu	Amazon River	1,300	2,100
Tapajós-Teles Pires	Amazon River	1,238	1,992
Mamoré	Guaporé River	1,200	1,931
Marañón-Huallaga	Amazon River	1,184	1,905
Guaporé (Iténez)	Mamoré River	1,087	1,749
Parnaiba	South Atlantic Ocean	1,056	1,700
Madre de Dios	Beni River	1,056	1,700
Putumayo (Içá)	Amazon River	1,000	1,609
Solimões	Amazon River	1,000	1,609
Uruguay	Río de la Plata	990	1,593
Magdalena	Caribbean Sea	930	1,497
Guaviare	Orinoco River	930	1,497
Ucayali	Marañón River	910	1,465
Teles Pires	Tapajós River	870	1,400
Grande	Mamoré River	845	1,360
Cauca	Magdalena River	838	1,349
Iguacu	Paraná River	808	1,300
Asia			
Yangtze	East China Sea	3,915	6,300
Yenisey-Baikal-Selenga	Kara Sea	3,442	5,540
Huang Ho (Yellow)	Gulf of Chihli	3,395	5,464
Ob-Irtysh	Gulf of Ob	3,362	5,410
Amur-Argun	Sea of Okhotsk	2,761	4,444
Lena	Laptev Sea	2,734	4,400
Mekong	South China Sea	2,700	4,350
Ob-Katun	Gulf of Ob	2,696	4,338
Irtysh-Chorny Irtysh	Ob River	2,640	4,248
Yenisey	Kara Sea	2,549	4,102
Ob	Gulf of Ob	2,268	3,650
Syr Darya-Arabelsu	Aral Sea	1,876	3,019
Nizhnyaya Tunguska	Yenisey River	1,857	2,989
Brahmaputra	Jamuna River	1,800	2,900
Indus	Arabian Sea	1,800	2,900
Amur	Sea of Okhotsk	1,755	2,824
Euphrates	Shatt-al-Arab	1,740	2,800
Vilyuy	Lena River	1,647	2,650
Amu Darya-Pyandzh	Aral Sea	1,578	2,540
Kolyma-Kulu	East Siberian Sea	1,562	2,513
Ganges	Padma River	1,560	2,510
Ishim	Irtysh River	1,522	2,450
Salween	Gulf of Martaban	1,500	2,400
Olenyok	Laptev Sea	1,424	2,292
Aldan	Lena River	1,412	2,273
Syr Darya	Aral Sea	1,374	2,212
Chu Chiang (Pearl)-Hsi	South China Sea	1,365	2,197
Kolyma (Kolima)	East Siberian Sea	1,323	2,129
Tarim	Lop Nor Basin	1,261	2,030
Chulym-Bely Iyus	Ob River	1,257	2,023
Irrawaddy	Andaman Sea	1,238	1,992
Vitim-Vitimkan	Lena River	1,229	1,978
Indigirka-Khastakh	East Siberian Sea	1,228	1,977
Hsi	South China Sea	1,216	1,957
Sungari	Amur River	1,197	1,927
Tigris	Shatt-al-Arab	1,180	1,900
Podkamennaya Tunguska	Yenisey River	1,159	1,865
Vitim	Lena River	1,141	1,837
Chulym	Ob River	1,118	1,799
Angara	Yenisey River	1,105	1,779
Indigirka	East Siberian Sea	1,072	1,726
Khatanga-Kotuy	Laptev Sea	1,017	1,636
Ket	Ob River	1,007	1,621
Argun	Amur River	1,007	1,620
Shilka-Onon	Amur River	989	1,592
Tobol-Kokpektysay	Irtysh River	989	1,591
Alazeya-Kadylchan	East Siberian Sea	988	1,590
Han Shui	Yangtze River	952	1,532
Yana-Sartang	Laptev Sea	927	1,492
Godavari	Bay of Bengal	910	1,465
Amga	Aldan River	908	1,462
Sutlej	Indus River	900	1,450
Ili-Tekes	Lake Balkhash	894	1,439
Olyokma	Lena River	892	1,436
Amu Darya	Aral Sea	879	1,415
Taz	Gulf of Taz	871	1,401
Yamuna	Ganges River	855	1,376
Kura	Caspian Sea	848	1,364
Tavda-Lozva	Tobol River	843	1,356
Liao	Gulf of Liaotung	836	1,345
Taseyeva-Chuna	Angara River	820	1,319
Vyatka	Kama River	817	1,314
Krishna	Bay of Bengal	800	1,290
Narmada	Gulf of Cambay	800	1,290
Zeya	Amur River	772	1,242
Chu	Betpak Dala Plateau	663	1,067
Europe			
Volga	Caspian Sea	2,193	3,530
Danube	Black Sea	1,770	2,850
Ural	Caspian Sea	1,509	2,428
Dnepr	Black Sea	1,367	2,200
Don	Sea of Azov	1,162	1,870
Pechora	Barents Sea	1,124	1,809
Kama	Volga River	1,122	1,805
Oka	Volga River	932	1,500
Belaya	Kama River	889	1,430
Rhine	North Sea	865	1,392
Dnestr	Black Sea	840	1,352
Northern Dvina-Sukhona	White Sea	809	1,302
Oceania			
Darling	Murray River	1,702	2,739
Murray	Great Australian Bight	1,609	2,589
Murrumbidgee	Murray River	981	1,579
Lachlan	Murrumbidgee River	992	1,484
Cooper Creek	Lake Eyre	882	1,420

*Conversions of rounded figures are rounded to nearest hundred miles or kilometres.

occur in upland areas. In such cases, the valley sides and riverbanks are for the most part coextensive. In river valleys in lowland areas, where the channel extends across a floodplain, no direct contact generally occurs between the channel and the valley sides.

River channels tend to curve, but if a channel is artificially constrained so that it flows in a relatively straight line, the river will erode and deposit sediment in such a way that its bed develops evenly spaced riffles and pools. The tendency of a river to curve and to develop broad looping curves is called meandering. A river heavily loaded with sediment may deposit the material at a rate that causes the channel to break up into several smaller channels. These channels typically diverge and converge, forming a braided pattern.

Deposition from rivers occurs when the velocity of flow is checked. This may occur when a river enters the ocean or a lake and creates a delta (*q.v.*) or when a sudden change in gradient at the mouth of a canyon or valley causes the river to form an alluvial fan (*q.v.*). In time of flood, river water spreads out from its overflowing channel and deposits its load over a wide area. This relatively flat surface constitutes the floodplain and is perhaps the most common of fluvial features. Flood deposits are usually sorted; the coarsest material is left nearest the channel. As the material accumulates, it often forms elongate narrow ridges adjacent to the channel. Such ridges are known as natural levees.

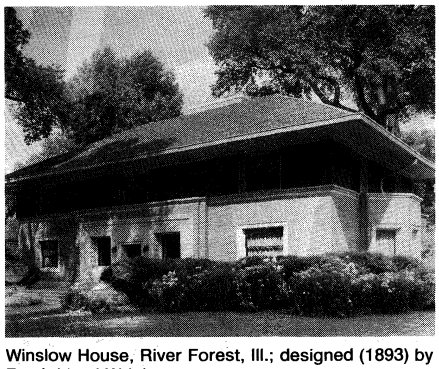
river birch (*Betula nigra*), also called RED BIRCH, or WATER BIRCH, ornamental tree of the family Betulaceae, found on river and stream banks in the eastern one-third of the United States. Because the lower trunk becomes very dark with age, the tree is sometimes called black birch, a name more properly applied to sweet birch (*q.v.*).

Commonly 18 to 25 m (60 to 80 feet) tall, river birch may reach 30 m (100 feet) in the lower Mississippi valley. The red-brown, deeply furrowed bark on an old trunk breaks into ragged, closely appressed scales; the upper trunk and branches are smooth, salmon pink to rose cinnamon, with a metallic lustre. The glossy, dark green, wedge-shaped leaves are unevenly double-toothed, with hairy veins below. The hairy, flattened leafstalks are about 1 cm (0.4 inch) long. Its fruits mature in late spring or early summer, in contrast to the fall ripening of other birches. The fast-growing tree has value in erosion control and as an ornamental and street tree. It grows well on moist, well-drained soil but does not tolerate shade. It is fairly immune to disease or insect attack but is short-lived and often injured by ice floes in spring floods. The wood is used for furniture, woodenware, and turned articles.

River Brethren: *see* Brethren in Christ.

river duck: *see* dabbling duck.

River Forest, village, Cook county, northeastern Illinois, U.S., western residential suburb of Chicago. Originally part of an area known as Harlem, it was settled in 1836 and was known as Thatcher until 1870, when it was laid out as River Forest. The village is the seat of Rosary College (1901) and Concordia Teachers College (1913). It has several structures designed by Frank Lloyd Wright, including the Winslow House (1893) and the River Forest Tennis Club (1906). Inc. 1880. Pop. (1987 est.) 11,734.



Winslow House, River Forest, Ill.; designed (1893) by Frank Lloyd Wright

Photograph © Wayne Andrews/Esto

river jack (snake): *see* rhinoceros viper.

River Rouge, city, adjacent to southwest Detroit, Wayne county, Michigan, U.S., on the Detroit and Rouge rivers. Site of an early French settlement, it grew in the 1920s with the development of the Ford Motor Company's plant in nearby Dearborn. Available rail and water transportation encouraged industrialization; manufactures include paper, ships, gypsum products, and steel. Zug Island, a highly industrialized 400-acre (162-hectare) site formed by a canal dredged between the two rivers, is in the city's northeast corner. Inc. village, 1889; city, 1921. Pop. (1987 est.) 11,405.

river terrace, bench or step that extends along the side of a valley and represents a former level of the valley floor. A terrace results from any hydrological or climatic shift that causes renewed downcutting; it is exposed only to occasional flood risk. It generally has a flat top made up of sedimentary deposits and a steep fore edge, and it may be the remains of an old floodplain, cut through by the river and left standing above the present floodplain level. Another type of terrace is cut into bedrock and may have a thin veneer of alluvium, or sedimentary deposits. In paired terraces, the terrace features on each side of a valley correspond.

Rivera, city, northern Uruguay, built atop two hills in the basaltic Santa Ana Hills, contiguous to Santana do Livramento, Braz. One of Uruguay's largest cities, Rivera is the commercial and manufacturing centre for the agricultural and pastoral hinterland. Grains, vegetables, fruit, and cattle are the principal trade commodities, and manufactures include textiles, cigars and cigarettes, mosaics, and brooms. There is a government-owned television station in Rivera. The city is linked by rail and highway to Tacuarembó, Montevideo, and other Uruguayan cities as well as to communities in nearby Brazil.

The surrounding region consists of gently rolling hills. It has good pastureland and is noted for its sheep and cattle ranches. Agriculture is of increasing importance; leading crops include rice, sweet potatoes, corn (maize), peanuts (groundnuts), wheat, and fruit. Pop. (1985 prelim.) 55,400.

Rivera, Diego, in full DIEGO MARÍA CONCEPCIÓN JUAN NEPOMUCENO ESTANISLAO DE LA RIVERA Y BARRIENTOS ACOSTA Y RODRÍGUEZ (b. Dec. 8, 1886, Guanajuato, Mex.—d. Nov. 25, 1957, Mexico City), Mexican painter whose bold, large-scale murals stimulated a revival of fresco painting in Latin America and in the United States, where they for a time were a cause célèbre.

A government scholarship enabled Rivera to enter the San Carlos Academy of Fine Arts, but after taking part in student riots he was expelled. With a stipend from the government of Santa Cruz, he transferred his studies to Spain. Growing restless, he made a sketching tour through western Europe, ultimately settling in Paris.

In 1910 he exhibited 40 of his works in Mexico. Public response was favourable, but Rivera had not yet developed the emphatic, vigorous style that was to win him fame. Returning to Europe, he exhibited in Paris and hiked through Italy, inspecting frescoes.

He returned to Mexico in 1921, after the reformist, art-loving Alvaro Obregón was elected president. Rivera created a huge allegory for the walls of the National Preparatory School,



Diego Rivera, *c.* 1910

Peter A. Juley and Son

Mexico City, and then a series of frescoes for the Ministry of Education courtyard and a work entitled "The Fecund Earth" for the National Agricultural School, Chapingo.

After a one-man retrospective exhibition at the Museum of Modern Art, New York City, he was commissioned to paint murals for the Detroit Institute of Arts (1932), one of which, "Vaccination," was attacked as a caricature of the Holy Family. Rivera weathered the Detroit crisis but not a New York City uproar the following year. His "Man at the Crossroads" fresco, executed for Rockefeller Center, was greeted with picketing and newspaper assaults because Rivera had included the figure of Lenin in the picture. The mural was destroyed by the centre but was reproduced by Rivera at the Palace of Fine Arts, Mexico City.

In the late 1930s and early 1940s Rivera was considered too radical for further American commissions; to his associates in the Mexican Communist Party, which he had joined in the 1920s, he was not sufficiently a social realist. His popular appeal, however, helped him carry on. His most ambitious and gigantic mural, an epic on the history of Mexico for the National Palace, Mexico City, was unfinished when he died.

Rivera's finest works are his earlier large-scale murals depicting Mexico's history, society, and economy. He used bold, fresh colours and drew flattened, simplified forms that achieve a monumental quality.

Rivera, José Eustasio (b. Feb. 19, 1889, Neiva, Colom.—d. Feb. 19, 1928, New York City), Columbian poet and novelist whose novel of the South American tropical jungle, *La vorágine* (1924; *The Vortex*), a powerful denunciation of the exploitation of the rubber gatherers in the upper Amazon jungle, is considered by many critics to be the best of many South American novels with jungle settings.

Rivera, a lawyer by profession, established his literary reputation with *Tierra de promisión* (1921; "The Promised Land"), a collection of sonnets portraying the untamed beauty of the Colombian tropics. In 1922 he was appointed to a government commission to settle a dispute over the boundary between Colombia and Venezuela. He traveled through the Amazon region and along the Orinoco River, living for a time among the Indians and gaining an intimate knowledge of the violence of

the jungle and the constant struggle necessary to survive in it.

Rivera contracted beriberi in the jungle and during his convalescence wrote *La vorágine,* combining firsthand knowledge with poetic vision and a talent for vivid description. *La vorágine* succeeds both as a novel of adventure and of social protest. Translated into several languages, it brought Rivera international recognition. It was his only novel.

Riverina, predominantly rural region, south-central New South Wales, Australia. Occupying 26,509 square miles (68,658 square km), it is bounded on the north and northwest by the Lachlan and Murrumbidgee rivers, on the south by the Murray River, and on the east by an imaginary line connecting the towns of Condobolin, Junee, and Albury. Most of the Riverina comprises level alluvial plains laced with meandering streams that flood periodically. Only in the east does the terrain become hilly. The soils are generally fertile and the climate mild. Average annual rainfall varies from 12 inches (300 mm) in the northwest to 25 inches (635 mm) in the southeast.

Evidence of Aboriginal occupation of the area more than 30,000 years ago has been found. Early exploration of the district was undertaken by John Oxley in 1817 and Thomas Mitchell in 1836. Pastoralists began to enter the area in the 1830s, attracted by the abundant natural fodder; since then, improvements in farming methods and conditions have led to great increases in agricultural activities. Along the southeastern slopes, with their lower temperatures and more reliable rain, arable farming is dominant, including fruit growing and dairying. Farther west, mixed wheat-sheep farms are characteristic. The great wealth of the Riverina, however, lies in its irrigated land, most of which borders the Murray and Murrumbidgee, farming being more intensive along the latter. Production is either horticultural (citrus and stone fruit, wine grapes, vegetables) or mixed (rice, wheat, oats, meat, wool). Irrigation water is supplied by the Burrinjuck and Berembed reservoirs on the Murrumbidgee and Hume Reservoir on the Murray, supplemented since 1949 by the Snowy Mountains Scheme. Industry is restricted to processing local products and includes wineries, canneries, and fruit-packing plants. Some tin and gypsum is mined, as well as negligible amounts of gold and subbituminous coal.

The major Riverina towns are Albury, Wagga Wagga, Leeton, Griffith, Junee, Narrandera, Deniliquin, Hay, and Condobolin. The region is well served by highways (Sturt, Mid Western, Newell, Cobb, Riverina) and railroads (the Sydney–Melbourne line crosses the southeastern corner with branch lines running north to Hillston and west to Hay).

riverine ecosystem, also called LOTIC ECOSYSTEM, any spring, stream, or river viewed as an ecological unit of the biotic community and the physiochemical environment, within which mass and energy are exchanged. The waters are usually flowing (lotic) and exhibit a longitudinal gradation in temperatures, concentration of dissolved material, turbidity, and atmospheric gases, from the source to the mouth. There are two major zones: rapids, shallow water where currents are strong enough to keep the bottom clear and firm; and pools, deeper waters where currents are reduced and silt and other debris collect on the bottom. Each zone has its specially adapted life forms.

Rivers, state (since 1967), southern Nigeria, comprising the Niger River Delta on the Gulf of Guinea. It is bounded by the states of Imo on the north, Akwa Ibom on the east, and Bendel on the west; its area of 8,436 square miles (21,850 square km) embraces mangrove swamps, tropical rain forest, and many rivers.

Several of the Ijaw peoples' fishing settlements, including Abonnema, Degema, Okrika, Bonny, Brass, Akassa, Nembe (Nimbi), and New Calabar, became important in the early 19th century because of their trade in slaves, and later for the export of palm oil and kernels. Incorporated as part of the Oil Rivers Protectorate in 1885 and Niger Coast Protectorate in 1893, the area became part of the amalgamated colony and protectorate of Nigeria in 1914. In 1976 some parts of the Ndoni territory in Bendel state were added to Rivers state. Fishing and farming are the principal occupations of the people. Plantains, bananas, cassava, oil palms, coconuts, rubber, raffia, and citrus fruits are grown. Large deposits of crude oil and natural gas are the major mineral resources. Major oil terminals exist offshore from Brass and Bonny; an oil refinery has been established at Alesa-Eleme. Port Harcourt, the state capital and the nation's second largest port, is on the southern terminus of the eastern branch of the Nigerian Railway's main line. Most industrial activity in the state is centred in Port Harcourt, which has become one of the nation's leading industrial centres; it manufactures tires, furniture, boats, metal products, textiles, bottles, cigarettes, paints, and plastics. It is also a centre of fishing industries, has an automobile engines and truck assembly plant, and is the site of a federal university (founded 1975) and a state university of science and technology. Because the landscape is dominated by the networks of rivers and mangrove swamps, water serves as the principal means of transport through much of the western part of the state. Pop. (1988 est.) 3,429,000.

Where the same name may denote a person, place, or thing, the articles will be found in that order

Rivers, Anthony Woodville, 2nd Earl, BARON RIVERS, Woodville also spelled WYDEVILLE, WYDVILLE, or WYDEVILL (b. *c.* 1440—d. June 25, 1483), English noble, a leading supporter of his brother-in-law the Yorkist king Edward IV.

Anthony and his father, Sir Richard Woodville (afterward 1st Earl Rivers), fought for the Lancastrians against the Yorkists in the early years of the Wars of the Roses (1455–85). After the Lancastrian army was decisively defeated in 1461, the Woodvilles supported the newly crowned Edward IV. The marriage of Anthony's sister Elizabeth to Edward IV in 1464 made the Woodvilles preeminent at court.



Anthony Woodville, 2nd Earl Rivers, portrait miniature from his *Dictes and Sayenges of the Phylosophers,* 1477; in Lambeth Palace Library, London

By courtesy of Lambeth Palace Library; photograph, J.R. Freeman & Co. Ltd.

During the next several years Anthony Woodville earned an international reputation for his bravery in tournaments. He succeeded to his father's earldom when the elder Woodville was killed by rebels under Richard Neville, earl of Warwick, in 1469. Warwick drove Edward and Rivers into exile in October 1470, and, after their return to England in March 1471, Rivers helped defeat Warwick at the Battle of Barnet (April 14). In addition, he held London while Edward destroyed a Lancastrian army at Tewkesbury, Gloucestershire, on May 4. Rivers then became increasingly involved with literary and spiritual concerns. His translation of a French moralistic work as *Dictes and Sayenges of the Phylosophers* (1477) was the first dated book printed in England. Several months after Edward's death (April 1483), Richard, duke of Gloucester (later King Richard III), the regent for young king Edward V, had Rivers executed for alleged treasonable activities. (Upon the death of his brother and heir in 1491, the peerage of Rivers became extinct.)

Rivers, Larry, original name YITZROCH LOIZA GROSSBERG (b. Aug. 17, 1923, New York City), American painter whose works frequently combined the vigorous, painterly brushstrokes of Abstract Expressionism (*q.v.*) with the images of the familiar associated with the Pop art (*q.v.*) movement.



Larry Rivers, photograph by Hans Namuth, 1965

Hans Namuth

He studied composition at the Juilliard School of Music and was a professional jazz saxophonist. From 1947 to 1948 he studied in the New York City and Provincetown, Mass., school of the prominent Abstract Expressionist Hans Hofmann. He later studied at New York University College, graduating in 1951. His early paintings were exhibited in New York City in 1949.

Rivers' first major work was "The Burial" (1951), a grim depiction of his grandmother's funeral, based on the famous "Burial at Ornans" by Courbet. His "Washington Crossing the Delaware" (1953) was based on the familiar work by a 19th-century American painter, Emanuel Leutze. Criticized for its banal subject matter and mixture of styles, the painting nonetheless attracted widespread attention. From 1951 to 1957 he made a series of portraits of his mother-in-law, of which the harshly realistic "Double Portrait of Berdie" (1955) is perhaps best-known.

Rivers' works were characterized by outstanding draftsmanship, a fine sense of colour, and the frequent use of complex, fragmentary, and multiple views. Beginning in 1961, commercial images, such as cigarette packages, figured prominently in his pictures, which, after 1963, frequently had elements of collage, construction, and sculpture. A particularly elaborate example of such mixed-media works was "The History of the Russian Revolution:

From Marx to Mayakovsky" (1965; Joseph H. Hirshhorn Collection, New York City), which had some 30 individual paintings and included, among other objects, a machine gun.

Rivers, Richard Woodville, 1st Earl, BARON RIVERS, Woodville also spelled WYDEVILLE, WYDVILLE, or WYDEVILL (d. Aug. 12, 1469, Kenilworth, Warwickshire, Eng.), father-in-law of the Yorkist king Edward IV of England (reigned 1461–70, 1471–83). Nobles opposed to Rivers initiated the uprising that temporarily drove Edward into exile in 1470.

Woodville fought with distinction during the last two decades of the Hundred Years' War (1337–1453) against France and in about 1436 married the wealthy Jacquetta of Luxembourg, Duchess of Bedford. He was created Baron Rivers in 1448. In the opening years of the Wars of the Roses (1455–85), Rivers supported the Lancastrian king Henry VI against his Yorkist opponents. Rivers was present when the Lancastrian army was annihilated at Towton, Yorkshire, in March 1461; and he then shifted his allegiance to the newly crowned Yorkist monarch Edward IV.

On May 1, 1464, Rivers married his daughter Elizabeth to Edward. Through royal favour most of his five surviving sons and eight daughters were married into noble families. Rivers himself was created Earl Rivers in 1466 and constable of England in 1467. Meanwhile, the older nobility eyed the upstart Woodvilles with hatred. The destruction of the family's influence was one of the aims of the rebellion against Edward instigated by Richard Neville, Earl of Warwick, in 1469. After the defeat of Edward at Edgecote, Northamptonshire (July 1469), Rivers and one of his sons were captured and beheaded.

Rivers, Thomas Milton (b. Sept. 3, 1888, Jonesboro, Ga., U.S.—d. May 12, 1962, New York, N.Y.), American virologist who, as chairman of the virus research committee of the National Foundation for Infantile Paralysis (now the March of Dimes Birth Defects Foundation; 1938–55), organized the long-range research program that led to development of the Salk and Sabin anti-poliomyelitis vaccines.

After graduation from Johns Hopkins University medical school, Baltimore (1915), Rivers led an early campaign to recognize viruses as distinct causative agents of disease, anticipating future discoveries when he observed that viruses are "obligate parasites" that depend upon living tissue for their growth and reproduction.

A member of the Rockefeller Institute for Medical Research, New York City (1922–37), he developed a tissue culture for vaccinia virus (1931) that served as the basis for the South African virologist Max Theiler's development of an anti-yellow-fever vaccine, and, as director of the Institute's affiliated hospital (1937–55), he conducted research concerning the viral causes of influenza and chicken pox. Rivers became the National Foundation's vice president of medical affairs in 1955.

Rivers, W(illiam) H(alse) R(ivers) (b. March 12, 1864, Luton, near Chatham, Kent, Eng.—d. June 4, 1922, Cambridge, Cambridgeshire), English medical psychologist and anthropologist known principally for *The Todas* (1906), a model of precise documentation of a people, and the important *History of Melanesian Society,* 2 vol. (1914).

After training as a physician, Rivers conducted research on problems of physiological psychology. In 1897 he became director of Britain's first experimental psychology laboratory (University of London), and in the same year he was appointed lecturer at the University of Cambridge, where he was pivotal in instituting the study of experimental psychology. In 1898 he joined the Cambridge expedition to the Torres Strait (between New Guinea and Australia), administered tests of sensory functions to Melanesians, and became keenly interested in anthropological fieldwork. He became a fellow of St. John's College, Cambridge, in 1902. Shortly afterward he made a firsthand study of the Toda people of southern India and later paid several visits to Melanesia. His ideas on kinship terminology were advanced in *Kinship and Social Organisation* (1914). Rivers devoted the rest of his life to medical psychology. His *Instinct and the Unconscious* (1920) did much to encourage a sympathetic British attitude toward psychoanalytic theory.

Riverside, city, seat (1893) of Riverside county, southern California, U.S., on the Santa Ana River. With San Bernardino and Ontario it forms a metropolitan complex east of Los Angeles. Once part of the Rancho Jurupa, it began as a silk-growing colony and was laid out as Jurupa in 1870. Renamed Riverside, it developed as a citrus town; the state's first Washington navel-orange trees, propagated from Brazilian cuttings, were cultivated there in 1873.

Riverside's economy now includes manufacturing and distributive and educational activities. The Riverside campus of the University of California has a citrus experiment station (founded 1907). Riverside City (junior) College was established in 1916. The La Sierra College of Loma Linda University (1922), California Baptist College (1955), and Sherman Indian High School (1901; a school for American Indians) are also located in Riverside. The Riverside International Raceway and March Air Force Base are nearby. Inc. city, 1883. Pop. (1988 est.) city, 212,616; Riverside–San Bernardino metropolitan area (PMSA), 2,277,600.

Riversleigh fossils, any of numerous assemblages of fossils found at Riversleigh Station, in northwestern Queensland, Australia, which together constitute the richest and most diverse collection of fossils ever found on that continent. Riversleigh is an isolated area about 140 miles (225 km) northwest of the city of Mount Isa. The fossils are found in limestone rock outcrops near the Gregory River. Since the Australian paleontologist Michael Archer began intensive explorations of the area in 1983, Riversleigh has yielded the remains of more than 200 previously unknown species of vertebrates. Most of the specimens lived in the Miocene epoch (23.7 million to 5.3 million years ago) or in the succeeding Pliocene epoch (about 5.3 million to 1.6 million years ago). The finds included many types of early (and extinct) marsupials, ranging from a large carnivorous kangaroo and marsupial "lions" and "wolves" to miniature koalas and phalangers. Other finds included dozens of new species of bats, a prehistoric type of platypus, and several unknown species of reptiles and rodents. The Riversleigh fossils vastly expanded existing knowledge of Australia's prehistoric life and of the evolutionary history of its marsupials.

Riverton, city, Fremont county, west-central Wyoming, U.S. It lies along the Bighorn River at the mouth of the Wind River. Founded and incorporated as Wadsworth in 1906, it was renamed Riverton because of its location near the convergence of four rivers. Riverton is a shipping point for the Wind River basin, which is irrigated by the Riverton Power and Land-Reclamation Project. The city has livestock interests, uranium and sulfuric acid plants, and mills producing railroad crossties and fence posts. Oil and natural-gas fields are nearby. The Central Wyoming College opened (1968) in Riverton. The city is adjacent to the Wind River Indian (Shoshone and Arapahoe) Reservation. Pop. (1986 est.) 9,630.

riverweed, any of the aquatic plants of the order Podostemales (*q.v.*).

rivet, headed pin or bolt used as a permanent fastening in metalwork; for several decades it was indispensable in steel construction. A head is formed on the plain end of the pin by hammering or by direct pressure. Cold riveting is practicable for small rivets of copper, brass, aluminum, iron, or steel, but the larger iron and steel rivets have to be heated to secure rapid and easy closing.

The various shapes of rivet heads or tails include the countersunk head, which is beaten flush into a conical recess in the plate; the cup, or round, head; the pan head, which has sloping sides and a flat top; the conical head, with sloped sides ending in a point; and the thin flat head. Bifurcated rivets for belts and harnesses have thin heads, but the tails are split and opened like a paper fastener. Often gas or electric welding has been substituted for riveting in the case of hollow ware and other sheet-metal products. Electric welding has increasingly displaced riveting as a method for connection of structural members such as columns and beams in building construction.

Rivets in which an explosive charge is used to set the tail are sometimes employed where the tail is not easily accessible, as in riveting the aluminum skin onto airplane wings.

Rivet, Paul (b. 1876, Wassigny, Fr.—d. March 25, 1958, Paris), French ethnologist who suggested Australian and Melanesian origins for the Indians of South America and who founded (1937) a major anthropological museum, the Museum of Man (Musée de l'Homme), Paris.

Educated as a physician, Rivet joined a scientific expedition sent to Ecuador in 1901. At the end of the mission, he remained in South America an additional six years, observing the peoples of the high Andean valleys.

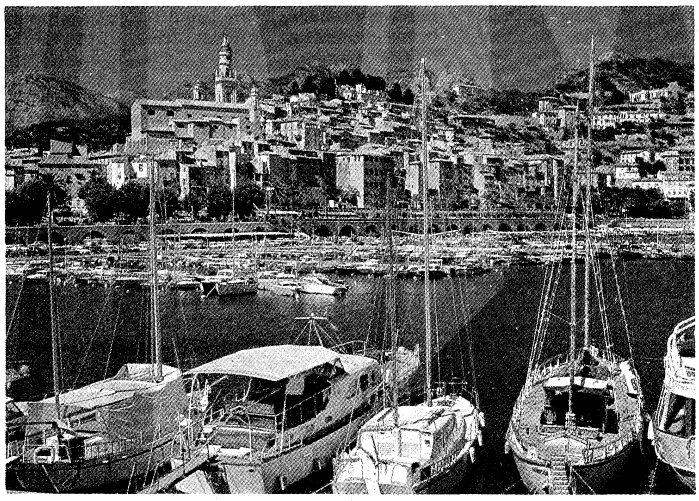
Returning to Paris, Rivet became an assistant at the National Museum of Natural History, classifying his South American materials and publishing, with museum director René Verneau, *Ethnographie ancienne de l'Équateur,* 2 parts (1912–22; "Ancient Ethnography of Ecuador"). In 1926 he helped to establish the Institute of Ethnology at the University of Paris, where he was instrumental in training many ethnologists. In 1928 he succeeded Verneau as museum director.

Rivet theorized that Asia was not the sole place of origin of the early Americans and that there had been migrations from Australia about 6,000 years ago and from Melanesia sometime later. His book *Les Origines de l'homme américain* (1943; "The Origins of American Man") contained linguistic and anthropological evidence supporting his migration thesis.

In 1942 Rivet went to Colombia, founding an ethnological institute and a museum there. In 1945 he returned to his Paris museum and teaching posts and continued his South American research. His linguistic work presented much data on languages otherwise little known, notably the Aymaran and Quechuan languages of South America.

Riviera, Mediterranean coastland between Cannes (France) and La Spezia (Italy). The French section comprises part of the Côte d'Azur (which extends farther west), while the Italian section is known to the west and east of Genoa as the Riviera di Ponente and the Riviera di Levante, respectively. Sheltered to the north by the Maritime Alps and Ligurian Apennines, the district has exceptionally mild winters and brilliant, hot summers, with much sunshine throughout the year. Rain falls on only about 60 days a year, and the coast rarely has snow. Many delicate plants, including the pomegranate, agave, mimosa, and some types of palm, flourish. Flowers are grown out of season in large quantities for

export to northern markets. The favourable climate, the grandeur of the rugged coastal scenery, and the attractions of the sea have for long drawn the leisured rich, especially during



The yachting harbour at Menton, Fr., on the French Riviera
Shostal Assoc.—EB Inc.

winter. The resident population is extremely dense and is increased by the tourists.

The popularity of Cannes dates from 1834, when Lord Brougham, avoiding a cholera epidemic in Nice, stayed there instead and set the fashion by returning regularly for the next 30 years. Modern transport has increased the influx of tourists; luxury villas and hotels are mixed with resort facilities of a more popular kind. Monte-Carlo (*q.v.*), in the tiny principality of Monaco, offers additional attractions for expensive living. From west to east the main centres of the coastal urban development are Cannes, Juan-les-Pins, Antibes, Nice, Menton (France), Bordighera, San Remo, Alassio, Santa Margherita, Rapallo, Sestri Levante, and Levanto (Italy). Land speculation and the power of private interests make planned or limited development for the public good very difficult. A three-tiered system of scenic motor roads (called the Corniches) runs between Nice and the Italian frontier at Menton. The highest is Grande Corniche, constructed by Napoleon I, emperor of France, to replace the Roman road; it passes the picturesque village of La Turbie and overlooks Monaco from a height of more than 1,400 ft (427 m). The lowest is Corniche, built in the 19th century by a prince of Monaco, which connects the coastal resorts. The middle road, opened in 1939, was created for the tourist industry and passes by the perched village of Èze. A railway passes through numerous tunnels in the projecting limestone headlands.

Rivière, Jacques (b. July 15, 1886, Bordeaux, Fr.—d. Feb. 14, 1925, Paris), writer, critic, and editor who was a major force in the intellectual life of France in the period immediately following World War I. His most important works were his thoughtful and finely written essays on the arts. In 1912 a collection of these essays was published as *Études*; a second such collection, entitled *Nouvelles études* ("Further Essays"), was published posthumously in 1947.



Jacques Rivière
Harlingue—H. Roger-Viollet

From 1914 to 1918 Rivière was a prisoner of war in Germany; *L'Allemand* (1918; "The German") was based on that experience. He was a co-founder and, from 1919 to 1925, editor of the *Nouvelle Revue Française,* a leading magazine of the arts. He was influential in winning a general public acceptance of Marcel Proust as an important writer. Rivière wrote two psychological novels, *Aimée* (1922) and the unfinished *Florence* (1935).

Brought up as a Roman Catholic, he left the church as a young man; religion continued to be a major force in his life, however, and he struggled unsuccessfully to accept the doctrines of the church. His personal anxiety and aspirations are best reflected in his letters to his brother-in-law, Alain-Fournier; in his correspondence with the poet and playwright Paul Claudel; and in his book *À la trace de Dieu* (1925; "On the Track of God").

Rivière-du-Loup, city, seat of Rivière-du-Loup regional county *(municipalité régionale de comté)*, Québec region, southeast Quebec province, Canada, about 100 mi (160 km) northeast of Quebec city on the south shore of the St. Lawrence River. The site, at the mouth of the Rivière-du-Loup (Wolf River), was a mission centre in 1683; in 1791 it became part of the seigniory of Andrew Fraser. Settled in 1834, it was named Fraserville. In 1919 it was renamed Rivière-du-Loup for the wolf packs that once roamed the area. The city soon became a commercial, industrial, and transportation centre; its chief products are lumber, pulp and paper, and furniture. Power is provided by a hydroelectric plant on the Wolf River. Among the city's educational institutions are a teachers' college and an arts and crafts school. The city is also the centre of a resort area. Inc. municipality, 1842; city, 1874. Pop. (1981) 13,459.

Rivoli, town, Torino province, Piemonte (Piedmont) region, northwestern Italy, just west of Turin (Torino). Once the favourite resort of the counts of Savoy, the town is dominated by a castle begun by Victor Amadeus II, king of Sicily and Sardinia, in 1712 on the site of an older structure. The house of the Green Count (Amadeus VI), dating from the 14th–15th century, is typical of the elegant patrician residences. Textile manufacturing is the chief industry of the town. Pop. (1981 prelim.) mun., 49,136.

Rivoli, André Masséna, duc de (duke of): *see* Masséna, André.

Riwa (India): *see* Rewa.

Riwari (India): *see* Rewāri.

Riyāḍ, ar-, also spelled RIYADH, *minṭaqah* (province), in the Najd Region, central Saudi Arabia. It is bounded by the *manāṭiq* (provinces) of ash-Sharqīyah to the north and east; Najrān to the south; ʿAsir, Makkah, and al-Madīnah to the west; and al-Qaṣīm and Ḥa'il to the northwest. Ar-Riyāḍ ("The Gardens") extends southward to the forbidding Arabian desert region Rubʿ al-Khali (the Empty Quarter) and is demarcated on the east by the ad-



The Khafs Daghrah oasis, in ar-Riyāḍ, Saudi Arabia
An Exxon photo

Dahnā' sand belt. Toward the middle of the province, the arc-shaped Jabal (mountains) Ṭuwayq run parallel to ad-Dahnā' desert in a north–south direction. Ar-Riyāḍ's economic activities are centred on agriculture and livestock. The major cities include Riyadh, the provincial and national capital, and al-Kharj, a flourishing agricultural centre. Pop. (1974) 1,272,000.

Riyadh, Arabic AR-RIYĀḌ, capital and largest city of Saudi Arabia, capital of a *minṭaqah* (province) of the same name, in Najd region of the central Arabian Peninsula. It is situated on a high plateau in the midst of Wādī



Modern Ministry of Finance building in Riyadh, Saudi Arabia
Diane Rawson—Photo Researchers

Ḥanīfah, Wādī Aysan, and Wādī al-Baṭḥā'. Riyadh was chosen the capital of the Saʿūd dynasty in 1824 and remained the centre of Saʿūd rule until 1881, when the Rashīd family of Ḥā'il extended its influence over Najd. In 1902, however, Ibn Saʿūd regained control for his family and used the city as the centre for his conquest of Arabia, which he completed by 1930, with the assimilation of ʿAsīr. When the unified Kingdom of Saudi Arabia was proclaimed in 1932, Riyadh was designated as the capital.

Discovery of immense petroleum deposits in the kingdom starting in the 1930s and the re-

sulting wealth that they generated transformed the old provincial town into a showplace of modern technology. Modern buildings, paved highways, new hotels, hospitals, and schools became commonplace in what had been a small oasis of mud-brick dwellings. The population, once exclusively Najdi, is now much more cosmopolitan. In addition to its administrative role, Riyadh is the kingdom's commerce, education, and transportation hub. Industries include an oil refinery. The city is served by a modern airport and by railroad and highway links to the coast. Riyadh University, the former King Sa'ūd I University, was founded in 1957. Pop. (1981 est.) 1,308,000.

Riza Shah Pahlevi (shah of Iran): *see* Reza Shah Pahlavi.

Riẓāiyeh (Iran): *see* Orūmīyeh.

Rizal (y Alonso), José, in full JOSÉ PROTASIO RIZAL MERCADO Y ALONSO REALONDA (b. June 19, 1861, Calamba, Phil.—d. Dec. 30, 1896, Manila), patriot, physician, and man of letters who was an inspiration to the Philippine nationalist movement.

The son of a prosperous landowner, Rizal was educated in Manila and at the University of Madrid. A brilliant medical student, he soon committed himself to the reform of Spanish rule in his home country, though he never advocated Philippine independence. Most of his writing was done in Europe, where he resided between 1882 and 1892.

In 1886 Rizal published his first novel in Tagalog, *Noli me tangere* (*The Social Cancer*), a passionate exposure of the evils of Spanish rule in the Philippines. A sequel, *El filibusterismo* (1891; *The Reign of Greed*), established his reputation as the leading spokesman of the Philippine reform movement. He published an annotated edition (1890; reprinted 1958) of Antonio Morga's *Sucesos de las Islas Filipinas,* hoping to show that the native people of the Philippines had a long history before the coming of the Spaniards. He became the leader of the Propaganda Movement, contributing numerous articles to its newspaper, *La Solidaridad,* published in Barcelona. Rizal's political program included integration of the Philippines as a province of Spain, representation in the Cortes (the Spanish parliament), the replacement of Spanish friars by Filipino priests, freedom of assembly and expression, and equality of Filipinos and Spaniards before the law.

Rizal returned to the Philippines in 1892. He founded a nonviolent-reform society, the Liga Filipina, in Manila, and was deported to Dapitan in northwest Mindanao. He remained in exile for the next four years. In 1896 the Katipunan, a Filipino nationalist secret society, revolted against Spain. Although he had no connections with that organization and he had had no part in the insurrection, Rizal was arrested and tried for sedition by the military. Found guilty, he was publicly executed by a firing squad in Manila. His martyrdom convinced Filipinos that there was no alternative to independence from Spain. On the eve of his execution, while confined in Fort Santiago, Rizal wrote "Último adiós" ("Last Farewell"), a masterpiece of 19th-century Spanish verse.

Rizal City (Philippines): *see* Pasay.

Rizalist cult, any of numerous ethnic religious groups in the Philippines that believe in the divinity of José Rizal, the physician, poet, novelist, and national hero martyred by the Spanish in 1896. Among many peasant cults it is commonly believed that he is still alive and will return to deliver his followers from poverty and oppression. Rizal has been identified as God, as the second, or Filipino, Christ, and as the god of the pre-Spanish Malay religion. Rizalist cults, such as the Iglesia Sagrada ni Lahi (Holy Church of the Race), Rizal Church, and Banner of the Race Church (the largest group), synthesize Roman Catholic rituals, images, and organization with traditional Filipino elements. Some 300,000 rural people adhere to these cults.

Rize, city, northeastern Turkey, on the Black Sea. The city lies on wooded hills stretching down to the sea, with its commercial section on the narrow strip of flat land around a small bay. Rize enjoys a mild climate and luxuriant vegetation. It is linked by road with Trabzon (41 miles [66 km] west), Hopa (55 miles [88 km] east, near the U.S.S.R. frontier), and Erzurum (south) and by ship with Istanbul. Rize is a processing and sea shipping centre for the tea grown in the surrounding area; it has a tea research institute, founded in 1958. Pop. (1985) city, 50,221.

RJR Nabisco, Inc., conglomerate corporation formed by the merger in 1985 of R.J. Reynolds Industries, Inc. (a diversified company specializing in tobacco and food products), and Nabisco Brands, an international manufacturer of snack foods. Headquarters are in New York City.

The origins of RJR Nabisco date to the establishment in 1875 of Richard Joshua Reynolds' first tobacco-plug factory. The Reynolds Tobacco Company (*q.v.*) grew steadily throughout the first half of the 20th century and began to diversify in the 1960s. It acquired several food companies, and in 1970 its name was changed to R.J. Reynolds Industries, Inc.

Nabisco originated in 1898 from the merger of two large American cracker-manufacturing firms, the New York Biscuit Company and the American Biscuit Company, to form the National Biscuit Company. The company grew and steadily diversified into other food products until by the 1980s it was one of the largest manufacturers of packaged foods in the world. Its products included cookies, crackers, packaged nuts, other snack foods, hot cereals, margarine, and condiments.

In 1985 R.J. Reynolds Industries acquired Nabisco Brands, Inc., and the company's present name was adopted in 1986. In 1988 the firm of Kohlberg Kravis Roberts & Company purchased RJR Nabisco in the largest leveraged buyout in history.

RKO Radio Pictures, Inc., American motion-picture studio that made some notable films in the 1930s and '40s. Radio-Keith-Orpheum originated in 1928 from the merger of the Radio Corporation of America, the Keith-Albee-Orpheum theatre chain, and the American Pathé production firm. Though it was one of the major studios in Hollywood, RKO spent much of its 25 years' existence struggling for financial stability.

During the 1930s RKO produced the well-known Fred Astaire-Ginger Rogers series of musicals and the early films of Katharine Hepburn, including *Bringing Up Baby* (1938). Among RKO's other better-known films were *Cimarron* (1931), from the novel by Edna Ferber; *King Kong* (1933), one of the first monster films; John Ford's *The Informer* (1935); and Orson Welles's *Citizen Kane* (1941), now considered a masterpiece in cinema techniques. Jacques Tourneur and Alfred Hitchcock directed several well-known psychological thrillers for the studio in the 1940s.

In 1948 the businessman and producer Howard Hughes bought RKO, but his inattention and growing reclusiveness doomed the company; it ceased production in 1953, and was sold to Desilu Productions in 1957. After numerous corporate reorganizations, the firm continued under the name RKO General, Inc., owning and operating radio and television stations, theatres, and related enterprises.

RNA, abbreviation of RIBONUCLEIC ACID, complex compound of high molecular weight that functions in cellular protein synthesis and replaces DNA (deoxyribonucleic acid) as a carrier of genetic codes in some viruses. RNA consists of ribose nucleotides in strands of varying lengths. The structure varies from helical to uncoiled strands. One type, transfer RNA (tRNA), sometimes called soluble, or activator, RNA, contains fewer than 100 nucleotide units; other types contain thousands of units. The nitrogenous bases in RNA are adenine, guanine, cytosine, and uracil.

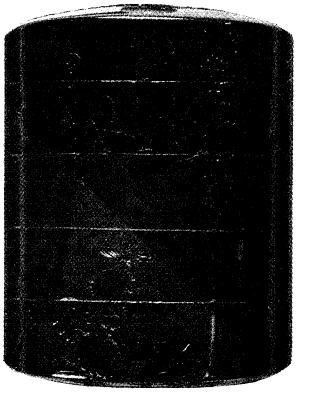
There are three main types of RNA: messenger RNA (mRNA), transfer RNA, and ribosomal RNA (rRNA). In protein formation, mRNA carries codes from the DNA in the nucleus to the sites of protein synthesis in the cytoplasm (the ribosomes). Ribosomes are composed of rRNA and protein; they can "read" the code carried by the mRNA. A sequence of three nitrogenous bases in mRNA specifies incorporation of an amino acid; tRNA brings the amino acids to the ribosomes, where they are linked into proteins.

In addition to the main types of RNA, a number of other small RNA molecules and ribonucleoproteins (molecules composed of RNA and protein) occur in the cell. The RNA portion of at least one cellular ribonucleoprotein has been shown to act as a biological catalyst, a function previously ascribed only to proteins. R.W. Holley described the structure of an RNA molecule in 1965.

Rnying-ma-pa, also spelled NYINGMAPA (Tibetan: "The Old Order"), second largest Buddhist sect in Tibet; it claims to transmit the original teachings of the celebrated Indian Vajrayāna (Tantric Buddhism) master Padmasambhava, who visited Tibet in the 8th century and, with Śāntirakṣita (another Indian teacher), founded at Samye the country's first monastery about 775. The sect emphasizes the mystical aspects of the Vajrayāna tradition and makes wide use of shamanistic practices and local divinities borrowed from the indigenous, pre-Buddhist Bon religion. Monks of the sect are not, as a rule, required to observe celibacy.

rō-iro, in Japanese lacquerwork, technique of coating with black lacquer, involving two major methods. *Hana-nuri* (or *nuritate-mono*) uses black lacquer that contains oil in order to impart a glossy finish to the article.

Rō-iro-nuri, used for the finest lacquerwork, uses black lacquer that can be burnished to a lustre. In the *rō-iro-nuri* technique, after several coatings, *rō-iro-urushi* (black lacquer without oil, made of translucent lacquer and iron colouring) is applied; when it is thoroughly dry, it is burnished with charcoal. This is relacquered, then polished with fine-grained



Four-case *inrō* with slightly raised spring wildflowers design done in black on a *rō-iro* ground, signed Tatsuke Takamasu, Tokugawa period (1603–1867)

From Melvin and Betty Janss, *Inro and Other Miniature Forms of Japanese Lacquer Art;* Charles E. Tuttle, Inc.

charcoal and water. The next step is the *suri-urushi* process, applying raw lacquer with cotton and wiping it with crumpled rice paper. When the article has dried well, a little rapeseed oil is applied with cotton and polished lightly; burnt deerhorn powder or titanium is applied to remove the lacquer that had been applied in the *suri-urushi* stage. After the *suri-urushi* and polishing processes have been repeated several times, a brilliant glow is attained.

Roa Bastos, Augusto (b. June 13, 1917, Iturbe, Paraguay), Latin-American novelist, short-story and film-script writer of national and international fame.

Born in an interior farm country village, Roa Bastos attended military school in Asunción in 1925 and fought in the Chaco War (1932–35) against Bolivia. While a student he also gained an appreciation of classical Spanish literature by reading in his uncle's library.

His first book of poetry, *El ruiseñor de la Aurora* (1942; "The Nightingale of the Dawn"), which he later renounced, is an imitation of the Spanish masters. The novel "Fulgencio Miranda" (written 1941) and a number of plays successfully performed during the 1940s were never published. Of a considerable amount of poetry written in the late 1940s, only the pamphlet *El naranjal ardiente* (1960; "The Burning Orange Grove") was published.

In 1947 civil war forced Roa Bastos and many others into exile in Buenos Aires, where he lived until 1970, serving as cultural attaché in the embassy and working as a journalist. His first collection of short stories, *El trueno entre las hojas* (1953; "Thunder Among the Leaves"), which he also adapted as a film script, describes the Paraguayan experience with emphasis on violence and social injustice. Roa Bastos began to experiment with magic realism in which realism is enhanced by myths and expressionistic techniques.

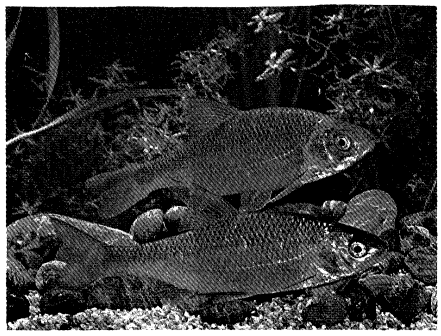
His novel *Hijo de hombre* (1960; *Son of Man,* 1965) was an overwhelming critical and popular success. It recreates Paraguay's history from the dictatorship of Francia early in the 19th century through the Chaco War. By carefully juxtaposing alternate narrative voices, Roa Bastos creates a tension that signals the moral and political stagnation of Paraguay and indicates that the only solution is for the common man to suffer and sacrifice himself for all humanity. In 1960 he adapted the novel for a film, and during the 1960s he wrote other film scripts.

Stories collected in *El baldío* (1966; "The Untilled") treat tenderly and understandingly the problems of Paraguayan exiles. In some of the stories there is a clear indictment of civil war atrocities. The story collections *Los pies sobre el agua* (1967; "The Feet on the Water") and *Madera quemada* (1967; "Burnt Madeira") rework psychologically and existentially themes used earlier.

On his return to Paraguay in 1970, he taught Spanish-American and Paraguayan literature. His most ambitious work, the novel *Yo el supremo* (1974; "I, the Chief"), is based on the life of Francia and covers more than a hundred years of Paraguayan history. From 1976 Roa Bastos taught at the Université de Toulouse II in France. A study in English is D.W. Foster, *Augusto Roa Bastos* (1977).

roach (insect): *see* cockroach.

roach (*Rutilus rutilus*), common European sport fish of the carp family, Cyprinidae, widely distributed in lakes and slow rivers. A high-backed, yellowish-green fish with red eyes and reddish fins, the roach is about 15–40 centimetres (6–16 inches) long and weighs up to 2 kilograms (4½ pounds). It lives in small schools and eats aquatic plants, insects, and other small animals. It is sometimes eaten or used as bait.



Roach (*Rutilus rutilus*)
Jane Burton—Bruce Coleman Ltd.

In North America the name roach is also applied to certain other fishes. These include the rudd (*q.v.*) and golden shiner (*see* minnow), both cyprinids, and several members of the sunfish (*q.v.*) family, Centrarchidae.

To make the best use of the Britannica, consult the INDEX *first*

Roach, Hal, original name HARALD EUGENE ROACH (b. Jan. 14, 1892, Elmira, N.Y., U.S.), U.S. motion-picture director and producer best known for his comedies of the 1920s and '30s featuring Harold Lloyd, Will Rogers, and the team of Laurel and Hardy. He ranks with Mack Sennett as a creator of inspired chaos in the early Hollywood comic style. He is also remembered as the producer of the shorts and features of Snub Pollard, Charlie Chase, Harry Langdon, and the "Our Gang" comedies.



Hal Roach
UPI—EB Inc.

After a number of miscellaneous jobs, Roach began his film career in 1912 as a bit player in westerns. In three years he formed a company to produce the "Willie Work" comedies of Harold Lloyd, achieving his first success with *Just Nuts* (1915). He later produced Lloyd's "Lonesome Luke" series and other Lloyd films, including his famous *Safety Last* (1923). During the 1920s Roach produced over 2,000 high-quality comedy shorts and a large number of full-length features. They included the Will Rogers series (beginning in 1923) that often satirized the movie-making industry; the "Our Gang" comedies; the two-reel ethnic comedies of Max Davidson; the "Dippity-Doo-Dads" with an all-animal cast; and adventures featuring Rex the Wonder Horse. Roach's insistence on carefully constructed scripts with good story lines and well-worked characterizations resulted in a humour based on character and situation rather than a string of sight gags.

The Laurel and Hardy series includes outstanding pictures like *Leave 'em Laughing* (1928) and *Way Out West* (1937). Laurel had been a gag writer and director for Roach, and Hardy, a bit player in Charlie Chase comedies. Two shorts produced by Hal Roach received Academy Awards, *The Music Box* (1932), with Laurel and Hardy, and the "Our Gang" short *Bored of Education* (1936). Roach also produced *Topper* (1937) and *Topper Returns* (1941), comedies about amiable ghosts helping a befuddled mortal. Roach also produced some serious films, notably *Of Mice and Men* (1939), an adaptation of the novel by John Steinbeck, directed by Lewis Milestone.

After World War II he turned to television but his production company failed in the late 1950s. In 1984 he was awarded an Academy Award for "life achievement."

Roach, Max, byname of MAXWELL ROACH (b. Jan. 10, 1925, Brooklyn, New York City), U.S. jazz drummer and composer, one of the most influential and widely recorded modern percussionists.

Roach was associated with Charlie Parker at Minton's Playhouse during the development of bebop in the mid-1940s, moving the fixed pulse in jazz from the bass drum to the ride cymbal and creating a polyrhythmic, percussive texture by exploiting the flexibility of the trap-drum set. By carefully developing thematic ideas on his drums, Roach elevated the percussionist to the equal of melodic improvisers. Roach participated in recordings by Parker's quintet in 1947–48 and in the Miles Davis series "Birth of The Cool"; co-led an early 1950s quintet with trumpeter Clifford Brown; and in the 1960s composed, with lyricist Oscar Brown, Jr., the "Freedom Now Suite" for his then wife, vocalist Abbey Lincoln, a chorus, instrumental soloists, and ensemble. Throughout the 1970s Roach led combos and recorded frequently, attending Pres. Jimmy Carter's White House jazz party of 1978 and later establishing an all-percussion ensemble, M'Boom. From 1971 Roach was a tenured professor at the University of Massachusetts (Amherst), and in 1980 he embarked on a series of duets with such avant-garde improvisers as pianist Cecil Taylor and saxophonist Anthony Braxton.

road, the travelled way on which people, animals, or wheeled vehicles move. In modern usage the term road describes a rural, lesser travelled way, while the word street denotes an urban roadway. Highway refers to a major rural travelled way; more recently it has been used for a road, in either a rural or urban area, where points of entrance and exit for traffic are limited and controlled.

A brief treatment of the history of road construction and of modern highway design follows. For full treatment, *see* MACROPAEDIA: Public Works.

The earliest roads developed from the paths and trails of prehistoric peoples; their construction was concurrent with the appearance of wheeled vehicles, which was probably in the area between the Caucasus Mountains and the Persian Gulf sometime before 3000 BC. Road systems were developed that connected the civilizations of Mesopotamia and Egypt and facilitated trade. The first major road was the Persian Royal Road, which extended from the Persian Gulf to the Aegean Sea over a distance of 1,775 miles (2,857 kilometres) and was used from about 3500 to 300 BC. The "Amber Routes" were the earliest European roads and extended from Greece and Tuscany to the Baltic Sea. In East Asia the Chinese built a road system that linked its major cities and had a combined length of about 2,000 mi. The techniques used to build these early roads varied. In northern Europe, where wet land was often a problem, logs were laid on branches and then overlaid with transverse rows of logs to carry traffic over marshy areas. On the island of Malta ruts were carved in sandstone to hold carts on the roads. Civilizations around the Indus Valley built roads of brick cemented together with bitumen (an asphalt substance) and provided drains for

water runoff. The Maurya Empire, one of the civilizations of this region, created a "ministry of public works" to keep its road system in good condition. The Romans also recognized the importance of roads in maintaining an empire; at the empire's peak it had some 53,000 miles (85,000 km) of road, extending from Britain in the north to North Africa in the south and from the Atlantic coast of the Iberian peninsula in the west to the Persian Gulf in the east. (*See also* Roman road system.)

The Romans were the first to construct roads scientifically. Their roads were characteristically straight, and the best ones were composed of a graded soil foundation that was topped by four courses (layers): a bedding of sand or mortar; rows of large, flat stones; a thin layer of gravel mixed with lime; and finally a thin wearing surface of flintlike lava. Roman roads varied in thickness from 3 to 5 feet (0.9 to 1.5 m), and their design remained the most sophisticated until the advent of modern road-building technology in the late 18th and early 19th centuries.

As Rome declined its roads fell into disrepair, and, other than some interest in municipal street paving in the 15th and 16th centuries, there was little road-building activity in the West for more than 1,500 years. The Silk Road, which connected the Roman Empire with India and China, was used intermittently during this period (it was frequently closed owing to warfare and raids by nomads). In South America, however, the Incas were building a sophisticated network of well-planned roads through their empire in the Andes Mountains. By the 16th century, when the Spaniards arrived, the Incas had two long, parallel roads (one along the coast and the other in the mountains) with numerous cross connections.

When interest in road building revived in Europe in the late 18th century, engineers began designing roads that incorporated lighter surfaces, relying on the subsurface for load support. Roads could thus be built relatively cheaply and quickly. The most influential of the early engineers was John Loudon McAdam, inventor of the macadam road surface. His design comprised a compacted subgrade of crushed rock to support the load, and a surface covering of light stone to absorb wear and shed water to the drainage ditches.

By the end of the 19th century the widespread use of the bicycle created a demand for roads with smoother surfaces. A pavement of natural rock asphalt was used in Paris as early as 1854, and portland cement concrete was used in Scotland in 1865. Road surfaces in the latter part of the century utilized a macadam construction. This process used a compacted stone base bound together with either a hydraulic (water-base) natural cement or a stone base impregnated with asphalt tar, called a tarmac surface.

Two classifications of pavement (the hardened surface layer laid on top of a natural-earth or crushed-stone subgrade) have been developed: flexible and rigid. Flexible pavement is usually made of an asphalt–gravel aggregate that is laid in one or more courses over the subgrade. The aggregate can be mixed at the road-building site or at a central plant, and its quality varies with the production method used.

A cheap method of pavement, called surface treatment, is made by spraying hot asphalt or tar on a compacted stone base and then placing small stone chips on the tar; it is suitable for lightly traveled roads and can be built up in layers. Pavements made with a high-temperature plant mix are suitable for the heaviest loads and are made by laying the asphalt while it is hot and rolling it before it cools. A flexible pavement has the advantage of being easy to build and repair; its asphalt binder is both waterproof and plastic, so that it resists water damage and can readily expand and contract with temperature variations.

Rigid pavement, made of portland cement concrete, generally has greater strength but is susceptible to cracking. The cement, mixed with water and various grades of crushed stone called aggregate, is poured onto the built-up and graded foundation as a plastic mass. It shrinks as it dries, causing tensile stresses. The concrete also contracts and expands with temperature change, so that cracking is a constant problem. To remedy this, concrete sections are jointed, and grooves are cut part way through the slabs so that cracks will occur at regular intervals. Expansion is absorbed by transverse joints consisting of small openings with steel-rod dowels for reinforcement. The best solution so far has been by pouring a continuous concrete slab in which a mesh of steel bars is embedded. The bars, running lengthwise through the concrete, absorb the tension of shrinkage and hold shut any cracks that form.

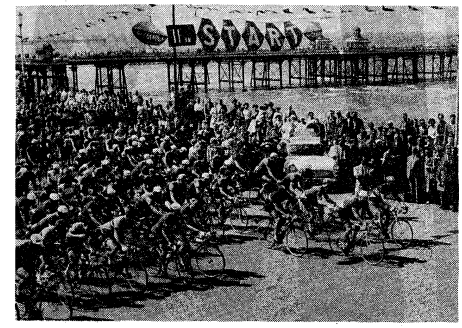
Modern highway design entails careful study of soil types, the topography of the intended route, and the drainage systems around the roadway. Where necessary, measures are taken to provide additional drainage facilities to prevent water from eroding the road base or freezing in cracks. The techniques of cutting and filling (excavating in one place and depositing it nearby to form a level roadbed) and switchbacking (zigzagging up a slope) have been used for centuries to obtain easy gradients in varied terrains. But it became necessary to design broad, banked curves to keep vehicles from leaving the roadway and to limit and control access to and egress from the highway, as well as to separate the lanes of traffic, in order to reduce the possibility of collisions.

The prototype of the modern superhighway was the Bronx River Parkway, which was completed in 1925 in New York City. It was a limited-access, high-speed highway designed to carry a large volume of traffic without disturbing the natural landscape. In the 1920s the Italians began the autostrada, and the Germans followed not long after with the autobahn. Military use was an important design feature of these highways, which could accommodate heavy traffic at speeds of 100 miles (160 km) per hour. In the United States the federal government created the national Interstate Highway System after World War II. It incorporated the toll-road network with other limited-access highways and linked all of the nation's major cities. Most industrialized countries in the world built similar systems to facilitate automobile and truck traffic.

For international statistical data on roads and vehicles, *see* BRITANNICA WORLD DATA ANNUAL.

road at sea, rules of the, internationally agreed-on traffic regulations for ocean waters. They were most recently revised in accordance with recommendations of the International Conference on Safety of Life at Sea in 1965. They are supplemented by national regulations for inland waters. The most important rules specify colour and arrangement of lights; size, shape, colour, and arrangement of daymarks; character, duration, and frequency of sound signals; and type of avoiding action for craft approaching each other, together with fixing of responsibility for taking action. Rules vary for power-driven and sailing vessels, and certain exceptions are made for small craft, naval vessels, and vessels of special construction.

road race, in bicycle racing, a contest run on a course marked out over open roads and highways. It may be several laps of a closed circuit, a point-to-point or town-to-town race, or a combination of several point-to-point stages lasting several days, with the winner being decided on the basis of lowest cumulative time for all the stages, as the Tour de France. Usually, all contestants begin at the same time, and the first one to reach the finish line is the winner. Other methods are

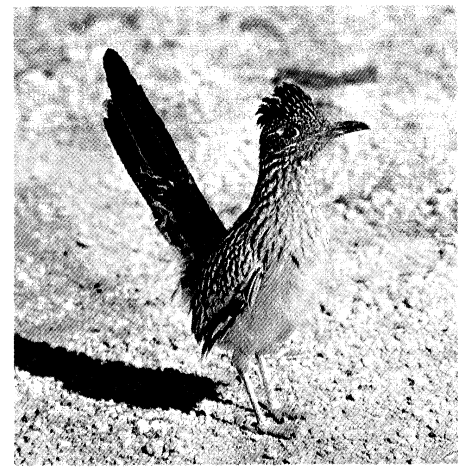


Mass start of the Tour of Britain
Keystone

used, however, especially in the longer tours, in which some stages may be run as a time trial, with riders sent off at intervals, racing against the clock. Normal mass-start stages usually include a short sprint through a town, with a prize or a few seconds' time bonus awarded to the winner. *See* Sporting Record: *Cycling. See also* Olympic Games.

Road Town, chief town and port of Tortola Island and tourist centre for the British Virgin Islands, situated on the western side of Road Bay about halfway along the southern coast. The name derives from the nautical term "the roads," a place less sheltered than a harbour but in which ships may lie at anchor. A 67-acre (27-hectare) area called Wickham's Cay was joined to the mainland as part of a large reclamation project undertaken to develop tourism. Fires periodically swept the town, and the oldest extant building dates from 1840 (though some water cisterns are older). Pop. (1980) 2,525.

roadrunner, also called CHAPARRAL COCK, either of two species of terrestrial cuckoos, especially *Geococcyx californianus,* of the deserts of Mexico and the southwestern United States.

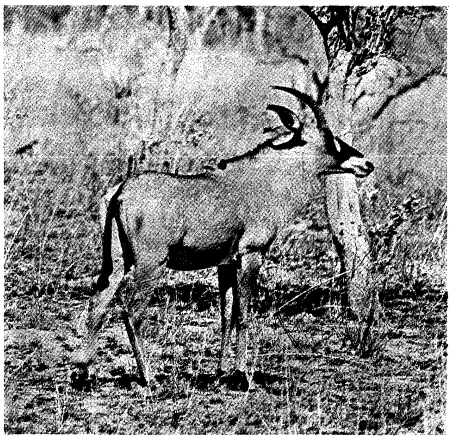


Roadrunner (*Geococcyx californianus*)
Russ Kinne—Photo Researchers/EB Inc.

It is about 56 cm (22 inches) long, with streaked olive-brown and white plumage, a short shaggy crest, bare blue and red skin behind the eyes, stout bluish legs, and a long, graduated tail carried at an upward angle. Clumsy in flight and tiring rapidly, the bird usually prefers to run along roads or across sagebrush, chaparral, or mesquite flats. It feeds on insects, lizards, and snakes. Reptilian prey is pounded to death with the bird's stout bill, then swallowed, headfirst. It lays from 2 to 12 (usually 3 to 5) white eggs in a substantial nest of twigs low in a cactus or small tree.

The lesser roadrunner (*G. velox*) is a slightly smaller (46 cm, or 18 in.), buffier, and less streaky bird, of Mexico and Central America.

roan antelope (*Hippotragus equinus*), African antelope, family Bovidae (order Artiodactyla), found in small groups on plains and scrublands. Related to the sable antelope (*Hippotragus niger*) and to the extinct blaauwbok,



Roan antelope (*Hippotragus equinus*)
Leonard Lee Rue III—Bruce Coleman Inc.

or bluebuck (*H. leucophoeus*), the roan antelope is a large, graceful animal standing 130–150 centimetres (50–60 inches) at the shoulder. Both sexes have long, pointed ears, an erect mane, long, sickle-shaped horns, and long hair on the throat. The coat is reddish gray to reddish brown, with black and white face markings and a white muzzle and white underparts.

Roanne, town, Loire *département,* Rhône-Alpes region, east central France, headquarters of an *arrondissement*, on the Loire River. Founded in the Romano-Gallic age, it was originally called Rodumna. The 11th-century castle-donjon is the only surviving remnant of its ancient castle. The centre of the town is the Carrefour Helvétique (Helvetian Crossroads). The Lycée Jean Puy occupies the former 17th-century Jesuit college.

The town is located 40 mi (64 km) west-northwest of Lyon at a junction of railroad lines and roads and at a terminus of the Canal de Roanne à Digoin. It is an important commercial and industrial centre. The gorges of the Loire are 2 mi (3 km) south, and the scenic Monts de la Madeleine are a few miles west.

The town's traditional industries (hatmaking, textile, machine tooling, and metal industries) are supplemented by synthetic fabrics, armoured vehicles, paper, and rubber tires. Pop. (1982) 48,574.

Roanoke, city, western Virginia, U.S., on the Roanoke River, at the southern end of the Shenandoah Valley, between the Blue Ridge and Allegheny mountains, 170 mi (274 km) west of Richmond. The city, focus of an industrial complex including Salem and Vinton, is geographically within, but administratively independent of, Roanoke County. Settled in 1740, it developed after 1882, when it became a junction of the Shenandoah Valley Railroad and the Norfolk and Western Railroad, offering an outlet for the coal deposits of Virginia and West Virginia. Chartered in 1874 as the town of Big Lick, it was renamed Roanoke (1882) after the Indian term for shell money. Large railroad shops and offices were built, and the arrival of the Virginia Railroad, in 1908, assured further growth. Fabricated steel and textile industries were established. The expansion of truck lines and the city's location near the Skyline Drive and Blue Ridge Parkway have sustained the economy. Manufactures now include railroad cars, metal and steel products, clothing, chemicals, and furniture.

National Business College (1886) and Virginia Western Community College (1966) are in the city, and Hollins College (1842) and Roanoke College (1842) are nearby. Roanoke is headquarters for the Jefferson National Forest, and Mill Mountain (2,000 ft [600 m]) is within the corporate limits. The Booker T. Washington National Monument (childhood home of the black educator) is 20 mi southeast. Inc. city, 1884. Pop. (1980) city, 100,427; metropolitan area (SMSA), 220,393, (1982 est.) 221,500.

Roanoke Island, island in Dare County, off the coast of North Carolina, U.S., south of Albemarle Sound, between Outer Banks and the mainland. The island, 12 mi (19 km) long and 3 mi wide, was explored (1584) by captains Philip Amadas and Arthur Barlowe, sent by Sir Walter Raleigh. Unsuccessful colonizing expeditions (the first by the English in the New World) followed in 1585 and 1587. The first child of English parents in the New World was born there (Virginia Dare, Aug. 18, 1587). By 1590 the settlers had vanished, leaving no clue to their fate. Since 1937 the story has been portrayed near Manteo in an outdoor drama, *The Lost Colony*, by Paul Green. The name Roanoke is probably of Algonkin Indian origin signifying "northern people"; it has also been applied to "place where shell beads are found." On Dec. 7, 1862, Confederate troops under Col. Henry M. Shaw surrendered the island to Federal general Ambrose E. Burnside.

Fort Raleigh National Historic Site (1941) is a restoration of the lost English colony. Manteo, the county seat, and Wanchese, a fishing village, are also tourist attractions.

Roanoke River, river rising in the Appalachian Valley in Montgomery County, southwestern Virginia, U.S., and flowing in a southeasterly direction for 380 mi (612 km) into Albemarle Sound, on the Atlantic coast of North Carolina. It drains an area of 9,580 sq mi (24,810 sq km). Just north of the Virginia–North Carolina boundary it joins the Dan River, its principal tributary; above the junction the river was formerly known as the Staunton.

The Roanoke is navigable for small craft for 112 mi from its mouth to Weldon, N.C., which lies just below the Fall Line near Roanoke Rapids, N.C. Ships with a draft of up to 12 ft (3.65 m) can reach Plymouth, N.C., 6 mi above the mouth. In 1829 the Weldon Canal, 12 mi long, was opened as a passage around the rapids, but it was abandoned in 1850. The river is impounded by a series of dams: Smith Mountain and Leesville below Roanoke, Va.; John H. Kerr Dam below Clarksville, Va.; and Roanoke Rapids Dam, which impounds Lake Gaston.

roaring forties, areas between latitudes 40° and 50° north or south, where the prevailing winds blow from the west. These areas are better developed in the Southern Hemisphere than in the Northern because the winds are less restricted over oceanic regions. The roaring forties of the Southern Hemisphere have strong, often gale-force, winds throughout the year. They were named by the sailors who first entered these latitudes.

Roark, Helen Newington Wills Moody: *see* Wills, Helen (Newington).

roasting, the cooking, primarily of meats but also of corn ears, potatoes, or other vegetables thus prepared, by exposure to dry, radiant heat either over an open fire, within a reflecting-surface oven, or in some cases within surrounding hot embers, sand, or stones. The procedure is comparable to the baking of other foods. *See* baking.

Roatán, capital, Islas de la Bahía department, northern Honduras, on the southwestern coast of Roatán, largest of the Bay Islands; it is known locally as Coxen's Hole. Remains of 17th-century pirates' fortifications can still be seen; it was from Roatán that the U.S. filibuster William Walker set sail on his third and last voyage to Central America in 1860. Roatán is now the island's principal commercial centre; there are shipyards and fish, fruit, and meat canneries. Coconuts are a main export. In the 1970s tourism was added to the local industries. Ferry and air services link Roatán to the mainland and to neighbouring Guanaja Island. Pop. (1983 est.) 6,330.

Rob Roy, byname of ROBERT MacGREGOR (baptized March 7, 1671, Buchanan, Stirlingshire, Scot.—d. Dec. 28, 1734, Balquhidder, Perthshire), noted Highland outlaw whose reputation as a Scottish Robin Hood was exaggerated in Sir Walter Scott's novel *Rob Roy* (1818) and in some passages in the poems of William Wordsworth. He frequently signed himself Rob Roy ("Red Rob"), in reference to his dark red hair.

Rob's father, Donald MacGregor, a younger brother of the chief of the clan MacGregor, received a military commission from the deposed King James II after the revolution of 1688. Rob was a freebooter with uncertain loyalty to James, and probably also engaged in cattle stealing and blackmail, old and at that time still honourable Highland practices. When the penal laws against the MacGregors were reintroduced in 1693, Rob took the name of Campbell. Since his lands lay between those of the rival houses of Argyll and Montrose, for a time he was able to play one off against the other to his own advantage. James Graham, 1st duke of Montrose, succeeded in entangling him in debt, and by 1712 Rob was ruined.

He then embarked on a career of brigandage, chiefly at the expense of Montrose. During the Jacobite (pro-Stuart) rebellion of 1715 he was distrusted by both sides and plundered each impartially. After the rebellion was put down he was treated leniently because of the intercession of John Campbell, 2nd duke of Argyll. Rob continued his exploits against Montrose until 1722, when Argyll brought about a reconciliation. Later, however, Rob was arrested and confined in Newgate Prison, London; he was pardoned in 1727 when about to be transported to Barbados.

In his old age Rob became a Roman Catholic. His letters show that he was well educated; the view of him as a mere brutish highwayman seems not to do him justice.

robāʿī (Persian: "quatrain"), plural ROBĀIYĀT, Arabic RUBĀʿĪ, plural RUBĀʿIYAT, in Persian literature, genre of poetry, a quatrain with a rhyme scheme *aaba*. With the *masnavī,* the rhymed couplet, it is a purely Persian poetic genre and not a borrowing from the Arabic, as were the formal ode (*qaṣīdah*) and the love lyric (*ghazal*). It was adopted and used in other countries under Persian influence.

The most famous example of this genre known in the Western world is the *robāʿiyāt* of Omar Khayyam, in the version *The Rubáiyát of Omar Khayyám* (*q.v.*) translated by Edward FitzGerald.

robalo (fish): *see* snook.

Robbe-Grillet, Alain (b. Aug. 18, 1922, Brest, Fr.), a representative writer and leading theoretician of the *nouveau roman* ("new novel"), the French "anti-novel" that emerged in the 1950s. He also became a screenwriter and film director.

Trained as a statistician and agronomist, he claimed to write novels for his time, especially attentive "to the ties that exist between objects,

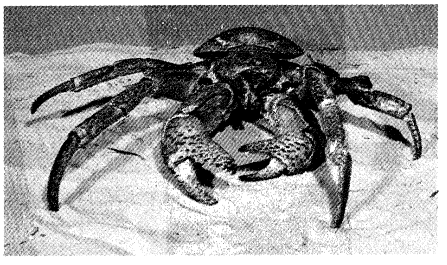
gestures, and situations, avoiding all psychological and ideological 'commentary' on the actions of the characters" (*Pour un nouveau roman,* 1963; *Toward a New Novel; Essays on Fiction,* 1965). Robbe-Grillet's world is neither meaningful nor absurd; it merely exists. Omnipresent is the object—hard, polished, with only the measurable characteristics of pounds, inches, and wavelengths of reflected light. It overshadows and eliminates plot and character. The story is composed of recurring images, either actually recorded by an objective eye or drawn from reminiscences and dreams.

If Robbe-Grillet's fiction, with its timetables, careful inventories of things, and reports on arrivals and departures, owes anything to the traditional novel, it is to the detective story. His first work, *Les Gommes* (1953; *The Erasers,* 1964), deals with a murder committed by the man who has come to investigate it. *Le Voyeur* (1955; Prix des Critiques, *The Voyeur,* 1958) also deals with a murder, that of a young girl by a passing stranger. *La Jalousie* (1957; *Jealousy,* 1959) is concerned with the actions of a wife and her suspected lover as they are viewed by a jealous husband through a louvre shutter (jalousie). Among his later novels are *La Maison de rendez-vous* (1966; *The House of Assignation,* 1970), *Projet pour une révolution à New York* (1970; *Project for a Revolution in New York,* 1972), *Topologie d'une cité famtôme* (1976; *Topology of a Phantom City,* 1977), *Un Régicide* (1978; "A Regicide") and *Djinn* (1981; Eng. trans. 1982). There have been many worldwide translations of his commentaries on fiction, *Pour un nouveau roman.*

Robbe-Grillet's techniques were dramatized in his films, especially in *L'Année dernière à Marienbad* (1961; *Last Year at Marienbad*). Ultimately, his work raises questions about the ambiguous relationship of objectivity and subjectivity.

Robben Island, island in Table Bay, western Cape Province, South Africa. It is 5 mi (8 km) west of the mainland and 6 mi north of Cape Town and has an approximate area of 5 sq mi (13 sq km). Its name is the Dutch word for "seals," once plentiful in the surrounding waters. The island was a common stopping point for passing ships in the 16th and early 17th centuries. After early efforts at settlement, it was made a penal colony. The Xhosa leader Makana, who led an attack on Grahamstown in 1819, was incarcerated on the island and drowned while trying to escape. The island housed a leper colony from 1846 to 1931, and those judged insane were also sent there. A lighthouse was installed in 1864. Fortifications were erected during World War II, and, since the mid-1960s, Robben Island has been designated South Africa's maximum security prison. Most inmates are black men incarcerated for political offenses. Stone quarried on the island has long been used in the construction of Cape Town buildings.

robber crab, also called COCONUT CRAB (*Birgus latro*), large, nocturnal land crab of the southwest Pacific and Indian oceans. It is closely related to the hermit crab (*q.v.*), belonging to the same family, Coenobitidae (order Decapoda of the class Crustacea). Adults are about one metre (about 40 inches) from head to tail and weigh about 17 kilograms (37 pounds).



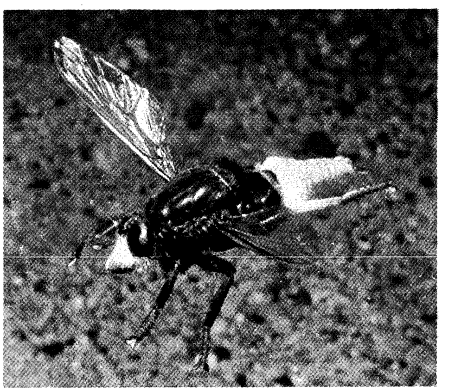
Robber crab (*Birgus latro*)
Cy LaTour

The crab uses two large chelae, or pincers, to pound or chip open coconuts—the soft, white meat of which constitutes its principal diet. The colour of the full-grown adult crab ranges from light violet to brown and deep purple. Young adults are brown, with black stripes on the legs.

The female lays her ripe eggs in the sea, and they immediately hatch into zoeas, the first larval stage, which live in the water, feeding on small organisms. After 20 or 30 days the zoea develops into a glaucothoe, the intermediate stage, and leaves the water to live in a seashell for three or four weeks. It then discards the shell, buries itself in moist sand, and transforms into a small adult.

Although robber crabs can climb trees, they apparently eat only coconuts already on the ground. Most of the daylight hours are passed in burrows up to about 0.6 metre (2 feet) deep, sometimes two crabs to a burrow. Its meat is a local delicacy.

robber fly, also called ASSASSIN FLY, a predatory insect of the family Asilidae (order Diptera), numbering about 4,000 species, worldwide in distribution. These flies have variable lengths that range to almost 8 centimetres (3 inches). They are the largest of all flies. Most are dull in colour, and their stout bodies resemble those of bumble bees. Between the large-faceted eyes is a moustache of bristles. The long legs are adapted to capture prey in flight and to hold it while eating.



Robber fly (Asilidae)
William E. Ferguson

The robber fly, a predator of almost all flying insects, injects a fluid into its victims that breaks down the muscle tissue. A few species of the genus *Promachus* are serious pests of apiaries because they feed on bees. Each species has a characteristic habitat—*e.g.,* tree trunk, foliage, grass, low plant, dead twig, gravel, or beach sand.

robbery, in criminal law, an aggravated form of theft (*q.v.*) involving violence or the threat of violence against the victim in his presence.

Robbia, Andrea Della: *see* Della Robbia, Andrea.

Robbia, Giovanni Della: *see* Della Robbia, Giovanni.

Robbia, Luca Della: *see* Della Robbia, Luca.

Robbins, Frederick Chapman (b. Aug. 25, 1916, Auburn, Ala., U.S.), U.S. pediatrician and virologist, who received (with John Enders and Thomas Weller) the 1954 Nobel Prize for Physiology or Medicine for successfully cultivating poliomyelitis virus in tissue cultures, making possible the production of polio vaccines, development of sophisticated diagnostic methods, and isolation of new viruses.

A graduate of Harvard University Medical School (1940), Robbins served in the United States, Italy, and North Africa during World War II (1942–46) as chief of the U.S. Army's 15th medical general laboratory virus and rickettsia section, where he investigated epidemics of infectious hepatitis, typhus, and Q fever.

Joining Enders and Weller at the Children's Hospital, Boston, in 1948, he helped solve the difficult problem of propagating viruses—submicroscopic quasi-life-forms then known to grow only in living organisms—in laboratory suspensions of actively metabolizing cells in nutrient solutions. At that time it was believed that the virus responsible for poliomyelitis, or infantile paralysis, grew and multiplied only in mammalian nerve tissue, highly insusceptible to maintenance outside the living animal. By 1952 Robbins and his colleagues had succeeded in cultivating the virus in mixtures of human embryonic skin and muscle tissue suspended in cell cultures, dramatically demonstrating that polio virus subsists in extraneural tissue, only later attacking the lower part of the brain and sections of the spinal cord.

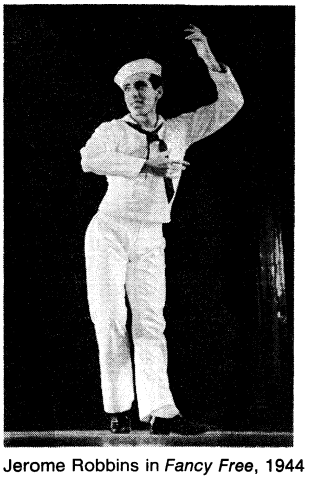
Robbins served as director of the department of pediatrics and contagious diseases, Cleveland Metropolitan General Hospital (1952–66), and as professor of pediatrics (1952–80) and dean (1966–80) at the Case Western Reserve University School of Medicine, Cleveland, from 1952 to 1980.

In 1980 he became president of the Institute of Medicine of the National Academy of Sciences.

Robbins, Jerome (b. Oct. 11, 1918, New York City), one of the most popular and imaginative U.S. choreographers of the 20th century, first known for his innovative ballets and subsequently for Broadway and Hollywood musicals and for his skillful use of contemporary American themes; he has been acclaimed for a number of highly innovative ballets structured within the traditional framework of classical dance movements.

A character dancer of distinction, Robbins appeared with the Gluck Sandor–Felicia Sorel Dance Center, danced in musicals, and toured with the Ballet Theater, before staging his first ballet, *Fancy Free,* in 1944 (restaged 1980).

His major works include the choreography for the ballets *Interplay, The Cage, Les Noces, Dances at a Gathering, The Four Seasons,* and the dance sequences for the musicals *On the Town, The King and I,* and *Fiddler on the Roof.* He joined the New York City Ballet in 1949, becoming associate director (1950–59). In 1962 he received an Academy Award for his choreography of the film version of *West Side Story,* a musical that he choreographed



Jerome Robbins in *Fancy Free,* 1944
Fred Fehl

for the stage in 1957 and that was successfully revived on Broadway in 1980. He served as a resident choreographer and a ballet master for the New York City Ballet from 1969 to 1983, when he and Peter Martins became ballet masters in chief (codirectors) of the company. The show *Jerome Robbins's Broadway,* a compilation of excerpts from 11 Broadway musicals that Robbins had directed or choreographed, opened on Broadway in 1989. Robbins resigned as codirector of the New York City Ballet in 1990.

Robbins (of Clare Market), Lionel Charles Robbins, Baron (b. Nov. 22, 1898, Sipson, Middlesex, Eng.—d. May 15, 1984, London), economist and leading figure in British higher education.

Robbins was educated at the University of London and the London School of Economics. After periods of teaching at the latter university and at New College, Oxford, he was appointed professor of economics at the London School of Economics in 1929, a position he held until 1961.

From the first he proved himself an agile theorist, at a time when it was still possible to be an economic theorist without extensive mathematical training. His *Essay on the Nature and Significance of Economic Science* (1932) has become a methodological classic. His work in the history of economic thought is represented in particular by *Theory of Economic Policy* (1952) and his study *Robert Torrens and the Evolution of Classical Economics* (1958).

During the 1930s Robbins served as chairman of the London School of Economics' economic theory seminars, which profoundly affected young economists of the period. Robbins was made a life peer in 1959. He was chairman of the *Financial Times* (1961–70) and was also chairman of the Committee on Higher Education (1961–64), which was responsible for the major expansion and reform of British university education in the 1960s.

robe, noblesse de: *see* noblesse de robe.

Robecchi-Bricchetti, Luigi (b. May 21, 1855, Pavia, Lombardy [Italy]—d. May 31, 1926, Pavia), Italian explorer, the first European to cross the Somali peninsula (the Horn of East Africa).

On his first African expedition he reached the oasis of Siwa (in western Egypt) in 1886, where he found a vast necropolis from which he collected skulls for European museums. On his two greatest expeditions, he twice traversed the previously unexplored interior of Somalia: in 1890 traveling the entire eastern section (from Obbia in the south to Alula on the Horn) and in 1891 cutting across the Horn of Somalia and the eastern part of Ethiopia from Mogadiscio (now Mogadishu), on the Indian Ocean, northward to Berbera, on the Gulf of Aden.

Robert, name of rulers grouped below by country and indicated by the symbol •.

Foreign-language equivalents:

Dutch	Robrecht
French	Robert
Italian	Roberto

APULIA

• Robert, byname ROBERT GUISCARD, or ROBERT DE HAUTEVILLE, Italian ROBERTO GUISCARDO, or ROBERTO D'ALTAVILLA (b. *c.* 1015, Normandy [France]—d. July 17, 1085, near Cephalonia, Greece, Byzantine Empire), Norman adventurer who settled in Apulia, in southern Italy, about 1047 and became duke of Apulia (1059). He eventually extended Norman rule over Naples, Calabria, and Sicily and laid the foundations of the Kingdom of Sicily.

Arrival in Apulia. Robert was born into a family of knights. Arriving in Apulia, in southern Italy, around 1047 to join his half brother Drogo, he found that it and Campania, though they were southern Italy's most flourishing regions, were plagued by political disturbances. These regions attracted hordes of fortune-seeking Norman immigrants, who were to transform the political role of both regions in the following decades.

In Campania, the Lombards of Capua were launching wars against the Byzantine dukes of Naples in order to gain possession of that important seaport. In Apulia, William ("Iron Arm") de Hauteville, Robert's eldest half brother, having successfully defeated the Byzantine Greeks who controlled that region, had been elected count of Apulia in 1042. In 1046 he had been succeeded by his brother Drogo.

When Robert joined his brothers, they sent him to Calabria to attack Byzantine territory. He began his campaign by pillaging the countryside and ransoming its people. In 1053, at the head of the combined forces of Normans from Apulia and Campania, he defeated the haphazardly led forces of the Byzantines, the Lombards, and the papacy at Civitate. Because of the deaths of William and Drogo and of his third half brother, Count Humphrey, in 1057, Robert returned to Apulia to seize control from Humphrey's sons and save the region from disgregating internal conflicts. After becoming the recognized leader of the Apulian Normans, Robert resumed his campaign in Calabria. His brother Roger's arrival from Normandy enabled him to extend and solidify his conquests in Apulia.

In his progression from gang leader to commander of mercenary troops to conqueror, Robert emerged as a shrewd and perspicacious political figure. In 1059 he entered into a concordat at Melfi with Pope Nicholas II. Until that time the papacy had been hostile toward the Normans, considering them to be an anarchist force that upset the political structure in southern Italy—a structure based on a balance of power between the Byzantines and the Lombards of northern Italy. The schism that took place between the Greek and Latin churches in 1054 worsened the relations between the Byzantine emperors and the papacy, and eventually the papacy realized that Norman conquests over the Byzantines could work to its advantage. Robert's plan to expel the Arabs from Sicily and restore Christianity to the island also found favour in Nicholas' eyes. This expedition into Sicily got under way in 1060, as soon as the conquest of Calabria was completed. Robert entrusted the command of the expedition to his brother Roger, but on particularly difficult occasions—*e.g.,* the siege of Palermo in 1071—he came to his brother's aid.

Until this time, Robert's relations with Roger had not always been amicable, since Roger, aware of both his own talent and Robert's dependency on him, would not settle for the subordinate role allotted him. Their differences were resolved when Robert invested Roger, after he had recognized Robert's supreme authority, with "the County of Sicily and Calabria" along with the right to govern and tax both counties.

Expansion of the Duchy. Robert continued to expand the small county left by Humphrey into a duchy, extending from the Adriatic to the Tyrrhenian sea. The capture of Bari in April 1071 resulted in the end of Byzantine rule in southern Italy. Robert turned next to the neighbouring territories of Salerno, controlled by the Lombards. Instead of fighting them, he dissolved his first marriage and in 1058 married the sister of Salerno's last Lombard prince, Gisulf II. Hostilities broke out between the two rulers, however, and Gisulf naively tried to bring about a Byzantine counteroffensive against Robert. Fearing that the Norman advances into Campania, Molise, and Abruzzi would threaten the papal dominions, Pope Gregory VII excommunicated Robert and gave Gisulf considerable military aid. The struggle came to a head when Gisulf, determined to display his power, advanced toward the prosperous city of Amalfi. Robert responded to the city's plea for help in 1073 and successfully defended it; in December 1076 he took Salerno from Gisulf and made it the capital of his duchy.

Robert was now at the height of his power. During his rise he repressed with an iron hand not only the claims of Humphrey's sons but also the uprisings of towns and lords that were fretting under the restraints imposed upon them. The harshness with which Robert chose to deal with these rebels was intended to transform a heterogeneous population into a strong, sovereign state.

When, in 1080, the conflict between church and state over the right to make ecclesiastical investitures had become more intense, Robert chose to reconcile himself with Gregory VII, entering into the Concordat of Ceprano, which confirmed the commitments of the earlier Council of Melfi. Even the Byzantine court drew closer to him and went as far as trying to establish a familial relationship with Robert. The Byzantine emperor Michael VII, in need of Robert's help to uphold his unstable throne, married his son, Constantine, to one of Robert's daughters, Helen. The opposition party, however, deposed Michael and confined Helen in a monastery. To guarantee Apulia against attack from the new rulers of Byzantium, Robert wanted the territories on the Adriatic coast of the Balkan Peninsula, and he began to build a large navy. Michael's expulsion and Helen's confinement reawakened his unappeased spirit of adventure and hastened his long-considered expedition. Now his goal was even more ambitious: to march to Byzantium and crown himself emperor in place of the deposed Michael.

In 1083 Robert landed in Epirus with a well-trained army and immediately succeeded in defeating the Byzantines and their Venetian allies. The pope, however, suddenly recalled him to Italy to help him expel the German king Henry IV, who was marching on Rome en route to claiming southern Italy for the Holy Roman Empire. Having returned home and suppressed the revolts of the lords hostile to himself and to Pope Gregory VII, Robert moved toward Rome, defeated the pope's enemies, and escorted him to Salerno in the summer of 1084. Following this success, he returned to his campaign on the Adriatic coast. He died during the siege of Cephalonia on July 17, 1085.

Achievements. Physically attractive, endowed with an acute and unscrupulous intelligence, a brilliant strategist and competent statesman, Robert had begun to organize a state composed of diverse ethnic and civil groups: Latin and Germanic in Lombard territories and Greek in Byzantine domains. The new political structure was built on a monarchial-feudal framework characteristic of the time, but it was controlled by the energetic and uncompromising Robert, who tried to use his ducal power to create a powerful and prosperous state. The other base on which he built was Roman Catholicism, the religion of the conquerors and most of the conquered, which he used to reconcile the subjected peoples. An extremely religious man, Robert was distrustful of the Greek clergy because of their ties with Byzantium. On the other hand, his generosity toward the Latin church was bountiful. He endowed it with territories and clerical immunities in order to tie it firmly to the feudal system. Splendid cathedrals and Benedictine abbeys were built in the hope that they would consolidate and diffuse Latin language and culture among the heterogeneous people and tie them into a new, unified state.

Robert was kept from realizing this political vision only by his death. (E.Po.)

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Constantinople

• **Robert,** byname ROBERT OF COURTENAY (d. 1228, Morea), Latin emperor of Constantinople from 1221 to 1228. He was so ineffective that the Latin Empire (consolidated by his uncle, Henry of Flanders) was largely dissolved at the end of his reign.

Robert was a younger son of Peter of Courtenay (died early 1219?) and Yolande of Flanders and Hainaut, who was empress regent for her sons until her death in September 1219. Their eldest son, Philip of Namur, refused to leave France and renounced the succession in favour of Robert, an irresponsible youth, who was crowned in Constantinople on March 25, 1221. Robert was betrothed to Eudocia, daughter of the Greek emperor at Nicaea, Theodore I Lascaris. In 1225 Theodore's successor, John III Vatatzes, forced Robert to cede most of the eastern lands of his Latin Empire in Asia Minor, and by 1228 Theodore Angelus, ruler of Epirus, a city-state in Asia Minor, seized Thessalonica and was crowned emperor there. In the meantime Robert had repudiated Eudocia and taken a French mistress, who was mutilated in the ensuing revolt by Robert's own barons. He died while fleeing to take refuge with Pope Gregory IX.

Flanders

• **Robert I,** also called ROBERT THE FRISIAN, French ROBERT LE FRISON, Dutch ROBRECHT DE FRIES (b. 1029–32—d. Oct. 13, 1093, Kassel, Ger.), count of Flanders (1071–93), second son of Count Baldwin V. In 1063 he married Gertrude, guardian of her son, who had inherited Frisia east of the Scheldt River. Upon this marriage, Robert's father had also invested him with Imperial Flanders, including the islands of Frisia west of the Scheldt. He thus in his own right and that of his stepson was ruler of all Frisia (Zeeland) and thus became known among his Flemish countrymen as Robert the Frisian.

His right to Imperial Flanders, however, was disputed by his elder brother, Baldwin VI, who had succeeded to the countship of Flanders. War broke out between the two brothers, and Baldwin was killed in battle in 1070. Robert then claimed the tutelage of Baldwin's children and obtained the support of the Holy Roman emperor Henry IV, while Richilde, Baldwin's widow, appealed to Philip I of France. The contest was decided at Ravenshoven, near Kassel, on Feb. 22, 1071, where Robert was victorious. Richilde was taken prisoner, and her eldest son, Arnulf III, was slain. Robert obtained from Philip I the investiture of Crown Flanders, and from Henry IV the fiefs that formed Imperial Flanders.

Robert the Frisian led a pilgrimage to Jerusalem in the late 1080s. In 1090, on his return, he took temporary service in the army of the Byzantine emperor Alexius I, in his war against the Seljuq Turks. Robert's pilgrimage and service with the Byzantine emperor established a pattern followed later in the First Crusade (1096–99).

• **Robert II,** byname ROBERT THE JERUSALEMITE, French ROBERT LE HIEROSOLYMITAIN, Dutch ROBRECHT VAN JERUZALEM (b. *c.* 1065—d. Oct. 5, 1111, near Meaux, Fr.), count of Flanders (1093–1111), one of the most celebrated of crusaders. The son of Robert I, he sailed for the Holy Land on the First Crusade in 1096 and earned fame perhaps second only to that of Godfrey of Bouillon. Returning to Flanders in 1100, he fought with his suzerain, Louis VI the Fat of France, against the English and was drowned in 1111 by the breaking of a bridge. He was succeeded by his son, Baldwin VII, who himself died fighting the English in 1119.

France

• **Robert I** (b. *c.* 865—d. June 15, 923, Soissons, Fr.), younger son of Robert the Strong of Neustria, and briefly king of France (922–923), or West Francia. His decisive victory over the Northmen at Chartres (911) led to a treaty settling one group of these fierce warriors in Normandy.

Robert faithfully served his older brother, King Eudes, during Eudes's reign (888–898). Though on Eudes's death he became one of the most powerful Frankish lords, inheriting all the family lands between the Seine and the Loire rivers, he swore fealty with other magnates to the new king, the Carolingian Charles III the Simple. Nevertheless, he was already served in his domains by viscounts, officials usually regarded as instruments of regal power. From 911 onward, his role became more decisive: his defeat of the Northmen at Chartres paved the way for the Treaty of Saint-Clair-sur-Epte, by which Charles assigned them territory in Normandy.

Robert's military success greatly enhanced his prestige, and dissension between him and the King became undisguised. When Charles III imprudently offered preferment exclusively to lords from Lorraine, the Neustrian lords, led by Robert, broke into open revolt. They elected Robert king at Reims in June 922. In a battle near Soissons a year later, Charles's army was routed, but Robert was killed. His grandson was Hugh Capet, founder of the Capetian dynasty.

• **Robert II,** byname ROBERT THE PIOUS, French ROBERT LE PIEUX (b. *c.* 970, Orléans, Fr.—d. July 20, 1031, Melun), king of France who took Burgundy into the French realm.

The son of Hugh Capet, founder of the Capetian dynasty, and Adelaide of Aquitaine, Robert was educated at the episcopal school of Reims under Gerbert of Aurillac, later Pope Sylvester II. Soon after his own coronation (July 987), Hugh prudently arranged the election and coronation (December 987) of Robert, thus facilitating his son's eventual succession (October 996) as sole ruler. His excommunication as a result of his marriage within the prohibited degrees of relationship was eventually lifted after the repudiation of the childless Bertha in 1001. Constance of Arles, whom the King married two years later, was the mother of his successor, Henry I.

Robert's domain was not extensive; and, to increase his power, he vigorously and tenaciously pressed his claim to fiefs as they became vacant. Thus, when the duke of Burgundy died without an heir (1002), Robert went to war against a rival claimant. Only in 1015, however, did he finally succeed in subduing the rich duchy. (The gain was transitory, for in 1032 Henry I granted Burgundy to his brother, Robert, and it thereafter remained for centuries outside royal control.)

A patron of the Cluniac monastic movement, Robert apparently ruled firmly and judiciously in his own lands.

Naples

• **Robert,** byname ROBERT OF ANJOU, or ROBERT THE WISE, Italian ROBERTO D'ANGIÒ, or ROBERTO IL SAGGIO (b. 1278—d. Jan. 19, 1343, Naples), Angevin prince and Guelf (papal party) leader who ruled Naples as king for 34 years (1309–43).

Robert's early years were clouded by the War of the Sicilian Vespers (1282–88), in which his father, Charles II of Anjou, was taken prisoner by the Aragonese. By the terms of the treaty Charles was freed, and Robert took his place as hostage at the Aragonese court. Taking the title of duke of Calabria (1296), he led an expedition attempting to recover Sicily from the Aragonese prince who ruled it as Frederick III. Robert's military success produced the Peace of Caltabellotta (1302), by which the Aragonese agreed to return Sicily to the House of Anjou when Frederick died.

On the death of his father in 1309, Robert inherited Naples and extensive territories in northern Italy and southern France. For several years Robert skirmished politically and militarily on the side of the Guelf party in northern Italy against the Ghibelline (pro-imperial) faction led by the Visconti of Milan, whom he defeated at Sesto, west of Genoa, in 1319. His desire to enlist the interest of Pope John XXII in a final defeat of the Ghibellines of northern Italy caused Robert to take up residence at Avignon, the papal seat, but in 1324 the victory of the Visconti over Guelf forces at Vaprio, east of Milan, brought him back to Italy to defend his lands.

Robert remained neutral when the German king Louis the Bavarian marched into Italy, was crowned emperor in Rome as Louis IV (1328), and set up an antipope, Nicholas V. Relations between Robert and John XXII terminated when the Pope allied himself with King John of Bohemia, who invaded northern Italy in 1330. In return for King John's support, the Pope offered him Robert's territories in southern France. The Pope's diplomacy shattered the traditional Guelf–Ghibelline alignments in Italy, and the league that Robert joined, consisting of members of both parties, drove King John out of Italy in 1336. The final years of Robert's reign were marked by defections of his northern Italian towns, and his failure to regain Sicily after Frederick III's death in 1337 brought a steady decline of Angevin power and influence.

Normandy

• **Robert I,** byname ROBERT THE MAGNIFICENT, or THE DEVIL, French ROBERT LE MAGNIFIQUE, or LE DIABLE (d. July 1035, Nicaea), duke of Normandy (1027–35), the younger son of Richard II of Normandy and the father, by his mistress Arlette, of William the Conqueror of England. On the death of his father (1026/27), Robert contested the duchy with his elder brother Richard III, legally the heir, until the latter's opportune death a few years later. A strong ruler, Robert succeeded in exacting the obedience of his vassals. On the death of Robert II the Pious, king of France (1031), a crisis arose over the succession to the French throne. The Duke gave his support to Henry I against the party favouring his younger brother; in reward for his services he demanded and received the Vexin Français, a territory not far north of Paris. A patron of the monastic reform movement, he died while returning from a pilgrimage to Jerusalem.

• **Robert II,** byname ROBERT CURTHOSE, French ROBERT COURTEHEUSE (b. *c.* 1054—d. February 1134, Cardiff, Wales), duke of Normandy (1087–1106), a weak-willed and incompetent ruler whose poor record as an administrator of his domain was partly redeemed by his contribution to the First Crusade (1096–99).

The eldest son of William I the Conqueror, Robert was recognized in boyhood as his father's successor in Normandy. Nevertheless he twice rebelled against his father (1077/78 and *c.* 1082–83) and was in exile in Italy until he returned as duke on his father's death in 1087. He was totally unable to control his rebellious vassals or to establish a central authority in Normandy.

In 1091 Robert's younger brother, King William II of England, invaded Normandy and compelled Robert to yield two counties. William attacked again in 1094, and when a peace was made that gave him control of Normandy in return for money, Robert joined the First Crusade. He fought at Dorylaeum (1097) and was at the capture of Jerusalem (1099). His courageous leadership contributed to the victory at Ascalon (1099).

When Robert's youngest brother, Henry I, succeeded William as king of England (1100), Robert was in Italy. He hastened back to invade England, with ignominious results, and Henry in turn invaded Normandy (1105 and 1106). Captured in the Battle of Tinchebrai (Sept. 28, 1106), Robert spent the rest of his life as a prisoner, dying in Cardiff castle.

SCOTLAND

• **Robert I,** original name ROBERT VIII DE BRUCE, or ROBERT THE BRUCE (b. July 11, 1274—d. June 7, 1329, Cardross, Dunbartonshire, Scot.), king of Scotland (1306–29), who freed Scotland from English rule, winning the decisive Battle of Bannockburn (1314) and ultimately confirming Scottish independence in the Treaty of Northampton (1328). Among the legends that later became attached to his name was the story that, when outlawed and hard pressed by the English, with his fortunes at low ebb, he derived hope and patience from watching a spider perseveringly weave its web.

Background and early life. The Anglo-Norman family of Bruce, which had come to Scotland in the early 12th century, was related by marriage to the Scottish royal family, and hence the sixth Robert de Bruce (died 1295), grandfather of the future king, claimed the throne when it was left vacant in 1290. The English king Edward I claimed feudal superiority over the Scots and awarded the crown to John de Balliol instead.

The eighth Robert de Bruce was born in 1274. His father, the seventh Robert de Bruce (died 1304), resigned the title of earl of Carrick in his favour in 1292, but little else is known of his career until 1306. In the confused period of rebellions against English rule from 1295 to 1304 he appears at one time among the supporters of the rebel William Wallace, but he later apparently regained Edward I's confidence. There is nothing at this period to suggest that he was later to be the Scottish leader in a war of independence against Edward's attempt to govern Scotland directly.

The decisive event was the murder of John ("the Red") Comyn in the Franciscan church at Dumfries on Feb. 10, 1306, either by Bruce or his followers. Comyn, a nephew of John de Balliol, was a possible rival for the crown, and Bruce's actions suggest that he had already decided to seize the throne. He hastened to Scone and was crowned on March 25.

King of Scots. The new king's position was very difficult. Edward I, whose garrisons held many of the important castles in Scotland, regarded him as a traitor and made every effort to crush a movement that he treated as a rebellion. King Robert was twice defeated in 1306, at Methven, near Perth, on June 19, and at Dalry, near Tyndrum, Perthshire, on August 11. His wife and many of his supporters were captured, and three of his brothers executed. The King himself became a fugitive, hiding on the remote island of Rathlin off the north Irish coast.

In February 1307 he returned to Ayrshire. His main supporter at first was his only surviving brother, Edward, but in the next few years he attracted a number of others. The King himself defeated John Comyn, earl of Buchan (a cousin of the slain John "the Red"), and in 1313 captured Perth, which had been in the hands of an English garrison; but much of the fighting was done by his supporters, who progressively conquered Galloway, Douglasdale, the forest of Selkirk and most of the eastern borders, and finally, in 1314, Edinburgh. During these years the King was helped by the support of some of the leading Scottish churchmen and also by the death of Edward I in 1307 and the ineptness of his successor, Edward II. The test came in 1314 when a large English army attempted to relieve the garrison of Stirling. Its defeat at Bannockburn on June 24 marked the triumph of Robert I.

Consolidation of power. Almost the whole of the rest of his reign had passed before he forced the English government to recognize his position. Berwick was captured in 1318, and there were repeated raids into the north of England, which inflicted great damage. Eventually, after the deposition of Edward II (1327), Edward III's regency government decided to make peace by the Treaty of Northampton (1328) on terms that included the recognition of Robert I's title as king of Scots and the abandonment of all English claims to overlordship.

The King's main energies in the years after 1314, however, were devoted to settling the affairs of his kingdom. Until the birth of the future king David II in 1324 he had no male heir, and two statutes, in 1315 and 1318, were concerned with the succession. In addition, a parliament in 1314 decreed that all who remained in the allegiance of the English should forfeit their lands; this decree provided the means to reward supporters, and there are many charters regranting the lands so forfeited. Sometimes these grants proved dangerous, for the King's chief supporters became enormously powerful. James Douglas, knighted at Bannockburn, acquired important lands in the counties of Selkirk and Roxburgh that became the nucleus of the later power of the Douglas family on the borders. Robert I also had to restart the processes of royal government, for administration had been more or less in abeyance since 1296. By the end of the reign the system of exchequer audits was again functioning, and to this period belongs the earliest surviving roll of the register of the great seal.

In the last years of his life, Robert I suffered from ill health and spent most of this time at Cardross, Dumbartonshire, where he died, possibly of leprosy. His body was buried in Dunfermline Abbey, but the heart was removed on his instructions and taken by Sir James Douglas on a pilgrimage to the Holy Land. Douglas was killed on the way (1330), but, according to one tradition of uncertain value, the heart was recovered and brought back to Melrose Abbey. In later times Robert I came to be revered as one of the heroes of Scottish national sentiment and legend.

(B.We.)

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• **Robert II,** also called (until 1371) ROBERT THE STEWARD, or (1357–71) ROBERT STEWART, EARL OF STRATHEARN (b. March 2, 1316—d. April 19, 1390, Dundonald, Ayrshire, Scot.), king of Scots from 1371, first of the Stewart (Stuart) sovereigns in Scotland. Heir presumptive for more than 50 years, he had little effect on Scottish political and military affairs when he finally acceded to the throne.

On the death (1326) of his father, Walter the Steward, in 1326, Robert became seventh hereditary steward of Scotland at age 10. From 1318 he was heir presumptive to his maternal grandfather, King Robert I the Bruce (died 1329). He lost this position in 1324 when the Bruce's son, afterward King David II, was born; but two years later the Scottish Parliament confirmed Robert the Steward as heir apparent to David.



Robert II, coin, 14th century; in the British Museum
Peter Clayton

During David's periods of exile and of imprisonment by the English, Robert the Steward was joint regent (1334–35; with John Randolph, 3rd earl of Moray) and sole regent (1338–41, 1346–57). After David had been ransomed from the English, Robert led an unsuccessful rebellion (1362–63). He succeeded in defending his own right as heir apparent against David's abortive proposal to commute his remaining ransom payments to the English by making a son of King Edward III of England heir to the Scottish throne.

On the death of David (Feb. 22, 1371), Robert succeeded to the throne, his reign proving largely an anticlimax to his career. He took no active part in the renewed war with England (from 1378 to 1388). From 1384 the kingdom was administered by Robert's eldest son, John, earl of Carrick (afterward King Robert III), and from 1388, by his next surviving son, Robert, earl of Fife (afterward 1st duke of Albany).

Robert's marriage (*c.* 1348) to Elizabeth Mure followed the birth of their four sons and five daughters, whose legitimation by the subsequent marriage did not give any of them an undisputed right of succession to the crown. A superior claim was asserted on behalf of Robert's two sons and two daughters by his second wife, Euphemia Ross, whom he married in 1355. Partly because of this dispute, Walter, earl of Atholl, one of Robert's sons by Euphemia, instigated the murder (1437) of James I, king of Scots, grandson of Robert and Elizabeth Mure. Robert also had at least eight illegitimate sons.

• **Robert III,** also called (until 1390) JOHN STEWART, EARL OF CARRICK (b. *c.* 1337—d. April 4, 1406, Rothesay, Bute, Scot.), king of Scots from 1390, after having ruled Scotland in the name of his father, Robert II, from 1384 to 1388. Physically disabled by a kick from a horse, he was never the real ruler of Scotland during the years of his kingship.

The eldest son of Robert the Steward (the future Robert II) and Elizabeth Mure, he was legitimated by their marriage several years after his birth. In 1362–63 he joined his father in a futile revolt against King David II, who both imprisoned him and created him earl of Carrick in 1368. (He had been created earl of Atholl in 1367.) Robert II became king in 1371; in 1384, because of his advanced age, he turned over the government to Carrick. After his injury in 1388, however, Carrick was supplanted by his brother Robert, earl of Fife.

On his accession, probably on April 19, 1390, he changed his name to Robert (III) from John, to avoid reminding others of John de Balliol, king of Scotland from 1292 to 1296, who was not favourably remembered. Fife, created duke of Albany in 1398, continued to govern throughout this reign, except for three years (1399–1402) when Robert III's eldest son, David, duke of Rothesay, took his place. The dissolute Rothesay died in March 1402 while imprisoned in Albany's castle of Falkland, Fife. Perhaps in an attempt to save his remaining son, James (afterward James I, king of Scots), from death at Albany's hands,



Robert III, coin, 14th century; in the British Museum
Peter Clayton

Robert III sent the boy to France, but James was captured by English sailors, a shock to the aging king.

Robert CURTHOSE, French ROBERT COURTEHEUSE: *see* Robert II *under* Robert (Normandy).

Robert DE HAUTEVILLE: *see* Robert *under* Robert (Apulia).

Robert DE TORIGNI, also called ROBERTUS DE MONTE (b. *c.* 1110, Torigni-sur-Vire, Fr.—d. June 23/24, 1186, Mont-Saint-Michel, Normandy), Norman chronicler whose records are an important source both for Anglo-French history and the intellectual renaissance in the 12th century.

Robert was born to a family apparently of high rank. In 1128 he joined the monastery at Bec, where he was ordained deacon (1131) and elected prior (1149). He became abbot of Mont-Saint-Michel in 1154. Robert occupied an excellent position for a 12th-century historian because Mont-Saint-Michel was one of the great European trading and cultural centres of the period. He had wide personal contacts and made two visits to England—in 1157 and 1175—which greatly enhanced his *Appendix to Sigebert* (a continuation of the chronicle of Sigebert de Gembloux, which had ended in 1112), covering England (and France) under Henry II from 1154 to 1186.

Although Robert's chronology is somewhat dubious because the task of copying was left to his successors, his account of Henry's experiences in continental Europe is extremely valuable, and his use of such other sources as Fulbert of Chartres, Eadmer, and Bede is reliable. The chronicle was highly respected by contemporaries for its literary style and erudition, and it remains an important document today. Robert also wrote a treatise on monastic orders and Norman abbeys (1154), was responsible for the annals of Mont-Saint-Michel from 1135 to 1173, and prepared prefaces for a collection of excerpts from St. Augustine and for Pliny's *Natural History.*

Robert GUISCARD: *see* Robert *under* Robert (Apulia).

Robert OF ANJOU: *see* Robert *under* Robert (Naples).

Robert OF BELLÊME, 3RD EARL OF SHROPSHIRE OR SHREWSBURY, Bellême also spelled BELESME (b. *c.* 1052—d. after 1130, Wareham, Dorset, Eng.), Norman magnate, soldier, and outstanding military architect, who for a time was the most powerful vassal of the English crown under the second and third Norman kings, William II Rufus (died 1100) and Henry I. His contemporary reputation for sadism was extreme, even among the cruel Normans.

A younger son of Roger de Montgomery, 1st earl of Shropshire or Shrewsbury, Robert inherited lordships in Normandy, among them Bellême (in the present French *département* of Orne). In the struggle between the two older sons of King William I the Conqueror he originally sided with Duke Robert II Curthose of Normandy, but in 1097 he fought for the other son, William II Rufus, against the Duke and King Philip I of France. Also on behalf of Rufus, he captured Helias (Hélie), count of Maine, thereby securing the important town of Le Mans for the English. His greatest work of military architecture was the castle of Gisors, on the border between Normandy and the French kingdom.

After Henry I, who had been Robert's chief rival for power in Normandy, had succeeded Henry's older brother, Rufus, as king of England, Robert rebelled (1101–02). He was deprived of his English lands and earldom (1102) and unsuccessfully fought against Henry in the Battle of Tinchebrai (Sept. 28, 1106). King Louis VI of France sent him (November 1112) as ambassador to Henry I, who quickly arrested Robert and imprisoned him for the rest of his life.

Robert OF COURTENAY: *see* Robert *under* Robert (Constantinople).

Robert OF GENEVA (antipope): *see* Clement (VII).

Robert OF GLOUCESTER (fl. 1260–1300), early Middle English chronicler known only through his connection with the work called "The Chronicle of Robert of Gloucester"—a vernacular history of England from its legendary founding by Brut (Brutus), great-grandson of Aeneas, to the year 1270. It was written, probably around 1300, in rhymed couplets. Two versions exist, and it is now believed that only one part, dealing with recent or contemporary events—the last 3,000 lines of the longer version—was written by Robert. This supplies interesting details of the civil strife during the reign of Henry III and a vivid description of the Battle of Evesham that has the value of contemporary authority. The earlier parts of the work, based on the chronicles of Geoffrey of Monmouth, William of Malmesbury, and other minor sources, seem to have been written by different authors.

Robert OF JUMIÈGES (b. Normandy, Fr.—d. *c.* 1055, Jumièges), one of the Normans given high position by the English king Edward the Confessor.

Robert was prior of Saint-Ouen, Rouen, Fr., when elected abbot of the Benedictine abbey of Jumièges in 1037. Taken to England by King Edward in 1042, he was made bishop of London in 1044. He became Edward's chief adviser and head of the Norman party and was appointed archbishop of Canterbury in 1051. Robert influenced Edward to exile the overpowerful Godwine, earl of Wessex; and, when Godwine returned in 1052, Robert himself was banished to the Continent. He retired to Jumièges. The uncanonical usurpation of his see by Stigand, bishop of Winchester, caused the papacy to support the invasion of England in 1066 by Duke William of Normandy (later King William I the Conqueror, of England).

Robert OF MOLESME, SAINT (b. *c.* 1027, Troyes, Fr.—d. 1110, Molesme; canonized 1222; feast day April 29), French Benedictine monk and abbot, monastic reformer, and founder of Cîteaux (Latin Cistercium) Abbey (1098), which developed into the Cistercian Order.

The son of noble parents, Robert entered the Benedictine monastery of Moutier-la-Celle near Troyes as a youth and soon became prior. He later became abbot of Saint-Michel-de-Tonnerre, near Langres, where he attempted reforms with little success. He eventually accepted the request of some hermits to become their leader, and in 1075 they established themselves at Molesme. Their austere life gradually gave way to prosperity and laxity, and in 1098 Robert and about 20 monks withdrew to establish Cîteaux, where they strictly followed St. Benedict's Rule.

Robert THE BRUCE: *see* Robert I *under* Robert (Scotland).

Robert THE DEVIL, French ROBERT LE DIABLE, legendary son of a duke of Normandy, born in answer to prayers addressed to the devil. He uses his immense strength only for crime. Directed by the pope to consult a certain holy hermit, he is delivered from his curse by maintaining absolute silence, feigning madness, taking his food from the mouth of a dog, and provoking ill-treatment from the common people without retaliating. He later serves as the Holy Roman emperor's court fool but, at the bidding of an angel, three times rides out disguised as an unknown knight to deliver Rome from Saracen attacks. His disguise is pierced by the emperor's daughter. He refuses her hand in marriage, however, and withdraws to a hermitage.

This is the legend as given in *Robert le Diable,* a late 12th-century romance; other versions are told in two 14th-century poems, and in the 19th century a distorted version of the legend supplied a libretto for Giacomo Meyerbeer's opera *Robert le Diable.*

Robert THE FRISIAN: *see* Robert I *under* Robert (Flanders).

Robert THE JERUSALEMITE: *see* Robert II *under* Robert (Flanders).

Robert THE PIOUS: *see* Robert II *under* Robert (France).

Robert THE STEWARD: *see* Robert II *under* Robert (Scotland).

Robert THE STRONG, French ROBERT LE FORT (d. Sept. 15, 866, Brissarthe, Fr.), ancestor of the Capetian kings of France.

Count of various regions between the Seine and Loire rivers, Robert served the Carolingian king of France Charles II the Bald and, by his bold and inspiring military leadership, succeeded in checking the depredations of the Northmen who were laying waste the settlements near the Loire. A great victory over the Northmen in 865 was followed by the King's grant to Robert of full control over Neustria early the next year; but he was killed in a skirmish against the Northmen in September. The memory of Robert's exploits brought great prestige to his family. His sons, Eudes and Robert I, both became kings of West Francia (or France); and the Capetian kings (from 987) were his direct descendants.

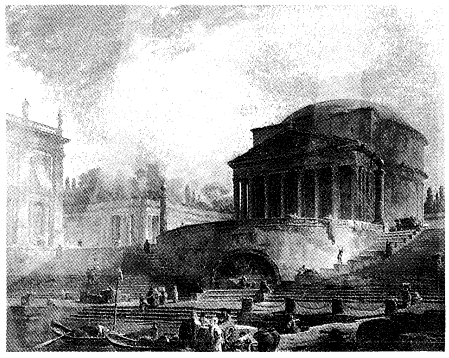
Robert THE WISE: *see* Robert *under* Robert (Naples).

Robert, Henry Martyn (b. May 2, 1837, Robertville, S.C., U.S.—d. May 11, 1923, Hornell, N.Y.), U.S. Army officer, author of the standard manual on parliamentary procedure in the United States, known as *Robert's Rules of Order.*

A graduate (1857) of the U.S. Military Academy, West Point, N.Y., Robert was commissioned in the Corps of Engineers and

retired (1901) with the rank of brigadier general. During the Civil War (1861–65) he constructed defenses for Washington, D.C.; Philadelphia; and the port of New Bedford, Mass. About 1862, while stationed at New Bedford, he presided over a turbulent meeting of his church; upon later investigation, he learned that there was no generally accepted set of parliamentary rules. He then began to write his own code, breaking with precedent when necessary. He had to pay the original publication cost, producing the *Pocket Manual of Rules of Order for Deliberative Assemblies* in 1876. The work was immediately successful and went through numerous editions during Robert's lifetime, including the 1915 revision, entitled *Robert's Rules of Order Revised for Deliberative Assemblies* (revised, 1971, as *Robert's Rules of Order Revised*). Robert's *Parliamentary Practice* (1921) and *Parliamentary Law* (1922) were still in print in the 1970s.

Robert, Hubert (b. May 22, 1733, Paris—d. April 15, 1808, Paris), French landscape painter sometimes called "Robert des Ruines" because of his many romantic representations of Roman ruins set in idealized surroundings.



"The Porto di Ripetta at Rome," composite landscape with the Pantheon; canvas, by Hubert Robert, 1776; in the École des Beaux-Arts, Paris

Giraudon—Art Resource/EB Inc.

Robert went to Rome (1754), was elected to the French Academy there, and became a friend and associate of the renowned etcher of architectural subjects Giambattista Piranesi. In 1759 he joined Abbé de Sainte-Non and the French painter Jean-Honoré Fragonard in travels through southern Italy and Sicily. Each man influenced the other's style but not the other's choice of subjects. At the Villa d'Este, Tivoli, Robert produced a quantity of red chalk drawings of ancient buildings in ruined parks, animated with small figures.

Returning to Paris (1765), Robert became a member of the French Royal Academy in 1766. A gifted decorative artist, he based his paintings on his Italian drawings, and his popularity was enhanced by exhibitions at the Salons from 1767 on. In addition to Italian landscapes, he painted scenes of Ermenonville, Marly-le-Roi, and Versailles, near Paris, and of the south of France, with its ruined Roman monuments. He also directed the design of the English garden at Versailles. Although imprisoned during the French Revolution, he continued to work. He collaborated with Fragonard on a commission for the Musée Français in the Louvre during the 1790s, but at the time of his death he was forgotten.

Robert, Shaaban (b. January 1909, Tanga, German East Africa—d. June 20, 1962, Dar es Salaam, Tanganyika), popular Swahili writer, Robert was the product of two cultures—his father was a Christian, but Shaaban returned to Islām. His work ranges from poetry to essay and didactic tale, influenced in style by the Oriental tradition. Many poems follow the form of *utendi* verse (used for narration and didactic themes), but, like his famous predecessor, Muyaka bin Haji al-Ghassaniy, he often employed other traditional and experimental forms. His prose style is clear and concrete and strongly individual in expression.

In addition to his poems and tales, Robert produced an autobiography, *Maisha yangu* (1949; "My Life"), and a biography, *Maisha ya Siti Binti Saad, mwimbaji wa Unguja* (1958; "Life of Siti Binti Saad, Poetess of Zanzibar"). His essays on many subjects were collected in *Insha ya mashairi* (1959; "Essays and Poems"). He lectured on poetry and its relation to Swahili culture and strongly supported the movement to preserve African verse traditions of the past. The first volume of his complete works, *Diwani ya Shaaban,* appeared in 1966.

Robert-Houdin, Jean-Eugène, original name JEAN-EUGÈNE ROBERT (b. Dec. 6, 1805, Blois, Fr.—d. June 13, 1871, St. Gervais, near Blois), French magician who is considered to be the father of modern conjuring. He was the first magician to use electricity; he improved the signalling method for the "thought transference" trick; and he exposed "fakes" and magicians who relied on supernatural explanations for their feats. Although he did not do away with apparatus, he did, in the main, use what appeared to be common and familiar objects to create an illusion, then supplied the audience with a plausible explanation of the technical procedures involved in the trick.

Interested in magic from boyhood, Robert-Houdin was trained as a watchmaker; he later worked on his mechanical devices in Paris and was a magician at the Palais-Royal (1845–55), performing on a bare stage in evening dress instead of in wizard-like costumes. There he created a sensation with his "floating boy" trick achieved with the use of a concealed metal support structure. In 1856 he was sent to Algeria by the French government to combat the influence of the dervishes by duplicating their feats. His influential books, based largely on the best ideas of his predecessors, explain the art of magic and give, as well, step-by-step lessons. They include an autobiography (1857), *Confidences d'un prestidigitateur* (1859), and *Les Secrets de la prestidigitation et de la magique* (1868).

Harry Houdini, who named himself after Robert-Houdin, wrote *The Unmasking of Robert-Houdin* (1908).

Roberti, Ercole (Grandi d'Antonio) de' (b. *c.* 1450, Ferrara, Papal States—d. 1496, Ferrara), Italian painter of the Ferrarese school whose work is characterized by a highly personal style of sensibility and deep pathos.

Roberti is believed to have studied with Cosmè Tura, a court painter to the Este family of Ferrara, and he is known to have studied with Tura's student Francesco del Cossa. Although his early paintings are influenced by the styles of both Tura and Cossa, he distinguished his work by exaggerating the emotional quality of his painting, often at the expense of technical expertise. Later works show Roberti to have achieved seriousness and intensity of emotion without sacrificing technique.

In 1470 Roberti worked with Cossa on a series of frescoes at the Palazzo Schifanoia in Ferrara. Scholars also believe he assisted Cossa in painting altarpieces in the Church of San Petronio in Bologna. During that five-year period, Roberti and Cossa are believed to have worked together on a predella, now in the Vatican Museum.

Roberti worked in Cossa's workshop until the master's death in 1478. From 1479 to 1486 he ran his own workshop in Ferrara, but he left the city to complete works begun by Cossa and to execute new commissions in other cities. Around 1480 Roberti painted the famous profile portrait of "Ginevra Bentivoglio" (National Gallery of Art, Washington, D.C.). The large church work thought to have been executed solely by Roberti, "The Madonna and Child with Saints" (1480), is now known as the Ravenna Altarpiece and is in the Pinacoteca di Brera in Milan.

Roberti was appointed by Duke Ercole I to replace Tura as court painter in 1486. His ability as a portraitist is evident thereafter in the many paintings of the members of this family that he completed. A predella, with scenes of the Passion, for the altar of the church of San Giovanni in Monte, Bologna, is also thought by most critics to be by Roberti; three of its panels remain: the "Pietá," (Walker Art Gallery, Liverpool), the "Harvest of the Manna" (National Gallery, London), and the "Way of the Cross" (Gemäldegalerie, Dresden, Ger.).

Roberti's work is characterized by bright, metallic colours, sinuous lines, and an open conception of space. His dynamic figurative compositions are marked by an exceptional intensity of feeling.

Roberto (Italian personal name): *see under* Robert.

Roberts, Bartholomew, byname BLACK BARTY (b. 1682?, near Haverfordwest, Wales—d. Feb. 10, 1722, at sea off the Guinea coast), pirate captain of a succession of ships—the "Royal Rover," "Fortune," "Royal Fortune," and "Good Fortune"—who burned and plundered ships from the coasts of West Africa to the coasts of Brazil and the Caribbean and as far north as Newfoundland. His conquests are said to have included more than 400 vessels and, in terms of sheer numbers, are rivalled only by the feats of Sir Henry Morgan.

Roberts took to piracy late, after the age of 37, but he quickly rose to captaincy. He even designed a flag for himself, portraying a giant figure of himself standing, sword in hand, astride two skulls labelled A.B.H. ("a Barbadian's head") and A.M.H. ("a Martinican's head"). He was finally felled by grapeshot in battle with a pursuing British warship off the Guinea coast of Africa.

Roberts, Sir Charles G(eorge) D(ouglas) (b. Jan. 10, 1860, Douglas, N.B.—d. Nov. 26, 1943, Toronto), poet who was the first to express the new national feeling aroused by the Canadian confederation of 1867. His



Charles Roberts, *c.* 1930

By courtesy of the Harriet Irving Library, University of New Brunswick, Fredericton

example and counsel inspired a whole nationalist school of late 19th-century poets. Also a prolific prose writer, Roberts wrote several volumes of animal short stories, a genre in which he became internationally famous.

After graduating from the University of New Brunswick (1879), Roberts taught school, edited the influential Toronto magazine *The Week,* and for ten years was a professor of English at King's College in Windsor, Nova Scotia. In 1897 he moved to New York City where he worked as a journalist, and in 1911

he established residence in London. Returning to Canada 14 years later, Roberts embarked on a cross-Canada lecture tour and later settled in Toronto as the acknowledged dean of Canadian letters. He was knighted in 1935.

Beginning with *Orion, and Other Poems* (1880), in which he expressed traditional themes in traditional poetic language and form, Roberts published about 12 volumes of verse. He wrote of nature, love, and nationalism, but his best remembered poems are simple descriptive lyrics about the scenery and rural life of New Brunswick and Nova Scotia. Outstanding among his poetic works are *In Divers Tones* (1887), *Songs of the Common Day* (1893), *The Vagrant of Time* (1927), and *The Iceberg, and Other Poems* (1934).

Roberts' most famous prose works are short stories in which his intimate knowledge of the woods and their animal inhabitants is displayed—*e.g., Earth's Enigmas* (1896), *The Kindred of the Wild* (1902), *Red Fox* (1905), and *Neighbours Unknown* (1911). His other prose includes a pioneer *History of Canada* (1897) and several novels dealing with the Maritime Provinces.

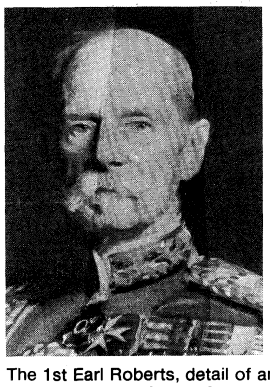
Roberts, Elizabeth Madox (b. Oct. 30, 1886, Perryville, Ky., U.S.—d. March 13, 1941, Orlando, Fla.), Southern American novelist, poet, and short story writer noted especially for her vivid, impressionistic depiction of her protagonists' inner life and for her accurate portrayal of life in Kentucky.

Educated in schools in Springfield, a village near her birthplace, Roberts taught school from 1900 to 1910. After 1910 she stayed for a time in Colorado, where the first of her verses were published. In 1917 she enrolled in the University of Chicago. Much encouraged in her writing, Roberts was graduated in 1921, and she determined to become a full-time writer. She returned to Springfield, where she spent the rest of her life.

Her first novel, *The Time of Man* (1926), concerns a poor white woman living in Kentucky. Its rich texture, contrasting inner growth with outward hardship, and its account of life in Kentucky won for her international acclaim. *The Great Meadow* (1930), her best known novel, describes a woman's spiritual return to the wilderness. Her subsequent books generally dealt with similar themes and settings, but her fame declined in the 1930s.

In addition to a number of lesser known novels, Roberts wrote two books of short stories, *The Haunted Mirror* (1932) and *Not By Strange Gods* (1941), and two books of poetry, *Under the Tree* (1922; enlarged 1930) and *Song in the Meadow* (1940).

Roberts (of Kandahar, Pretoria, and Waterford), Frederick Sleigh Roberts, 1st Earl, VISCOUNT ST. PIERRE, also called (from 1892) BARON ROBERTS OF KANDAHAR (b. Sept. 30, 1832, Cawnpore, India—d. Nov. 14, 1914, Saint-Omer, Fr.), British field marshal, an outstanding combat leader in the Second Afghan War (1878–80) and the South African War (1899–1902), and the last commander in chief of the British Army (1901–04; office then abolished). Foreseeing World War I, he was one of the earliest advocates of compulsory military service.



The 1st Earl Roberts, detail of an oil painting by John Singer Sargent, 1904; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Roberts first distinguished himself during the suppression of the Indian Mutiny (1857–58). On Sept. 1, 1880, he scored the decisive victory of the Second Afghan War, defeating Ayub Khan's Afghan Army near Qandahār. From 1885 to 1893 he was commander in chief in India. As the second British commander in chief (December 1899–November 1900) in the South African War, he ended a succession of British defeats; captured Bloemfontein, capital of the Orange Free State Republic (March 13, 1900), and annexed that Boer state as the Orange River Colony (May 24); took the cities of Johannesburg (May 31) and Pretoria (June 5); and defeated Boer commandos at Bergendal (August 27). A field marshal from 1895, he gave way to Horatio Herbert Kitchener as commander in chief in South Africa in November 1900.

Roberts was created a baron in 1892 and an earl and viscount in 1901. Both of his sons having predeceased him, the barony became extinct, but the earldom and viscounty devolved, in turn, on his elder and younger surviving daughters.

Roberts, Sir Gilbert (b. Feb. 18, 1899, London—d. Jan. 1, 1978, London), British civil engineer who pioneered new design and construction methods in a series of major bridges including the 3,300-foot (1,006-metre) Firth of Forth highway bridge in Scotland, the seventh longest in the world.

After attending City and Guilds College of the University of London (B.S., 1923), he became a civil engineer and worked on the Sydney Harbour Bridge and on the Otto Beit suspension bridge across the Zambezi in what was then Southern Rhodesia. A brilliant designer, he adopted new welding methods and the use of high-tensile steel and introduced box columns and girders in the construction of power stations, thereby using less steel. Roberts's designs, which called for lighter construction, better stability, and lower cost, were implemented in such engineering masterpieces as the Severn River Bridge in western England, the Auckland Harbour Bridge in New Zealand, the Volta Bridge in Ghana, and the suspension bridge across the Bosporus in Turkey.

Roberts also developed all-welded ships in World War II and designed the Dome of Discovery for the Festival of Britain in 1951, the Babcock 500-ton Goliath crane, and a 210-ft-(64-m-) diameter radio telescope in Australia.

In 1965 (upon completion of the Firth of Forth bridge) he was knighted and elected a fellow of the Royal Society.

Roberts, Isaac (b. Jan. 27, 1829, Groes, near Denbigh, Clwyd, Wales—d. July 17, 1904, Crowborough, Sussex, Eng.), British astronomer who was a pioneer in photography of nebulae.

In 1883 Roberts began experimenting with astronomical photography, taking pictures of stars, the Orion and Andromeda nebulae, and the Pleiades cluster. Although the photographs proved difficult to interpret, they were revealing. His three-hour exposure of the Pleiades showed the nebulosity surrounding these stars, and his photographs of Andromeda showed its spiral structure. Roberts' photographs were exhibited regularly at the Royal Astronomical Society and earned him the Society's Gold Medal in 1895.

Roberts, Joseph Jenkins (b. March 15, 1809, Petersburg, Va., U.S.—d. Feb. 24, 1876, Monrovia, Liberia), American-born, first president of Liberia (1848–56).

A native of Virginia, Roberts was the son of free "blacks" whose heritage was more than seven-eighths white. At the age of 20 he immigrated to Liberia with his mother and younger brothers, became a merchant, and also became an unofficial aide to the white governor of the colony, Thomas H. Buchanan, a member of the American Colonization Society, which sought the return of American freedmen to Africa. On Buchanan's death in 1842, Roberts was appointed the first black governor of the colony.

In efforts to establish the political and economic stability of the colony, Roberts and other colonists sought treaties with native tribes and recognition from foreign powers. In 1847 they proclaimed the new republic of Liberia; Roberts was elected the first president. In 1849, during a visit to England, he secured British recognition of Liberia as a sovereign nation; and in 1852, in another trip to continental Europe, he acquired recognition from other powers.

From 1856 he served as president of the new Liberia College and, during a prolonged financial crisis, served again as president of the republic from 1872 to 1876.

Roberts, Kate (b. Feb. 13, 1891, Rhosgadfan, Caernarvonshire, Wales—d. April 4, 1985, Denbigh, Clwyd), one of the outstanding Welsh-language short-story writers of the mid-20th century. She was also a novelist and playwright.

Her works are set in the quarrying districts of North Wales or in the mining villages of South Wales, where poverty is usually the harsh determinant of her characters' hopes and fates. Her works include *O Gors y Bryniau* (1925; "From the Swamp of the Hills"), *Rhigolau Bywyd* (1929; "The Grooves of Life"), *Traed mewn Cyffion* (1936; *Feet in Chains*, 1977), *A Summer Day and Other Stories* (1946), *Stryd y Glep* (1949; "Gossip Street"), and *Y Byw Sy'n Cysgu'* (1956; *The Living Sleep*, 1976).

Roberts, Kenneth (Lewis) (b. Dec. 8, 1885, Kennebunk, Maine, U.S.—d. July 21, 1957, Kennebunkport, Maine), American journalist and novelist who wrote fictional reconstructions of the American Revolution.

Roberts worked as a journalist until 1917, when he began service as a captain in the Intelligence Section of the U.S. Army's Siberian Expeditionary Force. He was staff correspondent of the *Saturday Evening Post* from 1919 until 1928, when he devoted himself to writing fiction. Believing that the past is only poorly understood through historical accounts, Roberts published *Arundel* (1930), a fictional treatment of the Revolutionary War.

He is best known for *Northwest Passage* (1937), dealing with the career of the American frontier soldier Maj. Robert Rogers, and *Rabble In Arms* (1933), a celebration of Revolutionary heroes who fought the British under conditions of great hardship. Roberts researched his books carefully and was devoted to arguing over minute points of American history. He considered his home state a last outpost of rugged individualism, and several of his books are set there.

Roberts, Owen (Josephus) (b. May 2, 1875, Philadelphia—d. May 17, 1955, Chester Springs, Pa., U.S.), associate justice of the United States Supreme Court (1930–45).

Upon graduating from law school, Roberts taught law at the University of Pennsylvania in Philadelphia, but by 1918 he had to devote his full time to his practice. While he was still teaching, Roberts had served as assistant district attorney and as special deputy attorney during World War I.

In 1924 Pres. Calvin Coolidge named him as one of the two attorneys to prosecute parties named in the Teapot Dome scandal. After a

methodical investigation, former Interior Secretary Albert B. Fall was convicted in 1929. The following year Roberts was appointed to the Supreme Court by President Herbert Hoover.

Although inclined to conservatism, Roberts voted independently, and by 1931 he and the new Chief Justice Charles Evans Hughes were characterized as "unreliable members of the so-called liberal majority." Roberts cast the deciding vote on several New Deal programs, upholding some of them. His most important contributions to the court were in the area of civil liberties. In the most famous decision that he wrote, *Herndon* v. *Lowry,* Roberts set aside the conviction of a black Communist organizer convicted under a law that provided no clear standard of guilt. In *Nebbia* v. *New York* (1934) Roberts' opinion upheld the price-setting activities of the New York State Milk Control Board and provided a legal foundation for government regulation of business "affected with a public interest," setting aside the narrow interpretation made famous by Justice James C. McReynolds in *Munn* v. *Illinois* (1877).

Roberts was appointed by President Franklin D. Roosevelt to head a commission investigating the bombing of Pearl Harbor; the following year it issued a report highly critical of the military.

Roberts, Richard (b. April 22, 1789, Carreghova, Montgomeryshire, Wales—d. March 16, 1864, Manchester), British inventor known for his great versatility.

Roberts began his career as an uneducated quarryman. He had remarkable mechanical ability, however, and worked at various times for the industrialist John Wilkinson and the inventor Henry Maudslay. He was one of the inventors of the metal planer and made a number of important improvements on the machine lathe. He also devised a screw-cutting lathe and built the first successful gas meter as well as gearcutting and slotting machines. In 1825 his firm, Sharp, Roberts, and Company, designed an automatic spinning mule. A year later he went to Alsace to develop French cotton manufacturing. Later his firm made railway locomotives in one of the earliest applications of the use of interchangeable parts. In the 1840s he devised automatic machinery for punching patterns of holes in bridge and boiler plate. Roberts was said to have improved everything he touched, but he was not a shrewd businessman and died in poverty.

Roberts-Austen, Sir William Chandler (b. March 3, 1843, Kennington, Surrey, Eng.—d. Nov. 22, 1902, London), English metallurgist noted for his research on the physical properties of metals and their alloys. He was knighted in 1899.

As professor of metallurgy at the Royal School of Mines in London from 1882 to 1902, Roberts-Austen conducted extensive studies on the effects of impurities on the mechanical properties of pure metals. He also made improvements in the procedures used to analyze the components of alloys. The results of his work had wide industrial application, as did his automatic recording pyrometer, a device that he invented to make precise measurements of temperature changes in furnaces and molten metals. Much of Roberts-Austen's work centred on mintage, and he was recognized as one of the world's leading authorities on the technical aspects of the operation.

Robertson, Sir Dennis Holme (b. May 23, 1890, Lowestoft, Suffolk, Eng.—d. April 21, 1963, Cambridge, Cambridgeshire), British economist who was an early supporter of John Maynard Keynes but later produced cogent criticisms of his work.

Robertson was educated at Eton and at Cambridge, where he graduated with first class honours in the Economics Tripos in 1912. He taught at the London School of Economics (1938–44) and then became a professor at Cambridge (1944–57). Robertson was knighted in 1953.

At Cambridge he studied under Keynes, with whom he formed a long collaboration. Robertson's first work, *A Study of Industrial Fluctuation* (1915), emphasized real rather than monetary forces, especially the interaction of invention and investment, in the trade cycle. However, in *Money* (1922), he turned his attention to monetary forces. Robertson, like Keynes, maintained that government policy should attempt to stabilize the price level and that bank deposits were of paramount importance to the money supply. In the course of his further investigations, Robertson developed a dynamic theory of saving and investment that was quite possibly more sophisticated than the one later developed by Keynes; it was one of the key features in his criticism of Keynes's *The General Theory of Employment, Interest and Money* and a major reason for the breaking of his association with Keynes. Robertson was also known for his study of business cycles.

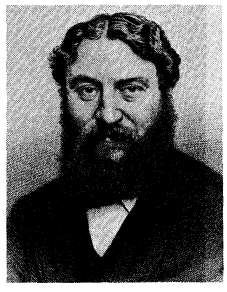
Robertson, Ethel Florence Lindesay: *see* Richardson, Henry Handel.

Robertson, Margaret Shafto (English actress-manager): *see* Kendal, Dame Margaret; and William Hunter (Grimston).

Robertson, Marjorie: *see* Neagle, Dame Anna.

Robertson, Thomas William (b. Jan. 9, 1829, Newark-on-Trent, Nottinghamshire, Eng.—d. Feb. 3, 1871, London), British playwright whose realistic social comedies and pioneering work as a producer-director helped establish the late-19th-century revival of drama in England. Many of his plays long remained in the repertory, and his *Caste* is still performed.

Born into a theatrical family that played a provincial circuit based on the city of Lincoln, Robertson in 1848 moved to London to become an actor. In 1854 he was engaged as prompter at the Lyceum Theatre by Mme Vestris, an enterprising and important manager. It was her work in refining the staging of comedy that he was eventually to perfect. After his marriage in 1856, Robertson gradually abandoned acting for writing. Some of his adaptations and translations had already been produced, and in 1861 a one-act farce called *The Cantab,* his first original play, was staged.



Thomas William Robertson, engraving after a photograph

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

From 1865 to 1870 a number of plays made Robertson famous: *Society, Ours, Caste, Play, School,* and *The M.P.* The broader themes suggested by the titles are merely touched upon, but the plays give a convincing picture of the social scene, marred only by a strain of sentimentality. Generally speaking, Robertson's characters are recognizable as individuals, his plots are skillfully manipulated, and his characters' dialogue is easy and conversational. As a director, Robertson stressed the performance as a whole, insisting upon adequate rehearsal, attention to detail, and ensemble playing. It was his staging methods rather than his plays that proved most influential on the development of English theatre.

Consult the INDEX *first*

Robertson, Sir William Robert, 1ST BARONET (b. Jan. 29, 1860, Welbourn, Lincolnshire, Eng.—d. Feb. 12, 1933, London), field marshal, chief of the British Imperial General Staff during most of World War I, who supported Sir Douglas Haig, the British commander in chief in France, in urging concentration of manpower on the Western Front.

After serving as an enlisted man for 11 years, Robertson was commissioned in 1888. He served in India until 1896 and then became the first officer from the ranks to pass through the Staff College at Camberley, Surrey (1897). During the South African (Boer) War (1899–1902) he was on the intelligence staff. He was appointed commandant of the Staff College (1910) and director of military training (1913) in the War Office.

From the beginning of World War I Robertson was quartermaster general of the British expeditionary force in France. In January 1915 he was appointed chief of staff to Sir John French, and in December of that year he became chief of the Imperial General Staff.

In this capacity Robertson held most of the powers of the secretary of state for war. The holder of that office in the latter part of 1915, David Lloyd George, disagreed with Robertson and Haig that the war could and should be won in the west and advocated an Allied attack originating in the Middle East. The mutual distrust between the two generals on one side, and their civilian superior on the other, grew after Lloyd George became prime minister in December 1916. Finally, in February 1918, Robertson resigned as chief of the Imperial General Staff and was given a command in England. In 1919–20 he commanded the British army of occupation on the Rhine.

Robertson was created a baronet in 1919 and a field marshal in 1920. He wrote two books of memoirs, *From Private to Field-Marshal* (1921) and *Soldiers and Statesmen 1914–18,* 2 vol. (1926).

Robertsport, town and fishing port, western Liberia, Western Africa. It is situated at the outlet of Lake Piso (Fisherman Lake), on Cape Mount.

In 1461 or 1462 the Portuguese navigator Pedro de Sintra reached the cape, a 1,000-foot-(305-metre-) high granite promontory, which he named Cabo do Monte. In the early 19th century a colony of North American freed slaves settled the site, which was part of the Vai territory.

Robertsport (named after Liberia's first president, Joseph Jenkins Roberts) is connected with Monrovia by air and by road. The town is situated in an area of heavy rainfall, averaging some 205 inches (5,200 mm) annually. The inhabitants are engaged mainly in fishing and rice farming. Pop. (1974) 2,562.

Robertus DE FLUCTIBUS (English mystic): *see* Fludd, Robert.

Roberval, city, Saguenay-Lac-Saint-Jean region, south-central Quebec province, Canada, on the southwest shore of Lac-Saint-Jean. Settled in 1855, it was named after the sieur de Roberval, the first viceroy of Canada. The city, 130 miles (210 km) north-northwest of Quebec city, is the chief administrative, commercial, and market centre of the Lac-Saint-Jean re-

gion, with its dairying, potato growing, and salmon fishing. It is also a popular resort. Inc. village, 1883; town, 1903; city, 1956. Pop. (1986) 11,448.

Roberval, Gilles Personne de, Personne also spelled PERSONIER (b. Aug. 8, 1602, Roberval, Fr.—d. Oct. 27, 1675, Paris), French mathematician who made important advances in the geometry of curves.

In 1632 Roberval became professor of mathematics at the Collège de France, Paris, a position he held until his death. He studied the methods of determination of surface area and volume of solids, developing and improving the method of indivisibles used by the Italian mathematician Bonaventura Cavalieri for computing some of the simpler cases. He discovered a general method of drawing tangents, by treating a curve as the result of the motion of a moving point and by resolving the motion of the point into two simpler components. He also discovered a method for obtaining one curve from another, by means of which planar regions of finite dimensions can be found that are equal in area to the regions between certain curves and their asymptotes (lines that the curves approach but never intersect). To these curves, which were also used to determine areas, the Italian mathematician Evangelista Torricelli gave the name of Robervallian lines.

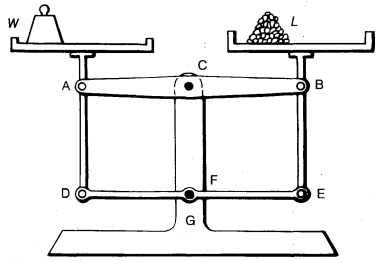
Roberval indulged in scientific feuds with several of his contemporaries, among them the French philosopher and mathematician René Descartes. He also invented the balance known by his name (*see* Roberval balance).

Roberval, Jean-François de La Rocque, sieur de (sire of) (b. *c.* 1500, Carcassonne, Fr.—d. 1560/61, Paris), French colonizer chosen by Francis I to create a settlement on North American lands found earlier by Jacques Cartier.

Roberval was born into a noble family and lived at the court of Francis of Angoulême. Roberval converted to Protestantism and was outlawed, but he was able to return to France and resume living in the court of Francis, now King Francis I. He dissipated his fortune and borrowed from his relatives; he was ill-financed when Francis chose him in 1541 to be lieutenant general of the North American territory. He received a royal subsidy of 45,000 livres but needed considerably more, which he acquired as a pirate by seizing a number of English ships. Roberval sailed for the New World in 1542 in command of the ships *Valentine, Anne,* and *Lèchefraye* with a band of French gentlemen and some convicts to do heavy labour. His mission was to colonize and convert the natives to Roman Catholicism (though he was a Protestant). Cartier was to have been his guide, but the impatient explorer had left the previous year. The two did meet in Newfoundland on June 8, but thereupon Cartier returned to France.

Roberval's company navigated the Gulf of St. Lawrence and then settled temporarily at Cartier's former headquarters at Cap Rouge (near present-day Quebec). Roberval did some exploring in the area and suffered through a harsh winter with the company. He was a stern disciplinarian, although his pardon of one member of the crew who had killed one of the sailors is the oldest extant Canadian document, dated Sept. 9, 1542. The settlement was short-lived, breaking up in 1543 and returning to France. Mineral wealth that he brought back turned out to be fool's gold and mica. Roberval was in ruins financially, and he barely managed to keep his estate at Roberval. According to tradition, he was attacked and killed when he and a group of coreligionists were emerging from a nighttime Calvinist meeting in Paris.

Roberval balance, linked mechanism invented in 1669 by the French mathematician Gilles Personne de Roberval and used in commercial weighing machines. As shown in the figure, AB is an equal-armed beam pivoted to the vertical member G at C, while DE is an identical beam pivoted to G at F. The



Roberval balance

beams are connected by identical vertical links AD and BE, which are attached to the scale pans (platforms). The rectangle formed by the beams and links in the position shown becomes a parallelogram when one of the scale pans moves up and the other moves down. If the weight W and the load L are the same, the beams will remain horizontal regardless of the positions of W and L on the platforms.

Robeson, Paul (Bustill) (b. April 9, 1898, Princeton, N.J., U.S.—d. Jan. 23, 1976, Philadelphia, Pa.), celebrated American singer, actor, and black activist.

The son of a former slave turned preacher, Robeson attended Rutgers University in New Brunswick, N.J., where he was an All-America football player. Upon graduating from Rutgers at the head of his class, he rejected a career as a professional athlete and instead entered Columbia University. He obtained a law degree in 1923, but, because of the lack of opportunity for blacks in the legal profession, he drifted to the stage, making a London debut in 1922. He obtained a part in the Provincetown Players' production of Eugene O'Neill's play *All God's Chillun Got Wings* in 1924. His subsequent appearance in the title role of O'Neill's *Emperor Jones* caused a sensation in New York City (1924) and London (1925) and, later, in the film version (1933). In addition to his other talents, Robeson had a superb bass-baritone singing voice. In 1925 he gave his first vocal recital of Negro spirituals in Greenwich Village, New York City, and he became world famous as Joe in the musical play *Show Boat* with his version of "Ol' Man River." His characterization of the title role in *Othello* in London (1930) won high praise, as did the Broadway production (1943), which set an all-time record run for a Shakespearean play on Broadway.

Increasing political awareness impelled Robeson to visit the Soviet Union in 1934, and from that year he became increasingly identified with strong left-wing commitments, while continuing his success in concerts, recordings, and theatre. In 1950 the U.S. State Department withdrew his passport because he refused to sign an affidavit disclaiming membership in the Communist Party. In the following years he was virtually ostracized for his political views, although in 1958 the Supreme Court overturned the affidavit ruling. Robeson then left the United States to live in Europe and travel in countries of the Soviet bloc, but he returned to the United States in 1963 because of ill health.

He appeared in a number of films, including *Sanders of the River* (1935), *Show Boat* (1936), *King Solomon's Mines* (1937), and *The Proud Valley* (1940).

Robeson Channel, northernmost part of the sea passage connecting Baffin Bay, an inlet of the North Atlantic Ocean, with the Lincoln Sea, a portion of the Arctic Ocean, to the north. The channel is 11–18 miles (18–29 km) wide between Ellesmere Island, Can. (west), and northwest Greenland (east); and it extends northward for 50 miles (80 km) from the Hall Basin to the Lincoln Sea. For brief periods during the summer the channel is open to navigation. In 1871 favourable ice conditions enabled the American explorer Charles F. Hall to navigate to latitude 82°11′ N, longitude 61° W, then the farthest northern point reached by a vessel. Many other expeditions using the Robeson Channel followed.

Robespierre, Maximilien-François-Marie-Isidore de (b. May 6, 1758, Arras, Fr.—d. July 28, 1794, Paris), radical Jacobin leader and one of the principal figures in the French Revolution. In the latter months of 1793 he came to dominate the Committee of Public Safety, the principal organ of the Revolutionary government during the Reign of Terror, but in 1794 he was overthrown and executed in the Thermidorian Reaction.

Early life. Robespierre was the son of a lawyer in Arras. After his mother's death, his father left home, and Maximilien, his brother, and his sisters were raised by their maternal grandparents. From 1765 he attended the college of the Oratorians at Arras, and in 1769 he was awarded a scholarship to the famous college of Louis-le-Grand in Paris, where he distinguished himself in philosophy and law. He received a law degree in 1781 and became a lawyer at Arras, where he set up house with his sister Charlotte. He soon made a name for himself and was appointed a judge at the Salle Épiscopale, a court with jurisdiction over the provostship of the diocese. His private practice provided him with a comfortable income.

He was admitted to the Arras Academy for the advancement of the arts and sciences in 1783 and soon became its chancellor and later its president. Contrary to the long-held belief that Robespierre led an isolated life, he often visited local notables and mingled with the young people of the district. He entered academic competitions, and his "Mémoire sur les peines infamantes" ("Report on Degrading Punishments") won first prize at the Academy of Metz. By 1788 Robespierre was already well known for his altruism. As a lawyer representing poor people, he had alarmed the privileged classes by his protests in his "Mémoire pour le Sieur Dupond" against royal absolutism and arbitrary justice. When the summoning of the Estates General (a national assembly that had not been called since 1614) was announced, he issued an appeal entitled "To the people of Artois on the necessity of reforming the Estates of Artois." In March 1789 the citizens of Arras chose him as one of their representatives, and the Third Estate (the commons) of the bailiwick elected him


Robespierre, portrait by an unknown artist; in the Musée Carnavalet, Paris
J.E. Bulloz

fifth of the eight deputies from Artois. Thus he began his political career at the age of 30.

Leadership of the Jacobins. Robespierre preserved his frugal way of life, his careful dress and grooming, and his simple manners both at Versailles and later in Paris. He quickly attracted attention in an assembly that included some distinguished names. He probably made his maiden speech on May 18, 1789, and was to speak more than 500 times during the life of the National Assembly. He succeeded in making himself heard despite the weak carrying power of his voice and the opposition he aroused, and his motions were usually applauded. Proofs of his growing popularity were the ferocious attacks made by the royalist press on this "Demosthenes," "who believes everything he says," this "monkey of Mirabeau's" (the Comte de Mirabeau, a politician who wanted to create a constitutional assembly).

Robespierre was kept out of the committees and from the presidency of the National Assembly; only once, in June 1790, was he elected secretary of the National Assembly. In April he had presided over the Jacobins, a political club promoting the ideas of the French Revolution. In October he was appointed a judge of the Versailles tribunal.

Robespierre, nevertheless, decided to devote himself fully to his work in the National Assembly, where the constitution was being drawn up. Grounded in ancient history and the works of the French philosophers of the Enlightenment, he welcomed the Declaration of the Rights of Man and of the Citizen, which formed the preamble of the French constitution of Sept. 3, 1791, and insisted on observing it. He fought for universal suffrage, for unrestricted admission to the National Guard, to public offices, and to the commissioned ranks of the army, and for the right to petition. He opposed the royal veto, the abuses of ministerial power, and religious and racial discrimination. He defended actors, Jews, and black slaves and supported the reunion of Avignon, formerly a papal possession, with France in September 1791. In May he had successfully proposed that all new deputies be elected to the next legislature so that, as a new body, it would better express the people's will.

His passionate fight for liberty won him more enemies, who called him a dangerous individual—and worse. After the flight of Louis XVI (June 20–21, 1791), for which Robespierre vainly demanded his trial, the slanders against the revolutionary deputy became twice as violent. He hastened the vote on the constitution so as to attract "as many of the democratic party as possible," inviting in his *Adresse aux Français* (July 1791) the patriots to join forces. Martial law was proclaimed, and at the Champ-de-Mars the National Guard, under the Marquis de Lafayette, a moderate who wanted to save the monarchy, opened fire on a group demanding the abdication of the King. Robespierre, his life threatened, went to live with the family of the cabinetmaker Maurice Duplay. He managed to keep the Jacobin Club alive after all of its moderate members had joined a rival club. When the National Assembly dissolved itself, the people of Paris organized a triumphal procession for Robespierre.

Although he had excluded himself and his colleagues from the new Legislative Assembly, Robespierre continued to be politically active, giving up the lucrative post of public prosecutor of Paris, to which he had been elected in June 1791. Henceforth, he spoke only at the Jacobin Club, where he was to be heard about 100 times, until August 1792. There he opposed the European war that the revolutionary Jacques-Pierre Brissot was advocating as a means of spreading the aims of the revolution.

He denounced the secret intrigues of the court and of the royalists, their collusion with Austria, the unpreparedness of the army, and the possible treason of aristocratic officers whose dismissal he demanded in February 1792. He also defended patriotic soldiers, such as those of the Châteauvieux regiment, who had been imprisoned after their mutiny at Nancy. When Brissot's supporters stirred up opinion against him, Robespierre founded a newspaper, *Le Défenseur de la Constitution,* which strengthened his hand. He attacked Lafayette, who had become the commander of the French Army, whom he suspected of wanting to set up a military dictatorship, but failed to obtain his dismissal and arrest.

The reverses suffered by the French Army after France had declared war on Austria and Prussia had been foreseen by Robespierre, and, when invasion threatened, the people rallied to him. Although he had defined the aims of insurrection, he hesitated to advocate it: "Fight the common enemy," he told the provincial volunteers, "only with the sword of law." When the insurrection nevertheless broke out on Aug. 10, 1792, Robespierre took no part in the attack on the Tuileries Palace. But that same afternoon his *section* (an administrative subdivision of Paris), Les Piques, nominated him to the insurrectional Commune. As a member of the electoral assembly of Paris he heard about the September Massacres of imprisoned nobles and clergy by Parisian crowds. He exonerated the mob, and on September 5 the people of Paris elected him to head the delegation to the National Convention.

Work in the National Convention. The Girondins—the Revolutionary group that favoured political but not social democracy and that controlled the government and the civil service—accused Robespierre of dictatorship from the first sessions of the National Convention, but the Legislative Assembly did not concur. At the King's trial, which began in December 1792, Robespierre spoke 11 times and called for death. His speech on December 3 rallied the hesitant. His new journal, *Les Lettres à ses commettants* ("Letters to His Constituents"), kept the provinces informed.

The King's execution did not, however, resolve the struggle between the Girondins and the Montagnards, the deputies of the extreme left. At the same time the scarcity of food and rising prices created a revolutionary mood. The treason of Gen. Charles Dumouriez, who went over to the Austrians, precipitated the crisis. A kind of "popular front" was formed between the Parisian sans-culottes, the poor, ultraleft republicans, and the Montagnards. On May 26, 1793, Robespierre called on the people "to rise in insurrection." Five days later he supported a decree of the National Convention indicting the Girondin leaders and Dumouriez's accomplices. On June 2 the decree was passed against 29 of them.

The Committee of Public Safety and the Reign of Terror. After the fall of the Girondins, the Montagnards were left to deal with the country's desperate position. Threatened from within by the movement for federalism and by the civil war in the Vendée in the northwest, and threatened at the frontiers by the anti-French coalition, the revolution mobilized its resources for victory. In his diary, Robespierre noted that what was needed was "une volonté une" ("one single will"), and this dictatorial power was to characterize the revolutionary government. Its essential organs had been created, and he set himself to make them work.

On July 27, 1793, Robespierre took his place on the Committee of Public Safety, which had first been set up in April. While some of his colleagues were away on missions and others were preoccupied with special assignments, he strove to prevent division among the revolutionaries by relying on the Jacobin societies and the vigilance committees. Henceforward his actions were to be inseparable from those of the government as a whole. As president of the Jacobin Club and then of the National Convention, he denounced the schemes of the Parisian radicals known as the Enragés, who were using the food shortage to stir up the Paris *sections.* Robespierre answered the demonstrators on September 5 by promising maximum prices for all foodstuffs and a revolutionary militia for use in the interior against counterrevolutionaries and grain hoarders.

In order to bring about a mass conscription, economic dictatorship, and total war, he asked to intensify the Reign of Terror. But he objected to pointless executions, protecting those deputies who had protested the arrest of the Girondins and of the King's sister. He was sickened by the massacres condoned by the *représentants en mission* (members of the National Convention sent to break the opposition in the provinces) and demanded their recall for "dishonoring the Revolution."

Robespierre devoted his report of 5 Nivôse, year I (Dec. 25, 1793 [the French Republican calendar had been introduced in September 1793]), to justifying the collective dictatorship of the National Convention, administrative centralization, and the purging of local authorities. He protested against the various factions that threatened the government. The Hébertists, the Cordeliers, and the popular militants all called for more radical measures and encouraged de-Christianization and the prosecution of food hoarders. Their excesses frightened the peasants, who could not have been pleased by the decrees of 8 and 13 Ventôse, year II (Feb. 26 and March 3, 1794), which provided for the distribution among the poor of the property of suspects.

Reappearing at the Jacobin Club after a month's illness, Robespierre denounced the radical Revolutionist Jacques-René Hébert and his adherents, who together with some foreign agents were executed in March. Those who wanted, like Georges Danton, to halt the Reign of Terror and the war attacked the policies of the Committee of Public Safety with increasing violence. Robespierre, although still hesitant, led the National Convention against these so-called Indulgents. The Dantonist leaders and the deputies who were compromised in the liquidation of the French East India Company were guillotined in April.

A deist in the style of Rousseau, Robespierre disapproved of the anti-Christian movement and the "masquerades" of the cult of reason. In a report to the National Convention in May, he affirmed the existence of God and the immortality of the soul and strove to rally the revolutionaries around a civic religion and the cult of the Supreme Being. That he remained extremely popular is shown by the public ovations he received after Henri Admirat's unsuccessful attempt on his life on May 22. The National Convention elected him president, on June 4, by a vote of 216 out of 220. In this capacity he led the festival of the Supreme Being in the Tuileries Gardens on June 8, which was to provide his enemies with another weapon against him.

Declining influence and authority. After the law of 22 Prairial (June 10) reorganizing the Revolutionary Tribunal, which had been formed in March 1793 to condemn all enemies of the regime, opposition to Robespierre grew; it was led by those *représentants en mission* whom he had threatened. His influence was challenged in the Committee of Public Safety itself, and the Committee of General Security, which felt slighted by the General Police Bureau directed by Robespierre, Georges Couthon, and Louis de Saint-Just, became even more hostile. In the cafés he was accused of being a moderate. And Joseph Cambon, the minister of finance, detested him.

Unremitting work and frequent speeches in the Legislative Assembly and at the Jacobin Club (a total of some 450 since the beginning of the session) had undermined Robespierre's health, and he became irritable and distant. Embittered by the slanders and by the accusations of dictatorship being spread both by the royalists and by his colleagues, the Montagnards, he stayed away from the National Convention and then, after June 28, from the Committee of Public Safety, confining his denunciations of counterrevolutionary intrigues to the Jacobin Club. At the same time he began to lose the support of the people, whose hardships continued despite the recent French victories. From his partial retirement Robespierre followed, dumbfounded, the unleashing of the Great Terror in the summer of 1794 and the progress of opposition.

Attempting to regain his hold on public opinion, Robespierre reappeared at the Committee of Public Safety on July 23 and then, on July 26, at the National Convention, to which he turned as his judge. His last speech was at first received with applause, then with disquiet, and finally the parliamentary majority turned against him. Despite his successful reception that evening at the Jacobin Club, the next day Robespierre's adversaries succeeded in preventing him from speaking before the Legislative Assembly, which indicted him together with his brother, Augustin, and three of his associates. Robespierre was taken to the Luxembourg prison, but the warden refused to jail him.

Later, he went to the City Hall (the Hôtel de Ville), where he could, doubtless, still have continued the struggle, for armed contingents from some of the *sections* of the city had been summoned by the Paris Commune and were awaiting his orders. But Robespierre refused to lead an insurrection and eventually his loyal contingents began to disperse. Declared an outlaw by the National Convention, Robespierre severely wounded himself by a pistol shot in the jaw at the City Hall, throwing his friends into confusion. The soldiers of the National Convention attacked the hall and easily seized Robespierre and his followers. In the evening of 10 Thermidor (July 28), the first 22 of those condemned, including Robespierre, were guillotined before a cheering mob on the Place de la Révolution (now the Place de la Concorde). In all, 108 people died for adherence to Robespierre's ideas.

Assessment. Robespierre's enemies credited him with dictatorial power, both in the Jacobin Club and in the Committee of Public Safety, a power that he did not have. Counterrevolutionaries and the rich condemned his egalitarian ideas, while popular militants accused him of lacking boldness. After his death, his memory was relentlessly attacked, and a great many of his papers were destroyed. History portrayed him as either a bloodthirsty creature or a timid bourgeois. But, following the ascendancy of the popular movements of the 19th century, both in France and abroad, homage was paid to this "persecuted patriot," and his most famous speeches were reprinted. His social ideal consisted in reducing extreme inequalities of wealth, in increasing the number of small property owners, and in ensuring work and education for all. He was a man of his times, of the Enlightenment, a patriot, a man with a sense of duty and of sacrifice, whose influence remains considerable.

(M.Bo.)

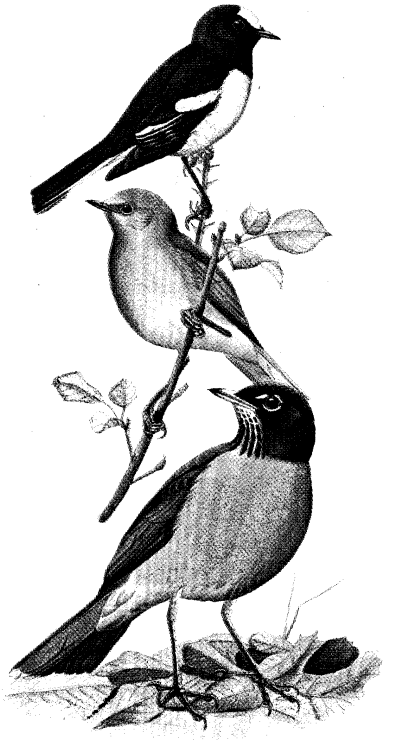
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Robey, Sir George, original name GEORGE EDWARD WADE (b. Sept. 20, 1869, Herue Hill, Kent, Eng.—d. Nov. 29, 1954, Saltdean, Sussex), English music-hall comedian known for many years as "the prime minister of mirth."

Robey made his first appearance on the professional stage in 1891, and of his numerous character roles, the most famous—the collarless cleric with the red nose, the startled and heavy black eyebrows, the indignant stare, the ribald smile—was a quite early development. He relieved the World War I years in London with *The Bing Boys Are Here,* a jovial musical comedy, and for 15 years thereafter he toured in his own revues and with his own companies. In 1932 he played King Menelaus in a lavish production of Offenbach's *Helen!* and three years later he played Falstaff in *Henry IV* (Part I).

Robey appeared in many pantomimes and films and in countless music-hall performances. A tireless perfectionist, he worked hard until his retirement at the age of 80. He was knighted in 1954.

robin, a European bird (*Erithacus rubecula*) of the family Turdidae (order Passeriformes) or any of various thrushes and thrushlike birds that resemble the European robin. The term is frequently placed in combination with other names—*e.g.,* bush-robin, scrub-robin, robin-chat (*see* thrush); magpie-robin (*q.v.*); Pekin robin (*see* Leiothrix). The best-known groups narrowly called robins include:



(Top) Scarlet robin (*Petroica multicolor*), (middle) European robin (*Erithacus rubecula*), (bottom) American robin (*Turdus migratorius*)
Painting by Murrell Butler

Chat-thrushes, about a dozen species of *Erithacus* and *Tarsiger* and a few related genera, typified by the European robin, which breeds throughout Europe. It is a plump, small-billed bird, 14 centimetres (5½ inches) long, with brown upperparts, white belly, and rusty-orange face and breast. Its high-pitched warbling is heard year round, and it nests in a hole, or cranny.

The Indian robin (*Saxicoloides fulicata*), about 15 cm (6 in.) long, with black plumage set off by a white shoulder patch and reddish patches on the underparts.

Typical New World thrushes (*Turdus*), especially the American robin (*T. migratorius*), 25 cm (10 in.) long, with gray-brown upperparts and rusty breast. It breeds throughout North America, making a sturdy cup nest, cemented with mud.

Certain unrelated ground-feeding, thrushlike flycatchers of the family Muscicapidae, of Australia and New Guinea are also called robins. Familiar in Australia is the scarlet robin (*Petroica multicolor*), a species 11 cm (4½ in.) tall, marked with black, white, and bright scarlet.

Robin Goodfellow, in medieval English folklore, a mischievous fairy also called Puck (*q.v.*).

Robin Hood, legendary hero of a series of English ballads, some of which date from at least the 14th century. He was a rebel, and many of the most striking episodes in the tales about him show him and his companions robbing and killing representatives of authority and giving the gains to the poor. Their most frequent enemy was the Sheriff of Nottingham, a local agent of the central government (though internal evidence from the early ballads makes it clear that the action took place chiefly in south Yorkshire, not in Nottinghamshire). Others included wealthy ecclesiastical landowners. Robin treated women, the poor, and people of humble status with courtesy. A good deal of the impetus against authority stems from restriction of hunting rights. The early ballads, especially, reveal the cruelty that was an inescapable part of medieval life.

Numerous attempts have been made to prove that there was a historical Robin Hood, though references to the legend by medieval writers make it clear that the ballads themselves were the only evidence for his existence available to them. A popular modern belief that he was of the time of Richard I probably stems from a "pedigree" fabricated by an 18th-century antiquary, Richard Stukely. A more serious view has been advanced that he was one of the disinherited followers of Simon de Montfort, after the latter's defeat in 1265.

The authentic Robin Hood ballads were the poetic expression of popular aspirations in the north of England during a turbulent era of baronial rebellions and agrarian discontent, which culminated in the Peasants' Revolt of 1381. Robin Hood was a people's hero as King Arthur was a noble's.

Although many of the best known Robin Hood ballads are postmedieval, there is a core that can be confidently attributed to the medieval period. These are *Robin Hood and the Monk*; *Robin Hood and Guy of Gisborne*; *Robin Hood and the Potter*; and the *Lytyll Geste of Robin Hode.* During the 16th century and later, the essential character of the legend was distorted by a suggestion that Robin

was a fallen nobleman, and playwrights, eagerly adopting this new element, increased the romantic appeal of the stories but deprived them of their social bite. Post-medieval ballads (which gave Robin a companion, Maid Marian) also lost most of their vitality and poetic value, doubtless as a result of losing the original social impulse that brought them into existence.

Robins, Benjamin (b. 1707—d. July 29, 1751, Madras), British mathematician and military engineer who laid the groundwork for modern ordnance (field-artillery) theory and practice with his *New Principles of Gunnery* (1742), which invalidated old superstitions about the nature and action of gunpowder and the flight of projectiles and formed the basis of all later scientific studies in these fields. His invention of the ballistic pendulum, a device allowing the determination of the energy of a projectile suddenly halted in its flight, enabled gunners for the first time to measure with considerable exactness the muzzle velocities of projectiles delivered by their pieces.

Robinson, Bill, byname BOJANGLES, original name LUTHER ROBINSON (b. May 25, 1878, Richmond, Va., U.S.—d. Nov. 25, 1949, New York City), American dancer of Broadway and Hollywood, best known for his dancing roles with Shirley Temple in films of the 1930s.

His parents having died when he was a baby, he was raised by a grandmother and received little formal schooling. He began dancing for pennies at the age of eight, when he had also begun to work as a stableboy. He eventually made a swing of a vaudeville circuit and in 1908 entered a business association with Marty Forkins, actors' agent, who helped him to fame. He became a star of black musical comedies, later a top vaudeville star, and finally a star of motion pictures, appearing in 14 films, notably *The Little Colonel* (1935), *In Old Kentucky* (1935), *The Littlest Rebel* (1935), *Rebecca of Sunnybrook Farm* (1938), and *Just Around the Corner* (1938). He also appeared in the wartime all-black musical film *Stormy Weather* (1943).

His soft-shoe and tap routines were widely copied by other dancers, but Robinson was probably unmatched for ingenuity in creating new steps, especially his famous "stair dance." He also was famed for a unique ability to run backward—almost as fast as other men could run forward; he once ran 75 yards backward in eight and one-fifth seconds.

Despite his earnings, which reached $6,600 a week for at least one year, he died in relative poverty, chiefly because of his spendthrift generosity and habits of gambling. On his death, he received tributes from royalty, the White House, and members of the U.S. president's cabinet.

Robinson, Boardman (b. Sept. 6, 1876, Somerset, Nova Scotia, Can.—d. Sept. 5, 1952, Stamford, Conn, U.S.), Canadian-American illustrator and painter noted for his political cartoons.

As a student in Paris in 1898, first at the Académie Colarossi, then the École des Beaux Arts, he was influenced by the great tradition of French political cartooning begun by Honoré Daumier. Returning to the United States, he published trenchant cartoons in many newspapers and periodicals, including the Socialist *Masses,* as well as *The Liberator* and *Harper's Weekly.* During World War I his reputation was established by his powerful and searching cartoons that focused on the human suffering caused by the war and on the war guilt of the German government.

As a teacher at the Art Students League, New York City (1919–30), and as a founder and head of the Colorado Springs (Colo.) Fine Arts Center (1936–47), he taught many outstanding artists. Robinson illustrated editions of Edgar Lee Masters' *Spoon River Anthology* (1941), Dostoyevsky's *The Brothers Karamazov* (1933), and Melville's *Moby Dick* (1942). He also created the murals in the Department of Justice Building in Washington, D.C.

Robinson, Brooks (Calbert), Jr. (b. May 18, 1937, Little Rock, Ark., U.S.), American professional baseball player who in 23 seasons as a third baseman with the American League Baltimore Orioles won the golden glove (fielding) award 16 times and set career records for a third baseman of 2,870 games played, a .971 fielding average, 2,697 putouts, 6,205 assists, and 618 participations in double plays. Robinson was at his best in postseason games, having a .986 fielding average and a .303 batting average (.267 regular season).

Robinson began playing baseball at the age of six and graduated from Midget League (9-year-olds) play to American Legion baseball during his high school years at Central High School (Little Rock), which had no baseball team. He batted and threw right-handed. After graduation, he signed a contract with the Orioles and played on their minor league teams in 1955–57, during which time he played part of each season with the parent club. He was a regular by 1958, though he spent part of the 1959 season in the minors. He was a player-coach in 1977 and retired thereafter. He played in four World Series (1966, 1970, won; 1969, 1971, lost), and in the playoffs preceding the 1970 series he hit .583 and .429 in the series. As a fielder he was superb on batted balls that were difficult, often seemingly impossible, to play. After his retirement as a player, he did television commentary for Orioles games (1978–79) worked for an oil company, and was employed in a management consultant company thereafter. He became a member of the Baseball Hall of Fame in 1983.

Robinson, Edward (b. April 10, 1794, Southington, Conn., U.S.—d. Jan. 27, 1863, New York City), American biblical scholar, considered the father of biblical geography.

Robinson graduated from Hamilton College in 1816, taught mathematics and Greek there, was instructor in Hebrew at Andover Theological Seminary, and in 1826 went to Europe to study in the major German universities, returning in 1830. In 1837 he became professor of biblical literature at Union Theological Seminary, New York City, and left the United States to explore in Palestine and Syria. His *Biblical Researches in Palestine, Mount Sinai, and Arabia Petraea* (1841), published simultaneously in England, Germany, and the United States, immediately established his reputation. *Later Biblical Researches in Palestine and the Adjacent Regions* appeared in 1856. Robinson's plans to sum up his important topographical studies in a work on biblical geography were cut short by illness in 1862. *Physical Geography of the Holy Land,* including his last work as far as he had been able to carry it, was published in 1865. All of Robinson's works were based on careful personal exploration and tempered by a thoroughly critical spirit, possibly at times too skeptical of local tradition. He also wrote *Harmony of the Four Gospels in Greek* (1845) and *Harmony of the Four Gospels in English* (1846), both important in their day.

Robinson, Edward G., original name EMMANUEL GOLDENBERG (b. Dec. 12, 1893, Bucharest—d. Jan. 26, 1973, Los Angeles), American motion-picture actor noted for characterizing tough, forceful men.

His family emigrated to New York City when he was 10 years old, and later while attending city college he chose a career in acting. He first appeared on Broadway in 1915 and for 15 years played a variety of roles.

Robinson made a brief appearance in a silent film, *The Bright Shawl,* in 1923, but it was not until 1930 after the advent of sound that he was catapulted to fame with his portrayal of Rico Bandello in *Little Caesar.* His work in that film created the prototype for most gangster roles in the many crime films of the 1930s. Though he was typecast for the next few years, he was gradually able to develop into an accomplished and versatile actor. Among his many pictures were *Dr. Ehrlich's Magic Bullet* (1940), *Double Indemnity* (1944), *The Ten Commandments* (1956), *The Cincinnati Kid* (1965), and *Soylent Green* (1973). He returned to Broadway in 1956 to star in *Middle of the Night.*

Robinson was posthumously awarded a special Oscar by the Academy of Motion Picture Arts and Sciences for his many contributions to film. Raymond Serra later wrote and starred in a play, *Manny,* that was based on Robinson's life.

Robinson, Edwin Arlington (b. Dec. 22, 1869, Head Tide, Maine, U.S.—d. April 6, 1935, New York City), American poet who is best known for his short dramatic poems concerning the people in a small New England village, Tilbury Town, very much like the Gardiner, Maine, in which he grew up.



Edwin Arlington Robinson

By courtesy of the Library of Congress, Washington, D.C.

After his family suffered financial reverses, Robinson cut short his attendance at Harvard and went to live in New York City, where he worked as a timekeeper on subway construction. From *The Children of the Night* (1897) to *The Man Against the Sky* (1916) his best poetic form was the dramatic lyric, as exemplified in the title poem of *The Man Against the Sky.* Among the best poems of this period are "Richard Cory," "Miniver Cheevy," "For a Dead Lady," "Flammonde," and "Eros Turannos." Robinson's work attracted the attention of Pres. Theodore Roosevelt, who gave him a sinecure at the U.S. Customs House in New York (held from 1905 to 1909).

Merlin (1917) was the first of his long blank-verse narrative poems based on the King Arthur legends, followed by *Lancelot* (1920) and *Tristram* (1927). Robinson's *Collected Poems* appeared in 1921. *The Man Who Died Twice* (1924) and *Amaranth* (1934) are perhaps the most often acclaimed of his later narrative poems; later short poems include "Mr. Flood's Party," "Many Are Called," and "The Sheaves."

Robinson, Frank (b. Aug. 31, 1935, Beaumont, Texas, U.S.), American professional baseball player and manager, who was the first black manager in organized baseball.

As a youth, Robinson played sandlot and American Legion Junior League baseball in Oakland, Calif., and at McClymonds High School, where he also played football and basketball. He played at third base and pitched occasionally. After graduation he was signed by the National League Cincinnati Reds and played with their minor league teams (third base and outfield) until he joined the parent club in 1956. He batted and threw right-handed. He was named rookie of the year and bat-

ted more than .300 in 5 of 10 years before he was traded to the American League Baltimore Orioles in 1966. In 1966 he won the triple crown by leading the league in home runs (49), runs batted in (122), and batting average (.316). He remained with Baltimore through 1971, then played with the National League Los Angeles Dodgers (1972), the American League California Angels (1973–74), and the Cleveland Indians (1974–76), also managing the Indians (1975–77). He had begun managing in winter baseball for the Santurce team in Puerto Rico from 1968 and also coached at Baltimore and for the International League. In 1981 he became manager of the National League San Francisco Giants. He was elected to the Baseball Hall of Fame in 1982.

Robinson, Frederick John: *see* Ripon, Frederick John Robinson, 1st earl of.

Robinson, George Frederick Samuel: *see* Ripon, George Frederick Samuel Robinson, 1st marquess and 2nd earl of.

Robinson, George Geoffrey (editor): *see* Dawson, George Geoffrey.

Robinson, Harriet Jane Hanson, *née* HANSON (b. Feb. 8, 1825, Boston—d. Dec. 22, 1911, Malden, Mass., U.S.), writer and woman suffrage leader in the United States.

Robinson was a mill operative for the Tremont Corporation at Lowell, Mass., beginning at the age of 10 as a bobbin doffer, and she later wrote poems and prose for the *Lowell Offering*, the mill operatives' newspaper that became nationally known. In 1848 she married William Stevens Robinson (died 1876), editor of the *Lowell Courier* and a Free Soil advocate.

Robinson later became an advocate of woman suffrage, organizing the National Woman Suffrage Association of Massachusetts in 1881 and presenting a request to the U.S. Congress in 1889 for her enfranchisement.

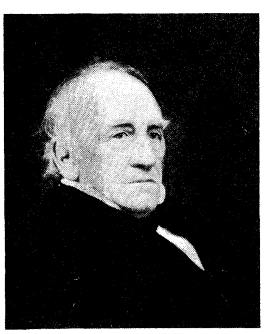
She was also a founder of the General Federation of Women's Clubs, serving on the first board of directors in the early 1890s.

Robinson's writings include *Massachusetts in the Woman Suffrage Movement* (1881), *The New Pandora* (1889), a dramatic poem, and *Loom and Spindle* (1898), a memoir of her years in the Lowell mills. *"A Good Poor Man's Wife": Being a Chronicle of Harriet Hanson Robinson and her Family in Nineteenth-Century New England,* by Claudia L. Bushman, was published in 1981.

Robinson, Henry Crabb (b. May 13, 1775, Bury St. Edmunds, Suffolk, Eng.—d. Feb. 5, 1867, London), English man of letters whose voluminous diaries provide valuable information on life in the early Romantic period and give lively portraits of a host of its literary personalities.

Living in London from 1796, Robinson practiced law as a barrister on the Norfolk circuit (1813–28). He also served as foreign correspondent for *The Times* of London (1807–09) and became involved in the antislavery campaign and in the founding of the University of London. Thus, he was well placed to record affairs in his age; his good sense and nature and shrewd judgment made him popular. He befriended William Blake, pre-Romantic visionary poet, painter, and designer, of whose last years Robinson's diaries give the only first-hand account. He also knew Charles Lamb, the Wordsworths, and Coleridge, of whose lectures he made notes. In Germany (1800–05) he met the leading poets and thinkers of his day, including Goethe, Schiller, and Herder; on his return to England, he was influential in making German literature and philosophy more widely known. A famous conversationalist, he was noted for his Sunday morning breakfast parties attended by men of affairs and letters.

His diaries were first published in 1869. Collections of his correspondence with the Wordsworth circle (1927), about Germany (1929), and about books and writers (1938) were edited by E.J. Morley.



Henry Crabb Robinson, detail of an oil painting by H. Darvall; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Robinson, Henry Peach (b. 1830, Ludlow, Shropshire, Eng.—d. Feb. 21, 1901, Tunbridge Wells, Kent), English photographer whose composite photographs and writings made him one of the most influential photographers of the last half of the 19th century.

As a young man of 21, Robinson was an amateur painter precocious enough to have one of his paintings hung at the Royal Academy. Nevertheless, photography gradually became his real passion, and in 1857 he opened a portrait studio in Leamington.

He soon tired of commercial portraiture and began to make what were then called "high art photographs," which imitated the anecdotal genre paintings popular at the time. Such photographs as "Juliet with the Poison Bottle" (1857), his earliest known work, were made by combining many preliminary sketches into a composition that was realized as a composite photograph, a picture formed by pasting together parts of several photographs. Although he sometimes used natural settings, he more often imitated the out-of-doors inside his studio. Moreover, the figures in his many bucolic scenes were played by costumed actors or society ladies, since he found country folk too awkward and dull to fit his ideal of the picturesque.

In 1858, Robinson exhibited "Fading Away," a picture skillfully printed from five different negatives. This work depicted the peaceful death of a young girl surrounded by her grieving family. Although it was made clear that the photograph was the product only of Robinson's imagination, many viewers felt that such a scene was too painful to be tastefully rendered by such a literal medium as photography. The controversy, however, made him the most famous photographer in England and the leader of the "high art" photographers.

Robinson's subsequent works, such as "The Lady of Shalott" (1861) and "Autumn" (1863), were so widely admired that he published *Pictorial Effect in Photography* (1869), a handbook that remained for decades the most influential work in English on photographic practice and aesthetics. In 1886, however, it was violently attacked by the photographer Peter Henry Emerson, who argued that photographic images should never be altered after exposure and decried Robinson's practice of using costumed models and painted backdrops. Nevertheless, Robinson continued to receive official honours, and in 1892 he became a founder-member of the Linked Ring, an association of the world's most prestigious art photographers.

Robinson, Henry Wheeler (b. Feb. 7, 1872, Northampton, Northamptonshire, Eng.—d. May 12, 1945, Oxford), notable Nonconformist English Baptist theologian and Old Testament scholar.

Robinson studied at Regent's Park College, London, the University of Edinburgh, Mansfield College, Oxford, and Marburg and Strasbourg universities (1890–1900), and then became Baptist minister at Pitlochry, Perthshire (1900–03), and St. Michael's, Coventry (1903–06), before being appointed tutor at Rawdon Baptist College near Leeds. He became president of the Yorkshire Baptist Association in 1918. He wrote the valuable textbook *The Religious Ideas of the Old Testament* (1913). From 1920 to 1942 he was principal of Regent's Park College, where his teaching and administrative gifts had full scope. It was largely through his efforts that the college was transferred from London to Oxford.

Robinson's most important academic work was in Hebrew psychology (notably in his exposition of the concept of "corporate personality") and Old Testament theology. His Speaker's Lectures (Oxford), posthumously published as *Inspiration and Revelation in the Old Testament* (1946), are the prolegomena to a full-scale Old Testament theology which he did not live to write. *The Christian Doctrine of Man* (1911), *The Christian Experience of the Holy Spirit* (1928), and *Redemption and Revelation* (1942) reflect his wider theological interests.

Robinson, Sir Hercules (George Robert), also called (from 1896) 1ST BARON ROSMEAD OF ROSMEAD AND OF TAFELBERG (b. Dec. 19, 1824, Rosmead, County Westmeath, Ire.—d. Oct. 28, 1897, London), British colonial governor, high commissioner in South Africa, 1880–89 and 1895–97.

After a brief army career he occupied certain civil service posts connected with the administration of Ireland and was first posted overseas as president of Montserrat in the West Indies in 1854 and as lieutenant governor of St. Kitts in 1855. He was knighted in 1859 and, after administering Hong Kong between 1859 and 1865, was appointed governor of



Sir Hercules Robinson, lithograph by W.H. Schröder

By courtesy of the Africana Museum, Johannesburg

Ceylon, where he vigorously promoted public works, especially road building and irrigation projects. In 1872 he was made governor of the self-governing colony of New South Wales and was employed from 1874 to 1875 on special service in connection with the cession of the Fiji Islands to Great Britain.

After a brief term as governor of New Zealand (1879–80), he went to South Africa in January 1881 as governor of the Cape Colony and as high commissioner in South Africa. His arrival coincided with the war between the Transvaal and Great Britain.

The Pretoria Convention of August 1881 did not remove the grievances of the Transvaal Boers, and when a Boer deputation went to England in 1883 to obtain a revision of the

terms, Robinson was summoned to London for the deliberations which led to the London Convention of February 1884. Robinson was sympathetic to the fears of Cecil John Rhodes, who had entered Cape politics in 1881, that British expansion into Bechuanaland, the road to the north, might be blocked by cooperation between the Transvaal Boers and the Germans who had established a protectorate over South West Africa in 1884. Following the dispatch of an expeditionary force under Sir Charles Warren to Bechuanaland, Britain annexed the territory in 1885. Robinson also gave his blessing to the Moffat treaty (February 1888), which gave Britain a virtual option on Matabeleland, and to the Rudd mineral concession, which became the basis of the operations of Rhodes's British South Africa Company chartered in 1889.

Robinson resigned in 1889 and left the Cape for England, but in May 1895 he was called out of retirement by Lord Rosebery's government to resume his previous post in South Africa. To Rhodes, now prime minister of the Cape, a pliant Robinson, over 70 years old and in ill health, was an acceptable figurehead. Interest in his second term of office centred on the fact that Robinson was high commissioner at the time of L.S. Jameson's raid (December 1895). Immediately upon being informed of Jameson's rash invasion of the Transvaal, Robinson tried to check the raiders by telegraph.

Ill health forced him to return to England in May 1896. He was raised to the peerage as Baron Rosmead in August. After returning to the Cape for a brief period, he finally left South Africa in April 1897 and died a few months later.

Robinson, Jackie, byname of JACK ROOSEVELT ROBINSON (b. Jan. 31, 1919, Cairo, Ga., U.S.—d. Oct. 24, 1972, Stamford, Conn.), first black baseball player in the U.S. major leagues during the 20th century, an infielder and outfielder for the Brooklyn Dodgers of the National League from 1947 through 1956. He was elected to the Baseball Hall of Fame in 1962.

Reared in Pasadena, Calif., Robinson became an outstanding all-around athlete at Pasadena Junior College and the University of California at Los Angeles. He excelled in football, basketball, and track as well as baseball. Robinson withdrew from U.C.L.A. in his third year to help his mother care for the family.

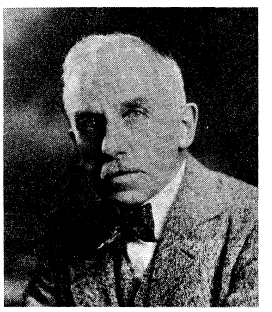


Jackie Robinson, 1946
UPI—EB Inc.

In 1942 he entered the U.S. Army, attended officer candidate school, was commissioned a second lieutenant in 1943, and received a medical discharge in 1945. He then played professional football in Hawaii and baseball with the Kansas City Monarchs of the Negro National League.

On Oct. 23, 1945, Robinson and pitcher John Wright, also black, were signed by Branch Rickey, president of the Brooklyn club, to play on a Dodger farm team, the Montreal Royals of the International League. Robinson led that league in batting average in 1946 and was brought up to play for Brooklyn in 1947. He was an immediate success. Leading the National League in stolen bases, he was chosen rookie of the year. In 1949 he won the batting championship with a .342 average and was voted the league's most valuable player. His career average was .311. As a base runner, Robinson unnerved opposing pitchers and terrorized infielders who had to try to prevent his stealing bases. After retiring from baseball early in 1957, Robinson engaged in business. His autobiography, *I Never Had It Made*, was published in 1972.

Robinson, James Harvey (b. June 29, 1863, Bloomington, Ill., U.S.—d. Feb. 16, 1936, New York City), U.S. historian, one of the founders of the "new history" that greatly broadened the scope of historical scholarship in relation to the social sciences.



James Harvey Robinson
Culver Pictures

The son of a bank president, Robinson went to Europe for a short while in 1882 and returned to work briefly in his father's bank. He entered Harvard in 1884, earning his M.A. in 1888. After further study at the universities of Strassburg and Freiburg, he received his Ph.D. at Freiburg (1890) and began teaching European history at the University of Pennsylvania, Philadelphia, in 1891. Four years later he moved to Columbia University.

Robinson's interest in the new history stemmed from a course he began teaching (1904) on European intellectual history, the first of its kind and one that proved extremely popular among his graduate students. His theories on the modernization of methods and content in historical research were published as *The New History* (1912). He called for a more comprehensive approach than the traditional specialization in political and military history: the interdisciplinary use of other social sciences, particularly anthropology, sociology, and psychology. His contention that the study of the past should serve primarily to elucidate the present and bring about greater advancement and progress aroused controversy and met with a good deal of disapproval. Nevertheless, his ideas were extremely influential in broadening the scope of history teaching and curricula.

In 1919 Robinson resigned from Columbia and was prominent in the founding of the New School for Social Research in New York that same year. Perhaps his most popular book, *The Mind in the Making* (1921) proposed that educational institutions in general and historians in particular approach social problems with a more progressive and a livelier view toward a just social order. During the 1920s he continued to teach and produce books, among them *The Humanizing of Knowledge* (1923), *The Ordeal of Civilization* (1926), and *The Human Comedy* (1937). He also was the author of several influential and widely used college textbooks, among them *An Introduction to the History of Western Europe* (1902; revised and enlarged by James T. Shotwell, 1946) and *The Development of Modern Europe,* 2 vol. (1907–08; written with Charles A. Beard), in which he analyzed industrial development and its effects on modern society. He was the president of the American Historical Association in 1929 and the recipient of many honorary degrees. Luther V. Hendricks' *James Harvey Robinson, Teacher of History* appeared in 1946, and Harvey Wish's introduction to J.H. Robinson in *The New History* appeared in 1965.

Robinson, Joan (Violet), *née* MAURICE (b. Oct. 31, 1903, Camberley, Surrey, Eng.—d. Aug. 5, 1983, Cambridge, Cambridgeshire, Eng.), British economist and academic who was involved in the development and furtherance of Keynesian economic theory.

Robinson was educated at the University of Cambridge, receiving her degree in economics in 1925. In 1926 she married Austin Robinson, another Cambridge economist. She was on the staff of Cambridge from 1931 to 1971, becoming a full professor in 1965. In 1979 she became the first woman to be made an honorary fellow of King's College.

Robinson established her reputation in 1933 with the publication of *The Economics of Imperfect Competition* (2nd ed., 1969), in which she analyzed distribution and allocation, dealing particularly with the concept of exploitation.

During the 1930s Robinson was involved with the Cambridge debates that were instrumental in the development of Keynes's revolutionary economic theory. In addition to teaching Keynesian theory, she wrote several books, study guides, and pamphlets designed to introduce economic theory to the nonspecialist. In the early 1940s, however, she began to push the Keynesian model beyond its theoretical framework, introducing aspects of Marxist economics in books such as *An Essay on Marxian Economics* (1942; 2nd ed., 1966) and *Marx, Marshall, and Keynes* (1955). Her unorthodox views and sympathetic approach to noncapitalist systems involved her in considerable controversy throughout her career.

Robinson made several trips abroad, especially to China, reporting her observations and analyses in *China: An Economic Perspective* (1958), *The Cultural Revolution in China* (1969), and *Economic Management in China* (1975; 3rd ed., 1976). Among the best known of her many books are *The Accumulation of Capital* (1956; 3rd ed. 1969), *Economic Philosophy* (1963), and *Introduction to Modern Economics* (1973). The five volumes of her *Collected Economic Papers* (1951–79) were reprinted in 1980.

Robinson, John (b. *c.* 1575, Sturton-le-Steeple, Nottinghamshire, Eng.—d. March 1, 1625, Leiden, Neth.), English Puritan minister called the pastor of the Pilgrim Fathers for his guidance of their religious life before their journey to North America aboard the "Mayflower" in 1620.

In 1602 Robinson became a curate at St. Andrew's Church, Norwich. His refusal to conform to the Anglican anti-Puritan decrees of 1604 led to his suspension from preaching, and in 1606 or 1607 he joined the Separatist congregation at Scrooby, Nottinghamshire. Also called Nonconformists, these early Congregationalists wished to separate from the Church of England so they could follow what they believed to be purer and more simplified forms of church government and worship.

With the Scrooby congregation Robinson traveled to Amsterdam in 1608, but in 1609 he went with 100 of his followers to Leiden to escape the dissension prevalent among the various other Nonconformist groups. As pastor at Leiden, he inspired the growth of his congregation to 300 members. One of them, William Bradford, who later became governor of Plymouth Colony in Massachusetts, likened Robinson's congregation to the early Christian churches because of its "true piety, humble zeal and fervent love towards God and his Ways."

Robinson entered Leiden University in 1615 to study theology, but by 1617 he and his followers were seeking a more secure and permanent location. In July 1620, while he remained with the majority who were not yet ready to travel, part of his congregation sailed for England aboard the *Speedwell*. Before their departure from Leiden, Robinson declared to them in a celebrated sermon, "For I am very confident the Lord hath more truth and light yet to break forth out of His holy Word." The following September, 35 of them left Plymouth on the *Mayflower* for New England. Robinson died before he could leave Holland, and the remnant of his congregation was absorbed by the Dutch Reformed Church in 1658. His influence persisted, however, not only in Plymouth Colony but also in his writings, among which are his adamant *A Justification of Separation from the Church of England* (1610), *Of Religious Communion, Private and Public* (1614), and his more tolerant *On the Lawfulness of Hearing Ministers in the Church of England* (1634).

BIBLIOGRAPHY. Timothy George, *John Robinson and the English Separatist Tradition* (1982), chronicles the development of the movement and Robinson's contributions.

Robinson, Joseph T(aylor) (b. Aug. 26, 1872, near Lonoke, Ark., U.S.—d. July 14, 1937, Washington, D.C.), American lawyer and legislator, a major figure in the enactment of New Deal legislation. He represented Arkansas in the U.S. House of Representatives (1903–13) and the U.S. Senate (1913–37).

Admitted to the bar in 1895, Robinson practiced law in Lonoke. In 1902 he was elected to the U.S. House of Representatives, where he served for 10 years. Elected governor of Arkansas in 1912, he resigned a few months later to assume the U.S. Senate seat left vacant by the death of Jeff Davis, himself a former Arkansas governor. Robinson was successively reelected until his death, eventually becoming Senate majority leader under President Franklin D. Roosevelt. In 1928 Robinson ran as the Democratic vice-presidential candidate on the losing ticket with Al Smith. As minority leader in the Senate, Robinson in 1929 pledged to cooperate with Hoover's economic program; he soon found himself at odds with the new president, however, and tried to convince him to step up relief efforts and public-works projects.

With the Democratic takeover of Congress in 1933, Robinson became majority leader and thus was responsible for steering through the upper chamber much of Roosevelt's New Deal program. In his final effort, Robinson worked tirelessly on behalf of the president's ill-fated court-packing plan, having received assurances from Roosevelt that he would be appointed to one of the new Supreme Court seats to be created by the bill. Roosevelt's court-packing plan was unpopular in the Senate—even among leading Democrats—and during the legislative battle, Robinson suffered a fatal stroke. He was considered an able and effective legislator, active in the drafting and passage of numerous bills, although only one, the Robinson–Patman Act of 1936, a fair-trade bill, bears his name.

Robinson, (Esmé Stuart) Lennox (b. Oct. 4, 1886, Douglas, County Cork, Ire.—d. Oct. 14, 1958, Dublin), Irish playwright and theatrical producer associated with the Abbey Theatre; a leading figure in the later stages of the Irish literary renaissance.

When still young Robinson became devoted to the cause of Irish nationalism through seeing performances of the Abbey Theatre Company in Cork, and his country's troubles were to be a frequent theme of his plays. His first work, *The Clancy Name,* was performed at the Abbey Theatre, Dublin, in 1908. He went on to write numerous plays, remarkable for their stagecraft and lively dialogue, among the most notable being *Patriots* (first performed 1912), *The Whiteheaded Boy* (1916), and *The Lost Leader* (1918). During 1910–14 Robinson was manager of the Abbey Theatre and again from 1919 to 1923, in which year he became a director. Among his later plays were *Drama at Inish* (1933), *Church Street* (1934), and *Killycreggs in Twilight* (1937). Although not in the first rank of Irish playwrights, Robinson nevertheless made an invaluable contribution to the Irish theatre. He was the author of several books, edited an anthology, *The Golden Treasury of Irish Verse* (1925), and wrote an autobiography, *Curtain Up* (1942).

Robinson, Robert (Henry) (b. Dec. 17, 1927, Liverpool), British journalist and broadcaster known for his wit and for the number and variety of his simultaneously held television assignments.

Robinson began his career in the print media and was film critic of the London *Sunday Graphic* and a columnist on the *Sunday Chronicle.* Film criticism introduced Robinson to television; he made his first appearance in 1959 reviewing current cinema for the program "Picture Parade."

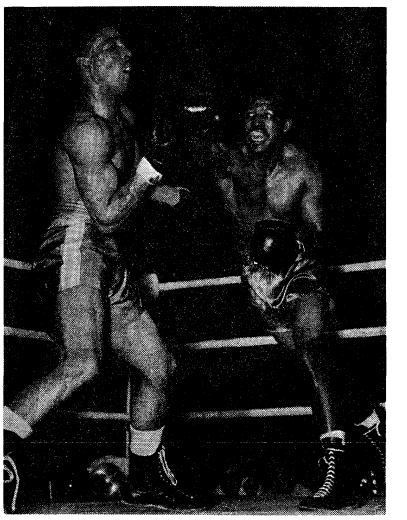
In 1962 he became the gossip columnist of *The Sunday Times,* continuing to work in television as the host of "Points of View". Robinson was a popular personality on television, and he began to accumulate jobs in that medium and on radio. He was often on as many as six concurrent programs, such as "Call My Bluff," a panel game show; "Ask the Family," a lighthearted quiz between members of two families; "Stop the Week," a diverting and intelligent radio chat show; "Brain of Britain," a radio quiz show; "Word for Word"; and "The Book Programme," which included reviews and interviews with authors. On the latter show Robinson conducted the last interview that Vladimir Nabokov gave. Robinson wrote two novels: *Landscape with Dead Dons* (1956) and *The Conspiracy* (1968). In 1978 he made a series of travelogues of the United States that was well received.

Robinson, Sir Robert (b. Sept. 13, 1886, near Chesterfield, Derbyshire, Eng.—d. Feb. 8, 1975, Great Missenden, Buckinghamshire, near London), British chemist, recipient of the Nobel Prize for Chemistry in 1947 for his research in plant biology, including alkaloids.

Educated at the Victoria University of Manchester, Robinson was appointed to the Waynflete chair of chemistry at the University of Oxford in 1930, from which he retired in 1955. He was knighted in 1939. He not only conducted research dealing with the structure and synthesis of many organic compounds but also formulated a qualitative electronic theory of organic molecular structure that contributed a new chapter to the science. His work on the details of alkaloid molecular structures led to the successful production of certain antimalarial drugs. He also played an important role in the development of penicillin.

Robinson, Sugar Ray, byname of WALKER SMITH, JR. (b. May 3, 1921, Detroit, Mich., U.S.—d. April 12, 1989, Culver City, Los Angeles), American professional boxer, six times a world champion: once as a welterweight (147 pounds), from 1946 to 1951, and five times as a middleweight (160 pounds), between 1951 and 1960. He is considered by many authorities to have been the best fighter in history.

He won 89 amateur fights without defeat, fighting first under his own name and then as



Sugar Ray Robinson (right) fighting Randy Turpin, 1951
AP/Wide World Photos

Ray Robinson, using the amateur certificate of another boxer of that name in order to qualify for a bout. He won Golden Gloves titles as a featherweight in 1939 and as a lightweight in 1940.

Robinson won 40 consecutive professional fights before losing to Jake LaMotta in one of their six battles. On Dec. 20, 1946, he won the welterweight championship by defeating Tommy Bell on a 15-round decision. Robinson resigned this title on winning the middleweight championship by a 13-round knockout of LaMotta on Feb. 14, 1951. He lost the 160-pound title to Randy Turpin of England in 1951 and regained it from Turpin later that year. In 1952 he narrowly missed defeating Joey Maxim for the light-heavyweight (175-pound) crown and a few months later retired.

Robinson returned to the ring in 1954, recaptured the middleweight title from Carl (Bobo) Olson in 1955, lost it to and regained it from Gene Fullmer in 1957, yielded it to Carmen Basilio later that year, and for the last time won the 160-pound championship by defeating Basilio in a savage fight in 1958. Paul Pender defeated Robinson to win the title on Jan. 22, 1960, and also won their return fight.

Robinson continued to fight until late 1965, when he was 45 years old. In 201 professional bouts, he had 109 knockouts. He suffered only 19 defeats, most of them when he was past 40. His outstanding ability and flamboyant personality made him a hero of boxing fans throughout the world. In retirement he appeared on television and in motion pictures and formed a youth foundation in 1969.

Robinson, William (b. July 5, 1838—d. May 17, 1935), British landscape designer who was a leading exponent of the wild, or natural, garden, which he advocated in voluminous writings, intemperately expressed, throughout a long life.

Robinson began as a working gardener in Ireland but moved to the Royal Botanic Society's garden in Regent's Park, London, where his work, a collection of English wildflowers, led to his *Wild Garden* (1870; reprinted in facsimile, 1978). This and his *Alpine Flowers for English Gardens* (1870) and *The English Flower Garden* (1883) were, in effect, an assault on

the contemporary formal architectural garden, on the use of exotics, and all obviously artificial gardening practices. The starting point of his philosophy was the plant itself, which he loved to see growing in a natural way. His approach gave responsibility for garden design to technicians rather than to artists and had a great influence on the modern sentimental garden.

Robinson, William Heath (b. May 31, 1872, London—d. Sept. 13, 1944, London), British cartoonist, book illustrator, and designer of theatrical scenery, who was best known for his cartoons that featured fantastic machinery.

In 1887 Robinson went to Islington School of Art and later briefly attended the Royal Academy schools, London. He illustrated a *Don Quixote* and an *Arabian Nights,* both in 1899, and in 1900 he illustrated an edition of the poems of Edgar Allan Poe. He continued book illustration and also did some advertising work, but his chief fame rests on his humorous drawings, which first appeared in *The Sketch* and later in *The Bystander, The Strand Magazine, The Illustrated London News,* and other English and American publications. Before World War I he had achieved a worldwide reputation. His drawings are particularly notable for the fun he made of machinery. A ludicrously impractical or elaborate machine came to be called "a Heath Robinson contraption." *Absurdities* (1934) is a collection of his drawings. His autobiography is *My Line of Work* (1938).

Roblès, Emmanuel (b. May 4, 1914, Oran, Alg.), Algerian-French novelist and playwright whose works came out of the war and political strife that he witnessed in Europe and North Africa. A common guiding theme in his writings is the stubborn resistance of heroes to their political or social tormentors. The Roblès' rebel, however, knows how to savour his short-lived happiness before irreversible fate seals him in.

Roblès, whose parents were of Spanish descent, graduated from the Teachers College (École Normale), in Algiers. During World War II he served as chief Spanish interpreter and war correspondent for the Supreme Allied Command of the Mediterranean operations and worked with Albert Camus as a reporter for the liberal daily *Alger-Républicain.* He then became cofounder of and frequent contributor to the daily *Espoir-Algérie.* In 1958 the escalation of the Algerian war forced him into exile in Paris, where he devoted his talent to discovering and publishing new African talent.

Roblès published his first novel, *L'Action,* in 1938. Wider recognition came with his fourth novel, *Les Hauteurs de la ville* (1948; "Heights of the City"), in which a young Arab worker commits a lonely act of revenge against the fascists responsible for the deportation and death of Algerians during World War II. Roblès achieved international success with *Cela s'appelle l'aurore* (1952; "It Calls Itself Dawn"; Eng. trans. *Dawn on Our Darkness*), a novel set in Sardinia and concerning a man caught between love and duty. *Le Vésuve* (1961; *Vesuvius*) and *Un Printemps d'Italie* (1970; "A Springtime in Italy") are love stories set in wartime Italy. *Venise en hiver* (1981; "Venice in Winter") takes place against a background of political terrorism.

Montserrat (1948), Roblès' most popular drama, is the story of a young Spanish officer who chooses to die for the liberation of Venezuela rather than reveal the hiding place of Simón Bolívar. Other plays include *La Vérité est morte* (1952; "Truth Is Dead"), about the Spanish Civil War, and *Plaidoyer pour un rebelle* (1965; *Case for a Rebel*), concerning terrorism.

robot, any automatically operated machine that replaces human effort, though it may not resemble human beings in appearance or perform functions in a humanlike manner. The term is derived from the Czech word *robota,* meaning "forced labour." Modern use of the term stems from the play *R.U.R.*, written in 1920 by Czech author Karel Čapek, which depicts society as having become dependent on mechanical workers called robots that are capable of doing any kind of mental or physical work.

A brief treatment of robots follows. For full treatment, *see* MACROPAEDIA: Automation.

Modern robot devices descend through two distinct lines of development—the early automaton (*q.v.*), essentially mechanical toys, and the successive innovations and refinements introduced in the development of industrial machinery.

Possibly the earliest ancestor of today's industrial-robot devices is the clepsydra, or water clock, which improved upon the hourglass by employing a siphon principle to automatically recycle itself. Ctesibius of Alexandria, a Greek physicist and inventor, is reputed to have constructed such a clock about 250 BC. Weight-driven, pendulum-controlled clocks were invented in the European Middle Ages. The spring-driven clock was finally developed during the 18th century, which also witnessed the introduction of rudimentary forms of automatic machinery in the textile industry.

The Industrial Revolution stimulated the invention of elementary robot mechanisms to perfect the production of power itself. The steam engine inspired the governor (actuated by rotating weights), which, when it slowed under load, increased the flow of steam to the engine and, when its load decreased, reduced it. The internal-combustion engine of the 19th century brought a recycling innovation in the form of pistons that repositioned themselves after each cycle. The later 19th and early 20th centuries saw a rapid proliferation of powerful machinery in industrial operations. These at first required a person to position both the work and the machine, and later only the work. Automatic cycle-repeating machines (automatic washers), self-measuring and adjusting machines (textile colour-blending equipment), and machines with a degree of self-programming (automatic elevators) soon followed.

Since the late 1960s major developments in microelectronics and computer technology have led to significant advances in robotics. In the automobile industry, for example, the introduction of computer-controlled robot devices have automated assembly lines to a marked degree. These one-armed robots are capable of simulating the articulation and movement of the human arm and hand and can be used to lift, weld, and spray-paint automobile bodies. The mechanical arms are programmed by physically moving them through the desired motions. The different movements are recorded in the computer's memory so that they can be repeated precisely. Some high-performance robots have built-in sensors that enable them to correct their movements if they deviate from the programmed patterns. Others are equipped with electronic digital cameras and are used to inspect automobile bodies to make certain that their dimensions meet specified standards. In such robot devices, the camera converts images into patterns of digital pulses, which in turn are compared with pulse patterns stored in the controlling computer's memory. The stored patterns represent two-dimensional geometric shapes that the computer has been programmed to identify. Similar kinds of advanced high-performance robots have been adopted by other assembly industries. Aircraft manufacturers employ single-arm mechanisms for drilling and riveting body sections, while a growing number of electronics firms are utilizing robot devices in conjunction with other computerized instruments to sort or test finished products.

Robotpatent (German: "Forced-Labour Patent"), law governing compulsory labour, performed by peasants for their lord in the Austrian domains. Enactments from earlier times existed throughout the Austrian domains, such as a Hungarian one that was issued as a penalty in 1514 following an abortive peasant revolt. This decreed that the peasants should work 52 days a year of haulage (involving draught animals) for the landowner. Elsewhere, conditions were less harsh; and, in such regions as the Tirol, *Robot,* or forced labour, hardly existed.

During 1771–78, Empress Maria Theresa introduced a series of patents regulating and restricting peasant labour, though only in the German and Bohemian parts of the empire, for the Hungarian nobility strongly resisted. Maria Theresa's principle in issuing *Robotpatents* was an insistence that the peasant must not only be able to support himself and his family but be able to cover the general national expenditure in peace or war. The nobles objected, however, and even the peasants objected less to the current stipulations than to their abuse by landlords. Ultimately most of the *Robotpatents* merely confirmed existing laws, though abolishing illegalities, encroachments, and usurpations. *Robot* was abolished by Emperor Joseph II in 1789 but restored by Emperor Leopold II. Not until 1848 was the system finally abandoned throughout the empire.

Robrecht (Dutch personal name): *see under* Robert.

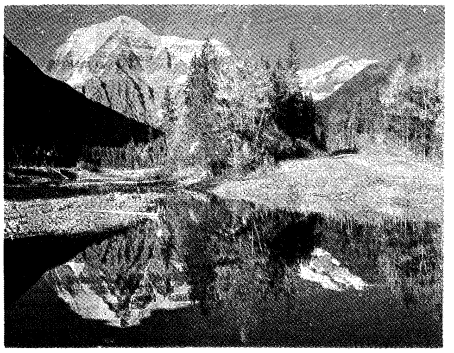
A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Robson, Dame Flora (McKenzie) (b. March 28, 1902, South Shields, Durham, Eng.—d. July 7, 1984, Brighton, East Sussex), British actress renowned for the excellence of her performances on the stage and in motion pictures.

After finishing high school, she studied at the Royal Academy of Dramatic Art in London and made her first professional appearance at the Shaftesbury Theatre, London, in 1921. She performed in repertory companies until 1924, when she left the theatre because of dissatisfaction with her professional progress. After taking a job in a food-processing factory, she formed an amateur theatrical group among the workers there. She later credited this experience with enlarging her view of dramatic structure and acting.

Robson returned to professional acting in 1929 and in 1931 won wide acclaim for her performances in Eugene O'Neill's *Desire Under the Elms* and James Bridie's *The Anatomist.* She soon gained a reputation for playing a wide range of roles. She appeared in motion pictures first in England in 1933 and later in Hollywood, made her stage debut in the United States in 1940, and began a television series in 1974. She appeared in more than 100 stage plays and 60 motion pictures. In 1952 she was named a Commander of the Order of the British Empire and in 1960 was elevated to the British peerage as Dame Commander of the Order of the British Empire.

Robson, Mount, peak in eastern British Columbia, Can., 50 miles (80 km) west-northwest of Jasper, Alta. Rising above Kinney Lake and overlooking Yellowhead Pass to the east, Mount Robson is the highest peak (12,972 feet [3,954 m]) in the Canadian Rockies. Composed of horizontal shale strata, the mountain was probably named for Colin Robson (1793–1842), an official of the Hudson's Bay Company. It was mentioned by fur traders as early as 1827, but not until 1913 did



Mount Robson, British Columbia, reflected in Kinney Lake

George Hunter

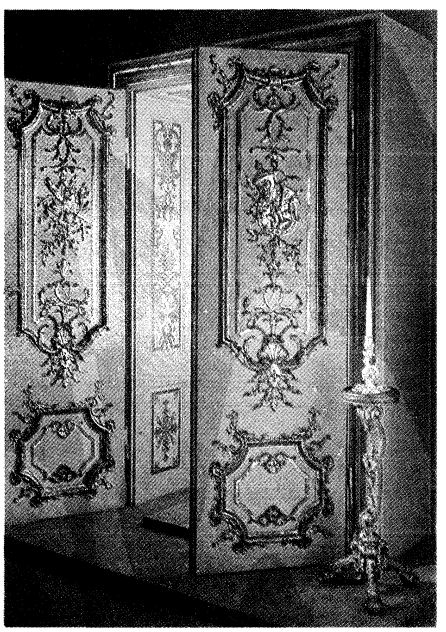
A.H. MacCarthy, W.W. Foster, and Conrad Kain (an Australian guide) reach its summit. The Canadian National Railway's main line traverses Mount Robson Provincial Park, which surrounds the mountain.

Roby (England): *see* Huyton with Roby.

roc, also spelled RUKH, Arabic RUKHKH, gigantic legendary bird, said to carry off elephants and other large beasts for food. It is mentioned in the famous collection of Arabic tales, *The Thousand and One Nights,* and by the Venetian traveler Marco Polo, who referred to it in describing Madagascar and other islands off the coast of eastern Africa. According to Marco Polo, Kublai Khan inquired in those parts about the roc and was brought what was claimed to be a roc's feather, which may really have been a *Raphia* palm frond.

Roca, Cape, Portuguese CABO DA ROCA, also called FOCINHO DA ROSA, promontory in Portugal, and the westernmost point of continental Europe. It lies on the Atlantic coast of Lisboa district, about 25 miles (40 km) westnorthwest of Lisbon. Known to the Romans as Promontorium Magnum, the cape is a narrow granite cliff, 472 feet (144 m) high, forming the western end of the Sintra Mountains.

rocaille, in Western architecture and decorative arts, 18th-century style featuring elaborately stylized shell-like, rocklike, and scroll motifs. Rocaille is one of the more prominent aspects of the Rococo style of architecture and decoration that developed in France during the reign of King Louis XV (1715–74). The Rocaille style has been defined as a reaction both to the classic rigidity of the waning Baroque style and to the new interest in nature and the natural sciences. In French, rocaille means "rubble," or "pebbles," and *style rocaille* is synonymous with Rococo.



Rocaille decorated doors, door frame, and *entreportes,* probably designed by François de Cuvilliés for the Königliche Residenz, Munich, c. 1740; in the Metropolitan Museum of Art, New York

By courtesy of the Metropolitan Museum of Art, New York, Rogers Fund, 1927

Rocaille is most often found in small pieces of furniture and household articles, especially in such personal items as snuffboxes and hand mirrors. In wall decorations of wood or plaster, rocaille features shells, pebbles, and scrolls as well as flower, fern, and coral forms, all emphasizing brief, asymmetric single or double curves. Originally the term was confined to the fanciful pierced shellwork of artificial grottoes in late Renaissance gardens.

Rocard, Michel (Louis Leon) (b. Aug. 23, 1930, Courbevoie, Fr.), French public servant and politician who became premier of France in 1988.

Upon graduating from the elite National School of Administration, Rocard became an inspector of finances in 1958 and subsequently rose to high posts in the government accounting service. He was early active in socialist politics, and in 1967 he became head of the small Unified Socialist Party, running unsuccessfully for the French presidency in 1969. He served in the National Assembly from 1969 to 1973 and from 1978 to 1981. In 1974 he, along with most of his party's membership, joined the larger Socialist Party, which was led by François Mitterrand. When Mitterrand was elected president of France in 1981, Rocard served successively as minister of planning and regional development (1981–83) and as minister of agriculture (1983–85), performing very ably in the latter post. When Mitterrand was reelected president in May 1988, he asked Rocard to be premier. Rocard, who was noted for his pragmatic views and his economic expertise, formed a government that remained a minority one after the Socialists failed to win a parliamentary majority in the legislative elections of June 1988.

Roccella, genus of tropical fruticose lichen, an important source of the dye orchil and litmus (*qq.v.*).

Rocha, city, southeastern Uruguay, situated in palm-dotted coastal lowlands. It is the surrounding region's main commercial and manufacturing centre, with wool and hides the main trade commodities. The railroad and highway from Montevideo to Rocha continue southeastward to the harbour at La Paloma, Rocha's port. Pop. (1975 prelim.) 21,672.

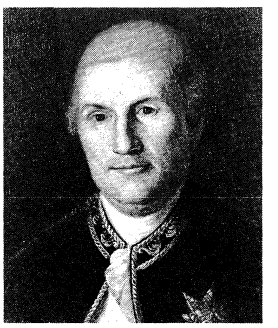
Rocha, Glauber (b. March 14, 1938, Victoria da Conquista, Bahia, Brazil—d. Aug. 23, 1981, Rio de Janiero), motion-picture director who was a leading figure in Brazil's Cinema Nuovo ("New Cinema").

Rocha's avant-garde films depict Brazil's history and contemporary upheavals of its social and political scene in a stylized, often violent manner. His first short film, *O Patio* (1959), caught the attention of critics and prompted his rise to fame. *Barravento* (1961), his first feature, was followed with *Deus e o Diabo na Terra do Sol* (1964; "Black God–White Devil"), *Terra em Transe* (1967), and *Antonie das Mortes* (1969), all dealing with Brazil's political problems. Beginning his career as a journalist and film critic, Rocha was at odds politically with Brazil's rulers. His conflicts with Brazilian authorities and opinion makers led to his leaving the country in 1970.

Una Estetica de Famer ("The Aesthetics of Violence"), one of the best-known of Rocha's many essays on film, discusses the use of violence in filmmaking. In his book *Revisao Critica do Cineman Brasiliero* (1963), Rocha traces the history of Brazilian cinema in its many aspects. His later films, made abroad, include *Claro* (1975), *Cabezas Cortadas* (1970; *Severed Heads*), and *A Idade da Terra* (1982; *The Age of the Earth*).

Rochambeau, Jean-Baptiste-Donatien de Vimeur, comte de (count of) (b. July 1, 1725, Vendôme, Fr.—d. May 10, 1807, Thoré), general who supported the American Revolution by commanding French forces that helped defeat the British at Yorktown, Va. (1781).

Rochambeau was originally trained for the church but then entered a cavalry regiment. He fought in the War of the Austrian Succession, attaining the rank of colonel. He became a brigadier general and inspector of cavalry in 1761 and in 1776 was appointed governor of Villefranche-en-Roussillon. Four years later



Rochambeau, portrait by Charles Willson Peale, 1782; in Independence National Historical Park, Philadelphia

By courtesy of the Independence National Historical Park Collection, Philadelphia

he was put in command of a French army of about 6,000 troops destined for North America to join the Continentals in their struggle for independence from the British.

Rochambeau and his troops arrived in Newport, R.I., in July 1780 and waited nearly a year for the arrival of French naval support (which never came). Finally, in June 1781 he joined forces with General George Washington in White Plains, N.Y., and together they made a swift descent to Yorktown, where Franco-American forces under the Marquis de Lafayette were harassing the British. With the aid of French naval forces under Admiral de Grasse, the allies laid siege to Lord Cornwallis' forces, bottled them up on the peninsula, and forced Cornwallis to surrender on October 19, thus virtually ending the war.

Rochambeau remained in Virginia for another year and then embarked for Europe in January 1783. Acknowledging his distinctive contribution to the peace, King Louis XVI appointed him commander of Calais and later of the Alsace district. During the French Revolution he commanded the Army of the North (1790–91) and was created a marshal of France (1791). Arrested during the Reign of Terror, he narrowly escaped the guillotine; but Napoleon then pensioned him.

Rochas, Alphonse-Eugène Beau de (engineer): *see* Beau de Rochas, Alphonse (-Eugène).

Rochdale, district (borough) in the northeastern part of the metropolitan area of Greater Manchester, England, with an area of 61 square miles (159 square km). Rochdale town lies at the confluence of the Rivers Spodden and Roch at the foot of a western spur of the Pennines. It grew as a market centre in the medieval period and became important in the 18th and 19th centuries as a centre of cotton textile manufacture, with special emphasis on heavy textiles for industrial uses. The Rochdale Canal (no longer used) was constructed to improve the local transportation. The town was the birthplace of

the cooperative movement, an international wholesale and retail trade organization whose profits are distributed to member–customers, the Rochdale Society of Equitable Pioneers (Rochdale Pioneers) being founded in 1844. Their first shop, in Toad Lane, has been preserved.

Rochdale has an art gallery, museum, and parks and recreational facilities. Hollingworth Lake (117 ac [47 ha]) is 3.5 mi (5.6 km) northeast. Middleton has a major golf driving range. Pop. (1983 est.) 206,400.

Roche limit, in astronomy, the minimum distance to which a large satellite can approach its primary body without being torn apart by tidal forces. If satellite and primary are of similar composition, the theoretical limit is about 2½ times the radius of the larger body. The rings of Saturn lie inside Saturn's Roche limit and may be the debris of a demolished moon. The limit was first calculated by the French astronomer Édouard Roche (1820–83). Artificial satellites are too small to develop substantial tidal stresses.

roche moutonnée (French: "fleecy rock"), English SHEEPBACK, or SHEEP ROCK, glaciated bedrock surface, usually in the form of rounded knobs. The upstream side of a *roche moutonnée* has been subjected to glacial scouring that has produced a gentle, polished, and striated slope; the downstream side has been subjected to glacial plucking that has resulted in a steep, irregular, and jagged slope. The ridges dividing the upstream and downstream slopes are therefore perpendicular to the general flow direction of the former ice mass.

A crag and tail is distinguished from a *roche moutonnée* by the presence of an elongate, tapered ridge of till extending downstream. Often produced by selective erosion of softer strata, *roche moutonnée* landscapes are characteristic of glaciated crystalline shield areas.

Roche-sur-Yon, François-Louis de Bourbon, prince de la: *see* Conti, François-Louis de Bourbon, prince de.

Roche-sur-Yon, La, town, capital of Vendée *département,* Pays de la Loire region, western France, south of Nantes. The Vendée region had been pacified at the time of the French Revolution but still remained disaffected after the counterrevolutionary insurrection of 1793; Napoleon in 1804 established a military and administrative town in the centre of the *département.* It was built on the site of the decayed township of Roche-sur-Yon, which had been burned down by the Republican troops. The new town was built according to plan, with wide rectangular streets, barracks, stables, and a vast parade ground. The town is an agricultural centre. Traditional local industries include tanning, and the manufacture of nails and needles; more recent industry includes household appliances. Pop. (1982) 42,026.

Consult the INDEX *first*

Rochefort, town and commercial harbour, Charente-Maritime *département,* Poitou-Charentes region, western France, situated on the right bank of the Charente River, 10 mi (16 km) from the sea. It has straight, regular streets and promenades running along the sites of its old fortifications. Rue Pierre Loti, a street named after the 19th-century French novelist who was born there, is located near the central Place Colbert, which is ornamented by an 18th-century fountain.

Rochefort derives its name from a castle built on the banks of the Charente to resist Norman invaders. A small township grew around the castle in the 11th century, and the modern town was built in the 17th century, when Jean-Baptiste Colbert, minister to Louis XIV, established a military port and an arsenal there. The town was fortified and between 1696 and 1806 successfully resisted five attempts to destroy it. It was from Rochefort that the Marquis de Lafayette sailed to North America in 1780 to participate in the American Revolution—in which the fleet based at Rochefort also took part. Napoleon stayed at Rochefort before surrendering to the English in 1815. The town was bombed during World War II.

Rochefort is an important air force base, with two specialized mechanical and technical schools. Local industries are based on dairy products, coal, and timber. Wood products and rubber boats are also manufactured. The town has been developed as a spa (rheumatic, skin, and circulatory diseases) since 1961. Pop. (1982) 25,392.

Rochefort, Victor-Henri, MARQUIS DE ROCHEFORT-LUCAY (b. Jan. 31, 1830, Paris—d. June 30, 1913, Aix-les-Bains, Fr.), gifted polemical journalist under the Second Empire and the Third Republic who distinguished himself, at first, as a supporter of the extreme left and later as a champion of the extreme right.



Rochefort, portrait by an unknown artist, *c.* 1868
H. Roger-Viollet

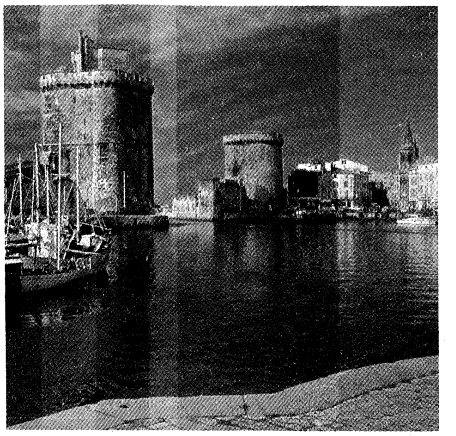
Rochefort's career began in 1868 with the founding of the weekly newspaper *La Lanterne,* which was speedily suppressed for its outspoken opposition to Napoleon III. He was elected to the Corps Législatif by a Paris constituency in 1869. When the empire fell the following year, he became a member of the emergency government of national defense. His open support of the revolutionary Paris Commune (1871) led to his condemnation under military law.

Transported to the penal colony of New Caledonia in 1873, he escaped in four months. He returned to France under the amnesty of 1880 to conduct a press campaign in *L'Intransigeant* for the extreme Radicals and Socialists. His dislike of the moderate Republicans led him in 1889 to support the reactionary adventurer Gen. Georges Boulanger, who had taken a leading role in suppressing the Commune in 1871. After the collapse of Boulangism in 1891, Rochefort once more backed the Socialists; then three years later he allied himself again with the right over the Dreyfus affair, which polarized French opinion by its exposure of injustice and anti-Semitism in the army. During his last years Rochefort wrote for the conservative and nationalistic press.

Rochefoucauld, François VI, duc de La (writer): *see* La Rochefoucauld, François VI, duc de.

Rochefoucauld, La, FAMILY: *see* La Rochefoucauld family.

Rochelle, La, town, Atlantic seaport and capital of Charente-Maritime *département,* Poitou-Charentes region, western France, situated on an inlet opposite the Île (island) de Ré. The town, which has straight, regular



Harbour with Saint-Nicolas (left) and La Chaîne (right) towers, La Rochelle, Fr.
Art Resource—EB Inc.

streets, a large park, and shady promenades on the sites of its old fortifications, grew considerably after 1946, especially to the west. The old commercial harbour, too shallow for large ships, has been modernized and is now one of the foremost French fishing ports. It is directly connected to a renovated fish market. In 1890 a commercial port, accessible to larger vessels, was opened at La Pallice, 3.5 mi (5.5 km) west of the town; it has since been enlarged several times. Imports include fuel oil, nitrates, and phosphates. The two ports have attracted both industry and trade to the town, which has shipbuilding yards, aircraft works, railroad yards, automobile assembly plants, and petroleum refineries. Other industries include food processing (fish canneries), sawmills, light metal working, and chemical products.

The entrance to the old port is defended by two massive 14th-century towers. The pentagonal Tour Saint-Nicolas, the larger of the two, is an imposing fortress with crenellated walls and a keep. Opposite it stands the Tour de la Chaîne, so named because at night a big chain was strung between it and the Tour Saint-Nicolas to close the port. In the 15th century a third tower, the Tour de la Lanterne, a round base surmounted by an octagonal spire, was built as a lighthouse. Other buildings of interest are the Gothic Porte de la Grosse-Horloge, the Renaissance Hôtel de Ville, and the 18th-century Hôtel de la Bourse. The rue des Merciers is typical of the old streets. Many of the 16th- and 17th-century houses, built over arcades, are decorated with gargoyles and strange allegorical figures.

La Rochelle developed in the 12th century after the neighbouring town of Châtelaillon was destroyed by the dukes of Aquitaine. During the Hundred Years' War (1337–1453) it changed hands a number of times but was finally captured by the French in 1372. It became largely Protestant at the time of the Reformation and after the Massacre of St. Bartholomew's Day (1572), in which many French Protestants (Huguenots) were killed; many of the survivors took refuge there. Under Louis XIII (ruled 1610–43), La Rochelle sided with the English, who had invaded the Île de Ré. Richelieu, the King's minister, besieged the town and built a vast sea wall to prevent English ships from relieving their allies. After 15 months' siege, the town capitulated, three-fourths of its citizens having starved to death. It slowly recovered its former prosperity but declined once more after 1685, when the revocation of the Edict of Nantes, depriving French Protestants of religious and civil liberty, led to massive emigration. In the 18th century the loss of Canada by the French further reduced La Rochelle's trade. In World War II, it was the location of a German sub-

marine base and suffered from Allied bombing. Pop. (1982) 74,728.

Rochelle salt, also called SODIUM POTASSIUM TARTRATE TETRAHYDRATE, a crystalline solid having a large piezoelectric effect (electric charge induced on its surfaces by mechanical deformation due to pressure, twisting, or bending), making it useful in sensitive acoustical and vibrational devices. Like other piezoelectric materials, Rochelle salt crystals ($KNaC_4H_4O_6 \cdot 4H_2O$) become strained when subjected to electric fields. They decompose at moderately high temperatures (55° C [131° F]) and require protection against moisture. Piezoelectric deformation is directly proportional to the applied electric field and reverses as the polarity of the applied field is reversed. These basic properties are put to use in electromechanical transducers such as ultrasonic generators, microphones, and phonograph pickups and in electromechanical resonators. *See also* tartaric acid.

Rochemont, Charles Pictet de: *see* Pictet de Rochemont, Charles.

Rochester, city, Rochester upon Medway district, county of Kent, England, on the River Medway, east of London. In ancient times it was the site of a walled Roman-British town (Durobrivae), situated where the Roman road from the English Channel ports to London crossed the River Medway at the head of its estuary.

The medieval city grew around its cathedral. The Church of St. Andrew was founded in 604 by King Aethelberht I, who made Rochester an episcopal see. It was a royal borough in the time of William the Conqueror (1066–87), and its citizens acquired important privileges from Henry III (1216–72), which were confirmed by later kings. It is now a city by special letters patent.

The cathedral church has a Norman west front (1125–30) and later Gothic work. The remains of a Norman church, chiefly a massive keep, overlook the river crossing, and there are remains of a 13th-century city wall. Other notable buildings include the Guildhall (1687), almshouses (1579), and the Elizabethan mansion that houses the museum. At Borstal, southwest of Rochester, early experiments on the educational treatment of delinquent youths were carried out, from which derives the modern British Borstal system for treatment of young offenders.

The Medway is navigable to Rochester Bridge for vessels drawing 26 ft (8 m). Since the 1850s considerable industrial development has taken place, notably in engineering and the manufacture of cement and paper. The city lies on the railway line from London to Canterbury and Dover. Pop. (1981 prelim.) 52,505.

Rochester, city, seat of Olmsted County, southeastern Minnesota, U.S., at the confluence of three tributaries of the Zumbro River, in a mixed-farming region, 75 mi (121 km) south of Minneapolis. The site, originally a camping ground for wagon trains, was settled in 1854 and named for Rochester, N.Y.

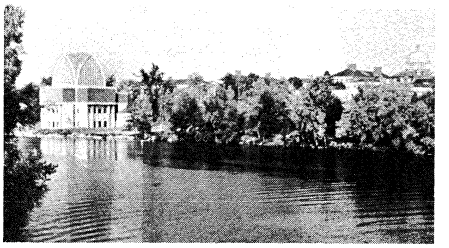


New and old buildings of the Mayo Clinic, Rochester, Minn.
Milt and Joan Mann from CameraMann

Its growth has been greatly stimulated by the Mayo Medical Center, established in 1889 by William Worrall Mayo and his sons (*see* Mayo family). Rochester Community College was founded in 1915. The economy is bolstered by light manufactures (chiefly electronic, business, and recording equipment) and food processing. The famed Mayo Clinic, actually a combination of hospitals and hotels, has a medical museum. The Minnesota Bible College (1913) moved to Rochester from Minneapolis in the early 1970s. Inc. 1858. Pop. (1980) city, 57,855; metropolitan area (SMSA), 92,006; (1982 est.) 94,000.

Rochester, city, Strafford County, southeastern New Hampshire, U.S., on the Cocheco and Salmon Falls rivers, just northwest of Dover. Named for Lawrence Hyde, earl of Rochester, it was incorporated as a town (township) in 1722, but no settlement was made until 1728. Chartered as a city in 1891, it now embraces Gonic and East Rochester. Early settlers were lumbermen, traders, and hunters. After fires destroyed local timber lands (1761–62) the people turned to farming. The arrival of the railroads in the late 1840s gave impetus to industrialization. Manufactures now include fibreboard and paper products, shoes, textiles, and fabricated metal items. The Rochester (agricultural) Fair has been held annually since 1875, and poultry farming and the raising of dairy cattle and horses are basic economic activities. Moose Mt., 23 mi (37 km) north of Rochester, has skiing facilities. Pop. (1980) city, 21,560; (1982 est.) Portsmouth–Dover–Rochester metropolitan area (SMSA), 287,400.

Rochester, industrial city, seat (1821) of Monroe County, northwestern New York, U.S., St. Lawrence Seaway port on the Genesee River at its outlet into Lake Ontario, 71 mi (114 km) east-northeast of Buffalo. It is the centre of a metropolitan area which in-



Chapel of the University of Rochester (left), on the Genesee River, Rochester, N.Y.
Milt and Joan Mann from CameraMann

cludes Irondequoit, Greece, and Brighton (the largest towns); these along with Gates, Chili, Pittsford, Perinton, Henrietta, Penfield, and Webster are mainly residential, although some have industrial parks. Settlement was made in 1789 at the falls of the Genesee, which powered a grist-mill built by Ebenezer Allen on a 100-ac (40-ha) tract granted on condition that he would serve the needs of the Seneca Indians. The venture was a failure and Allen's land was sold to Col. Nathaniel Rochester, Col. William Fitzhugh, and Maj. Charles Carroll (all from Maryland). Rochester offered lots for sale in 1811, and in 1817 the village was incorporated as Rochesterville (shortened in 1822). Its abundant waterpower and Erie Canal (1825) and railway linkages (1839) made it by the 1840s one of the early boom towns of the "West" (population 20,000) with a prosperous flour-milling industry based on the wheat production of the Genesee Valley. The clothing and shoe industries, initiated in the 1860s, were stimulated by demands of the Civil War, and mass production methods were rapidly developed. After its flour millers moved west to Minnesota, the city turned to nursery enterprises and became a pioneer in the mail-order sale of seeds and shrubs. During the 1890s, industrialists such as George Eastman, John Jacob Bausch, and Henry Lomb developed photographic, optical, and precision equipment. Photocopy machines and other specialized products including thermometers, machine tools, business machines, glass-lined steel tanks, and dental and electrical equipment now augment the economy. Rochester is also the processing, distribution, and shipping point for the surrounding fertile truck and fruit farming belt. In 1916 the city was extended in a strip along both banks of the Genesee to Lake Ontario, and in 1931 the port of Rochester was developed to handle Great Lakes and ocean shipping.

The city was the home of Margaret and Kate Fox, spiritualists who attracted world attention in the 1840s with a series of seances known as the Rochester rappings. In 1847 Frederick Douglass, the black abolitionist, published his antislavery paper (*North Star*) there, and Rochester was a terminus for the Underground Railroad (escape route for runaway slaves). Susan B. Anthony, the early woman suffragist, lived there from 1866 to 1906; her house is preserved, and she is buried in Mount Hope Cemetery. The city is the seat of the University of Rochester (founded in 1850, which includes the Eastman School of Music), the Rochester Institute of Technology (1829), and Roberts Wesleyan (1866), Nazareth (1924), St. John Fisher (1952), and Monroe Community (1961) colleges. The Colgate-Rochester Divinity School was founded in 1850 as the Rochester Theological Seminary. Cultural institutions include a symphony orchestra, an art gallery, planetarium, and the International Museum of Photography at George Eastman House. The city's parks, including Highland and Genesee Valley, are noted for horticultural displays, and the Rochester Lilac Time Festival is a well-known annual (May) event. Inc. village, 1817; city, 1834. Pop. (1980) city, 241,741; (1982 est.) metropolitan area (SMSA), 978,600.

Rochester, EARLS AND VISCOUNTS OF, titled English nobility of multiple creations, notably in the families Wilmot and Hyde, grouped below chronologically and indicated by the symbol •.

• Rochester, Robert Carr, Viscount: *see* Somerset, Robert Carr, earl of.

• Rochester, Henry Wilmot, 1st earl of, also called (1643/44–1652) 2ND BARON WILMOT OF ATHLONE, BARON WILMOT OF ADDERBURY (b. Nov. 2, 1612?—d. Feb. 19, 1658, Sluys, Flanders, Spanish Netherlands), distinguished Cavalier general during the English Civil Wars, who helped Charles II to escape after the Battle of Worcester.

Wilmot's family was descended from Edward Wilmot of Witney, Oxfordshire, whose son Charles (*c.* 1570–1643/44), having served with distinction in Ireland during the rebellion at the beginning of the 17th century, was president of Connaught from 1616 until his death. In 1621 he had been created an Irish peer as Viscount Wilmot of Athlone, and he was succeeded by his only surviving son, Henry. Having fought against the Scottish at Newburn and been imprisoned and expelled from the House of Commons for plotting in the interests of Charles I in 1641, Henry Wilmot served the King well during the Civil Wars, being responsible for the defeats of Sir William Waller at Roundway Down in July 1643 and at Cropredy Bridge in June 1644. In 1643 he was created Baron Wilmot of Adderbury. Wilmot was on bad terms with some of the King's friends and advisers, including Prince Rupert, and in 1644 he is reported to have advised his supercession by his son, the Prince of Wales (the future Charles II). Consequently he was deprived of his command and, after a

short imprisonment, was allowed to cross over to France. He was greatly trusted by Charles II, whose defeat at Worcester and subsequent wanderings he shared, and during this king's exile he was one of his principal advisers, being created earl of Rochester in 1652. In the interests of Charles he engaged in several diplomatic missions on the continent; and in March 1655 he was in England, where he led a feeble attempt at a rising on Marston Moor, near York. On its failure he fled the country.

• **Rochester, John Wilmot, 2nd earl of** (b. April 10, 1647, Ditchley Manor House, Oxfordshire, Eng.—d. July 26, 1680, Woodstock, Eng.), court wit and poet who helped establish English satiric poetry.

Wilmot succeeded his father to the earldom in 1658, and he received his M.A. at Oxford in 1661. Charles II, probably out of gratitude to the 1st earl, who had helped him to escape after the Battle of Worcester (1651), gave the young earl an annual pension and appointed Sir Andrew Balfour, a Scottish physician, as his tutor. They travelled on the Continent for three years until 1664.

On his return, as a leader of the court wits, Rochester became known as one of the wildest debauchees at the Restoration court, the hero of numerous escapades, and the lover of various mistresses. Among them was the actress Elizabeth Barry, whom he is said to have trained for the stage, and an heiress, Elizabeth Malet. He volunteered for the navy and served with distinction in the war against the Dutch (1665–67). In 1667 he married Elizabeth Malet and was appointed a gentleman of the bedchamber to the king. In 1673 John Dryden dedicated to Rochester his comedy *Marriage A-la-Mode* in complimentary terms, acknowledging his help in writing it.

Rochester is generally considered to be the most considerable poet and the most learned among the Restoration wits. A few of his love songs have passionate intensity. He is also one of the most original and powerful of English satirists. His "History of Insipids" (1676) is a devastating attack on the government of Charles II, and his "Maim'd Debauchee" has been described as "a masterpiece of heroic irony." *A Satyr Against Mankind* (1675) anticipates Swift in its scathing denunciation of rationalism and optimism and in the contrast it draws between human perfidy and folly and the instinctive wisdom of the animal world.

In 1675 Rochester was appointed ranger of Woodstock Forest, where much of his later poetry was written. His health was declining, and his thoughts were turning to serious matters. His correspondence (dated 1679–80) with the Deist Charles Blount shows a keen interest in philosophy and religion, further stimulated by his friendship with Gilbert Burnet, later bishop of Salisbury. Burnet recorded their religious discussions in *Some Passages of the Life and Death of John, Earl of Rochester* (1680). In 1680 he became seriously ill and experienced a religious conversion, followed by a recantation of his past; he ordered "all his profane and lewd writings" burned.



John Wilmot, 2nd earl of Rochester, detail of an oil painting attributed to J. Huysmans; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

His single dramatic work, the posthumous *Valentinian* (1685), an attempt to rehandle a tragedy of Fletcher, contains two of his finest lyrics. His letters to his wife and to his friend Henry Savile are among the best of the period and show an admirable mastery of easy, colloquial prose.

A biography by Graham Greene, *Lord Rochester's Monkey*, was published in 1974.

• **Rochester, Lawrence Hyde, 1st earl of,** also called (1681–82) VISCOUNT HYDE OF KENILWORTH (b. March 1642—d. May 2, 1711, London), influential English statesman who served under Charles II, James II, William III, and Queen Anne.



Lawrence Hyde, 1st earl of Rochester, detail of an oil painting after Willem Wissing, c. 1685–87; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

The second son of the renowned statesman and historian Edward Hyde, 1st earl of Clarendon, he entered Parliament in 1660 and was master of the robes from 1662 to 1675. In 1679 he was made first lord of the Treasury and a privy councillor.

Hyde helped defeat Whig efforts (1678–81) to exclude from the succession the Catholic James, duke of York (later King James II), whose first wife had been Hyde's sister. In 1681 Hyde negotiated with the French a secret subsidy that enabled Charles II to remain independent of the Whig-dominated Parliament. He was created a viscount in 1681 and an earl in 1682.

For reasons that are not clear, Rochester was removed from the Treasury in 1684 but was given the lord lieutenancy of Ireland and the relatively powerless position of lord president of the Council. Under James II, Rochester was lord treasurer from 1685 to 1687 but fell from power as James endeavoured to implement his pro-Catholic policies.

Though he was appointed to the Privy Council in 1692, he failed to gain the favour of King William III until late in the reign, when he was lord lieutenant of Ireland (1701–03). In 1702–04 he published his father's great work, *History of the Rebellion and Civil Wars in England.* Upon the accession of Queen Anne, he became a leader of the Tory High Church Anglican party, and in 1710–11 he was again president of the Council.

Rochester upon Medway, formerly MEDWAY, district (borough), county of Kent, England, with an area of 62 sq mi (160 sq km). The district is named for, and lies around the mouth of, the River Medway where it flows into the estuary of the Thames. It comprises the cathedral city of Rochester, the town and naval dockyard of Chatham (centres that, together with nearby Gillingham, are sometimes referred to as the "Medway Towns"), and a section of the marshes and flats along the Thames. A detached portion of the latter, the Isle of Grain, has been dyked and reclaimed and is now the site of a large oil refinery. The lower Medway is an industrialized area. Since the 15th century Chatham has had one of Britain's major naval dockyards, and, besides this and the oil refinery at Grain, there are numerous engineering plants lining the river frontage of the Medway. Pop. (1983 est.) 146,200.

Rochford, district, county of Essex, England, bordered on the north by the unbridged River Crouch and on the south by the Southend-on-Sea urban area on the Thames Estuary. The River Roach (formerly Roch) flows through the centre of the district and into the North Sea among the islands, marshes, and mud flats that form the easternmost part of the district. The coast is much used for sailing and recreation, while the inland parts of the district lie within the commuter belt of London. The area of Rochford is 65 sq mi (169 sq km). Pop. (1983 est.) 74,800.

rock, in geology, naturally occurring and coherent aggregate of one or more minerals. Such aggregates constitute the basic units of which the solid Earth is comprised and typically form recognizable and mappable volumes. Rocks are commonly divided into three major classes according to the processes that resulted in their formation. These classes are (1) igneous rocks, which have solidified from molten material called magma; (2) sedimentary rocks, those consisting of fragments derived from preexisting rocks or of materials precipitated from solutions; and (3) metamorphic rocks, which have been derived from either igneous or sedimentary rocks under conditions that caused changes in mineralogical composition, texture, and internal structure. These three classes, in turn, are subdivided into numerous groups and types on the basis of various factors, the most important of which are chemical, mineralogical, and textural attributes.

For the composition, physical properties, formation, and distribution of the major classes of rocks and their subgroupings, *see* MACROPAEDIA: Minerals and Rocks; for petrology, the scientific study of rocks, *see* Earth Sciences, The.

For a description of the place of rocks in the circle of learning and for a list of both MACROPAEDIA and MICROPAEDIA articles on the subject, *see* PROPAEDIA: Part Two, Division I.

rock, also called ROCK AND ROLL, in music, a style that arose in the United States in the mid-1950s and through both the assimilation and evolution of other styles and the gradual broadening of the name itself came to be the dominant form of popular music, spreading as well to Europe and other parts of the world. Although rock music utilized a wide variety of instruments, the basic elements were one or several vocalists, an assortment of heavily amplified electric guitars (including bass, rhythm, and lead), and drums. Among the other instruments that could be used were the electric piano, electric organ, and music synthesizer, along with horns, woodwinds, and minor percussion instruments. In its early stages, it was a fundamentally simple style, relying on heavy, dance-oriented rhythms, common melodies and harmonies, and lyrics sympathetic to its audience's concerns—young love, the stresses of adolescence, and automobiles. In its maturity rock tended to exhibit more complexity, and some of its most talented exponents attracted the notice of serious critics of music.

The roots of rock lay in the styles of U.S. music known as rhythm and blues (*q.v.*) and country and western (*q.v.*). In the early 1950s both styles were outside the mainstream of popular music. They were reported separately in trade journals, and in radio broadcasting they were played only on small stations for their respective minority audiences. In 1953, as an experiment, Alan Freed, a Cleveland disc jockey, began a program of rhythm and blues, then played only to black audiences. It succeeded in drawing a large number of listeners and gave currency to the term he had adopted (though not invented) for the music—rock and roll, or rock 'n' roll. In the resulting form that emerged in 1955–56 with the rise to fame of Chuck Berry, Bill Haley and the Comets, and, particularly, Elvis Presley, a quick-tempo version of traditional rhythm and blues was used to express emotional urgency and enthusiasm, and the lyrical content of popular music was adapted to mirror the concerns of a young audience. This highly rhythmic, sensual music struck a responsive chord in the newly affluent postwar teenage audience. The charismatic Presley achieved an overwhelming popularity with his combination of country-and-western and blues elements with resonant and skillful vocals.

In subsequent years, however, the rough, exciting energy and emotional intensity of rock and roll was gradually lost in the efforts of major recording companies to make the music more acceptable to a wider audience.

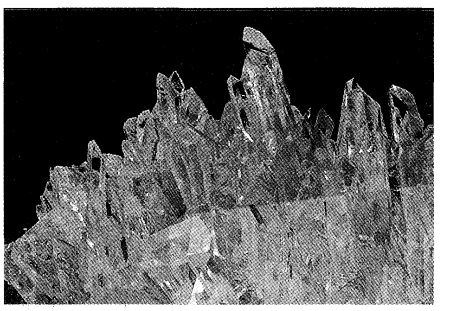
In the early and middle 1960s, however, a number of influences combined to lift rock out of what by then had become a bland, sentimental, and basically mechanical format. In England the development of rock had been much slower, largely because of strict programming controls in radio and recording. When, at last, native performers did achieve a wide hearing, they were found to have retained the freshness and naïve excitement of the very early years of rock and roll. Their success at home became even greater in the United States, where a new generation of teenagers had grown up unaware of the music on which that of the new stars was based. Preeminent among the new performers were the Beatles, whose remarkable musical abilities and growth enabled them to transform a merely popular music into an open field for genuine creativity. At the same time, Bob Dylan and other U.S. performers were developing "folk rock," a blending of traditional ballad and verse forms with rock rhythms and instrumentation. Although the Beatles' music had its origins in the rock and roll of the mid-1950s, whereas Dylan's musical roots lay in the tradition of American folk song, they both combined unusual melodic gifts with an ability to write complex and significant lyrics. Rock music gathered momentum in the mid-1960s as young musicians began to explore rock's ability to deal with social and political themes. Such groups as the Rolling Stones, The Byrds, Cream, The Grateful Dead, Jefferson Airplane, The Doors, and the Allman Brothers Band combined imaginative lyrics with an unprecedented rock instrumental virtuosity, which was typified by the incorporation of long passages of solo improvisation into the increasingly complex textures and musical structures of rock songs. Powerful vocalists like Janis Joplin and guitarists like Jimi Hendrix achieved large followings with their exotic elaborations on traditional rhythm-and-blues themes. Rock was further enriched by the rediscovery by white audiences of the black blues music from which it was originally derived, and by such groups as Crosby, Stills, and Nash, who evolved a gentler music using acoustic instruments and clear, sonorous vocals. In the shadow of the new experimentation, standard adolescent rock and roll was relegated to the background, although it was still commercially important.

With the premature decline of the great instrumental bands in the early 1970s, rock music was perhaps typified by such authoritative songwriter-vocalists as Elton John, David Bowie, Bruce Springsteen, and Bob Seeger. In the 1970s, in addition to the continuance of large rock groups, "soul rock" introduced Jamaican reggae music, and rock assimilated other popular music forms to produce pop rock, jazz-rock (*q.v.*), and punk rock. In the 1980s, rock music was complemented by the production of short video programs built around popular rock songs and featuring as actors the rock musicians who performed them.

rock bolt, in tunnelling and underground mining, steel rod inserted in a hole drilled in the face of a rock formation to support the roof or sides of the cavity. The bolt may be provided with an expanding device to grip the rock at the far end of the hole or may be bonded to the rock by means of expanding cement. Rock bolts may be used singly or in rows and are increasingly supplanting timber as mine supports because they are more economical and easier to use and allow larger unobstructed areas; like timber, they can be used in any type of excavation.

rock cress, any of the 100 species of the genus *Arabis,* herbs belonging to the mustard family (Brassicaceae), found throughout the Northern Hemisphere and in mountainous areas of Africa. Some are cultivated as ornamentals for their white, pink, or purple four-petalled flowers. Rock cresses are either erect or mounding in habit and bear long, narrow seedpods. Wall rock cress, or garden arabis (*A. caucasica*), a perennial from southeastern Europe, reaches 30 centimetres (1 foot) in height and bears fragrant white flowers in early spring; it has double, pink, dwarf, and variegated varieties. Other members of the genus range in size from the tower mustard (*A. glabra*), which is nearly 170 cm tall, to the bluish rock cress (*A. caerulea*), an alpine perennial only 10 cm tall.

rock crystal, transparent variety of the silica mineral quartz (*q.v.*) that is valued for its clarity and total lack of colour or flaws. Vessels and spheres have been carved from large crystals since ancient times, and the application of the word crystal to fine glassware de-



Rock crystal from the Dauphiné region of France
Emil Javorsky—EB Inc.

rives from this practice. Rock crystal formerly was used extensively as a gemstone (usually brilliant-cut) but has been replaced by glass and plastic; rhinestones originally were quartz pebbles found in the Rhine River. Although the resemblance to diamond is remote, the widespread use of colourless quartz in jewelry gave rise to the use of the word diamond in the description of quartz crystals from many areas, as the "Herkimer diamond" from Herkimer County, New York. The optical properties of rock crystal led to its use in lenses and prisms; its piezoelectric properties are used to control the oscillation of electrical circuits. Its physical properties are those of quartz (*see* silica mineral [table]).

rock edicts, narrative histories and announcements carved into cliff rock, onto pillars, and in caves throughout India by King Aśoka (reigned *c.* 265–238 BC), the most powerful emperor of the Maurya dynasty and a highly influential promulgator of Indian Buddhism. Aśoka's first eight years as king were marked by his brutal slaughter of thousands of people who he felt challenged his rule. Having been exposed to the moral teachings (*dharma*) of Buddhism—teachings based on the necessity for nonviolence and compassion—Aśoka was moved to deep remorse for his actions. He converted to Buddhism, and as a record of his understanding of moral law he carved lessons into stone in the hope that he could provide inspiration and guidance to the people of his extensive kingdom. The rock edicts are important sources for modern understanding of ancient Indian political and religious history, particularly with regard to the influence of the Buddha's teachings on the king and, through him, on the people at large.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

rock fan, fan-shaped bedrock surface at the foot of a mountain, often where a stream flows out onto a piedmont slope. It is often covered with a thin veneer of alluvium and may be confused with an alluvial fan. Rock fans are usually quite steep (20° to 26° slope). It has been suggested that they represent the early stage of pediment development. *See* pediment.

rock glacier, tonguelike body of coarse rock fragments, found in high mountains above the timberline, that moves slowly down a valley. The rock material usually has fallen from the valley walls and may contain large boulders: it resembles the material left at the terminus of a true glacier. Interstitial ice usually occurs in the centre of rock glaciers. Where the ice approaches the terminus, it melts and releases the rock material, which then forms a steep talus slope. A rock glacier may be 30 metres (100 feet) deep and nearly 1½ kilometres (about 1 mile) long.

A rock glacier may have wavelike ridges on its surface that curve convexly downstream; these indicate flowage. Maximum movements observed exceed 150 centimetres (4½ feet) per year. The method of movement is thought to be either flowage of the interstitial ice or creeping by frost action.

Rock Hill, city, York County, northern South Carolina, U.S., near the Catawba River, 28 mi (45 km) south of Charlotte, N.C. Established in 1851 as a depot on the Charlotte and South Carolina Railroad, it was named for a flint hill in the vicinity. During the Civil War, Rock Hill was a transfer point for Confederate troops and supplies. Development of cotton mills in the area, beginning in 1867, spurred the community's growth. Industrial activity now centres on textile and wood-pulp production. The Catawba River is dammed north of the city, forming Lake Wylie and furnishing hydroelectric power. Rock Hill is the seat of Winthrop College (1886) and York Technical Education Center (1964). Catawba Indian Reservation and the Andrew Jackson Historical State Park are nearby. Inc. 1870. Pop. (1980) city, 35,344; (1982 est.) Charlotte–Gastonia–Rock Hill metropolitan area (SMSA), 1,002,700.

Rock Island, city, seat (1833) of Rock Island County, northwestern Illinois, U.S., on the Mississippi River near the mouth of the Rock River and opposite the island for which it was named. With Moline, East Moline (*qq.v.*), and

Davenport, Iowa, it forms the Quad Cities complex. Founded in 1835 as Stephenson, it was renamed and incorporated as a town in 1841. Settlers were attracted to Ft. Armstrong (built on the island in 1816) and the cornfields of the Indians. The fort (reconstructed) was headquarters of operations in the Black Hawk War (1832). In 1854 the site was reached by the Rock Island Railroad, and it was there the Mississippi was first bridged (1855). The island was a Civil War ordnance depot and served as a prisoner-of-war camp, where many Confederates died; national and Confederate cemeteries are on the island. It is now occupied by military installations, including the huge Rock Island Arsenal, the U.S. Army's Armament Material Readiness Command headquarters, and the John M. Browning Memorial (military arms) Museum. Black Hawk State Park, at the city's southern edge, was once the site of the Sauk and Fox Indian capitals.



The grounds of the Woodmen Building adjacent to the Mississippi River, Rock Island, Ill.
Milt and Joan Mann from CameraMann

Diversified industry (with emphasis on the manufacture of farm equipment) grew with the arsenal. Augustana College was founded (1860) in Rock Island by Swedish immigrants. Inc. city, 1849. Pop. (1980) city, 47,036; (1982 est.) Davenport–Rock Island–Moline metropolitan area (SMSA), 383,800.

Rock Island Railroad: *see* Chicago, Rock Island, and Pacific Railroad Company.

rock maple: *see* sugar maple.

rock rat, also called DASSIE RAT (*Petromus typicus*), squirrel-like rodent of the family Petromyidae (order Rodentia), found in the rocky hills and mountains of southwestern Africa. The rock rat is a soft-furred, gray, tawny, or yellowish brown animal about 15 to 20 centimetres (6 to 8 inches) long without the long tail. It has a wide, flat head and extremely flexible ribs, and can thus flatten its body to squeeze into narrow openings in the rocks. Diurnal in habit, it shelters in rock crevices and emerges during the day to feed on green plants, berries, and seeds, and to lie in the Sun. It breeds once a year, in summer; the female bears one or two relatively large, well-developed young per litter.

Rock River, nonnavigable stream in the north central United States, rising in Washington County, eastern Wisconsin, and flowing in a generally southwesterly direction to join the Mississippi at Rock Island, Ill. The 300-mi (480-km) river, which from source to mouth drops about 500 ft (150 m), has small hydropower developments. It drains an area of 10,880 sq mi (28,180 sq km). The bottomlands along the lower course are subject to spring floods and require levee protection. Major cities along its course include Watertown, Janesville, and Beloit, Wis.; and Rockford, Dixon, Sterling, and Rock Island, Ill. Its tributaries are the Pecatonica, Kishwaukee, and Green rivers. On the river bluffs, near Oregon, Ill., in Lowden Memorial State Park, is Lorado Taft's "Black Hawk," a 48-ft statue of the Indian leader.

rock rose (*Cistus*), any of a genus of 17 species of low to medium-sized shrubs, in the rock rose family (Cistaceae), native to the Mediterranean region and long known to horticulture. There are a number of garden hybrids useful in warm areas, where they are often grown in rock gardens. The flowers are single and roselike, in white, pink, or rosy-purple, often with a yellowish or dark blotch at the base of the petals.

Cistus ladanifer, called laudanum, has white petals, red-brown at the bases, and yields a resin used in perfumery. *C. albidus*, up to 2 metres (6 feet) high, has lilac- to rose-coloured flowers. *C. palhinhae*, a low shrub, reaching about 45 centimetres (1½ feet), bears large white flowers up to 10 cm across. *C. incanus*, growing to about 1 m, has rose-pink flowers up to 6 cm across.

The so-called sun roses, related plants of the genus *Helianthemum* (family Cistaceae), are also sometimes referred to as rock roses (*see* sun rose).

rock salt (mineral): *see* halite.

Rock Springs, city, Sweetwater County, southwestern Wyoming, U.S., on Bitter Creek, at an altitude of 6,270 ft (1,911 m) among sagebrush plains and hills, 13 mi (21 km) east of Green River city. Named for a nearby saline spring, it began as a stage stop in 1862; after the arrival of the Union Pacific Railroad in 1868, it developed as a coal-mining and ranching centre. Federal troops were called (in 1885) to quell riots against Chinese mine workers and remained there until 1898. "Butch" Cassidy, the outlaw, once worked in a butcher's shop in Rock Springs, hence his name. Coal, soda ash (from nearby trona deposits), oil, natural gas, and livestock are the economic mainstays. Western Wyoming Community College (1959) is there. Flaming Gorge National Recreation Area lies to the southwest; and Rock Springs is the gateway to scenic areas to the north including Jackson Hole, the Wind River Mountains, the Grand Tetons, and Yellowstone National Park. Inc. 1888. Pop. (1970) 11,657; (1980) 19,458.

rock tripe, lichen of the genus *Umbilicaria*, sometimes used as emergency food by soldiers or explorers. It contains about one-third more calories than equal amounts of honey, corn flakes, or hominy; however, this lichen cannot seriously be considered as a food crop because of its slow growth rate. Rock tripe was boiled by Washington's troops at Valley Forge. In Japan *U. esculenta*, called "iwa-take," or "rock mushroom," is sold as a delicacy and eaten in salads or fried in deep fat. Species of rock tripe are also used as dyes.

rock wren, New Zealand bird belonging to the family Xenicidae (*q.v.*); also, a true wren of North America (*Salpinctes obsoletus; see* wren).

Rockall, uninhabited islet, Rockall Bank, North Atlantic, 220 mi (354 km) west of the Outer Hebrides, Scotland. It was formally annexed by Great Britain in 1955 and has since assumed economic importance in relation to oil and fishing rights in its territorial waters.

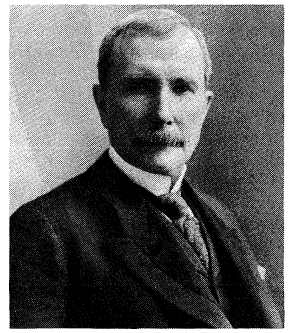
rockaway, a light, low, four-wheeled, horse-drawn carriage popular in the United States after its introduction at Rockaway, N.J., in 1830. It had a driver's seat built into the body, with the top projecting forward to protect the driver from inclement weather. The main body was of the coupé type and was suspended on elliptic springs made of several layers of curved flat steel.

In about 1870 the term depot wagon was applied to many carriages of the rockaway type, and by 1890 the term station wagon was also in use, though there were few, if any, differences between them. They were made until the end of the 19th century, and the style was carried over into many early automobiles.

Rockefeller, David (b. June 12, 1915, New York City), U.S. banker and philanthropist, the youngest of the five sons of John D. Rockefeller, Jr.

He received a B.S. degree from Harvard University (1936), did graduate study in economics at Harvard and at the London School of Economics, and then worked for a Ph.D. degree from the University of Chicago (1940). After service in the U.S. Army during World War II (1942–45), he joined in 1946 the staff of the Chase National Bank of New York, of which his maternal uncle, Winthrop W. Aldrich, was chairman of the board. He rose steadily in the hierarchy to become senior vice president in 1952 and was instrumental in the merger (1955) of the Chase National and the Bank of Manhattan Company that resulted in the Chase Manhattan Bank. His rise in the merged institution was capped in 1969, when he became chairman of the board (1969–81) and chief executive officer (1969–80). His speciality became international banking, and he was a familiar figure to ministers and heads of state of various countries around the world, as well as to heads of multinational corporations.

Rockefeller, John D(avison) (b. July 8, 1839, Richford, N.Y., U.S.—d. May 23, 1937, Ormond Beach, Fla.), U.S. industrialist and philanthropist, founder of the Standard Oil Company, which dominated the oil industry and was the first great U.S. business trust.



John D. Rockefeller, 1884

Rockefeller moved with his family to Cleveland in 1853, and six years later he established his first enterprise—a commission business dealing in hay, grain, meats, and other goods. Sensing the commercial potential of the expanding oil production in western Pennsylvania in the early 1860s, he built his first oil refinery, near Cleveland, in 1863. Within two years it was the largest refinery in the area, and thereafter Rockefeller devoted himself exclusively to the oil business.

In 1870 Rockefeller and a few associates incorporated the Standard Oil Company (Ohio). Because of Rockefeller's emphasis upon economical operations, Standard prospered and began to buy out its competitors until, by 1872, it controlled nearly all the refineries in Cleveland. That fact enabled the company to negotiate with railroads for favoured rates on its shipments of oil. It acquired pipelines and terminal facilities, purchased competing refineries in other cities, and vigorously sought to expand its markets in the United States and abroad. By 1882 it had a near monopoly of the oil business in the United States. In 1881 Rockefeller and his associates placed the stock of Standard of Ohio and its affiliates in other states under the control of a board of nine trustees, with Rockefeller at the head. They thus established the first major U.S. "trust" and set a pattern of organization for other monopolies.

The aggressive competitive practices of Standard Oil, which many regarded as ruthless, and the growing public hostility toward monopolies, of which Standard was the best known, caused some industrialized states to

enact anti-monopoly laws and led to the passage by the U.S. Congress of the Sherman Antitrust Act (1890). In 1892 the Ohio Supreme Court held that the Standard Oil Trust was a monopoly in violation of an Ohio law prohibiting monopolies. Rockefeller evaded the decision by dissolving the trust and transferring its properties to companies in other states, with interlocking directorates so that the same nine men controlled the operations of the affiliated companies. In 1899 these companies were brought back together in a holding company, Standard Oil Company (New Jersey), which existed until 1911, when the U.S. Supreme Court declared it in violation of the Sherman Antitrust Act, and therefore illegal.

A devout Baptist, Rockefeller turned his attention increasingly during the 1890s to charities and benevolence; after 1897, he devoted himself completely to philanthropy. He made possible the founding of the University of Chicago in 1892, and by the time of his death had given it more than $80,000,000. In association with his son, John D. Rockefeller, Jr., he created major philanthropic institutions, including the Rockefeller Institute for Medical Research (renamed Rockefeller University) in New York City (1901); the General Education Board (1902); and the Rockefeller Foundation (1913). Rockefeller's benefactions during his lifetime totalled more than $500,000,000 while his and his son's totalled more than $2,500,000,000 by 1955.

The standard biography is Allan Nevins, *John D. Rockefeller: the Heroic Age of American Business,* 2 vol. (1940). A revised edition is *Study in Power: John D. Rockefeller, Industrialist and Philanthropist,* 2 vol. (1953).

Rockefeller, John D(avison), Jr. (b. Jan. 29, 1874, Cleveland, Ohio, U.S.—d. May 11, 1960, Tucson, Ariz.), U.S. philanthropist, son of John D. Rockefeller, Sr., and heir to the Rockefeller fortune, who built Rockefeller Center in New York City and was instrumental in the decision to locate the United Nations in that city. John D. Rockefeller, Jr., joined his father in business for a time but from 1910 devoted his energies almost exclusively to philanthropy.

He was the only son of Rockefeller Senior and Laura Spelman Rockefeller. After graduation from Brown University in 1897, he entered his father's office. What business interests he pursued were associated with his father's longstanding opposition to strikes by organized labour, and he at least condoned the so-called Ludlow Massacre (April 20, 1914), in which sit-in strikers at the Rockefeller-owned Colorado Fuel and Iron Company were fired on by militiamen, resulting in over 40 deaths. Later, his agents were responsible for creating the nation's first company unions, controlled by management.

In association with his father, he created major philanthropic institutions, including the Rockefeller Institute for Medical Research (renamed Rockefeller University) in New York City (1901), the General Education Board (1902), and the Rockefeller Foundation (1913). In the 1930s he oversaw construction of Rockefeller Center in Manhattan. During World War II he helped establish the United Service Organizations (USO), an agency for the aid of members of the U.S. military and their dependants.

After the war, he donated the land for the United Nations headquarters, a gift that figured prominently in the decision to locate the world organization in the United States. In 1958 he donated $5,000,000 for the Lincoln Center for the Performing Arts in New York City. His other philanthropic works included restoration of colonial Williamsburg, Va., construction of low-rent housing in poor sections of New York City; and donations to the city's Riverside Church and the Museum of Modern Art.

Rockefeller married twice. The offspring of his first marriage, to Abby Greene Aldrich (1874–1948) were one daughter, Abby (b. 1903), whose married names were successively Milton, Pardee, and Mauzé, and five sons: John D. III, Nelson A., Laurance S., Winthrop, and David (*qq.v.*).

Rockefeller, John D(avison), III (b. March 21, 1906, New York City—d. July 10, 1978, Mount Pleasant, N.Y., U.S.), U.S. philanthropist, eldest of the five sons of John D. Rockefeller, Jr.

After graduating from Princeton University (1929), he joined the family's enterprises, becoming, by 1931, trustee of the Rockefeller Foundation, the General Education Board, the Institute for Medical Research, the China Medical Board, and 29 other boards and committees. During World War II he served in the U.S. Navy (1942–45). Generally thereafter he shunned public life to devote his time and energy to philanthropy and to the acquisition of one of the finest of Oriental art collections (bequeathed at his death to the Asia Society). Among the great cultural gifts he left the nation were the Lincoln Center for the Performing Arts in New York City, the India International Centre in New Delhi, the International House of Japan, and the Asia Society. As eventual chairman of the Rockefeller Foundation, he gave substantial support to international agencies but donated his own funds to found the Population Council (1952), a research centre for family planning.

His son, John ("Jay") Davison Rockefeller, IV (b. 1937), became prominent in West Virginia politics, serving as governor from 1977.

Rockefeller, Laurance S(pelman) (b. May 26, 1910, New York City), U.S. venture capitalist and philanthropist, third of the five sons of John D. Rockefeller, Jr.

He graduated from Princeton University with a degree in philosophy (1932) but became the most business-minded of all the Rockefeller brothers. He participated in the founding of Eastern Airlines (1938) and, within a few years, held the largest share of the company's stock (100 percent of its preferred). He was also associated with McDonnell Aircraft Corporation. During World War II he was in the U.S. Navy. After the war he engaged in a wide range of investments, from resort hotels to nuclear equipment and computers. In later life he became more involved in various conservation programs, especially as chairman of the Citizens Advisory Committee on Environmental Quality (1969–73), president of the American Conservation Association, and chairman of the New York Zoological Society.

Rockefeller, Nelson Aldrich (b. July 8, 1908, Bar Harbor, Maine, U.S.—d. Jan. 26, 1979, New York City), 41st vice president of the United States (1974–77), four-term governor of New York (1959–73), leader of the moderate wing of the Republican Party, and three-time seeker of his party's presidential nomination.

Rockefeller, a grandson of John D. Rockefeller, Sr., founder of Standard Oil, was graduated from Dartmouth College (Hanover, N.H.) in 1930 with a degree in economics. For the remainder of the decade, he worked for a number of family enterprises: Chase National (later Chase Manhattan) Bank, Rockefeller Center, and Creole Petroleum.

As director of Creole Petroleum—a Standard Oil affiliate with large holdings in Venezuela—from 1935 to 1940, Rockefeller acquired fluency in Spanish and a profound interest in Latin America. In 1940 he took his first post with the federal government as coordinator of inter-American affairs at the State Department. Despite the fact that he was a Republican in the Democratic administration of Franklin D. Roosevelt, Rockefeller rose to the position of assistant secretary of state for the American republics in 1944.

In 1945 Rockefeller left the federal government, and a year later he became one of the founders of a private nonprofit group formed to help developing nations in Latin America. Having returned to government service during the administration of Harry S. Truman as head of the International Development Advisory Board in 1950, he was appointed by President-elect Dwight D. Eisenhower two years later as chairman of a presidential advisory committee on government organization. From 1953 to 1955, Rockefeller served as undersecretary of the newly created Department of Health, Education, and Welfare.

With the intention of seeking an elective rather than appointive office, Rockefeller again retired from the federal government in 1956. In 1958 he challenged the incumbent, Averell Harriman, for governor of New York and, in an otherwise Democratic year, won the contest by more than 500,000 votes. His victory made him a prominent candidate for the Republican presidential nomination in 1960, but he withdrew when it became clear that Richard M. Nixon would be the nominee.

Reelected governor in 1962, 1966, and 1970, Rockefeller oversaw massive changes in New York's fiscal, cultural, and educational policies and facilities. The state university system was greatly expanded. The number of state employees and the size of the budget doubled and quadrupled, respectively.

With Nixon out of the contest in 1964, Rockefeller again sought the Republican nomination. As the leader of the party's liberal-moderate wing, he was opposed by conservative Barry Goldwater, who won the heated competition by a slim margin.

Rockefeller again entered the presidential race in 1968 and again was defeated for the nomination—for the second time by Nixon. In 1970, however, he won his fourth term as governor, defeating former U.S. Supreme Court justice and UN representative Arthur Goldberg by nearly 700,000 votes. It was during this term that Rockefeller, amid a storm of controversy, refused to visit the state prison at Attica during the riot there that led to the deaths of 43 inmates and guards.

Rockefeller retired as governor in 1973 to devote his time to the National Commission on Critical Choices for America and the Commission on Water Quality. But on December 19, 1974, he was sworn in as vice president of the United States, succeeding Gerald R. Ford, who assumed the presidency upon Nixon's resignation. Rockefeller served two years, until the Ford administration ended in January 1977.

Rockefeller was known also as a collector and patron of art. He served as a trustee of the Museum of Modern Art and was the founder and president of the Museum of Primitive Art (in 1982 incorporated into the Metropolitan Museum of Art as the Michael C. Rockefeller Memorial Wing), both in New York City.

Rockefeller, William (b. May 31, 1841, Richford, N.Y., U.S.—d. June 24, 1922, Tarrytown, N.Y.), U.S. industrialist and financier known, in conjunction with his older brother, John D. Rockefeller, for his role in the establishment and growth of the Standard Oil Company.

Rockefeller began his career as a bookkeeper. At age 21 he started his own business, Hughes and Rockefeller, as a produce commission merchant. In the mid-1860s John D. Rockefeller, who had invested in Ohio's newly discovered oil finds, asked William to head the export operations in New York City for what would in 1870 become Standard Oil.

Though he was not subject to as much public

scrutiny as his brother, William played an active role in the company throughout its life as a "trust" and, later, as a holding company. He served as head of the New Jersey and New York branches until 1911, when the U.S. Supreme Court—acting on the Sherman Anti-Trust Law—dissolved the holding company. He retired in 1911, devoting his time to his investments and his railroad properties.

Rockefeller, Winthrop (b. May 1, 1912, New York City—d. Feb. 22, 1973, Palm Springs, Calif., U.S.), American politician and philanthropist, second youngest of the five sons of John D. Rockefeller, Jr.

He left college in 1934 and did various kinds of work for the Rockefeller interests—in the oil fields of Texas and at the Chase National Bank—before joining the U.S. Army in 1941. After World War II he became part of New York's cafe society before moving to Arkansas in 1953, where he eventually built a massive experimental farm called Winrock. There he engaged in various local philanthropic ventures. Becoming Republican governor of Arkansas (1967–71), he secured passage of the state's first minimum-wage law, introduced extensive prison reforms, and took significant steps toward the desegregation of state schools. His philanthropies in Arkansas included $1,250,000 for a model school, financing of civic projects and medical clinics, and contributions to the building of the Arts Center at Little Rock.

Rockefeller Center, a 12-acre (5-hectare) complex of 14 limestone buildings in midtown Manhattan in New York City, designed by a team of architects headed by Henry Hofmeister, H.W. Corbett, and Raymond Hood. The group of skyscrapers was built between 1929 and 1940.

Wood veneering, mural painting, mosaics, sculpture, metalwork, and other allied arts were integrated with the architecture as it was being planned and executed. Although much criticized in its early days, Rockefeller Center has since served as a model for other such urban developments.

Rockefeller University, in New York City, private coeducational institution devoted to research and graduate education in the biomedical sciences. It was founded by John D. Rockefeller in 1901 as a medical-research centre, and in 1954 the school became part of the University of the State of New York and was reorganized as a graduate university. It assumed the name Rockefeller University in 1965. The university offers a small number of gifted students tuition-free, advanced instruction and research opportunities in the biological and biomedical sciences. The university awards the Ph.D. for work in a number of fields, but there is no set curriculum. The school also operates a cooperative program with Cornell University Medical College that leads to a joint M.D.-Ph.D. degree. Numbered among Rockefeller University's graduates and faculty have been more than 15 Nobel Prize laureates.

rocket, any of the 90 species of the genus *Sisymbrium,* of the mustard family (Brassicaceae), weedy plants with yellow flowers that are common in waste areas and fields of the Northern Hemisphere and mountains in the Southern Hemisphere. Rockets have long, thin seedpods and usually coarse, deeply cut, dandelion-like leaves. Eastern rocket (*S. orientale*), a European annual 30 to 60 cm (1 to 2 feet) tall, has long pods and clusters of small flowers at the stem tip. Hedge mustard (*S. officinale*), a Eurasian species with pods close to the stem, is naturalized in North America. The name rocket is also given to *Barbarea vulgaris* (*see* winter cress).

rocket, any of a type of jet-propulsion device that carries either solid or liquid propellants that provide both the fuel and oxidizer required for combustion. The term is also commonly applied to any of various vehicles, including firework skyrockets, guided missiles, and spacecraft launch vehicles, driven by such a propulsive device. Typically, thrust (*i.e.,* forward motion) is produced by reaction to a rearward expulsion of hot gases at extremely high velocity.

Rockets are treated in a number of articles in the MACROPAEDIA. For treatment of rocket propulsion, *see* Energy Conversion; for treatment of spacecraft launch vehicles, *see* Exploration; for treatment of military rockets and guided missiles, *see* War, The Technology of.

Fundamentals of rocket propulsion. The most common types of rockets burn chemical propellants, either solid or liquid. (The term rocket engine is applied only to those that use liquid propellants exclusively, while the designation rocket motor is usually restricted to those that employ solid propellants.) Combustion of the propellants provides the hot gases that are ejected in a jet through a nozzle to the rear of the rocket. Other kinds of rockets employ hybrid systems (*e.g.,* liquid propellant burned in a solid-propellant core) and air-turborockets that utilize some ram air for part of the combustion process.

Since rockets constitute a special form of jet-propulsion device, they are related to turbojet, pulse-jet, and ramjet engines but differ from them in that the elements of the propulsive jet (*i.e.,* the fuel and oxidizer) are self-contained within the vehicle. The thrust produced is totally independent of the medium through which the vehicle travels. Other varieties of jet-propulsion engines carry only their fuel, which is burned with the oxygen in the air scooped into the engine as the vehicle flies along. They are thus called "air-breathing" and are restricted to operation within the Earth's atmosphere.

Jet propulsion, as noted above, is based on the reaction of the vehicle to the backward thrust of a jet of gas. Because the kinetic energy in a rocket jet is derived from the conversion of the chemical energy of combustion to directed kinetic energy, high thermochemical energy per unit weight of propellant is desirable. In practice, the kinetic energy of the rocket exhaust jet may amount to only about 40 to 70 percent of the theoretical heat energy from the combustion of the propellant. Much of the efficiency loss comes from unavailable thermal energy that leaves the exhaust nozzle as residual enthalpy.

Development of rockets. No specific date can be determined for the invention of the rocket. Most historians of rocketry maintain that the Chinese developed the first practical military rockets in the 13th century, though it is likely that fireworks were in use at an even earlier date. Ancient records of battle strategies seem to indicate that gunpowder was known to the Chinese by 1232 and was utilized as a propulsive agent for a number of weapons, including arrows and incendiary bombs.

Rockets appeared in Europe at about the same time, and the first firearms followed in the early 14th century. These applications, which employed all the basic components of rockets, were crude and ineffectual but did demonstrate the enormous potential of rocket power. Progress in firearms design was rapid over the next few centuries, but rocketry was compromised by limited technology and the lack of suitable raw materials.

The 19th century saw several important advances. Durability was improved by the replacement of paper shells with metal casings. Notable too was the work of William Congreve, an English munitions expert. He standardized the composition of gunpowder propulsives, added flight-stabilizing guide sticks, and built the first practical launching pad. His rockets were utilized by the British forces during the Napoleonic Wars and the War of 1812 and provided the impetus for the widespread adoption of rocketry for military purposes in Europe. Even more significant, albeit less well known, was the discovery of spin guidance by the British engineer William Hale. His rockets were fitted with angled exhaust tubes that spun the projectile during flight. This increased accuracy and eliminated the excess weight of the guide stick. Hale's spin stabilization remains an important design feature of modern rockets.

Various applications of rocket power for nonmilitary purposes began to appear by the late 1800s. One notable example was the use of a rocket to carry a lifeline to sailing ships in distress near shore.

The foundations of modern rocketry were established during the late 19th and early 20th centuries by Konstantin Eduardovich Tsiolkovsky, Hermann Oberth, and Robert H. Goddard. The contributions of Goddard, an American scientist and inventor, are perhaps the most widely recognized. He was the first to explore mathematically the ratios of energy and thrust per weight of various fuels, including liquid oxygen and liquid hydrogen. He also launched the first liquid-propellant rocket and developed mechanisms for correcting deviations from planned flight path.

World War II witnessed the enormous expenditure of resources for the development of rocket-propelled weapons. Except in the case of Germany, which produced the V-2 guided missile under the direction of Wernher von Braun, much of the effort was in the designing and fabrication of unguided rockets. As German resistance collapsed in 1945, the Allies made intensive efforts to secure details of the sophisticated guided-missile system developed by von Braun and his colleagues.

During the early postwar years the heritage of German rocketry and advances in ballistic-missile technology provided the basis for launching Earth satellites. The Soviet Union orbited the first two spacecraft of this kind, Sputnik 1 and Sputnik 2, in 1957, using launch vehicles derived from intercontinental ballistic missiles. The United States launched its first Earth satellite in 1958 with the Jupiter-C launch vehicle. Jupiter-C was a modified Redstone liquid-propellant, medium-range ballistic missile to which was added three upper stages of solid-propellant rockets. Subsequent space vehicles, including unmanned planetary probes and manned spacecraft, employed launch vehicles based on military developments as well as new technology. The latter is exemplified by the Saturn series of launch vehicles, which was developed for the Apollo lunar-mission program. The Saturn series represented the first booster rockets to be designed specifically for space operations.

Work on a totally new type of rocket-powered space vehicle, the space shuttle, was initiated by the United States during the 1970s. The first reusable system ever developed, the space shuttle has three major components: (1) an orbiter equipped with three main rocket engines in the aft fuselage, (2) an external tank containing liquid hydrogen and liquid oxygen propellants for use by the main engines of the orbiter for ascent, and (3) two separable, solid-propellant rocket motors that burn along with the main orbiter engines to provide thrust during initial ascent. The first shuttle craft, the *Columbia,* was launched on April 12, 1981. Its main engines and the two boosters combined to provide more than 6,500,000 pounds (28,900,000 newtons) of thrust at lift-off.

Rocket, pioneer railway locomotive built by the English locomotive inventor George Stephenson. Following the success of the Stockton & Darlington Railway in 1825, the cities of Liverpool and Manchester decided to build a 40-mile (64.4-kilometre) steam-oper-

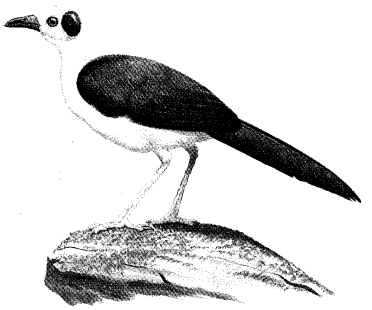
ated line connecting them. Stephenson was entrusted with constructing the line, but a competition was held to choose a locomotive. Stephenson's "Rocket" won against three rivals, including an entry by John Ericsson, who later designed an armoured vessel called the "Monitor" for the federal forces during the American Civil War. For a short stretch the "Rocket" achieved a speed of 36 mi per hour.

rocket salad (plant): *see* roquette.

rockfish, also called STONEFISH, alternative name sometimes used for the scorpionfish (*q.v.*), family Scorpaenidae, which includes the lion-fish and the redfish (*qq.v.*).

Rockford, city, seat of Winnebago County, northern Illinois, U.S., on the Rock River. The state's second largest city, it was founded by New Englanders in 1834 and originally called Midway (as the site of a coach stop halfway between Chicago and Galena); it was renamed for the ford across the river. Waterpower supplied by a dam constructed in 1844 led to the development of Rockford as a manufacturing centre in the middle of an agricultural area. Its principal manufactures include machine tools, screw products and fasteners, hardware, farm implements, furniture, and seeds. The farm-machinery business began in the early 1850s when John Manny, a Rockford inventor, developed a reaper and mower combination. The furniture industry began with an influx of Swedish carpenters, who went there following the extension of the Galena and Chicago Union Railroad to the Rock River (1852). Camp Grant, a reception and medical centre during World Wars I and II, was converted into the Greater Rockford Airport. Rockford College was founded in 1847 as Rockford Female Seminary. Rock Valley (junior) College was opened in 1964. The Time Museum in the Clock Tower Inn houses a notable collection of antique timepieces. Sinnissippi Park Sunken Gardens is a riverfront recreational area. Inc. village, 1839; city, 1852. Pop. (1980) city, 139,712; (1982 est.) metropolitan area (SMSA), 279,200.

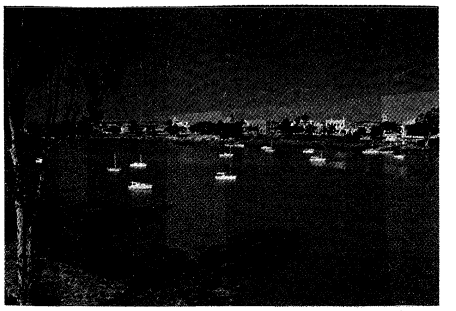
rockfowl, also called BALD CROW, either of the two species of western African birds, genus *Picathartes,* constituting the subfamily



White-necked rockfowl (*Picathartes gymnocephalus*)
Painting by Albert E. Gilbert

Picathartinae, of uncertain family relationships in the order Passeriformes. Both species, with virtually no feathering on the head, have drab, grayish plumage and are thin-necked, hump-backed, and heavy-billed—quite vulture-like in appearance. In the white-necked rockfowl (*Picathartes gymnocephalus*), 48 centimetres (19 inches) long, found from Sierra Leone to Togo, the head skin is yellow and black; in the gray-necked rockfowl (*P. oreas*), 40 cm (15½ in.) long, of Cameroon, it is red and gray-blue. Rockfowl search the ground for insects, snails, crustaceans, and small vertebrates in wet, rocky upland forests. They make mud nests in colonies on cliffs.

Rockhampton, city and commercial centre for a large part of central Queensland, Australia, at the head of ocean navigation on the



Rockhampton on the Fitzroy River, Queensland
Frederick Ayer—Photo Researchers

Fitzroy River, 38 mi (60 km) upstream from its mouth on Keppel Bay. The town was laid out in 1858 on Gracemere Station and its name chosen in reference to rock formations in the river and to Hampton, Eng. Proclaimed a municipality in 1860, it began to grow after gold, tin, and copper were found in the interior at Canoona and Peak Downs. Its development was stimulated by the completion in 1867 of a railroad over the Eastern Highlands, by the discovery in the 1880s of gold at Mount Morgan (22 mi south), and by the introduction of refrigerated meat boats. Declared a borough in 1883, it became the City of Greater Rockhampton in 1960.

Located on the Bruce Highway and the Great Northern Railroad to Brisbane, 325 mi southeast, Rockhampton continues to serve the grain, cattle, and sheep lands to the west. Its more immediate hinterland yields tropical fruits, corn (maize), and dairy products; gold, copper, pyrites, limestone, salt, and coal (at Moura and Blair Athol) are mined farther west. The city is served by Port Alma, its deepwater outport at the mouth of the Fitzroy. Rockhampton has facilities for processing meat, butter, and fruit; railroad workshops; fertilizer, chemical, soap, and cement plants; and cotton ginneries. A tourist base for the Great Barrier Reef offshore, the city has botanic gardens and celebrates an annual *eisteddfod,* a Welsh cultural festival. Pop. (1981) 50,146.

Rockingham, Charles Watson-Wentworth, 2nd marquess of (b. May 13, 1730—d. July 1, 1782, London), prime minister of Great Britain from July 1765 to July 1766 and from March to July 1782. He led the parliamentary group known as Rockingham Whigs, which opposed Britain's war (1775–83) against its colonists in North America.

He succeeded to his father's title of marquess in 1750 and served from 1751 to 1762 as gentleman of the bedchamber for George II (reigned 1727–60) and George III (reigned 1760–1820). In July 1765 George III dismissed George Grenville as head of the ministry and appointed Rockingham in his place. The new prime minister obtained repeal of the Stamp Act, which had imposed an unpopular tax



Rockingham, bas-relief by J. Tassie; in the Scottish National Portrait Gallery, Edinburgh
By courtesy of the Scottish National Portrait Gallery, Edinburgh

on the American colonists, but he agreed to the passage of a Declaratory Act reaffirming Parliament's power to tax the colonies and to make statutes binding on them in all areas. He tried to lighten the tax burden on Americans by reducing the duty on non-British imported molasses. Despite solid legislative achievements in other areas, Rockingham's ministry collapsed through internal dissension, and in July 1766 George replaced Rockingham with William Pitt (later earl of Chatham).

For the next 16 years Rockingham led a strong parliamentary opposition to the ministries in power. Because he was totally lacking in oratorical skills, his brilliant colleague Edmund Burke presented the group's case against Britain's efforts to suppress the American rebellion. During his brief second ministry Rockingham initiated peace negotiations with the American colonists and pushed through Parliament Burke's program for limiting the king's patronage power. In addition, his ministry obtained legislative independence for the Irish Parliament. Ross Hoffman's biography of Rockingham, *The Marquis,* was published in 1973.

Rockingham ware, English earthenware, stoneware, and porcelain made at Swinton, Yorkshire, in a factory on the estate of the Marquess of Rockingham. The pottery was started in 1745, but it was not until 1826 that it assumed the name Rockingham. It



Rockingham porcelain vases, *c.* 1830; in the Victoria and Albert Museum, London
By courtesy of the Victoria and Albert Museum, London; photograph, EB Inc.

continued to operate until 1842. Rockingham porcelain, light in weight, was eclectic in style, much of it in an extravagant revived Rococo style of questionable taste but always well made and finished. A manganese-brown glaze called "Rockingham glaze" was used on the stoneware. From *c.* 1840 to 1900, U.S. factories such as that in East Liverpool, Ohio, made a brown-glazed pottery also called Rockingham.

Rockland, city, seat (1860) of Knox County, southern Maine, U.S., on the west shore of Penobscot Bay, 81 mi (130 km) northeast of Portland. The site, settled in 1717, was originally part of Thomaston; it was separately incorporated in 1848 as the town of East Thomaston and was renamed Rockland in 1850 for the local limestone quarries. Its early development was based on lime production and shipbuilding (the famed clipper ship "Red Jacket" was built there in 1854). The city is now the commercial hub of the Penobscot Bay region with a significant summer tourist trade. There is some commercial fishing and light industry (cement production, boat building, and welding). Rockland's harbour, one of the finest on the Maine coast, is a major landing and distribution point for lobsters which form the basis for the city's annual Maine Seafoods Festival (August).

Edna St. Vincent Millay, the poet, was born in Rockland in 1892. The city's William A. Farnsworth Library and Art Museum houses

a notable collection of paintings by Andrew Wyeth and his family, and the adjacent Farnsworth Homestead is an example of a 19th-century Greek Revival mansion. Thomaston, immediately southwest, retains a number of elegant old homes that attest to its colonial mercantile past; including Montpelier, a replica of Gen. Henry Knox's mansion that is maintained as a state memorial museum. A state ferry service operates from Rockland to the offshore yachting-resort islands of Vinelhaven, North Haven, and Matinicus. Inc. city, 1854. Pop. (1980) 7,919.

Rockledge (Florida, U.S.): *see* Cocoa–Rockledge.

Rockne, Knute (Kenneth) (b. March 4, 1888, Voss, Nor.—d. March 31, 1931, Chase County, Kan., U.S.), football coach who built the University of Notre Dame, Indiana, into a major power in U.S. college football. The success of his teams and his humorous, colourful personality captured the public's imagination during the 1920s, the "golden age" of American sports.

From 1893 Rockne's immigrant family lived in Chicago. At the age of 22 he entered Notre Dame, where he played end on the football team and also was a track star. In 1913 the passing from Charles ("Gus") Dorais to Rockne enabled Notre Dame to upset powerful Army (U.S. Military Academy, West Point, N.Y.) and popularized the forward pass, which had not been widely used. From 1914 he taught chemistry and served as assistant football coach at Notre Dame, and in 1918 he became head football coach and athletic director. He also played end for numerous professional teams during that period.

In 13 seasons Rockne's "Fighting Irish" of Notre Dame won 105 games, while losing only 12 and tying 5. Notre Dame was undefeated in 1919, 1920, 1924, 1929, and 1930, and was considered national champion in 1924, 1929, and 1930. Rockne trained such famous players as George Gipp and the 1922–24 backfield men known as the "Four Horsemen," and he prefigured the modern "platoon system" by substituting complete teams, which he called "shock troops," during games.

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Rockville, city, seat (1776) of Montgomery County, Maryland, U.S., northwestern suburb of Washington, D.C. The settlement originated during the Revolutionary period around Hungerford's Tavern and was known first as Montgomery Court House and later as Williamsburg. Created a town in 1801, it was renamed for nearby Rock Creek. The Great Falls of the Potomac are 9 mi (14 km) southwest. Since World War II the city has become a focus of commercial development with emphasis on research and technology (aerospace, computer, nuclear energy, and communications). It is the location of the Food and Drug Administration and Health Services Center and of the Rockville Campus of Montgomery College (1946). Novelist F. Scott Fitzgerald and his wife, Zelda, are buried in St. Mary's Cemetery. Inc. city, 1860. Pop. (1980) 43,811.

rockweed, common name for various species of brown algae. *See* Fucus; Sargassum.

Rockwell, Norman (b. Feb. 3, 1894, New York City—d. Nov. 8, 1978, Stockbridge, Mass., U.S.), U.S. illustrator best known for his covers for the journal *The Saturday Evening Post.*

Rockwell, a scholarship winner of the Art Students League, received his first free-lance assignment from Condé Nast at 17 years of age and thereafter provided illustrations for various magazines. In 1916 he sold his first cover to *The Saturday Evening Post,* for which in the next 47 years he illustrated a total of 317 magazine covers. From 1926 to 1976 Rockwell also illustrated the official *Boy Scout Calendar.* During World War II, posters of his paintings portraying the "Four Freedoms" were reproduced and distributed by the Office of War Information.



"The Argument," painting by Norman Rockwell; in a private collection
EB Inc.

Rockwell was a careful craftsman with an ability to represent detail realistically. The subjects of most of his illustrations are taken from everyday family and small-town life and are often treated with a touch of humour. Though loved by the public, Rockwell's work was dismissed by most critics as lacking artistic merit and authentic social observation. In 1977 he was awarded the Presidential Medal of Freedom—the nation's highest peacetime award—by Pres. Gerald R. Ford.

Rockwell International Corporation, formerly (1967–73) NORTH AMERICAN ROCKWELL CORPORATION, major U.S. manufacturer of products for the aviation and aerospace markets and one of the country's leading defense contractors. Headquarters are in Pittsburgh.

The main company was incorporated in 1928 as North American Aviation, Inc., a holding company for a number of aviation companies, but it switched to aircraft manufacturing when it received a contract from the Army Air Corps for 42 planes. The contract was fulfilled by the development and construction of the BT-9. By the start of World War II, North American had produced the B-25 bomber. After the war the company turned to rocket design.

In 1967 North American merged with Rockwell-Standard Corporation to become North American Rockwell Corporation. The company assumed its present name in 1973. Rockwell traced its origins to a small axle plant founded in Oshkosh, Wis., by Col. Willard Rockwell in 1919. The company produced truck axles for military use during World War I and in 1928 merged with the Timken-Detroit Axle Company, a leader in the heavy-duty axle field. During the 1930s Rockwell worked with the U.S. War Department to design truck and tank transmissions and eventually expanded into all types of automotive parts. In 1958 Rockwell moved into aircraft manufacturing by acquiring Aero Design and Engineering.

Since the merger Rockwell has continued to be a major government contractor, manufacturing automotive components for military vehicles, rocket propulsion systems, missiles and rockets, sonobuoys (bouys equipped with sonar), missile guidance and control systems, B-1B bomber airframes, and system components for the space program. The company also manufactures household appliances, power tools, telecommunications equipment, and systems and products related to the production of energy for the oil, gas, and nuclear industries.

Rocky Mount, city, Nash and Edgecombe counties, east central North Carolina, U.S., 50 mi (80 km) east-northeast of Raleigh. Founded in 1816, it was named for the rocky mounds and ridges along its site near the falls of the Tar River. After the arrival of the Wilmington and Weldon Railway in 1840, it developed as a railroad centre and division point that merged with a village that had grown around cotton mills (established 1818) by the falls. The tracks of the Seaboard Coast (railway) Line bisect the main street and mark the boundary of the two counties. The city has one of the world's largest bright-leaf tobacco marts, and its diversified manufactures include textiles, furniture, fabricated metals, and chemicals. North Carolina Wesleyan College, 3 mi north, was founded in 1956. Pop. (1980) 41,283.

Rocky Mountain goat: *see* mountain goat.

Rocky Mountain National Park, national park, in north central Colorado, U.S., established in 1915. Enclosing part of the Front Range of the Rocky Mountains, it is 262,191 ac (106,109 ha) in area. The park contains numerous high peaks exceeding 10,000 ft (3,000 m), including Longs Peak (14,256 ft), as well as broad valleys, gorges, alpine lakes, and plunging streams. Ice Age glacial deposition is evidenced by meadows and rolling moraines. A great variety of plant life can be seen, with more than 700 known species. The tundra in the park's high country is an island of arctic vegetation, surrounded by plants of lower latitudes. Animal life includes bighorn sheep, deer, mountain lions, and a variety of birds.



The Mummy Range, Rocky Mountain National Park, Colorado
Josef Muench

Rocky Mountain spotted fever, typhus-like disease first described in the Rocky Mountain section of the United States, caused by a specific microorganism (*Rickettsia rickettsi*) and transmitted to man by ticks. It is identical with a disease known as São Paulo fever in Brazil and with the spotted fever of Colombia. Discovery of the microbe of Rocky Mountain spotted fever in 1906 by H.T. Ricketts led to the understanding of other rickettsiae-caused diseases.

The predominance of the disease in western North America among persons exposed to the open range, and its seasonal limitation to late spring and early summer months, were explained when the carrier species was identified as a wood tick, *Dermacentor andersoni,* widely distributed in the adult form upon large mammals, particularly cattle and sheep. The occurrence of the human disease in the eastern and southern United States was explained when it was discovered that the common dog tick, *Dermacentor variabilis,* which attacks man, also acts as a carrier. In the southwestern United States, human cases were also traced to the lone star tick, *Amblyomma americanum.* In Brazil the common carrier is *Amblyomma cajennense.*

The clinical course of the disease is essentially similar to that of typhus fever. In severe

cases of spotted fever the rash tends to be more hemorrhagic and to be accentuated on the extremities, particularly about the wrists and ankles. Nervous and mental symptoms are common; restlessness, insomnia, disorientation, and delirium are frequent manifestations of involvement of the central nervous system. Prostration may be marked from the beginning, merging into coma with death possible as early as the sixth or seventh day. Convalescence is likely to be slow and may be complicated by visual disturbances, deafness, and mental confusion. Although the patient's recovery may be delayed, it is usually complete. The case-fatality rates, as in typhus, vary directly with age.

Early treatment with antibiotics greatly shortens the disease and decreases the risk of death. Prevention depends primarily upon the exercise of personal care in protection against tick bites. Persons exposed to known infected areas should frequently examine their clothing and body for ticks. Usually the tick does not become attached to its host immediately but crawls about for several hours. The chance of receiving infection from the bite of a tick is directly proportional to the length of time that the tick has fed. Ticks should be removed from the person or from a pet with a small forceps, and the skin area involved swabbed with an antiseptic.

There is a satisfactory vaccination procedure against Rocky Mountain spotted fever: the vaccine is administered in the spring or early summer before the beginning of the tick season and is repeated annually, because the maximum degree of protection conferred is for less than a year. The degree of immunity afforded is relative, but the chance for subsequent infection is lessened, and the risk of death is greatly reduced. *See also* boutonneuse fever.

Rocky Mountain Trench, geological depression extending north-northwest for about 900 miles (1,400 km) from western Montana, U.S., south of Flathead Lake, through British Columbia, Can., to the headwaters of the Yukon River. The trench parallels the steep western face of the Rockies, separating them from the older western ranges, and its rugged floor (2–10 miles [3–16 km] wide and 2,000–3,000 feet [600–900 m] above sea level) forms a natural travel route. It is occupied in part by several rivers, including the headwaters of such rivers as the Kootenay, Fraser, Peace, Columbia, and Liard.

Rocky Mountains, byname THE ROCKIES, mountain range that is a major component of the great upland system of western North America, extending from northern Alberta (Canada) southward through the western United States to Mexico, a distance of some 3,000 miles (4,800 km). It is bounded by the Great Plains on the east and by the ridges and plateaus of the Western Intermontane Region, which includes the Basin and Range Province, on the west.

A brief treatment of the Rocky Mountains follows. For full treatment, *see* MACROPAEDIA: North America.

The width of the system varies from 70 to 400 miles (110 to 650 km) and the elevation from 5,000 feet (1,500 m) to 14,433 feet (4,399 m) at Mount Elbert, Colorado, the highest point in the Rockies. In the Late Cretaceous Period (from about 65,000,000 to 100,000,000 years ago), the Laramide orogeny (mountain-building episode) uplifted the young folded mountains of the Rockies, which were later subjected to further uplifting and glaciation.

Physiographically, the Rockies comprise two distinct divisions, eastern and western. The eastern division has two massive uplifts, the 300-mile- (480-kilometre-) long Front Range of Colorado and the central Arizona uplift (of similar extent); the rest of the ranges are smaller and quite uniform in size, about 60 miles (95 km) long and 15 miles (25 km) wide. Layers of sedimentary rocks in the ranges of the eastern division are relatively thin, varying in thickness from a few feet to 6,000 to 7,000 feet (1,800 to 2,100 m) and are mostly uplifted in place with little folding or faulting. The western division is very different, being characterized by a series of parallel ridges created by extensive thrust and block faulting and folding; the sedimentary rockbeds of these ridges have a thickness of more than 40,000 feet (12,000 m) in places. The western division's main subdivisions are the Canadian and the northwestern Montana Rockies.

Some of North America's major rivers, such as the Missouri, Rio Grande, Columbia, and Colorado, originate in the Rockies, which also form the Continental Divide separating rivers flowing toward the Gulf of Mexico and Atlantic Ocean in the east from those flowing toward the Pacific Ocean in the west. The snow line (the lower margin of perennial snowfields) in the Rockies is at about 13,000 feet (4,000 m) in the southern ranges and 8,000 feet (2,500 m) in the northern ranges.

Rocky Mountain flora include white spruce, juniper, aspen, fir, pine, and alpine meadow grasses; fauna include grizzly bear, brown bear, wapiti (elk), mule deer, Rocky Mountain goat, bighorn sheep, and cougar. The Rocky Mountain states of Idaho, Nevada, Utah, New Mexico, Arizona, Colorado, Montana, and Wyoming have rich deposits of copper, iron ore, silver, gold, lead, zinc, phosphate, potash, and gypsum; these states are also substantial producers of coal, natural gas, and petroleum. In the Rocky Mountains are found almost all of the United States' molybdenum, beryllium, and uranium. Other economic activities on the mountain slopes and valleys are ranching, lumbering, and tourism. Rocky Mountain, Yellowstone, and Grand Teton national parks in the United States are major recreational facilities. The Eisenhower Memorial Tunnel, at an elevation of 11,000 feet (3,350 m), west of Denver, is one of the world's highest highway tunnels.

Rococo style, style in interior design, the decorative arts, painting, architecture, and sculpture that originated in Paris in the early 18th century but was soon adopted throughout France and later in other countries, principally Germany and Austria. It is characterized by lightness, daintiness, grace, elegance, and an excessive use of curving, natural forms in ornamentation. The word *Rococo* is derived from the French word *rocaille,* which denoted the shell-covered rockwork that was used to decorate artificial grottoes.

At the outset the Rococo style represented a reaction against the grand ponderousness of Louis XIV's Palace of Versailles and the official Baroque art of his reign. Several interior designers, painters, and engravers, among them Pierre Le pautre, J.-A. Meissonier, Jean Berain, and Nicolas Pineau, developed a lighter and more intimate style of decoration for the new residences of nobles in Paris, and the style was disseminated throughout France by means of engravings. In the Rococo style, walls, ceilings, and moldings were decorated with delicate interlacings of curves and countercurves based on the fundamental shapes of the "C" and the "S," as well as with shell forms and other natural shapes. Asymmetrical rather than symmetrical design was the rule. Light pastels, ivory white, and gold were the predominant colours, and Rococo decorators frequently used mirrors.

Excellent examples of French Rococo are the Salon de M. le Prince (completed 1722) in the Petit Château at Chantilly, decorated by Jean Aubert, and the salons (begun 1732) of the Hôtel de Soubise, Paris, by Germain Boffrand (*q.v.*). The decorative arts of the period from 1715 to 1745 exemplify the Rococo tendencies admirably, for it was a style well-suited to furniture, tapestry, porcelain, goldwork, and silverwork.

Rococo painting in France began with the graceful, gently melancholic paintings of Antoine Watteau, culminated in the playful and sensuous nudes of François Boucher, and ended with the freely painted genre scenes of Jean-Honoré Fragonard. Rococo portraiture had its finest practitioners in Jean-Marc Nattier and Jean-Baptiste Perroneau. French Rococo painting in general was characterized by easygoing and frivolous treatments of mythological and courtship themes, rich and delicate brushwork, a relatively light tonal key, and sensuous colouring. Rococo sculpture was notable for its small and intimate scale.

From France the Rococo style spread in the 1730s to the Catholic German-speaking lands, where it was adapted to a brilliant style of religious architecture that combined French elegance with south German fantasy as well as with a lingering Baroque interest in dramatic spatial and plastic effects. Some of the most beautiful of all Rococo buildings outside France are to be seen in Munich—for example, the refined and delicate Amalienburg (1734–39), in the park of the Nymphenburg palace, and the Residenztheater (1750–53; rebuilt after World War II), both by François de Cuvilliés. Among the finest German Rococo pilgrimage churches are the Vierzehnheiligen (begun 1743), near Lichtenfels, in Bavaria, designed by Balthasar Neumann (*q.v.*), and the Wieskirche (begun 1745), near Munich, built by Dominikus Zimmermann and decorated by his elder brother Johann Baptist Zimmermann. G.W. von Knobelsdorff and Johann Michael Fischer also created notable buildings in the style, which utilized a profusion of stuccowork and other decoration.

In Italy the Rococo style was concentrated primarily in Venice, where it was epitomized by the large-scale decorative paintings of Giambattista Tiepolo. The urban vistas of Francesco Guardi and Canaletto were also influenced by the Rococo. Meanwhile, in France the style had already begun to decline by the 1750s when it came under attack from critics for its triviality and ornamental excesses, and by the 1760s the new, more austere movement of Neoclassicism began to supplant the Rococo in France.

The term Rococo is sometimes used to denote the light, elegant, and highly ornamental music composed at the end of the Baroque period—*i.e.*, from the 1740s until the 1770s. The earlier music of Joseph Haydn and of the young Wolfgang Amadeus Mozart can thus be termed Rococo, although the work of these composers more properly belongs to the emerging Classical style.

Rocque, François de la (b. 1885, Cantal, Fr.—d. April 28, 1946, Paris), French fascist and army officer who sought dictatorial power but merely helped bring down the government of Édouard Daladier in 1934.

The son of a general, Rocque was from a long line of career officers. After graduating from the prestigious military academy of Saint-Cyr (1916), he served with distinction in World War I and was on the staff of Marshal Ferdinand Foch. After tours of duty in Poland (1922–24) and Morocco (1924–28), he resigned from the army.

In 1931 he became president of the Croix de Feu ("Cross of Fire"), orginally an organization of veterans decorated at the front, which espoused ultranationalistic views with vaguely fascist overtones. Rocque displayed a particular talent for mob oratory. On Feb. 6, 1934, thousands of people and members of virtually every political group in France demonstrated opposite the Chamber of Deputies, ostensibly over the Stavisky affair (*q.v.*). Rocque

stole the show with his flaming invective. He might have been able to make himself dictator then, but at the crucial moment he failed to act. The Daladier government resigned that night, highlighting the Third Republic's weakness.

Thereafter, Rocque's organization suffered a loss of prestige and finally was dissolved by the Popular Front government in 1936. Rocque then formed the Parti Social Français, an openly fascist political party. He served in the Vichy government but was arrested by the Nazis and spent more than two years in a German prison, from which he was liberated by the Allies. Officially disgraced in his homeland, he was forced to retire from politics.

Rocroi, ancient fortress town, Ardennes *département,* northeastern France. It lies 4 miles (6 km) from the Belgian frontier. The great bastions surrounding the small town in the form of a pentagon have been preserved intact and offer an exceptionally good example of 16th- to 17th-century military architecture. Begun in 1555, the ramparts were rebuilt in 1691 by Sébastien Le Prestre de Vauban, the French military engineer. The Great Condé defeated the Spaniards near Rocroi in 1643. Pop. (1982) 2,363.

Rocroi, Battle of (May 19, 1643), a military engagement of the Thirty Years' War in which a French army of 22,000 men, under the Duc d'Enghien (later known as the Great Condé), annihilated a Spanish army of 26,000 men under Don Francisco de Melo, marking the end of Spain's military ascendancy in Europe.

The Spanish army crossed the French border from the Netherlands and then stopped to besiege the small fortress of Rocroi, 55 miles (88 km) northeast of Reims. Enghien advanced rapidly, knowing that the Spaniards were expecting reinforcements. On May 18 both armies positioned themselves with the bulk of their infantry in the centre, flanked by two wings of cavalry. Early on May 19 Enghien led a successful cavalry charge of the French right against the Spanish left. The French cavalry of the left also attacked the Spanish right, against his orders, and was repulsed. The Spaniards then followed through by starting their assault on the French centre. Meanwhile, Enghien's cavalry turned to its left and cut its way through the middle of the enemy infantry, thus isolating the elite Spanish soldiers in the front ranks from their less steady German and Italian allies in the rear. Enghien's troops then reached the cavalry on the Spanish right flank, who were still engaged with the French in their front, and dispersed them. The 8,000 elite Spanish infantry were by now completely isolated, as Enghien's attack had broken up the rear ranks of supporting German and Italian infantry. Late in the day, when all the available French as well as the captured Spanish guns were turned on them, the Spanish asked to surrender. But as Enghien and his staff were coming to receive the surrender some Spaniards mistakenly opened fire. The enraged French hurled themselves on the Spanish infantry, killing more than half and capturing the rest. The Battle of Rocroi marked the decline of Spanish military power.

rod, light-sensitive cell in the retina of the eye that can receive gray images, like those on a black-and-white television screen, in dim light. The outer segment of a rod cell, *i.e.,* that part which is farthest from the interior of the eye (and, curiously enough, the farthest from entering light rays), is made up of thin disks, like a pile of extremely thin poker chips. To these disks are attached molecules of the visual pigments. The inner segment of a rod contains the energy producers for the cell (the mitochondria), the nucleus, and the element that connects the rod cell with another nerve cell, known as a bipolar cell. Attached to the light-absorbing disks in the outer segment are molecules of the pigment visual purple, or rhodopsin, a compound of the protein opsin and the carotenoid retinal formed from the oxidation of vitamin A. The greater the concentration of visual purple, the greater the ability to see in dim light. The visual purple is broken down by light; its concentration is lessened to the point at which production of the pigment and its breakdown are in balance. The lessened concentration of visual purple causes the eye to be less sensitive to light (light adaptation). In dim light there is little breakdown of visual purple, and its manufacture far outstrips its breakdown. The more concentrated pigment makes it possible to see objects better (dark adaptation). If too little vitamin A is absorbed, it is unavailable for manufacture of visual purple, and night blindness ensues. If deprivation of vitamin A is continued there can be permanent injury to the rods. *See also* cone.

rod, old English measure of distance equal to 16½ feet (5 m). That length is sometimes also called a perch. The word *rod* is an Anglicization of the Dutch *rood,* which in turn is traced to the German *rute.* The Dutch *rood* referred to a land area 1 × 40 rods, equal to one-quarter acre, or 10,890 square feet (1,012 square m). It also denoted just one square rod, or 272.25 square feet (25.29 square m). The rood also was a British linear unit, designating any of a wide range of lengths. At 16½ feet (5 m) it was identical with the common surveyor's measure, the rod. The German *rute* was much shorter, about 12.36 to 12.47 feet (about 3.78 m).

Rod, Édouard (b. March 29, 1857, Nyon, Switz.—d. Jan. 29, 1910, Grasse, Fr.), French-Swiss writer of psychological novels and a pioneer of comparative criticism.

After his first novels, written in the style of Émile Zola, the best of which was *Palmyre Veulard* (1881), Rod soon evolved his own highly sensitive, introverted psychological art in such novels as *La Course à la mort* (1885), *Le Sens de la vie* (1889), *Nouvelles Romandes* (1890), *La Vie privée de Michel Teissier* (1893; *The Private Life of an Eminent Politician*), and *Le Silence* (1894). Although often a prey to pessimism and despondency, Rod insisted more and more on duty, conscience, and renunciation as decisive elements of life. As a critic he was a forerunner of modern comparative literary study, his chief works being *De la littérature comparée* (1886) and *Reflets d'Amérique* (1905).

Rodbertus, Johann Karl (b. Aug. 12, 1805, Greifswald, Swedish Pomerania [now Germany]—d. Dec. 6, 1875, Jagetzow, Prussia [now Germany]), economist who, because of his conservative interpretation of social reform, was instrumental in the passage of social legislation in Prussia.

Rodbertus was educated in law at Prussian universities. In 1836 he acquired the landed estate of Jagetzow in Pomerania.

Rodbertus advocated governmental regulation of wages so that they might rise in proportion to increases in national productivity. Unlike Thomas Malthus and David Ricardo, who argued that wages rise naturally with a rise in the standard of living, Rodbertus maintained that wage earners, when left to their own devices, cannot earn enough for more than a bare minimum of physical existence. All increases of national productivity, Rodbertus believed, accrue to the owners of property. Since property owners constitute a minority of the population, crises of under consumption and retarded production occur. Although this doctrine was similar to notions posited by some socialists, Rodbertus did not call into question the fundamental institutions of capitalism itself. On the contrary, in entrusting the government with the task of legislating the conditions of wage payments, he furnished a conservative basis for state intervention, thus winning support for social legislation from groups who ordinarily opposed socialist agitation and precepts.



Rodbertus, lithograph *c.* 1850
Archiv fur Kunst und Geschichte, Berlin

Rodchenko, Aleksandr (Mikhailovich) (b. Dec. 5 [Nov. 23, Old Style], 1891, St. Petersburg [now Leningrad]—d. Dec. 3, 1956, Moscow), Soviet painter, sculptor, designer, and photographer, an important member of the Constructivist movement.

Rodchenko studied art at the Kazan School of Art in Odessa from 1910 to 1914 and then went to Moscow. He soon abandoned a Futurist style of painting in favour of a completely abstract, highly geometric style using a ruler and compass. His first major show was part of an exhibition organized in Moscow in 1916 by Vladimir Tatlin, and in 1918 Rodchenko presented a one-man show in Moscow. In the latter year he painted a series of black-on-black geometrical paintings in response to the famous "White on White" painting of his rival, Kazimir Malevich. In 1919 Rodchenko began to make three-dimensional constructions out of wood, metal, and other materials, again using geometric shapes in dynamic compositions; some of these hanging sculptures were, in effect, mobiles.

Rodchenko led a wing of artists in the Constructivist movement—the Productivist group—who wanted to forge closer ties between the arts and industry and to produce works that they considered more appropriate in the daily lives of worker-consumers. He thus renounced easel painting in the 1920s and took up other art forms, among them photography; poster, book, and typographic design; furniture design; and stage and motion-picture set design. He held various government offices concerned with art-related projects, helped to establish art museums, and taught art.

Rodd, Kylie Tennant: *see* Tennant, Kylie.

Rodenbach, Albrecht (b. Oct. 27, 1856, Roeselare, Belg.—d. June 23, 1880), one of the leaders of the revival in Flemish literature that developed in the late 1870s as a direct challenge to the growth of French influence in Belgian cultural life.

When he went to the university at Louvain, Rodenbach at once began to collaborate with another young poet, Pol de Monte, to promote ideals of a thoroughly Flemish artistic revival through the mobilization of student opinion. A volume of Rodenbach's verse, *Eerste Gedichten* (1878; "First Poems"), was published before his early death. He also wrote a grandiose verse play, *Gudrun,* which did not, however, appear during his lifetime. On Rodenbach's death, Pol de Monte became the leader of the Flemish movement, which henceforth tended to look more to Germany for its inspiration.

Rodenbach, Georges (-Raymond-Constantin) (b. July 16, 1855, Tournai, Belg.—d. Dec. 25, 1898, Paris), Symbolist poet and

novelist whose writing was inspired by scenes of his native Belgium.

Rodenbach studied law in Ghent and continued his studies in Paris. His first collection of verse, *Le Foyer et les champs* ("The Hearth and the Fields"), was published in 1877. He returned from Paris to Brussels to practice law but later renounced the profession to devote himself to the Belgian literary renaissance movement, La Jeune Belgique.

Rodenbach's early works were known mainly in Belgium, but with the 1886 publication of *La Jeunesse blanche* ("The White Youthfulness") came general recognition in France. Following this, Rodenbach settled in Paris. His finest work includes *Bruges-la-Morte* (1892; "Bruges, the Dead City"), a nostalgic novel evoking the landscape of Flanders, and *Les Vies encloses* (1896; "The Enclosed Lives"), moody, ruminative poems evoking the interior landscape of a self-absorbed mind.

rodent, a member of the mammalian order Rodentia, a diverse and abundant group of gnawing animals that includes such families as the squirrels and chipmunks (Sciuridae); Old World rats and mice (Muridae); voles, gerbils, hamsters, lemmings, and deer mice (Cricetidae); beavers (Castoridae); pocket gophers (Geomyidae); guinea pigs (Caviidae); pocket mice and kangaroo rats and mice (Heteromyidae); New World porcupines (Erethizontidae); and Old World porcupines (Hystricidae). Rodents account for half of the species of mammals living today; as individuals, rodents probably comprise more than 50 percent of living mammals.

A brief treatment of rodents follows. For full treatment, *see* MACROPAEDIA: Mammals.

Although the largest living rodent, the South American capybara (*Hydrochoerus hydrochoeris*), may attain a length of 1.3 m (4 feet) and a weight of 50 kg (110 pounds), rodents are generally among the smallest animals, some mice and dormice reaching only 7.5 cm (3 inches) in length and 20 g (0.7 ounce) in weight. Although rodents appear in diverse forms and adaptations, they share two major characteristics, both relating to their specialization as gnawing animals. The first is an ability to shift the jaws into two positions: when the lower jaw is pulled back, the cheek teeth come into contact to allow the grinding of food; when the jaw is pulled forward and down, the large pairs of upper and lower incisors meet at their tips to allow gnawing. The second specialization has to do with the structure of these incisors. All rodents have only one pair each of upper and lower incisors, and these teeth grow continuously throughout the animal's life. This not only permits but requires the rodent to gnaw frequently on hard substances; if the teeth are not used enough they will grow past each other and eventually cause the animal's death, either by making it incapable of eating or by actually growing back into its skull.

Rodents are specialized for many different habitats and life-styles. Typical rodents scamper on four legs, but there are various modifications in limb structure found in the group. The hind limbs are enlarged for hopping in some groups, such as the kangaroo rats, while in the highly specialized burrowing forms, such as pocket gophers, the forelimbs are short and massive with strong claws. The aquatic beavers have webbed hind feet and a dense coat. Many rodents have taken up an arboreal way of life, and various gliding species also occur.

The fossil record shows identifiable rodents in North America in the late Paleocene (about 57,000,000 years ago). Diversification was wide and rapid, especially when new territory was colonized. Rodents were the only placental mammals, other than bats, to reach Australia before the arrival of man. Man's activities have helped a few species of rodents to continue to colonize new territories in historical times. The rat species have populated the entire habitable world by traveling on boats and ships.

Most rodents are herbivorous, although many will eat animal food on occasion. Plant seeds are a preferred food of many species. These may be eaten at once or carried off to be eaten in the burrow or stored for later use. Some rodents prefer berries, grasses, leaves, acorns, buds, fruits, and other types of plant matter. The capybara and the agouti are grazers, as are the holarctic marmots and woodchuck. A few rodents are almost totally predatory.

The majority of rodents live in nests dug in the ground, sometimes at the end of complex burrow systems such as those constructed by prairie dogs. Some, like the prairie dog, are communal; others, such as the muskrat, are solitary. Squirrels either nest in holes in trees or build leafy nests among the branches. Beaver lodges in ponds or streams are constructed of branches covered with mud; the entrance is underwater. Many rodents remain in their burrows during bad weather, and some, including the hamsters and the woodchuck, undergo true hibernation.

Large rodents such as capybaras and beavers breed only once a year, but the smaller species breed more often, and some voles may have up to 13 litters in one year. Some of the smaller species, such as harvest mice and voles, may breed within five to seven weeks of birth. Part of the reason for this high reproductive rate is the fact that small rodents form the staple diet of many mammalian, avian, and reptilian predators, so they must reproduce prolifically to compensate for their low survival rate.

Rodents affect humans in several ways. Many species eat agricultural crops, destroying as much as one-third of stored grain during heavy infestations. They can also serve as reservoirs for various diseases that affect humans, such as the bubonic plague and tularemia. On the positive side, beavers, nutria, and chinchillas are highly valued for their pelts, and much important medical research has been done with the laboratory strains of the house mouse and brown rat.

rodenticide, any substance that is used to kill rats, mice, and other rodent pests. Warfarin, 1080 (sodium fluoroacetate), ANTU (legal label for alpha-naphthylthiourea), and red squill are commonly used rodenticides. These substances kill by preventing normal blood clotting and causing internal hemorrhaging. Fumigants such as sulfur dioxide, carbon monoxide, hydrogen cyanide, and methyl bromide are also effective rodenticides. Phosphorus paste, barium carbonate salt, and powders such as zinc phosphide, white arsenic, thallium sulfate, strychnine, strychnine sulfate, and calcium cyanide are mixed with bait and placed where rodents will find and eat them. All these poisons are toxic to other animals, and most cause death by disturbance of nervous-system functions. Red squill, a rodenticide derived from the bulbs of a lilylike subtropical plant, is slower-acting and less toxic to animals other than rodents because it is removed from the stomach by vomiting—a reflex that is absent in rodents.

rodeo, sport involving a series of contests and exhibitions derived from riding, roping, and related skills developed by cowboys during the era of the range cattle industry in northern Mexico and the western United States (1867–87).

The five standard rodeo events are calf roping, bull riding, steer wrestling (bulldogging), saddle bronc riding, and bareback bronc riding. (A bronc [bronco, broncho, or bucking bronco] is an unbroken range horse picked for its resistance to training and its tendency to buck, or throw, its rider.) Two other events are recognized for championships: single-steer roping and team roping. There is no ban on additional contests, and there are usually contract acts—professional specialty performances such as trick riding, fancy roping, and other exhibitions. The barrel race, a saddle horse race around a series of barrels, is a popular contest for cowgirls. Steer decorating is seen in junior contests. Prize money may be offered in a wild-horse race, wild-cow milking, trick and fancy riding, or a contest for cutting horses (horses trained to separate cattle from a herd).

The participants pay entry fees, and the prize money won is their only compensation. More than half of all rodeos are independent of state and county fairs, livestock shows, or other attractions, and many, large and small, are held in arenas devoted to the purpose. The equipment, however, is simple and may be improvised.

Rodeo developed as a peculiarly American sport confined mainly to Mexico, the United States, and Canada. Rodeos had their origin in the United States when cowboys would gather together in the "cowtowns" at the end of cattle-driving trails and vie for the unofficial title of best bucking-horse rider, roper, and so on. As the cowboys' occupation was curtailed in scope by the railroads and by fencing, the contests became regular, formal programs of entertainment. Many Western towns and areas claim the distinction of being the first place to hold a rodeo in the United States, among them Cheyenne, Wyo., in 1872 and Winfield, Kan., in 1882, but at best such early contests were merely exhibitions of riding and roping skills and not the highly organized shows that modern rodeo became. Denver, Colo., is traditionally accepted as the birthplace of paid spectator rodeo, in October 1887. The Pendleton (Ore.) Round-Up started in 1910, and the Calgary Stampede in 1912. The latter has been an annual event since 1919. But the oldest annual show of all is Cheyenne Frontier Days, which has been presented each year since 1897.

In 1903 Bill Pickett (*q.v.*), a black cowboy from Texas, leaped for the horns of a steer to save his horse from being gored and wrestled the steer to the ground, biting its upper lip in a bulldog grip. He found he could repeat the act, which became known as bulldogging—or, more politely, steer wrestling, after rodeo rules eliminated the lip biting. His employers Zack T. and George L. Miller in 1907 organized the Miller Bros. 101 Ranch Real Wild West show, which employed, as well as Pickett, such notables as Lucille Mulhall, called the first cowgirl and world's lady champion in roping and tying wild steers; Tom Mix, silent-movie cowboy actor; and Guy Weadick, who organized the first Calgary Stampede.

In 1929 the Rodeo Association of America, an organization of rodeo managers and producers, was formed to regulate the sport. The contestants themselves took a hand in 1936 after a strike in Boston Garden and organized the Cowboy Turtles Association—"turtles" because they had been slow to act. This group was renamed the Rodeo Cowboys Association (RCA) in 1945 and the Professional Rodeo Cowboys Association (PRCA) in 1975. Its rules became accepted by most rodeos. Amateur rodeo grew in popularity, and the National Intercollegiate Rodeo Association, formed in 1948, has 80 member schools. Some 500 secondary school, 4-H Club, Future Farmers of America, and other junior rodeos are held annually. The National High School Rodeo Association, which was formed in 1959, is a federation of 31 state and two Canadian provincial organizations. In the last quarter of the 20th century, the number of rodeos, attendance, and purse money all increased, and women competed in their own rodeos, adding such traditional men's events

as calf roping, bareback bronc riding, and bull riding to the traditional women's event, barrel racing.

The calf for roping and the steer for wrestling are released from chutes, an innovation since early rodeos. These are timed events. The calf must be roped and thrown, and any three feet tied together. In the steer-wrestling contest, a hazer helps to keep the steer moving straight forward. The wrestler must throw the steer with head and all feet in line. In calf roping, championships have been won in 16 s, but it has been done in well under 15 s. In steer wrestling, 11 s is championship time, but less than 10 s is on record.

In riding events the contestant is mounted before the chute gates are opened. The rider must stay on the animal for 8 s, holding on with one hand only. Judging, on a point system, is based on the performance of the animal as well as that of the contestant. Broncos are not trained to buck, and the rules of professional rodeo ban cruelty. In all riding events the contestant is disqualified if he touches the animal or its rigging with his free hand. All-around championships and championships in each of the standard events are determined each year at the National Finals Rodeo on the basis of a long-established point-award system. For winners of men's all-around rodeo championships, *see* Sporting Record: *Rodeo.*

(D.R.)

Roderic O'CONNOR, also called RORY O'CONNOR, or O'CONOR, Old Irish RUAIDHRI UA CONCHUBAIR (d. 1198, near Lough Corrib, County Galway, Ire.), king of Connaught and the last high king of Ireland; he failed to turn back the Anglo-Norman invasion that led to the conquest of Ireland by England.

Roderic succeeded his father, Turloch O'Connor, as king of Connaught in 1156. Since Turloch's title of high king was claimed by Muirchertach O'Lochlainn of Ulster, Roderic did not become high king until O'Lochlainn was killed in 1166. He then attacked Dermot MacMurrough, king of Leinster, and seized his territories. Dermot appealed to the English for aid, and in 1170 the Anglo-Norman Richard de Clare, 2nd earl of Pembroke—subsequently known as "Strongbow"—landed near Waterford. Soon Dublin had fallen to the invaders. Roderic laid siege to the city in June 1171, but his forces were routed by the Normans in mid-September. Gradually all the Irish chieftains except Roderic and the northern rulers submitted to King Henry II of England (ruled 1154–89). In 1175 Roderic agreed to become Henry's vassal for Connaught. He relinquished the high kingship but was permitted to exercise authority over territories that had not fallen under Norman rule. In about 1186 Roderic was, for a time, expelled from his kingdom by members of his own family. In 1191 he retired to a monastery, where he died.

Roderick, also spelled RODERIC, Spanish RODRIGO (d. 711), the last Visigothic king of Spain, who died in the Muslim invasion.

Roderick's predecessor, King Witiza, died in 710, leaving two young sons, for whom Witiza's widow and family tried to secure the succession. But the Visigothic nobles elected Roderick and drove the Witizans from Toledo. Roderick seems to have been *dux* (duke) or military commander of one of the provinces, perhaps Baetica. He faced a revolt of the Basques and was never recognized in the Northeast. Meanwhile, Witiza's family had made contact with the Muslims. From North Africa, the Muslims sent over a raiding party, which caused Roderick to march to the south. The Muslim governor of Tangier, Ṭāriq (or Tarik) ibn Ziyād, crossed with his main force and defeated Roderick near the Río Barbate (near Cape Trafalgar), and Roderick apparently perished in the field. Ṭāriq marched straight on to Toledo, and most of Spain capitulated. The episode is encrusted with legends; versions of Roderick's survival are apocryphal.

Rodez, town, capital of Aveyron *département,* Midi-Pyrénées region, and, until 1789, capital of the old district of Rouergue, southern France; it lies at the confluence of the Auterne and Aveyron rivers, overlooking the green undulating country of the Plateau de Segala. Colonized as Ruthena by the Romans, the town was the scene of a struggle between the bishops of Rodez (established there in AD 401) and the counts of Rouergue. A double wall was built between the two hostile parts, the names of which (the episcopal Cité and the feudal Bourg) survive in the town's two places (squares). The Place de la Cité is the site of the magnificent Gothic Notre-Dame cathedral with its 16th-century belfry rising to 285 feet (87 m); the Place du Bourg has the Romanesque church of Saint-Amans, with an 18th-century exterior and 12th-century nave (restored).

Rodez has an established woolen industry; gloves and plastic products are also manufactured. Tourism is of growing importance. Pop. (1982) 23,858.

Rodgers, Jimmie, byname of JAMES CHARLES RODGERS (b. Sept. 8, 1897, Meridian, Miss., U.S.—d. May 26, 1933, New York City), American singer and guitarist, one of the principal figures in the emergence of the country and western style of popular music. He was known throughout his musical career as the "Singing Brakeman."

Rodgers left school at the age of 14 and became a water carrier on the Mississippi and Ohio Railroad. He held a number of jobs with the railroad, including that of brakeman. The life of the railroad worker provided Rodgers ample opportunity to develop and exercise his musical skills; it was there that he learned to play the guitar and banjo, that he absorbed the techniques of the blues (from the black railroad workers), and that he honed what became his characteristic sound—a blend of traditional country, work, blues, hobo, and cowboy songs. By about 1924/25 his tubercular condition had made it impossible for him to continue to work on the railroad, and he began instead to work as a performer. In 1927 Rodgers was discovered by the RCA Victor recording company in Tennessee, and he quickly became a best-selling recording artist. He toured mostly in the South and eventually settled in Texas.

Rodgers' more than 110 recordings (including "Blue Yodel No. 1," "Brakeman's Blues," "Mississippi River Blues," and "My Time Ain't Long") have had a profound influence on many popular singers, and they are considered to be a major contribution to the establishment of the country and western genre.

Rodgers, Richard (b. June 28, 1902, New York City—d. Dec. 30, 1979, New York City), one of the dominant composers of American musical comedy, known especially for his works in collaboration with the librettists Lorenz Hart and Oscar Hammerstein II.

As a youth Rodgers composed songs for amateur boys' club shows. In 1918 he entered Columbia University. There he met Hart, with whom he collaborated on Columbia's varsity show of 1919, *Fly with Me.* After a year and a half he left Columbia, intending to work full time composing for the musical theatre. He studied composition for two years at the Institute of Musical Art (now Juilliard School of Music), New York City, and produced several amateur shows with Hart.

Rodgers and Hart's first professional success was a revue, *The Garrick Gaieties* (1925), which included the song "Manhattan." In 1936 their comedy *On Your Toes* was produced. This production, with the jazz ballet *Slaughter on Tenth Avenue* (choreography by George Balanchine), introduced ballet and established serious dance as a permanent part of musical comedy. Among their other collaborations were *Babes in Arms* (1937), including the songs "My Funny Valentine" and "The Lady Is a Tramp," *I Married an Angel* (1938), and *The Boys from Syracuse* (1938), adapted from Shakespeare's *Comedy of Errors.* Their *Pal Joey* (1940), adapted by John O'Hara from a series of his short stories, turned away from purely escapist entertainment to serious drama. Too realistic for its time when first produced, it was revived in 1952 with enormous success. Among its songs was "Bewitched, Bothered, and Bewildered." Their final collaboration, one year before Hart's death, was *By Jupiter* (1942).

In 1942 Rodgers began working with Hammerstein on an adaptation of Lynn Riggs's play *Green Grow the Lilacs.* The result, the 1944



Richard Rodgers
Brown Brothers

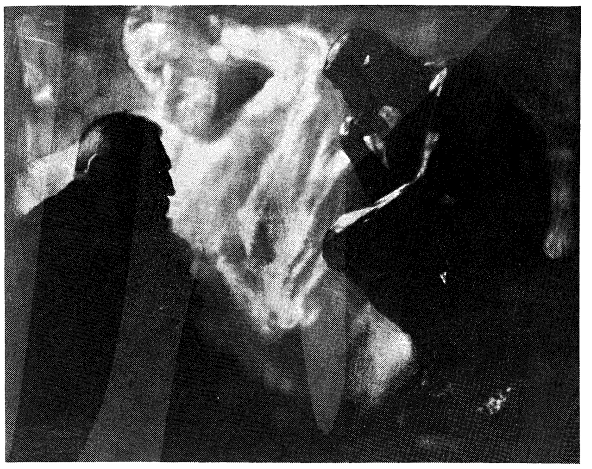
Pulitzer Prize-winning *Oklahoma!* (1943), enjoyed a then-unprecedented Broadway run of 2,248 performances. Choreographed by Agnes deMille and including the songs "Oh, What a Beautiful Morning," "The Surrey with the Fringe on Top," and "People Will Say We're in Love," it marked the beginning of a 17-year partnership that ended with Hammerstein's death. *Carousel* (1945) and the experimental *Allegro* (1947) were somewhat less successful, but *South Pacific* (1949) had a Broadway run almost as long as that of *Oklahoma!* and won a second Pulitzer Prize (1950). Unusual in its treatment of racial prejudice and skillful matching of music to character, it included the songs "Younger than Springtime," "Some Enchanted Evening," and "I'm Gonna Wash That Man Right Outa My Hair." There followed *The King and I* (1951), remarkable for its exotic character; *Pipe Dream* (1955); *The Flower Drum Song* (1958); and one of their major successes, *The Sound of Music* (1959).

Rodgers also wrote the music for the documentary film *Victory at Sea* (1952).

Rodhópis, Orosirá (Europe): *see* Rhodope Mountains.

Ródhos (Greece): *see* Rhodes.

Rodin, Auguste, in full RENÉ-FRANÇOIS-AUGUSTE RODIN (b. Nov. 12, 1840, Paris—d. Nov. 17, 1917, Meudon, Fr.), French sculptor of sumptuous bronze and marble figures, considered by some critics to be the greatest portraitist in the history of sculpture. His "La Porte de l'Enfer" ("The Gates of Hell"), commissioned in 1880 for the future Musée des



Rodin with his sculptures "Victor Hugo" and "The Thinker," gum print by Edward Steichen, 1902

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Arts Decoratif in Paris, remained unfinished at his death but nonetheless resulted in two of Rodin's most famous images: "Le Penseur" (1880; "The Thinker") and "Le Baiser" (1886; "The Kiss"). His portraits include monumental figures of Victor Hugo and Honoré de Balzac.

Early life and work. Rodin was born into a poor family. At the age of 13 he entered a drawing school, where he learned drawing and modelling, and at 17 he attempted to enter the École des Beaux-Arts, but he failed the competitive examinations three times. The following year (1858), he decided to earn his living by doing decorative stonework. Traumatized by the death of his sister Marie in 1862, he considered entering the church, but in 1864 the young sculptor met Rose Beuret, a seamstress, who became his life companion, although he did not marry her until a few weeks before her death in February 1917.

Rodin had begun to work with the sculptor A.-E. Carrier-Belleuse when, in 1864, his first submission to the official Salon exhibition, "L'Homme au nez cassé" ("The Man with the Broken Nose"), was rejected. His early independent work included also several portrait studies of Beuret. In 1871 he went with Carrier-Belleuse to work on decorations for public monuments in Brussels. Dismissed by Carrier-Belleuse, he collaborated on the execution of decorative bronzes, and Beuret joined him in Brussels.

In 1875, at the age of 35, Rodin had yet to develop a personally expressive style because of the pressures of the decorative work. Italy gave him the shock that stimulated his genius. He visited Genoa, Florence, Rome, Naples, and Venice before returning to Brussels. The inspiration of Michelangelo and Donatello rescued him from the academicism of his working experience. Under those influences, he molded the bronze "Le Vaincu" ("The Vanquished"), his first original work, the painful expression of a vanquished energy aspiring to rebirth. It provoked scandals in the artistic circles of Brussels and again at the Paris Salon, where it was exhibited in 1877 as "L'Âge d'Airain" ("The Age of Bronze"). The realism of the work contrasted so greatly with the statues of Rodin's contemporaries that he was accused of having formed its mold upon a living person.

In 1877, Rodin returned to Paris, and in 1879 his former master Carrier-Belleuse, now director of the Sèvres porcelain factory, asked him for designs. He was rejected in various competitions for monuments to be erected in London and Paris, but finally he received a commission to execute a statue for the Hôtel de Ville (City Hall) in Paris. Meanwhile, he explored his personal style in "St. Jean-Baptiste prêchant" (1878; "St. John the Baptist Preaching"). Its success and that of "The Age of Bronze" at the salons of Paris and Brussels in 1880 established his reputation as a sculptor at the age of 40.

Toward the achievement of his art. At an age when most artists already had completed a large body of work, Rodin was just beginning to affirm his personal art. He received a state commission to create a bronze door for the future Musée des Arts Décoratifs, a grant that provided him with two workshops and whose advance payments made him financially secure.

That bronze door was to be the great effort of Rodin's life. Although it was commissioned for delivery in 1884, it was left unfinished at his death in 1917. The theme of its scenes was borrowed from Dante's *Divine Comedy,* and eventually it came to be called "La Porte de l'Enfer." His original conception was similar to that of the 15th-century Italian sculptor Lorenzo Ghiberti in his "Gates of Paradise" door for the Baptistery in Florence. His plans were profoundly altered, however, by his visit to London in 1881 at the invitation of the painter Alphonse Legros. There Rodin saw the many Pre-Raphaelite paintings and drawings inspired by Dante, above all the hallucinatory works of William Blake. He transformed his plans for "The Gates" to ones that would reveal a universe of convulsed forms tormented by love, pain, and death. This unachieved monument was the framework out of which he created independent sculptural figures and groups, among them his famous "Le Penseur," originally conceived as a seated portait of Dante for the upper part of the door.

In 1884, Rodin was commissioned to create a monument for the town of Calais to commemorate the sacrifice of the burghers who gave themselves as hostages to King Edward III of England in 1347 to raise the year-long siege of the famine-ravaged city. Rodin completed work on "Les Bourgeois de Calais" ("The Burghers of Calais") within two years, but the monument was not dedicated until 1895. In 1913 a bronze casting of the Calais group was installed in the gardens of Parliament in London to commemorate the intervention of the English queen who had compelled her husband, King Edward, to show clemency to the heroes.

While the artist's glory continued to increase, his private life was troubled by the numerous liaisons into which his unbridled sensuality plunged him. In about 1885 he became the lover of one of his students, Camille Claudel, the gifted sister of the poet Paul Claudel. It proved a stormy romance beset by numerous quarrels, but it persisted until Camille's madness brought it to a finish in 1898. Their attachment was deep and was pursued throughout the country. During the years of passion Rodin executed sculptures of numerous couples in the throes of desire. The most sensuous of these groups was "Le Baiser," sometimes considered his masterpiece. Originally conceived as the figures of Paolo and Francesca for "The Gates of Hell," it exposed him to numerous scandals.

Discords and triumphs. In spite of his success, Rodin was often in conflict with L'Institut de France, the national art academy, with the public, and even with the Parliament. He devoted a decade to executing four monuments honouring the landscape painter Claude Lorrain, Pres. Domingo Sarmiento of Argentina, and the writers Victor Hugo and Honoré de Balzac, and each of the four monuments was challenged. In Nancy, Fr., the Claude statue and, in Buenos Aires, the "President Sarmiento" caused riots. The conflicts over the "Victor Hugo" and the "Balzac" were even more serious.

In 1886 he received the order for the monument to Hugo for the Panthéon, France's hall of its great men. The nudity depicted in the work caused such shock that he had to abandon the project. It was 1909 before another "Victor Hugo," also nude but seated, was installed at the gallery of the Palais-Royal, although it had been intended for the Luxembourg Gardens. In 1891, Rodin was commissioned to portray Balzac for the Société des Gens de Lettres (Society of Men of Letters). He gave himself over completely to massive research designed to translate the several Balzac portraits into sculpture. He obtained the exact measurements of the novelist's body by finding his former tailor. After much conjecture and experimentation to find an appropriate posture for the statue, he finally conceived of the writer as partly draped. The concisely designed model resembled a menhir, or upright prehistoric altar stone, foreshadowing the simplicity of modern art. The artist's delays and his design for the statue brought on a legal dispute with the Société, and, when the model was shown at the Salon de la Société Nationale des Beaux-Arts in 1898, it generated a violent debate in which the sculptor was defended by Georges Clemenceau, the future premier of France. Finally Rodin reimbursed the Société and took back the model. The statue, cast in bronze, was not erected until 1939, in the crossroads of the Montmartre section of Paris.

The Exposition Universelle of 1900 in Paris featured a pavilion in which 150 of Rodin's sculptures and numerous drawings were displayed, testifying to the international scope of his fame. After it closed, he had his works transported to a property that he had bought at Meudon in 1896. His residence there became a vast workshop where he employed a legion of assistants amid an endless stream of "favourites" who passed as his students. He was by then less a sculptor than an entrepreneur of sculpture. He himself executed only models, of which he made many, while searching for the form that suited him. Casting in bronze was the domain of specialists, but he also delegated the hewing of marble to others, to be executed under his direction but not by him. He was assisted in this "industrial" enterprise by a series of secretaries, including for a brief period the Austrian poet Rainer Maria Rilke.

After 1900, Rodin's worldwide success attracted abundant orders for portrait busts from the United States, Germany, Austria, England, and France. He enjoyed great renown in England, where he had numerous friends and which he often visited. In 1902 he was carried in triumph by students at a banquet in his honour in London. In 1907 he went to London for the inauguration of his monument to the poet William Henley at Westminster Abbey, and he—along with the French composer Camille Saint-Saëns and the U.S.

writer Mark Twain—was made a doctor *honoris causa* at Oxford University. In May 1908, King Edward VII of England visited him at his workshop in Meudon.

In the same month Rodin also rented a floor in one of the most beautiful 18th-century Parisian hotels, the Hôtel Biron, which was surrounded by an immense garden. Eventually he occupied the entire premises under an agreement by which the French state agreed to acquire and preserve the hotel as a Rodin museum in return for his donation to the state of all his works. These negotiations were endangered, however, by the self-serving intrigues of the last of his great favourites, an American who became duchess of Choiseul. They were furthered by Judith Cladel, who became his chronicler and who worked to see that the negotiations were successful, and by his last secretary, Marcelle Tirel, who defended him from the covetousness of women who tried to coax away his legacy. The purchase of the hotel and the donation of Rodin's goods was finally completed in 1916. The museum is constituted as an autonomous organization maintained by sales of castings from plaster casts that he left. On the day of Rodin's burial a solemn service was celebrated in his honour at Westminster Abbey in London.

To his sculpture, Rodin added, during his lifetime, book illustrations, dry-point etchings, and innumerable drawings of nudes, principally female. He also had literary pretensions and produced several writings with the help of friends. He was enamoured of the art of the Middle Ages, and among his major efforts was the book *Les Cathédrales de France* (1914; *Cathedrals of France,* 1965).

Assessment. At the beginning of the 20th century Rodin was famous throughout the world and long had been revered as a modern-day Michelangelo, a titan of sculpture, an incarnation of the power of inspired genius. Even his prodigious sensuality was excused as a symbol of his Olympian stature. Three-quarters of a century later, however, criticism had become less uniform, pointing to the elements in his work that belie his early life as a decorative sculptor and the concomitant lack of formal discipline. Nonetheless, he exerted an immense influence on sculpture, and his numerous students from many countries helped to spread his style. His example was particularly fruitful for such later French sculptors as Charles Despiau, Aristide Maillol, and Émile Bourdelle.

Most major museums own copies of his works, and museums in Paris, Philadelphia, and Tokyo are dedicated to him. Rodin's prime contribution was in bringing Western sculpture back to what always had been its essential strength, a knowledge and sumptuous rendering of the human body. His evocations of great men, such as his "George Bernard Shaw" and "Nijinsky," are uniformly brilliant.

(G.R.M.B.)

MAJOR WORKS. *Sculpture.* All bronzes (in multiple editions) unless otherwise noted. "L'Homme au nez cassé" ("The Man with the Broken Nose"; 1864; Musée Rodin, Paris); "Young Girl with Flowers in Her Hair" (plaster, 1865–70; Musée Rodin); "Young Mother and Child" (1865–70; Musée Rodin); "L'Âge d'Airain" ("The Age of Bronze"; 1876; Minneapolis Institute of Arts, Minnesota); "St. Jean-Baptiste prêchant" ("St. John the Baptist Preaching"; 1878; Museum of Modern Art, New York City); "La Porte de l'Enfer" ("The Gates of Hell"; 1880–1917; Rodin Museum, Philadelphia); "Le Penseur" ("The Thinker"; 1880; Musée Rodin); "Adam" (1880; Rodin Museum); "Eve" (1881; Toledo Museum of Art, Ohio); "Le Petit Homme au nez cassé" ("The Little Man with the Broken Nose"; 1882; Musée Rodin); "The Earth" (1884; Musée Rodin); "Les Bourgeois de Calais"; ("The Burghers of Calais"; 1884–86; Joseph H. Hirshhorn Collection, New York City); "The Martyr" (1885; Rodin Museum); "Le Baiser" ("The Kiss"; 1886; Tate Gallery, London); "Balzac, Nude" (1893; Musée Rodin); "Balzac" (1897; Rodin Museum); "Victor Hugo" (1897; Musée Rodin); "Fugit amor" (1897; Musée Rodin); "The Bather" or "Beside the Sea" (marble, 1905; Metropolitan Museum of Art, New York City); "The Walking Man" (1905; Musée Rodin); "George Bernard Shaw" (1906; Rodin Museum); "Nijinsky" (1912; Musée Rodin).

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Rodman, Thomas Jackson (b. July 30, 1815, near Salem, Ind., U.S.—d. June 7, 1871, Rock Island, Ill.), U.S. inventor of prismatic and perforated-cake gunpowder that burned evenly, providing controlled expansion of gases in a gun rather than a sudden shock that might burst the barrel. He also invented a system of casting cannon around a hollow core cooled from inside, resulting in a stronger barrel as concentric layers of metal cooled and shrank one upon another.

Rodman was graduated from the U.S. Military Academy at West Point, N.Y., in 1841 and from 1845 worked out the ideas of his inventions, which were accepted by the U.S. government in 1859. During the U.S. Civil War he commanded the arsenal at Watertown, Mass. He was brevetted brigadier general in 1865. At the end of the war he was placed in command of the arsenal at Rock Island.

Rodna Massif, Romanian MUNŢII RODNEI, mountain massif, the highest part of the Eastern Carpathians in Romania, reaching a height of 7,556 ft (2,303 m) at Pietrosu in the northern part of the country. Active glaciers are no longer present, but extensive glaciation of the crystalline rocks has produced fretted peaks and lakes, particularly on the northern slopes, which contain a number of alpine lakes, the largest being Lake Lala.

Rodney, Caesar (b. Oct. 7, 1728, Dover, Del.—d. June 26, 1784, Dover, Del., U.S.), delegate to the Continental Congress (1774–76, 1777–78), "president" of Delaware (1778–81), and key signer of the Declaration of Independence.

Rodney had served as high sheriff of Kent County, Del. (1755), and as a delegate to the Stamp Act Congress (1765). One of Delaware's three delegates to the Continental Congress, Rodney had been away in Delaware when he got word of the impending vote on the resolution for independence. Hurrying back to Philadelphia on horseback, he arrived in time to break the tie in his delegation and cast Delaware's deciding vote for independence.

In 1777 he was made commander of the Delaware militia with the rank of brigadier general. In 1783, after his term as "president," he was elected to the legislature but died the next year.

Rodney (of Stoke-Rodney), George Brydges Rodney, 1st Baron (baptized Feb. 13, 1718, London—d. May 24, 1792, London), English admiral who won several important naval battles against French, Spanish, and Dutch forces.

The grandson and son of army officers, Rodney briefly attended Harrow and entered the navy in July 1732. During the War of the Austrian Succession (1740–48), he took part in Admiral Hawke's victory off Ushant (Oct. 14, 1747) over the French fleet. In 1749 he was appointed governor and commander in chief of Newfoundland, with the rank of commodore.

During the Seven Years' War Rodney had a share in the expedition against Rochefort (1757). In the next year he served under Boscawen at the taking of Louisburg (Cape Breton). In 1759 and again in 1760 he inflicted great loss on the French transports collected on the Normandy coast for an attack on Great Britain. In October 1761 he was appointed commander in chief of the Leeward Islands station and, within the first three months of 1762, had reduced the important island of Martinique, while both St. Lucia and Grenada had surrendered to his squadron. In 1764 he was created a baronet, and in 1771 he was appointed rear admiral of Great Britain.

Rodney won his greatest victories against the European powers that opposed Britain in the American Revolutionary War. He captured a Spanish convoy off Cape Finisterre on Jan. 8, 1780, and eight days later defeated the Spanish admiral Don Juan de Langara off Cape St. Vincent, taking or destroying seven ships. On April 17 an action, which, as a result of the carelessness of some of Rodney's captains, was indecisive, was fought off Martinique with the French admiral Guichen. Rodney, acting under orders, captured the valuable Dutch island of St. Eustatius on Feb. 3, 1781. It had been a great entrepôt of neutral trade, and was full of booty, which Rodney confiscated. A running engagement with the French fleet on April 9, 1782, led up to his crowning victory (the Battle of the Saints) off Dominica, when with 36 ships of the line he defeated the comte de Grasse, who had 34 ships (April 12), severely damaging French naval prestige. On his return to England Rodney received a barony and a pension of £2,000 a year.

Rodnina, Irina (Konstantinovna) (b. Sept. 12, 1949, Moscow), Soviet figure skater who, with her partners, first Alexei Ulanov and later Aleksandr Zaytsev, won 10 successive world championships (1969–78) and three successive Olympic gold medals, equalling the record of Sonja Henie.

Rodnina was graduated from the Central Institute of Physical Culture, Moscow, and taught as well as skated. After winning the gold medal in the 1972 Winter Olympic Games, the Rodnina–Ulanov partnership, which had begun in 1968, was broken up, and Rodnina chose Zaytsev as her new partner after Soviet skating officials had conducted a nationwide search. The two were married in 1975. They won gold medals in the 1976 Winter Olympic Games and again in 1980, giving Rodnina three gold medals for three successive Olympics.

The Rodnina–Zaytsev team introduced side-by-side double axels (a jump movement) and was considered more athletic than lyrical—the characteristic of their predecessors the Protopopovs.

Rodó, José Enrique (b. July 15, 1872, Montevideo—d. May 1, 1917, Palermo),



Rodó, c. 1917
By courtesy of the Organization of American States

Uruguayan philosopher, educator, and essayist, considered by many to have been Spanish America's greatest philosopher, whose vision of a unified Spanish America inspired his continent. His credo, *reformarse es vivir* ("to reform oneself is to live"), and his devotion to the people of the Americas pervaded all his writings.

Rodó spent most of his life in Montevideo, devoting himself to writing, voracious reading, teaching, and political activity, gathering around him many of the writers and thinkers of the Spanish-speaking world. In 1895 he helped found the *Revista nacional de literatura y ciencias sociales* ("National Review of Literature and Social Sciences"), and from 1898 he was professor of literature at the national university (Universidad de la República) in Montevideo. He also served as director of the National Library (Biblioteca Nacional de Uruguay). Twice, in 1902 and 1908, he was a member of the Chamber of Deputies.

In the essay generally considered to be his masterpiece, *Ariel* (1900; Eng. trans. 1922), Rodó set forth his moral credo. Concerned with patterns of human life and with both personal and political conduct, Rodó maintained that individual self-scrutiny is the basis for enlightened action for the good of all. Próspero, the venerable teacher in *Ariel,* cautions his young listeners not to be impressed by material triumph but to use their own spiritual, moral, and intellectual resources to strive for a well-rounded life. Warning against what he saw as North American materialism, Rodó called for idealism from young Spanish Americans to bring forth the best features of democracy. This essay, which brought Rodó international recognition and is today considered one of the most influential works of philosophy written in Spanish America, has been called by one critic "the ethical gospel of the Spanish-speaking new world."

Rodó's other writings include *Motivos de Proteo* (1908; *The Motives of Proteus,* 1929) and *El mirador de Próspero* (1913; "The Gallery of Próspero"), a series of essays on some of the outstanding figures of Spanish America. In 1916 Rodó left Montevideo to travel in Europe, where he died.

Rodolph, Utto: *see* Ouologuem, Yambo.

Rodolphe (French personal name): *see under* Rudolf.

Rodopi (Europe): *see* Rhodope Mountains.

Rodosto (Turkey): *see* Tekirdağ.

Rodrigo, Joaqúin (b. Nov. 22, 1902, Sagunto, Spain), one of the leading Spanish composers of the 20th century.

Although blind from the age of three, Rodrigo began music studies at an early age and later became a pupil of Paul Dukas in Paris. In 1940, after the first performance of his highly successful *Concierto de Aranjuez* for guitar and orchestra, in Barcelona, he was widely regarded as the leading post-Civil War Spanish composer.

Although best known for his music for the guitar, he also wrote concerti for other instruments, as well as an opera, choral works, piano pieces, and songs. His broadly Neoclassical style combines folkloristic colour with piquant orchestration and agreeable melodies.

Rodrigues Alves, Francisco de Paula (b. July 7, 1848, Guaratinguetá, near São Paulo, Braz.—d. Jan. 16, 1919, Rio de Janeiro), president of Brazil from 1902 to 1906, generally considered the outstanding civilian holder of that office. During his term Rio de Janeiro was extensively rebuilt and aesthetically improved, and the city's public health was drastically reformed, eliminating yellow fever. Through his foreign minister, José Maria da Silva Paranhos, barão do Rio Branco, border disputes were settled peacefully with Bolivia, Uruguay, British Guiana, and Surinam (Dutch Guiana).

First elected to public office in 1872, Rodrigues Alves was president of São Paulo state in 1900–02 and 1912–16. In 1918 he was re-elected president of Brazil but died before he could take office.

Rodrigues Island, island dependency of the western Indian Ocean state of Mauritius. Of volcanic origin, it has an area of 40 sq mi (104 sq km). The island was apparently uninhabited when it was sighted by the Portuguese in 1507. It was first successfully colonized by the French, who used slaves to cultivate sugar plantations. The British received the island from the French at the end of the Napoleonic Wars (1800–15), and the French settlers were evacuated, leaving their slaves behind. Most of the Rodriguans are descended from those slaves; there are also a few Chinese and Indo-Mauritian immigrants.

The island's economy is based mainly on subsistence agriculture and fishing. There is a small export of salted fish, animals, and crops (especially onions and chilies), and the outflow of labour to Mauritius is fairly large. Port Mathurin, the main town, has a small harbour with regular steamer service to Mauritius. Pop. (1983 prelim.) 33,000.

Rodrigues Lobo, Francisco (b. 1580, Leiria, Port.—d. November 1621, Portugal), pastoral poet, known as the Portuguese Theocritus, after the Classic Greek originator of this poetic genre.

Rodrigues Lobo received a degree in law at Coimbra and then entered the service of the Duke of Braganza. His first book of poems, *Romances* (1596), written in the Baroque manner of the Spanish poet Góngora, reveals a refined sensibility and skill in describing the moods of nature. Most of the 61 poems are in Spanish, a second language for Portuguese writers until the end of the 17th century.

Rodrigues Lobo's best works are the eclogues interpolated in his trilogy of pastoral novels, *Primavera* (1601; "Spring"), *O Pastor Peregrino* (1608; "The Wandering Shepherd"), and *O Desencantado* (1614; "The Disenchanted"). These poems combine pleasing descriptions of the countryside of his native region with witty dialogues between shepherds and shepherdesses on the wiles of love. His most masterful works in prose are the lively and elegant dialogues *Côrte na Aldeia* (1619; "Village Court"), in which a young noble, a student, a wealthy gentleman, and a man of letters discuss manners, philosophy, social questions, and especially literary style. Rodrigues Lobo was accidentally drowned on a voyage on the Tagus River.

Rodríguez, Lorenzo (b. *c.* 1704, Guadix, Spain—d. 1774, Mexico City), Spanish-born architect who became the originator of the elaborate ultra-Baroque style known as Mexican Churrigueresque.

Rodríguez was a son and pupil of the chief architect for the bishopric of Guadix. From there he moved to Cádiz as a master mason. By 1731 Rodríguez had settled in Mexico City, where he was initially employed as a carpenter at the Mint.

His Sagrario Metropolitano (*c.* 1749–69), a small church adjoining the cathedral in Mexico City, is a principal Churrigueresque monument in the New World. Its facades are lavishly ornamented in the tradition of Rodríguez' native Andalusia but surpass even that style in their richness and complexity of detail.

Among Rodríguez' other works are the chapel of the convent of Santo Domingo (dedicated 1757, now demolished) and, probably, the church of La Santísima Trinidad (begun *c.* 1755 on the site of an earlier chapel), both in Mexico City. Rodríguez' influence can be seen best in the mining territory of Guanajuato, northwest of Mexico City, where adherents to his style built extensively. The farthest reach of this school may be seen in Texas at the mission San José de Aguayo, near San Antonio (begun 1768).

Rodríguez Sánchez, Manuel Laureano: *see* Manolete.

Rodzinsky, Artur (b. Jan. 1, 1892, Spalato, Dalmatia, Austria-Hungary—d. Nov. 27, 1958, Boston), U.S. conductor of Polish descent who was one of the better known conductors of the first half of the 20th century.

Rodzinsky pursued advanced musical studies while taking a law degree at Vienna University, subsequently conducting in his home city of Lwów in Galicia. The year 1921 saw his Warsaw debut, and in 1925 he made his American debut with the Philadelphia Symphony Orchestra. He returned there the following year to become Leopold Stokowski's assistant. In 1929 he joined the Los Angeles Philharmonic, and in 1933, the year he became a U.S. citizen, he began a decade with the Cleveland Orchestra. A much sought-after guest conductor through the 1930s, he was invited to assemble and train the NBC orchestra. He took charge of the New York Philharmonic in 1942 with changes that were major, swift, and beneficial. Friction with the management brought about his resignation in 1947. A similar chain of events led to his dismissal from the Chicago Symphony Orchestra only a year later. Disenchanted and ailing, he made his way to Italy, where he found particular success conducting opera. He returned to America in the last month of his life to conduct the Chicago Lyric Opera.

roe, either the mass of eggs of a female fish (hard roe) or the mass of sperm, or milt, of a male fish (soft roe), considered as food. The most prized of hard roes is that of the sturgeon, from which caviar (*q.v.*) is made. The eggs of a number of fish are eaten, often after having been salted or smoked. Smoked cod roe is popular in Great Britain; *tarama,* salted carp roe, is the base of *taramasalata,* a Greek appetizer spread. Soft roes can be poached or sautéed and are sometimes served as hors d'oeuvres or light entrées. Other fish roes especially prized are those of herring, mackerel, mullet, salmon, shad, and sole. Sea urchin roe is a local delicacy of coastal areas, eaten raw or lightly cooked.

Roe, Sir (Edwin) Alliott Verdon (b. April 26, 1877, Patricroft, Lancashire, Eng.—d. Jan. 4, 1958, London), the first Englishman to construct and fly his own airplane.

Roe quit school at age 14 and went to British Columbia. He returned a year later and became an apprentice at the Lancashire and Yorkshire Railway's locomotive shops. He left the shops and went to sea on a freighter where, while observing seagulls, he became interested in the problem of flight. Back in England he heard of the success of the Wright brothers and set out to build his own plane. On June 8, 1908, he flew his biplane a distance of 75 feet (23 metres).

Roe founded A.V. Roe and Company, Ltd., with his brother Humphrey in 1910. Of his early planes, the Avro 504 was the most successful: more than 17,000 were manufactured. It was used on bombing missions in the early part of World War I and served as a trainer for British pilots. Ten years after the war, Roe severed all ties with his company and acquired an interest in another firm, which became Saunders-Roe, Ltd.; the company designed and manufactured flying boats. He was knighted in 1929.

Avro aircraft played an important part in World War II, and Avro developed some of the major air weapons of Britain's modern air force, including the Vulcan bomber and the Blue Steel missile. In 1962 A.V. Roe Company became an integral unit of Hawker Siddeley Aviation, Ltd.

Roe, Sir Thomas (b. *c.* 1581, near Wanstead, Essex, Eng.—d. November 1644, Bath, Somerset), diplomat and author who advanced England's mercantile interest in Asia and was prominent in negotiations during the Thirty Years' War. He was knighted in 1604.



Sir Thomas Roe, detail of an oil painting after M.J. Miereveldt, *c.* 1640; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Roe began his diplomatic career in India as ambassador to the court of the Mogul emperor Jāhāngīr. In his four years of duty (1614–18) there he furthered the fortunes of the English East India Company.

As ambassador to Constantinople (1621–28), Roe obtained increased privileges for the English merchants trading in the Ottoman Empire. He negotiated a treaty with Algiers, then subject to Ottoman rule, resulting in the release of several hundred Englishmen captured by the Barbary pirates (1624). He also mediated a peace treaty between the Ottoman Empire and Poland.

Returning to England in 1629, Roe helped negotiate the Truce of Altmark between Gustavus II Adolphus of Sweden and Sigismund III of Poland, for which he received a gift of £2,000 from the Swedish king. The truce left the Swedes free to intervene on the Protestant side in the Thirty Years' War. After spending six years in retirement, Roe was appointed chancellor of the Order of the Garter (1637) and given an annual pension of £1,200 (1638).

He served as the English representative at three conferences—Hamburg (1638), Ratisbon (1641), and Vienna (1642)—where attempts were made to end the Thirty Years' War. Meanwhile, in 1640 he was made a privy councillor and was elected a member of the Long Parliament for the University of Oxford. In July 1643 he was permitted, because of ill health, to retire to Bath.

Roe left numerous diplomatic memoirs, including the *Embassy of Sir T. Roe to the Court of the Great Mogul* (1899).

roe deer (*Capreolus capreolus*), Eurasian deer, family Cervidae (order Artiodactyla), found in small family groups in lightly forested regions. When alarmed, the roe deer barks like a dog. A nimble animal, it often tramples the



Roe deer buck (*Capreolus capreolus*)

Philip Wayre—EB Inc.

underbrush during the mating season, leaving identifiable circular or figure eight tracks. The female bears one or two spotted young; the gestation period is usually extended to about 10 months by delayed implantation of the embryo in the wall of the uterus.

A small, almost tailless deer, the roe deer stands 66–86 centimetres (26–34 inches) at the shoulder. Its coat is reddish brown in summer and grayish brown, with a conspicuous white rump patch, in winter. The male has short, usually three-tined antlers that are roughened at the base.

Roebling, John Augustus (b. June 12, 1806, Mühlhausen, Prussia—d. July 22, 1869, Brooklyn Heights, N.Y., U.S.), German-born U.S. civil engineer, a pioneer in the design of steel suspension bridges. His best known work is the Brooklyn Bridge, New York City, completed under the direction of his eldest son, Washington Augustus, in 1883.

After graduating from the polytechnic school in Berlin, Roebling worked for the Prussian government for three years and at the age of 25 emigrated to the U.S. He settled with others from his hometown in a small colony that was later called Saxonburg, near Pittsburgh, in the hills of western Pennsylvania. He married the daughter of another Mühlhausen emigrant,



John Augustus Roebling, engraving by William Murray

By courtesy of the Smithsonian Institution, Washington, D.C.

and they had nine children. After a few years of unsuccessful farming, John Roebling went to the state capital in Harrisburg and applied for employment as a civil engineer.

He had often watched canalboats being hauled over hills from one watershed to another, and he persuaded the canal commissioners to let him replace the hempen hawsers with wire cables. He developed his own method for stranding and weaving wire cables, which proved to be as strong and durable as he had predicted. The demand for such cable soon became so great that he established a factory to manufacture it in Trenton, N.J. This was the beginning of an industrial complex that finally was capable of producing everything from chicken wire to enormous 36-inch (91-centimetre) cables. It remained a family-owned business, carried on by three generations of Roeblings.

Roebling was less a businessman than an engineer, and with the growth of his reputation as a designer and builder of long-span suspension bridges, he spent less and less time at the Trenton factory. His eldest son, Washington, joined him in his work, and in the 1850s and 1860s they built four suspension bridges: two at Pittsburgh, one at Niagara Falls, and another across the Ohio River between Cincinnati, Ohio, and Covington, Ky., with a main span of 1,051 feet (320 metres). New York state accepted Roebling's design for a bridge connecting Brooklyn and Manhattan with a span of 1,595 ft (486 m) and appointed him chief engineer.

Work on the bridge cost Roebling his life. He was taking final compass readings while standing on some pilings at a ferry slip and did not notice that a boat was docking. As it banged into the slip, one of his feet was caught between the pilings. He was rushed to his son's house in Brooklyn Heights, where the doctors amputated his injured toes. Three weeks later, he died of tetanus at the age of 63. His son carried on his work on the Brooklyn Bridge.

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Roebling, Washington Augustus (b. May 26, 1837, Saxonburg, Pa., U.S.—d. July 21, 1926, Trenton, N.J.), U.S. civil engineer under whose direction the Brooklyn Bridge, New York City, was completed in 1883; the bridge was designed by Roebling with his father, John Augustus.

After graduating from Rensselaer Polytechnic Institute, Troy, N.Y. (1857), he joined his father in the work of building suspension bridges. The Civil War, however, intervened, and he served in the Union Army, rising to the rank of colonel by war's end, after which he returned to the construction business. His father put him in charge of the construction of the enormous masonry towers that supported the cables of the Cincinnati–Covington Bridge (1865–67) and then sent him to Europe to study new methods for the sinking of the foundations on which the granite towers of the Brooklyn Bridge were to stand.

On his father's death in 1869 he was asked to serve as chief engineer on the Brooklyn Bridge and immediately began work on the foundations for the two towers. The use of pneumatic caissons (watertight chambers) was still in a somewhat experimental stage, and what happened to men working in compressed air at the bottom of the caisson was not yet fully understood. Though every precaution was taken there were more than a hundred cases of decompression sickness (the "bends") when men were brought up too rapidly. There were also the usual difficulties of fires and breakdowns, as well as so-called blow-outs that shot mud and water into the air. Like his father, Colonel Roebling felt he had to inspect every detail of the work. One day he remained 12 consecutive hours in the compressed-air chamber, finally being carried



Washington Augustus Roebling, 1870

By courtesy of Rutgers University Library, New Brunswick, N.J.

out unconscious. In those days there was little understanding of the amount of time needed for slow decompression. The nitrogen bubbles in the bloodstream could paralyze a man for life. His health was permanently affected, and, though he lived to be almost 89, the Brooklyn Bridge was his last major undertaking. The bridge, opened in 1883, took 13 years to complete.

Roebuck, John (b. 1718, Sheffield, Yorkshire, Eng.—d. July 17, 1794, Borrowstounness, West Lothian, Scot.), British physician, chemist, and inventor, perhaps best-known for having subsidized the experiments of the Scottish engineer James Watt that led to the development of the first commercially practical condensing steam engine (1769).

Roebuck devoted much of his time to chemistry, especially its practical applications. Among the most important of his early achievements in this field was the introduction of leaden condensing chambers in the manufacture of sulfuric acid (1746). The substitution of leaden chambers for glass globes, which had been employed for years, revolutionized the production process and drastically reduced costs. In 1760 Roebuck became engaged in the manufacture of iron. He established an ironworks at Carron, in Stirlingshire, Scot., where he introduced various improvements in production, including the conversion of cast iron into malleable iron by burning coke derived from bituminous coal. In utilizing coke instead of charcoal, he revived in Britain a practice that had been introduced by the ironmaster Dud Dudley (*q.v.*) in the early 1620s.

Roehm, Ernst: *see* Röhm, Ernst.

roentgen, unit of X radiation or gamma radiation, the amount that will produce, under normal conditions of pressure, temperature, and humidity, in 1 cubic cm (0.001293 gram) of air, an amount of positive or negative ionization equal to one electrostatic unit of charge (an electric charge that will repel a similar charge at 1 cm distance with a force of one dyne). It is named for the German physicist Wilhelm Conrad Röntgen. *See also* rem.

Roentgen, Abraham (b. 1711, Mühlheim, Cologne—d. 1793, Neuwied?, Trier [Germany]), German joiner and designer who founded what became one of Europe's most widely renowned furniture workshops; he was the father of David Roentgen, the celebrated cabinetmaker to Queen Marie-Antoinette of France.

After various jobs in Holland, the elder Roentgen settled (1731) in London and apparently was apprenticed in marquetry, engraving, and joinery. He became a member of the Moravian Church, a Protestant sect founded in Bohemia that emigrated to the British Isles in 1734. Returning to Germany in 1738, he departed in 1740 for North America as a Moravian missionary. Shipwrecked off the Irish coast, he temporarily worked in County Galway before returning to Germany, settling (1750) at Neuwied (just northwest of Cologne), where he opened a workshop that produced furniture of outstanding quality, often decorated with inlay work of ivory and other semiprecious materials. Much of this furniture was created for various German courts.

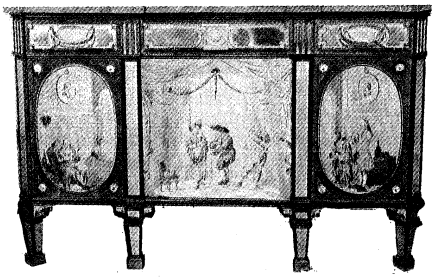
Roentgen's son David succeeded him in 1772 as head of the firm; the two then worked in partnership until the senior Roentgen retired in 1784. The family workshop was famous for its fine Rococo-styled furniture and for music boxes, clocks, and mechanical toys.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Roentgen, David (b. Aug. 11, 1743—d. Feb. 12, 1807, Wiesbaden, Duchy of Nassau), cabinetmaker to Queen Marie-Antoinette of France; under his direction the family workshop at Neuwied (near Cologne), founded by his father, Abraham Roentgen, became perhaps the most-successful firm of furniture production in the 18th century.

After succeeding his father as head of the Neuwied workshop in 1772, Roentgen strove to broaden their clientele, an ambition that brought him first to Hamburg and ultimately to Paris (1774), where in 1779 he was spectacularly successful in selling his finest furniture to King Louis XVI of France for £3,300 to £4,000, an unprecedented sum for the time. His reputation was thus established.

Appointed cabinetmaker to the queen, Roentgen was granted admission (1780) as *maître-ébéniste* (master cabinetmaker) to the trade corporation of Paris cabinetmakers, making it possible for him to keep in Paris a stock of



Commode veneered with walnut and sycamore with marquetry of various woods by David Roentgen, 1785–95; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London

the furniture manufactured at Neuwied. Thus he was uniquely able to compete with such great cabinetmakers as Jean-Henri Riesener and Adam Weisweiler, reputedly his former pupil at Neuwied. After his first visit to St. Petersburg (now Leningrad), Empress Catherine II the Great bought huge quantities of his furniture; King Frederick William II of Prussia was also his client. When in 1795 the French Revolutionary armies threatened to cross the Rhine, Roentgen evacuated his establishment and moved his stock farther inland. Unfortunately, he lost everything in his Parisian salon and in his Neuwied workshop, both of which were sacked by Republican troops. He was crushed, despite his appointment as court furnisher to the king of Prussia, and, although he never succeeded in starting production again, former apprentices of his whom he helped to establish in the German cities of Berlin (David Hacker) and Brunswick (Christian Härder) were successful.

Roentgen had begun his career by continuing and developing the Rococo furniture that his father had introduced. The furniture of his "French" style is characterized by curved outline, sometimes decorated with rich carvings. His "English" cabinetwork is based on elements dating from the early years of King George III and occasionally influenced by the renowned furniture manufacturer Thomas Chippendale. Both national types are frequently decorated with rich inlay of outstanding charm and elegance composed of a variety of woods, some tinted and made to form figural and floral compositions, often in the manner of chinoiserie (Chinese motifs). Between 1775 and 1780 Roentgen abandoned his earlier styles in favour of rigid, classical forms, the effect of which is often based on contrasting mahogany with rich bronze appliqués, represented in his monumental combined secretaire and medal-cabinet of about 1785–89. His workshop indulged in mechanical devices, a characteristic flair begun by his father, that made drawers and mirrors appear and disappear by pressing on hidden releases; Peter Kinzing invented many of these gadgets and provided the workshop with clockworks.

Roentgen, Wilhelm Conrad: *see* Röntgen, Wilhelm Conrad.

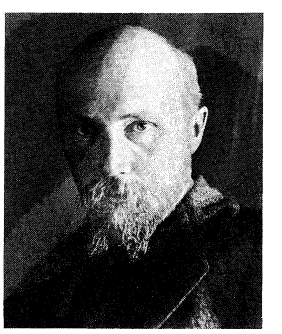
roentgen tube: *see* X-ray tube.

Roepat (Indonesia): *see* Rupat Island.

Roerich, Nicholas, original Russian NIKOLAY KONSTANTINOVICH RYORIKH, Ryorikh also spelled RERIKH (b. Oct. 9 [Sept. 27, Old Style], 1874, St. Petersburg [now Leningrad]—d. Dec. 13, 1947, Nagar, India), Russian scenic designer for Diaghilev's Ballets Russes who is best-known for his monumental historical sets. He was also a popular mystic.

Educated at the St. Petersburg Academy of Fine Arts, he was not only a scenic designer but also an archaeologist and landscape painter. Roerich's paintings evidence an intense feeling for the epic dimensions and mystery of nature, particularly prehistoric nature. As a scenic designer Roerich worked within the conservative tradition of the picture-frame stage. His outstanding achievements arose out of the opportunity to create scenic evocations of the past, such as the 12th-century Russia of *Polovtsian Dances* (1909) from Aleksandr Borodin's *Prince Igor* or the legendary Scandinavia of Edvard Grieg's *Peer Gynt* (1912).

In 1920 he emigrated to the United States, where he fashioned a reputation as a painter, seer, guru, and peacenik, especially among the well-to-do, who provided him funds and even built him museums, one of which still stands in New York City. In 1930 he befriended Henry Wallace, who, after becoming secretary of agriculture in the Franklin D. Roosevelt administration, sent him on a botanic expedition to the Gobi desert to determine whether con-



Roerich

By courtesy of the Musee de l'Opera, Paris; photograph, James Fox

ditions there had answers for America's Dust Bowl. Ignoring his mission for the most part, Roerich waded into Asian politics, roaming

with a Cossack bodyguard and vainly urging Buddhist masses to revolution. Wallace broke with Roerich over these events but not before an exchange of letters demonstrated both men's antic views. (In one letter this oracular view of Manchuria was expressed in fanciful code: "The Monkeys are seeking friendship with the Rulers so as to divide the land of the Masters between them. The Wandering One thinks this, and is very suspicious of Monkeys.") These so-called "guru letters" came into the possession of a Pittsburgh newspaper but, through the efforts of the Roosevelt administration in 1940, were suppressed. The first excerpts were not published until 1948. The story is related in Robert C. Williams, *Russian Art and American Money, 1900–1940* (1980).

Roermond, *gemeente* (commune), Limburg *provincie,* southeastern Netherlands, at the confluence of the Maas (Meuse) and Roer rivers. Chartered in 1232, it was the historic capital of the Upper Quarter of Gelderland (until the duchy was ceded to Charles V in 1543) and was a prosperous centre of the cloth trade in the 14th and 15th centuries. Predominantly Roman Catholic (the seat of a bishopric since 1559), it remained under Habsburg rule when the Netherlands became independent. It was occupied by the French during the Revolutionary and Napoleonic wars and by the Belgians from 1830 to 1839. It was heavily damaged in World War II. Historic landmarks are the late Romanesque minster (consecrated 1224; restored) and the Cathedral of St. Christoffel (1410). A Redemptorist chapel with the shrine of Our Lady of the Sand is nearby. An agricultural market with a large egg-packing station, Roermond also manufactures chemicals, electrical equipment, clothing, wood products, and cigars. Pop. (1987 est.) 38,291.

Roeselare (Flemish), French ROULERS, municipality, West Flanders *province,* western Belgium, on the Mandel River, south of Brugge (Bruges). An important linen market since the Middle Ages, it was the scene of a French victory over the Austrians (1794) during the French Revolutionary Wars. The canal (1872) to the Leie (Lys) River favoured its industrial growth. Severely damaged in World War I, Roeselare was rebuilt and recovered as a textile centre; it also has metallurgical and chemical industries. Surviving historic buildings include the Church of St. Michael (1497–1504) with a 17th-century carved pulpit, the town hall and the Seminary Church (both 18th century), and a 16th-century château at nearby Rumbeke. Roeselare was the birthplace of the composer Adriaan Willaert and of the Flemish poet Albrecht Rodenbach. Pop. (1983 est.) mun., 51,649.

Rogaland, *fylke* (county), southwestern Norway. With an area of 3,529 square miles (9,141 square km), it lies between the North Sea (west) and the uplands of Bykleheiane and Rjuven (east). The principal coastal feature is the broad island-studded Bokna Fjord, the narrow and deep branches of which penetrate far inland. The *fylke's* three principal districts are Ryfylke, on the northern coast, mountainous with some cattle raising; Jæren, a southwestern coastal lowland, one of the most important dairying districts of Norway; and Dalane, highlands in the south. Fishing is important all along the coast. Stavanger is the largest city and county seat. Other cities are Haugesund, Egersund, and Sandnes; all are fishing ports and light-industrial centres. Some copper is mined on Karmøy island. Pop. (1988 est.) 329,630.

Rogation Days, in the Roman Catholic church, festivals devoted to special prayers for the crops; they comprise the Major Rogation (Major Litany) on April 25 and the Minor Rogations (Minor Litany) on the three days before Ascension Day (40th day after Easter). The Major Rogation originated as a Christian festival to supplant a pagan Roman festival, Robigalia, which consisted of a procession from Rome to a point outside the city, where a dog and a sheep were sacrificed to save the crops from blight (*robigo,* "wheat rust"). According to a document of Pope Gregory I, the Christian festival was established as an annual event by the year 598. The Christian procession followed the same route as the pagan procession for a certain distance and then turned off and returned to St. Peter's Basilica, where mass was celebrated.

The Minor Rogations were first introduced in Gaul by St. Mamertus of Vienne about the year 470 and were made binding for all of Gaul by the first Council of Orléans (511). Later (*c.* 800) the festivals were adopted in Rome by Pope Leo III. It is possible that Mamertus first instituted the Minor Rogations to replace three days of pagan crop processions called the Ambarvalia.

Roger, name of rulers grouped below by country and indicated by the symbol •.

Foreign-language equivalents:
French ..... Roger
Italian ..... Ruggiero

ANTIOCH

• **Roger** (d. June 28, 1119, principality of Antioch [now in Turkey]), Norman ruler (1112–19) of the crusader state of Antioch during the period of its greatest power.

The son of Prince Richard of Salerno, he succeeded his uncle Tancred as regent in 1112. He forestalled a Seljuq Turkish attempt to reconquer Syria by his victory in the Battle of Danith (Sept. 14, 1115). Fighting for possession of Aleppo, he was defeated and killed by the Artuqid Ilghāzī of Mardin in the Battle of the Field of Blood (June 28, 1119).

APULIA

• **Roger,** byname ROGER BORSA, Italian RUGGIERO BORSA (b. *c.* 1060—d. 1111), Norman duke of Apulia from 1085 to 1111, son of Robert Guiscard. His succession to his father's lands and title in 1085 led to a conflict with his half brother Bohemond de Hauteville. (*See* Bohemond I).

Roger was the son of Robert Guiscard by Robert's second marriage—to Sigelgaita, sister of the Lombard prince Gisulf of Salerno. Roger was called Borsa ("Purse"), to distinguish him from his uncle, Count Roger I of Sicily. With his brother Guy and his half brother Bohemond, Roger participated in Robert Guiscard's capture of Byzantine Corfu, off the coast of Greece, in 1083. At Sigelgaita's instigation, Robert named Roger Borsa as his heir rather than Bohemond, the son of his Norman first wife; and, when Robert died suddenly in 1085, Roger Borsa succeeded to the dukedom. His position was contested by Bohemond, who revolted and seized part of his father's territory. The quarrel continued until 1095, when Bohemond left on crusade.

Roger Borsa was a weak ruler who, in spite of the support of the pope and of Count Roger, presided over the gradual disintegration of the duchy of Apulia.

SICILY

• **Roger I,** byname ROGER GUISCARD (b. 1031, Normandy, Fr.—d. June 22, 1101, Mileto, Calabria [Italy]), count of Sicily from 1072. He was the last son of the second marriage of Tancred of Hauteville.

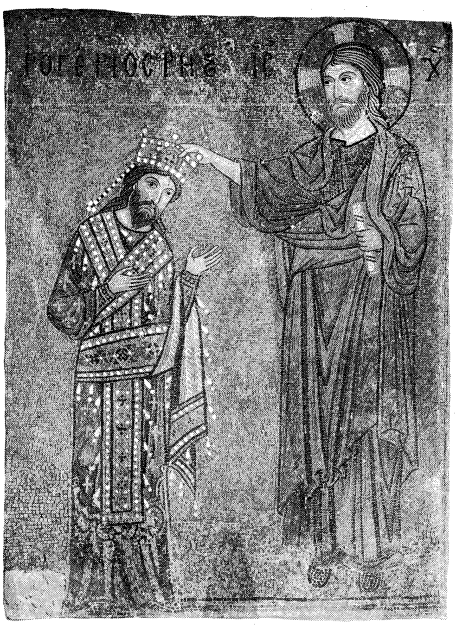
Roger went to Italy in 1057 to aid his brother Robert Guiscard in his conquest of Calabria from the Byzantines (1060). They began the conquest of Sicily from various Muslim rulers in 1061 with the capture of Messina, and they completed it in 1091. The turning point of the struggle was the capture of Palermo in 1072, when Robert invested Roger as his vassal with the county of Sicily and Calabria with a limited right to govern and to tax. After Robert's death Roger acquired full right to govern from Robert's son and in 1098 received the title of apostolic legate from Pope Urban II, which gave him control of the church in Sicily. At his death, Roger had created a centralized, efficient government, where the authority of the count was unchallenged.

• **Roger II** (b. Dec. 22, 1095—d. Feb. 26, 1154, Palermo [Sicily]), grand count of Sicily (1105–30) and king of the Norman Kingdom of Sicily (1130–54). He also incorporated the mainland territories of Calabria in 1122 and Apulia in 1127.

Early life. Roger was the son of Count Roger I of Sicily and his third wife, Adelaide of Savona. He succeeded his elder brother Simon on Sept. 28, 1105, at the age of nine. Little is known of his childhood. These years, during which his mother acted as regent, he probably spent between Mileto in Calabria, the family castle in northeastern Sicily, and Messina; but it was at Palermo in 1112 that he was knighted and assumed the reins of government, and there his Sicilian capital was henceforth established.

Though the island that Roger I and his brother Robert Guiscard had conquered was populated predominantly by Arabs—with a strong admixture of Greeks—Roger I had always remained essentially a Norman knight. His son, by contrast, was a man of the Mediterranean. Deprived of paternal influence from the age of five, Roger was brought up in a cosmopolitan, multilingual world of Greek and Muslim tutors and secretaries and soon revealed an exotic strain in his nature. The latter was obvious enough in his complexion and in the darkness of his eyes and hair, but his contemporaries soon learned to their cost that he was not only a southerner—he was also an Oriental. He was a ruler for whom diplomacy, however tortuous, was a more natural weapon than the sword, and gold, however corrupting, a more effective currency than blood.

Two qualities, however, he had inherited from his Norman forebears: his energy and his ambition. It was these, combined with a gift for imaginative statesmanship all his own, that enabled him to profit from the feckless-



Roger II, mosaic depicting his coronation by Christ, 12th century; in the Church of Martorana, Palermo

Alinari—Art Resource/EB Inc.

ness of his cousins—the son and grandson of Robert Guiscard—and to acquire, in return for military aid against a rebellious baronage, more and more of their mainland territories. By 1122 all Calabria was his, and in 1127, when Duke William of Apulia died without issue, Roger laid claim to the duchy as his rightful heir. Opposition was considerable; the barons had always resented the domination of the Hautevilles, whom they looked upon as upstarts no better than themselves, and the papacy had no wish to see too powerful a state established on its southern frontier. But they were no match for Roger's particular technique of armed diplomacy, and in 1128 Pope Honorius II invested Roger as duke of Apulia, Calabria, and Sicily.

Thus, at 32, the young duke found himself one of the most influential princes in Europe. Only one thing more was necessary before he could weld his triple duchy into a single nation and treat with his fellow rulers on equal terms: a royal crown. Two years later he secured it. Honorius' death early in 1130 led to a dispute over the papal succession. One of the two candidates, Innocent II, thanks to the energetic advocacy of St. Bernard of Clairvaux, soon had almost the whole continent behind him. His rival, the antipope Anacletus II, turned to Roger, who promised full support in return for coronation.

Enthronement as king of Sicily. The first king of Sicily was crowned on Christmas Day 1130 in the cathedral at Palermo. The antipope Anacletus died in 1138 and in the following year, after routing a papal army at Galluccio and taking the Pope captive, Roger forced Innocent to confirm him in the Kingdom of Sicily, with the overlordship of all Italy south of the Garigliano River. After this he was quickly able to pacify his mainland realm, where his vassals—abetted by the German emperor Lothair II who led a large, though unsuccessful, expedition to South Italy in 1136–37—had kept up an almost permanent insurrection. In Sicily itself, where the ban on large fiefs had left little opposition to Roger's rule, the new kingdom steadily grew more prosperous.

The King himself, more than any other ruler of his day, was an intellectual who had thought deeply about the science of government, and although he cherished no love for the empire of the East—which, like that of the West, maintained its claim to its former South Italian possessions—his whole upbringing inclined him toward the Byzantine concept of monarchy: a mystically tinged absolutism in which the sovereign, as God's viceroy, lived remote and elevated from his subjects in a magnificence that reflected his intermediate position between Earth and heaven. It is no coincidence that in one of the only two portraits of Roger with any claim to authenticity—the mosaic in the Church of the Martorana at Palermo—he is depicted in Byzantine robes being symbolically crowned by Christ.

But splendour did not mean empty extravagance. A contemporary chronicler notes that Roger would personally go through his exchequer accounts, recording even the smallest expenditure, and that he was as scrupulous in the payment of debts as in their collection. Still less did it mean idleness. In the words of his court geographer, the King "accomplished more in his sleep than others did in their waking day." Building on the foundations his father had laid, he created a civil service, based eclectically on Norman, Greek, and Arabic models, that was the wonder and envy of Europe. He entrusted finance to his Arab subjects, who also supplied him with the spearhead of his army. The navy, by contrast, was predominantly Greek; its chief, known by the Arabic title emir of emirs—from which the word admiral derives—served also as head of the government, ranking second after the king himself.

Roger's navy. It was on this navy above all that Sicily's security and prosperity depended, and Roger's use of it was not overscrupulous. Under the greatest of its admirals, George of Antioch, it subdued much of what is now Tunisia to form a profitable, if short-lived, North African empire; it captured Corfu; it harassed the Greek coast, abducting the best of the Theban silk workers to found the court workshop at Palermo; and in 1149 it sailed up the Bosporus to fire a few impudent arrows into the gardens of the imperial palace. Significantly, however, it played no part in the Second Crusade of 1147. Roger had hated the Frankish rulers of Jerusalem ever since his mother's disastrous remarriage to King Baldwin I of Jerusalem 34 years earlier. Besides, most of his Sicilian subjects were Muslims, and toleration was the cornerstone of his kingdom.

This policy even showed itself in his church buildings. Roger's first great building, the cathedral at Cefalù, shows little Saracenic influence, but the Palatine Chapel in Palermo, conceived on a Latin plan and aglow with Byzantine mosaics, is topped by a stalactite roof of pure Arab workmanship. Oriental inspiration is equally evident in the five vermilion cupolas of the church of S. Giovanni degli Eremiti, built in 1142 for the Benedictines.

The Assizes of Ariano. After the pacification of South Italy, the King promulgated in 1140 at the so-called Assizes of Ariano a corpus of law covering every aspect of his rule. He then returned to Palermo, which he seldom left again. There he spent his last 15 years in the most intellectual court of Europe, surrounded by the leading thinkers of the time. Sicily was already the only land where scholars could study both Greek and Arabic—then the scientific language par excellence. Through Roger's enthusiasm, Sicily became a cultural clearinghouse where, for the first time, Western and Oriental scholars could meet on an equal footing.

Roger II was married three times. He outlived his first wife, Elvira, daughter of Alfonso VI of Castile, and his second, Sibyl of Burgundy. His third wife, Beatrice of Rethel, whom he married in his last year, bore him a daughter, Constance, after his death. Constance married the future emperor Henry VI, bringing Sicily under the control of the Hohenstaufens. Upon his death at age 58, Roger was succeeded by his fourth but oldest surviving son, William. Despite his repeatedly expressed wish to rest in Cefalù, the King was buried in the cathedral at Palermo, having created, in a Europe rent by schism and exhausted by the Crusades, not just a kingdom but a political and religious climate in which all races, creeds, and cultures were equally encouraged and equally favoured. (N.)

BIBLIOGRAPHY. A full biography of Roger II in English is John Julius Norwich, *The Normans in the South* (U.S. title, *The Other Conquest,* 1967), which takes the story of the Norman conquest of South Italy and Sicily up to Roger's coronation in 1130; and its sequel, *The Kingdom in the Sun 1130–1194* (1970). Both volumes contain comprehensive bibliographies. See also F. Chalandon, *Histoire de la Domination normande en Italie et en Sicile,* 2 vol. (1907, reprinted 1960); and E.L.E. Caspar, *Roger II. (1101–1154) und die Gründung der normannisch-sicilischen Monarchie* (1904).

Roger BORSA: *see* Roger *under* Roger (Apulia).

Roger OF HELMARSHAUSEN: *see* Theophilus.

Roger OF HOVEDEN, Hoveden also spelled HOWDEN (d. *c.* 1201), English chronicler and historian of the reigns of Henry II and Richard I, whose report on the years 1148 to 1170 is one of the few authentic accounts of the period.

Little is known about Roger's background; he was probably born at Howden, a village in Yorkshire, and probably attended a monastic school at Durham, Yorkshire. He may have served as professor of theology at Oxford but in 1174 was employed by Henry II, later administering forest law and collecting royal revenue. After the King's death in 1189, Roger probably travelled with Richard's crusade to the Holy Land and began his narrative on the journey to and from the East. His *Chronica* are in two parts: the first is based on *Bede's Ecclesiastical History and Its Continuation* by Simeon and Henry of Huntingdon (732–1154), and the second treats the period from 1155 to 1201. This, the lengthy part of the chronicle, is by far the most important, being based largely on Roger's experience; it provides detailed elaborations of critical issues, particularly the quarrel between Henry II and Archbishop Thomas Becket. The portions covering the years between 1192 and 1201 are almost entirely the original work of Roger and are proof of his scholarly use of public documents and annals. Despite his tendency to rely on weak evidence, his work is careful, precise, and well organized, and its broad approach makes it one of the more sophisticated annals of its time.

Roger OF LAURIA: *see* Lauria, Ruggiero di.

Roger OF PONT L'ÉVÊQUE (d. Nov. 26, 1181, York, Yorkshire, Eng.), archbishop of York and adviser of King Henry II of England, who supported the King in his dispute with Thomas Becket, archbishop of Canterbury.

With Becket, he was, as a young man, member of the household of Theobald, archbishop of Canterbury. He was archdeacon of Canterbury (1148) and chaplain to King Stephen before being consecrated archbishop of York (October 1154). Having been appointed papal legate in England, Roger visited Pope Alexander III and King Louis VII the Young of France on behalf of Henry. In 1170, despite the exiled Becket's protests, and a prohibition from the Pope, Roger carried out Henry's wishes and crowned the King's eldest son, Henry (the "Young King"), at Westminster. Becket, with papal authority, suspended Roger and others who took part in the coronation and was subsequently murdered. Roger was accused of urging Becket's assassination but was absolved of all blame and returned to his see. He continued to dispute the provincial primacy of Canterbury over York until, in 1176, Henry II arranged a truce between Roger and Richard, archbishop of Canterbury.

Roger, Pierre (pope): *see* Clement VI.

Roger Simpson Island (Kiribati): *see* Abemama Atoll.

Rogers, city, Benton County, northwestern Arkansas, U.S., north of Fayetteville, near the Beaver Dam and Lake, in the Ozark Mountains. B.F. Sikes, who owned the original townsite, gave a right-of-way to the St. Louis-San Francisco Railway. The community, founded in May 1881 after the arrival of the first train, was incorporated in June 1881 and named for C.W. Rogers, a railway official. It developed as a marketing and processing centre for farm produce. Its economy became diversified with the tourist industry (based on the Beaver Lake district to the east) and light manufacturing. Pea Ridge National Military Park, site of a Civil War battle, is 10 mi (16 km) north. Pop. (1980) 17,429.

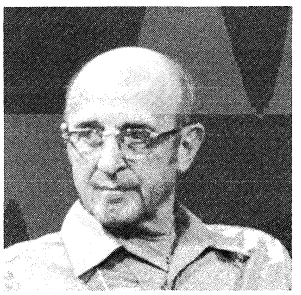
Rogers, Bruce (b. May 14, 1870, Linnwood, Ind., U.S.—d. May 18, 1957, New Fairfield, Conn.), typographer and book designer, highly influential in fine book design in the United States during the early 20th century.

Trained as an artist, Rogers began as an illus-

trator for an Indianapolis newspaper. In 1895 he moved to Boston, where he met a number of men who were revolutionizing the book publishing industry, including George Mifflin of Houghton Mifflin, who offered him a job at the Riverside Press. When the press opened a limited-editions department in 1900, Rogers was put in charge and given responsibility and freedom to design and print fine books. During the next 12 years he produced more than 100 Riverside Press editions, which are still highly esteemed and valued.

He designed the Montaigne typeface in 1901 and the Centaur in 1915, both inspired by Nicolas Jenson's roman type of 1470, as well as Riverside Caslon. In 1912 he left Boston to travel and to do free-lance work. While in England in 1916 he served as adviser to the Cambridge University Press, and after returning to the United States in 1919 he held an advisory post at Harvard University Press until 1934. At the same time, he was designing distinguished books for the William E. Rudge printing plant in Mount Vernon, N.Y. As adviser to the Oxford University Press he directed the preparation of the monumental Oxford Lectern Bible (1935). Other fine books and limited editions included the *Odyssey*, *Pacioli*, an edition of Shakespeare, the Boswell Papers, and an American Folio Lectern Bible.

Rogers, Carl R(ansom) (b. Jan. 8, 1902, Oak Park, Ill., U.S.—d. Feb. 4, 1987, La Jolla, Calif.), American psychologist who originated the nondirective, or client-centred, approach to psychotherapy, emphasizing a person-to-person relationship between the therapist and the client (formerly known as the patient), who determines the course, speed, and duration of treatment.



Carl Rogers, 1970
By courtesy of Carl Rogers

Rogers attended the University of Wisconsin, but his interest in psychology and psychiatry originated while he was a student at Union Theological Seminary, New York City. After two years he left the seminary and took his M.A. (1928) and his Ph.D. (1931) from Columbia University's Teachers College. While completing his doctoral work, he engaged in child study at the Society for the Prevention of Cruelty to Children, Rochester, N.Y., becoming the agency's director in 1930.

From 1935 to 1940 he lectured at the University of Rochester and wrote *The Clinical Treatment of the Problem Child* (1939), based on his experience in working with troubled children. In 1940 he became professor of clinical psychology at Ohio State University, where he wrote *Counseling and Psychotherapy* (1942). In it Rogers suggested that the client, by establishing a relationship with an understanding, accepting therapist, can resolve difficulties and gain the insight necessary to restructure his life.

While working as a professor of psychology at the University of Chicago (1945–57), Rogers helped to establish a counseling centre connected with the university and there conducted studies to determine the effectiveness of his methods. His findings and theories appeared in *Client-Centered Therapy* (1951) and *Psychotherapy and Personality Change* (1954). He taught psychology at the University of Wisconsin, Madison (1957–63), during which time he wrote one of his best-known books, *On Becoming a Person* (1961). In 1963 he moved to La Jolla, Calif., where he helped to found and became a resident fellow of the Center for Studies of the Person. His later books include *Carl Rogers on Personal Power* (1977) and *Freedom to Learn for the 80's* (1983).

Rogers, Ginger, original name VIRGINIA KATHERINE McMATH (b. July 16, 1911, Independence, Mo., U.S.), American stage and film dancer and actress, noted primarily as the partner of Fred Astaire in a series of motion-picture musicals.

She began her dancing career in vaudeville and made her Broadway debut in 1929 in *Top Speed.* After starring in George Gershwin's *Girl Crazy* (1930–31) she went to Hollywood and began performing in movies, typecast as a flippant blonde.

Her first performance with Fred Astaire occurred in *Flying Down to Rio* (1933), which was so popular that they continued the partnership in nine other films. Though best known for her dancing, Rogers preferred dramatic acting and in 1940 won an Oscar from the Academy of Motion Picture Arts and Sciences for her leading role in *Kitty Foyle.* She also enjoyed a sure hand in light comedy and starred in such films as *Tom, Dick and Harry* (1941) and *The Major and the Minor* (1942). Rogers returned to the Broadway stage in 1965 when she took over the role of Dolly Levi in *Hello Dolly* and followed that in 1969 with a star performance as *Mame* in London.

Rogers, Harriet Burbank (b. April 12, 1834, North Billerica, Mass., U.S.—d. Dec. 12, 1919, North Billerica), educator and pioneer in the oral method of instruction of the deaf in the United States.

After graduating from Massachusetts State Normal School (now Framingham State College) in 1851, Rogers taught at several schools in Massachusetts. Her prominence as an American educator began in 1863, when she accepted a deaf girl for private instruction.

Rogers had read about the use of oral teaching (a method involving the imitation of breathing patterns and larynx vibrations) in German schools for the deaf, and—despite the general acceptance of sign language as the preferred instructional mode in the United States—she quite successfully employed the oral method with her new student.

In 1866 she cofounded a school for the deaf at Chelmsford, Mass., and the next year was selected to direct the Clarke School for the Deaf (originally Clarke Institution for Deaf Mutes) in Northampton, Mass., a position she held until she retired in 1886. She remained firmly committed to oral teaching and lipreading despite the disdain of the manualists, who used sign language and manual alphabets exclusively. The Rogers position, however, was endorsed in 1886 by the convention of the American Educators of the Deaf.

Rogers, Henry Darwin (b. Aug. 1, 1808, Philadelphia—d. May 29, 1866, Glasgow), American structural geologist who contributed much to the theory of mountain building through his studies of the geology of Pennsylvania.

At 21 Rogers was professor of chemistry and natural philosophy at Dickinson College, Carlisle, Pa. In 1835 he became professor of geology and mineralogy at the University of Pennsylvania and, in the same year, chief of the New Jersey Geological Survey. One year later he was appointed head of the Pennsylvania Geological Survey. Because of a lack of state appropriations, the Pennsylvania survey came to a halt in 1842. Unwilling to leave the work unfinished, Rogers continued the survey at his own expense until 1847, when he finished *Report on Pennsylvania* (1858), which included a general account of the geology of the United States and of the coalfields of North America and Great Britain. Rogers and his brother William Barton Rogers jointly published *On the Physical Structure of the Appalachian Chain* (1842), expressing their findings on the structure of the Appalachians. In 1857 Rogers became the first American to be appointed Regius professor of natural history at the University of Glasgow.

Rogers, John (b. *c.* 1500, Aston, Staffordshire, Eng.—d. Feb. 4, 1555, Smithfield, London), religious Reformer and the first Protestant martyr of the English queen Mary I's reign. He was the editor of the English Bible published (1537) under the pseudonym Thomas Matthew.

A graduate of Cambridge (1526), he was made rector of Holy Trinity, Queenhithe, London, *c.* 1532 and two years later became a chaplain to English merchants at Antwerp. There the English scholar William Tyndale influenced him to forsake Roman Catholicism for Protestantism. After Tyndale was betrayed and executed in 1536, Rogers combined Tyndale's translation of the Old Testament, which was complete through II Chronicles, with the remaining books from the translation by another English scholar, Miles Coverdale, and added Tyndale's New Testament (1526). This version of the complete Bible, which also included Coverdale's translation of the Apocrypha, was first printed in Antwerp in 1537 by one Thomas Matthew; this pseudonym probably was intended to protect Rogers from meeting Tyndale's fate, and the Rogers edition was shortly afterward sold in England. Although Rogers had little to do with the actual translation, he supplied notes and valuable prefaces that constitute the first English commentary on the Bible. His work formed the basis of the Great Bible (1539), from which the Bishops' Bible (1568) and the Authorized, or King James, Version (1611) came.

He returned to England in 1548 from Germany, where he had served a Protestant congregation in Wittenberg, and published a translation of the German Reformer Philipp Melanchthon's *Considerations of the Augsburg Interim.*

Appointed a prebendary of St. Paul's Cathedral in London in 1551, Rogers was soon made a divinity lecturer. On the accession in 1553 of the Roman Catholic queen, Mary I, Rogers preached an anti-Catholic sermon warning against "pestilent Popery, idolatry, and superstition" and was immediately placed under house arrest. In January 1554 the bishop of London sent him to Newgate, where he was imprisoned for a year. With 10 other prisoners he was brought before a council in Southwark in January 1555 for examination, and within a week he was sentenced to death by burning for his heretical views.

Rogers, John (b. 1627, Messing, Essex, Eng.—d. 1665 or after), Fifth Monarchist leader in Cromwellian England.

The second son of an Anglican vicar, Rogers studied at King's College, Cambridge. From 1643 to 1647 he taught and preached in Huntingdonshire and then, following his Presbyterian ordination, was appointed rector of Purleigh, Essex. Increasingly dissatisfied with Presbyterian theology and discipline, he renounced his ordination in 1648. As lecturer at St. Thomas Apostle's Church, London, he espoused Independency and spoke in favour of the Long Parliament. At the request of the Parliament he ministered at Christ Church Cathedral, Dublin (1651–52).

When he returned to England, Rogers joined the extreme Puritans known as the Fifth Monarchists and, by 1653, was one of the

leaders of this millennial sect seeking government by the church according to Biblical prophecy. After Oliver Cromwell established the Protectorate, Rogers condemned him as an apostate and demanded freedom of religion and, as a consequence, was imprisoned at Lambeth Palace in July 1654. Because from his cell he continued to provide leadership for the movement, Rogers was transferred to Windsor Castle in March 1655 and then to Carisbrooke Castle on the Isle of Wight, where he was confined until January 1657. For seeking to establish an ecumenical alliance of Puritans and sectaries to pursue sweeping reform, he was imprisoned for part of 1658.

After Cromwell's death, Rogers called for a republican government. In 1659 he was sent to Ireland as a preacher, was appointed a military chaplain and, later that year was briefly imprisoned once more by the army leaders before being freed by Parliament. Weary of the political chaos in England, he went into exile in the Netherlands, where he studied medicine, graduating M.D. at Utrecht (1662). He returned to England in December 1662 to practice medicine.

Rogers, Mary Joseph, original name MARY JOSEPHINE ROGERS (b. Oct. 27, 1882, Boston—d. Oct. 9, 1955, New York City), founder of the Maryknoll Sisters of St. Dominic, popularly called the Maryknoll Sisters, an American religious congregation devoted specifically to foreign mission work.

She was graduated in 1905 from Smith College, Northampton, Mass., where she had been encouraged by Father James Walsh to establish a constructive activity for Roman Catholic students. Her interest in missionary work grew when she joined the staff of *Field Afar,* the magazine of the Catholic Foreign Mission Society of America (Maryknoll Missioners), which Walsh had cofounded in 1911. In 1912 the society gave her and five companions a house at Hawthorne, N.Y., where the lay group subsequently became known as Teresians (after St. Teresa of Avila).

Under the protection of the archbishop of New York, the Teresians were trained for the religious life, and in February 1916 they became Dominican Tertiaries. They were recognized by the pope in January 1917 as a sisterhood devoted to foreign missions, thus being called Dominican Tertiaries of the Foreign Missions. On Feb. 14, 1920, they received papal approbation as a diocesan religious congregation, the Foreign Mission Sisters of St. Dominic (Dominicans of the Third Order), and Mary Joseph was elected superior general, a position she held until her resignation in 1946.

The first group of Maryknoll Sisters went to southern China on Sept. 8, 1921. Mother Rogers founded the motherhouse at Maryknoll, N.Y., in the early 1930s and worked to establish similar centres and to prepare women for missionary work. By the time of her death, more than 1,100 Maryknoll Sisters had been sent throughout the world.

BIBLIOGRAPHY. Jeanne Marie Lyons (Sister Jeanne Marie), *Maryknoll's First Lady* (1964), is a biography.

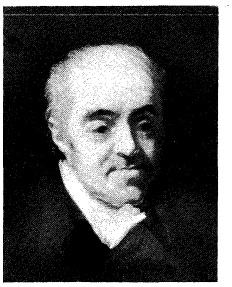
Rogers, Robert (b. Nov. 7, 1731, Methuen, Mass.—d. May 18, 1795, London), American frontier soldier who raised and commanded a militia force, known as Rogers's Rangers, which won wide repute during the French and Indian War (1754–63).

Rogers took part in General James Wolfe's expedition against Quebec and in the Montreal campaign of 1760. Afterwards he was sent by General Jeffrey Amherst to take possession of the northwestern posts, including Detroit. He was again in the West in 1763, during Pontiac's War (1763–64), and he participated in the Battle of Bloody Bridge. Soon after, he went to England and in 1765 published in London a *Concise Account of North America* and his *Journals* of service in the French and Indian War.

Rogers laid before King George III a memorial proposing to lead an overland expedition from the Mississippi River to the Pacific Ocean. This was refused him, but instead he was given command of the northwest post of Michilimackinac. From here in 1766 he sent out on his own initiative the first English expedition to explore the upper Mississippi and Great Lakes region, but it failed to penetrate to the Pacific as intended. Rogers' ambitions caused him to be tried for treason, but he was acquitted. He again went to England to retrieve his fortune but was unsuccessful. During the U.S. War of Independence he came to America but was regarded as a loyalist spy. He then openly joined the British and organized and commanded the Queen's Rangers, which saw service in operations around New York City. Later he organized the King's Rangers, but the command was taken by his brother, James Rogers, and Robert Rogers returned to England, where he lived his final years in obscurity.

Rogers, Samuel (b. July 30, 1763, Stoke Newington, near London—d. Dec. 18, 1855, London), English poet, best remembered as a witty conversationalist and as a friend of greater poets.

Rogers attained eminence with the publication of his discursive poem *The Pleasures of Memory* (1792). On his father's death (1793) he inherited a banking firm, and for the next half century he maintained an influential position as a leading figure in London society and as a generous host to brilliant company. His acquisition of paintings and objets d'art made his home a centre for anyone ambitious to be thought a man of taste. The amusing, though often unkind, conversations held at his breakfast and dinner parties were recorded



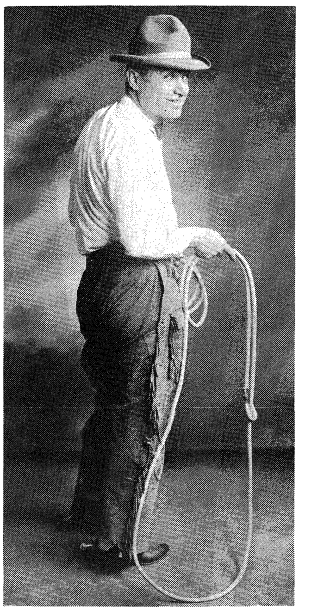
Samuel Rogers, detail of an oil painting by Thomas Phillips; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

by Alexander Dyce and published as *Recollections of the Table-Talk of Samuel Rogers* (1856; edited by Morchard Bishop, 1952). In spite of his sharp tongue, he performed many kind offices for his friends. He aided Richard Sheridan in his dying days and helped to secure a pension for Henry Cary, translator of Dante. He secured a position for William Wordsworth as distributor of stamps for Westmorland. On Wordsworth's death, in 1850, Rogers was offered the laureateship, which he refused.

Rogers, Will, byname of WILLIAM PENN ADAIR ROGERS (b. Nov. 4, 1879, near Oologah, Indian Territory, U.S.—d. Aug. 15, 1935, near Point Barrow, Alaska), American humorist and actor famous for his homespun wit.

Rogers used the rope twirling and lassoing he had learned on his father's ranch as a rope-throwing cowboy in steer-roping contests, Wild West shows, and vaudeville. His first New York appearance was in 1905. In Ziegfeld's *Midnight Frolic* in 1915, he introduced a humorous political commentary into his act, which developed into a newspaper column, syndicated weekly in 1922 and daily in 1926, noted for its humour and good-natured, but sharp, criticism of contemporary men and affairs. Rogers also wrote a series of books in a similar vein, including *Rogerisms—the Cowboy Philosopher on Prohibition* (1919), *Illiterate Digest* (1924), and *There's Not a Bathing*



Will Rogers

Culver Pictures

Suit in Russia (1927). Rogers was equally successful as a motion-picture actor. His films included *A Connecticut Yankee* (1931), *State Fair* (1933), and *David Harum* (1934). He was killed in a plane crash with the pilot Wiley Post while on a flight to the Orient.

Rogers, William (b. Nov. 24, 1819, London—d. Jan. 19, 1896, London), English educational reformer, known as "Hang-Theology Rogers" because of his proposals that doctrinal training be left to parents and the clergy.

Rogers was ordained in 1843 and in 1845 was appointed to the curacy of St. Thomas', Charterhouse, London, where he remained for 18 years, throwing himself passionately into the work of education of his poor and often criminal parishioners. He established a school for impoverished children in a blacksmith's abandoned shed, and he gradually extended it until schools were provided throughout the parish. In 1863 Rogers became rector of St. Botolph's, Bishopsgate, and there he tackled the problem of intermediate, or higher-elementary, education. He advocated secular



William Rogers

BBC Hulton Picture Library

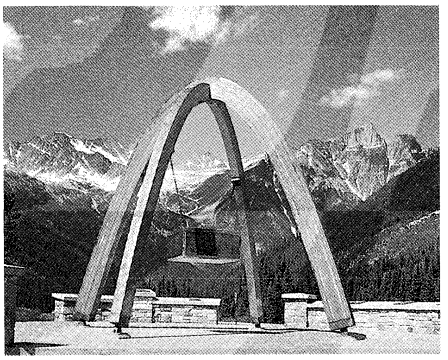
education and to the cry against "godless education" replied, "Hang theology; let us begin," earning his lasting nickname. Rogers also re-

constructed Edward Alleyn's charity at Dulwich and founded the Bishopsgate Institute.

Rogers, Woodes (b. 1679?—d. July 16, 1732, Nassau, Bahamas), English privateer and governor of the Bahamas who helped suppress piracy in the Caribbean.

Rogers commanded a privateering expedition (1708–11) around the world, sponsored by Bristol merchants whose ships had been lost to foreign privateers. In 1709 he rescued Alexander Selkirk—a Scottish seaman whose adventures later provided the basis for Daniel Defoe's *Robinson Crusoe*—from a Pacific island. In 1717 Rogers was appointed royal governor of the Bahamas. The following year he arrived at Nassau, headquarters of more than 2,000 pirates, where he established orderly government and forced many outlaws to surrender.

Rogers Pass, gap between the Hermit and Sir Donald ranges of the Selkirk Mountains, in Glacier National Park, southeastern British Columbia, Canada. It was named for Major A.B. Rogers, who explored it in 1881 as a practicable route for the main line of the Canadian Pacific Railway. However, despite its relatively low elevation (4,354 feet [1,327 m]), attempts to lay track through the pass cost so many lives from snowslides due to steep grades that it was necessary to build



Marker commemorating the opening of the Trans-Canada Highway, Rogers Pass, British Columbia

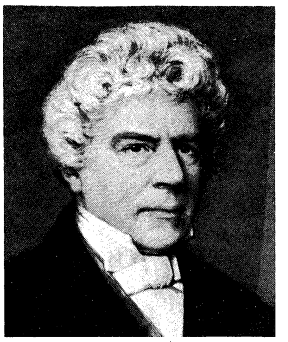
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the Connaught Tunnel in 1916 instead. The scenic Rogers Pass section (protected by huge snowsheds) of the Trans-Canada Highway was completed in 1962.

Roget, Peter Mark (b. Jan. 18, 1779, London, Eng.—d. Sept. 12, 1869, West Malvern, Worcestershire), English physician and philologist remembered for his *Thesaurus of English Words and Phrases* (1852), a comprehensive classification of synonyms or verbal equivalents that is still popular in modern editions.

Roget studied medicine at Edinburgh and later helped found the medical school at Manchester. In 1814 he invented a "log-log" slide rule for calculating the roots and powers of numbers. From 1808 to 1840 he practiced in London. The first edition of the *Thesaurus,* which was begun in his 61st year and finished in his 73rd, was a product of his retirement from active medical practice, although it was based on a system of verbal classification he had begun in 1805. Roget was a fellow (from 1815) and secretary (from 1827) of the Royal Society.

Rogier, Charles Latour (b. Aug. 17, 1800, Saint-Quentin, Fr.—d. May 27, 1885, Saint-Josse-ten-Noode, Brussels, Belg.), statesman and one of the leaders of the Belgian Revolution of 1830 that resulted in an independent Belgian kingdom. The foremost Liberal leader in the first four decades of the kingdom's existence, he served as prime minister in 1847–52 and 1857–67.



Rogier, painting by Edmond Lambrichs, 1879; in the Library of the Belgian Parliament

By courtesy of the Institut Belge d'Information et de Documentation, Brussels

Rogier worked as a lawyer in Liège and in 1824 helped found *Mathieu Laensbergh* (later *Le Politique*), a journal that became prominent for its advocacy of Belgian patriotism. When the Belgian rebellion against the Dutch-dominated Kingdom of the United Netherlands broke out in Brussels in August 1830, he led an armed group of Liègeois in support and emerged as a leader in the revolt. He became a principal member of the provisional government the following month and arranged an armistice with the Dutch at Antwerp. As a member for Liège of the new National Congress, he backed a proclamation of Belgian independence and helped Leopold of Saxe-Coburg become the first king of the Belgians as Leopold I in June 1831.

After acting as governor of Antwerp (1831–32), Rogier served as minister of the interior (1832–34) and sponsored a bill for construction of a national railway system, the first in Europe and a key bulwark of the nation's economic recovery. Kept out of office by Roman Catholic opposition between 1841 and 1847, he became prime minister in August 1847, when the Liberals won a decisive electoral victory. His electoral reform law (1848) helped save Belgium from the revolutionary unrest experienced by other European nations in 1848.

Rogier's education bill of 1850 created an alternative school system to the existing Roman Catholic system. His government's financial policy was guided by the forceful Hubert Joseph Walther Frère-Orban, who later became prime minister. In his second ministry (1857–67), Rogier's envoy August Lambermont settled the long-disputed Scheldt Question, freeing Antwerp's maritime commerce. Rogier retired in favour of Frère-Orban in 1867 but remained prominent in public affairs throughout the 1870s.

Rogun Dam, large rock and earth-fill dam on the Vakhsh River in southern Tadzhik S.S.R. It was completed in the late 1980s and is one of the highest dams in the world. Located upstream from the Nurek Dam (almost as tall), Rogun Dam rises to a height of 1,099 feet (335 m) above the canyon floor and has a crest length of 2,165 feet (660 m). Construction on the dam began in 1976, and its design included the building of six hydroelectric generating units with a planned power capacity totaling 3,600 megawatts.

Roh Tae Woo (b. Dec. 4, 1932, near Taegu, Korea [now in South Korea]), Korean military officer and politician who as president of South Korea (from 1988) instituted democratic reforms.

While a high-school student in Taegu, Roh became friends with a fellow student, Chun Doo Hwan. Following the outbreak in 1950 of the Korean War, Roh joined the South Korean army and with Chun attended the Korean Military Academy, where they both graduated in 1955. Roh rose steadily through the ranks thereafter, and by 1979 he was a general in command of the 1st Division.

In October of 1979, President Park Chung Hee was assassinated, and in December Chun Doo Hwan and some fellow officers launched a coup against the civilian government, with Roh giving them crucial support. After Chun became president of South Korea in 1980, Roh resigned from the military in 1981 and held a series of ministerial posts in Chun's government, including minister of political affairs (1981), sports (1982), and home affairs (1982). As head of the Seoul Olympic Organizing Committee from 1983 to 1986, he oversaw South Korea's preparations for the 1988 Summer Olympic Games to be held at Seoul.

In 1985 Chun chose Roh to become the new chairman of Chun's ruling political party, the Democratic Justice Party (DJP), and in June 1987 Chun chose Roh to be the candidate of the DJP in the upcoming presidential elections. Under the country's existing constitution, Roh was thus practically guaranteed to win the presidency, and this prospect ignited widespread popular unrest. In response, Roh on June 29, 1987, made a historic speech in which he proposed a broad program of democratic reforms, chief among them the direct election of the next president by popular vote.

Roh won the ensuing presidential election of December 1987 because both major opposition candidates, Kim Young Sam and Kim Dae Jung, ran against him, splitting the opposition vote. Roh began his five-year term as president on February 25, 1988, the same day a new constitution went into effect with the approval of all the major political parties.

As president, the moderate and conciliatory Roh seemed committed to the democratization and liberalization of South Korean politics. His Democratic Justice Party failed to gain a majority of seats in the National Assembly in elections in April 1988, but in 1990 the DJP under Roh's leadership merged with two moderate opposition parties to form a new majority party called the Democratic Liberal Party.

Roha (Ethiopia): *see* Lalibela.

Rohan FAMILY, one of the great families of the European nobility. Sometimes claiming descent from the first independent house of Brittany, it is traceable to the 12th-century lords, or viscounts, of Rohan, whose descendants by the end of the 15th century were in possession not only of Rohan but also of numerous other Breton lands. The French title of Duke de Rohan (created 1603) was transferred in 1648 to the house of Chabot, thereafter called Rohan-Chabot; but the titles of Prince de Guémenée (said to date from 1570) and of Duke de Montbazon (first created in 1588) remained with the Rohans, who later also obtained those of Prince de Soubise (1667) and of Duke de Rohan-Rohan (1714). The 19th-century Rohans acquired the Austrian rank of prince (*Fürst*) in 1808 and were recognized as heirs to the title of Duke de Bouillon in 1816.

Rohan, Benjamin de: *see* Soubise, Benjamin de Rohan, seigneur de (lord of).

Rohan, Charles de: *see* Soubise, Charles de Rohan, prince de.

Rohan, Henri, duc de (duke of) (b. 1579, Château of Blain, Brittany, Fr.—d. April 13, 1638, Königsfeld, Switz.), duke of Rohan from 1603, soldier, writer, and leader of the Huguenots during the French Wars of Religion.

Henri, whose father was René II, Count de Rohan (1550–86), appeared at court and entered the army at the age of 16. He was a special favourite with Henry IV, who made him Duke de Rohan and a peer of France in 1603,

at the age of 24. Two years later he married Marguerite de Béthune, the Duke de Sully's daughter. Henry IV died in 1610, and Rohan led the Huguenots in revolt against the government of Marie de Médicis in 1615–16. He became the Huguenots' foremost general in the civil wars of the 1620s, campaigning with considerable success in Languedoc. He twice made short-lived peace treaties with King Louis XIII's government (1623 and 1626), but again took up arms against the French king in 1627, during the War of La Rochelle, and fought on in Languedoc until the Peace of Alais in 1629. Rohan recounted the events of this last war in his celebrated *Mémoires* (1644–58).

After a long stay in Venice, Rohan returned to France in 1635 and was given command of the army sent across Switzerland to intervene against the Habsburgs' forces in the Valtellina. Though militarily victorious in his campaigns there, he failed to win the local population to a pro-French policy and was driven out in 1637. Because he was still considered dangerous to France, Rohan retired to Geneva and then entered the service of Bernhard of Saxe-Weimar. He received a mortal wound at the Battle of Rheinfelden on Feb. 28, 1638, and died at the abbey of Königsfeld, Bern canton.

Besides his memoirs, Rohan was also the author of a treatise on military theory entitled *Le Parfait Capitaine* (1636; *The Complete Captain*).

Rohan, Louis-René-Édouard, prince de (b. Sept. 25, 1734, Paris, Fr.—d. Feb. 17, 1803, Ettenheim, Baden [Germany]), cardinal from 1778 and bishop of Strasbourg from 1779 to 1801, who was the antihero of the French scandal known as the Affair of the Diamond Necklace in 1785 (*see* Diamond Necklace, Affair of the). Duped into undertaking the purchase of a necklace for Queen Marie-Antoinette, without her authority and without funds of his own, he was tried for fraud and acquitted but was nevertheless exiled in disgrace from the French court, thus becoming a martyr in the eyes of the queen's enemies and of the critics of royal absolutism.

Rohan-Montbazon, Marie de: *see* Chevreuse, Marie de Rohan-Montbazon, duchesse de (duchess of).

Róheim, Géza (b. 1891, Budapest, Austria-Hungary [Hungary]—d. June 7, 1953, New York, N.Y., U.S.), Hungarian-American psychoanalyst who was the first ethnologist to utilize a psychoanalytic approach to interpreting culture.

While working on his Ph.D. in Germany, Róheim became acquainted with the ideas of Sigmund Freud, including his psychoanalytic approach to interpreting culture. Returning to Budapest, Róheim joined the department of ethnology at the Magyar Nemzeti Museum and entered psychoanalysis in 1915 with one of Freud's closest disciples, Sándor Ferenczi. By the early 1920s he was publishing his pioneer writings in psychoanalytic anthropology and about this time became professor of anthropology at the University of Budapest. His treatise "Nach dem Tode des Urvaters" (1923; "Toward the Death of the Primal Fathers") brought Freudian theory into line with contemporary anthropological knowledge. Another notable work is *Australian Totemism* (1925).

In 1928 Róheim set out to make psychoanalytic-anthropological studies of Australian Aborigines. Later he spent nine months at Sipupu in the D'Entrecasteaux Islands off New Guinea. Some of his results appeared in *Animism, Magic, and the Divine King* (1930).

Róheim taught psychoanalysis and anthropology at Budapest Institute of Psychoanalysis from 1932 to 1938, when he went to the United States and joined the Worcester State Hospital, Massachusetts, as an analyst. From 1940 he was a lecturer at the New York Psychoanalytic Institute and engaged in private psychoanalytic practice. He examined folklore and interpreted myths in *The Origin and Function of Culture* (1943). Róheim theorized that the protracted dependence of the infant and child on the mother, resulting in emotional and social bonds, is the foundation of culture. He also held that individual and societal development may evolve from magical, symbolic thinking akin to that occurring in schizophrenia. His later works include *Psychoanalysis and Anthropology* (1950), *The Gates of the Dream* (1952), and *Magic and Schizophrenia* (1955).

Rohilkhand, low-lying, alluvial region in northwestern Uttar Pradesh state, northern India. The Rohilkhand is part of the Upper Ganges Plain and has an area of about 10,000 square miles (25,000 square km). It is bounded by the Ganges River on the south and the west and by the frontiers of China and Nepal on the north. The region is referred to as the Madhyadesh in the Hindu epics the *Mahābhārata* and the *Rāmāyaṇa*. It was later called Hindustān by Muslim historians. The Rohilkhand was settled by the early Aryans and was successively ruled by various Hindu kings before it became part of the territory of the Muslim rulers of Delhi. With the eclipse of Mughal rule, the region was divided by Jāṭ, Rohilla, and Marāṭhā annexations until it passed to the British following the 1857 Indian Mutiny.

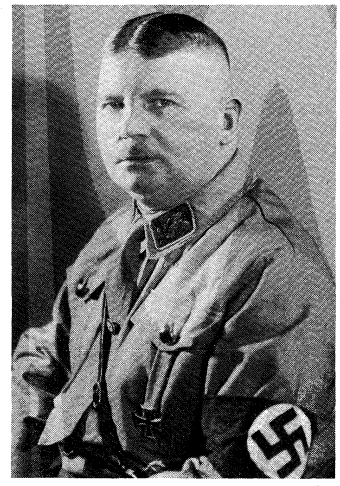
Part of the asymmetrical, alluvium-filled Indo-Ganges trough, the plain is broken by the Tārai-Bhabar submontane belt extending eastward from the foot of the Siwālik Hills. The Rāmgangā, Sukhata, Deona, Sārda, Pilkhara, and Garra rivers follow a northwest-to-southeast course through Rohilkhand. The region was once densely forested, but only a few small patches of forest remain. Agriculture, especially cereals, dominates the regional economy. Large-scale industries (producing textiles, sugar, general-engineering products, and chemicals) are located in urban centres such as Morādābād, Bareilly, Shāhjahānpur, and Pīlībhīt. The region is one of the most densely populated in India and is well served by a network of roads.

Rohlfs, (Friedrich) Gerhard (b. April 14, 1831, Vegesack, near Bremen [Germany]—d. June 2, 1896, Bad Godesberg), German explorer renowned for his dramatic journeys across the deserts of North Africa. More an adventurer than a scientific explorer, Rohlfs nevertheless compiled valuable geographic information. He was also the first European known to have traversed Africa by land from the Mediterranean Sea south to the Gulf of Guinea.

Rohlfs entered the French Foreign Legion in 1855 and, after learning Arabic, began his explorations. In 1862, disguised as an Arab, he explored Morocco to the Atlas Mountains, and in 1864 he reached the Fezzan region of Libya, deep in the Sahara. The following year he began an immense journey through wholly unexplored regions, from Tripoli on the Mediterranean entirely across the Sahara to northeastern Nigeria and down the Niger River to the Atlantic Ocean near Lagos, where he arrived in 1866. In 1874 he again explored the Sahara, traveling east from Tripoli to Egypt. In 1885 he was named German consul to Zanzibar.

Röhm, Ernst, Röhm also spelled ROEHM (b. Nov. 28, 1887, Munich, Ger.—d. June 30, 1934, Munich-Stadelheim), German army officer and chief organizer of Adolf Hitler's storm troops (Sturmabteilung, or SA; Brownshirts). Feared as a rival by Hitler, he was murdered at the Führer's order.

A soldier from 1906, Röhm was wounded three times in World War I, during which he attained the rank of major. After the war he helped to found, before Hitler, the National Socialist German Workers' Party. He helped Hitler win the support of the army in Bavaria and made available to him his private strong-arm force, which, in October 1921, became the Sturmabteilung. For his part in the Munich (Beer Hall) Putsch of Nov. 8–9, 1923, Röhm was briefly imprisoned.



Röhm, 1933
Heinrich Hoffmann, Munich

Röhm wanted the SA to absorb or supplant the Wehrmacht (regular army) and to secure equality with the Nazi Party, contrary to Hitler's wishes. In 1925 Röhm went to Bolivia, returning late in 1930 at Hitler's request to reorganize the SA. After Hitler had become chancellor in 1933, he temporized by including Röhm in his Cabinet but then definitely subordinated the SA to the party and the Wehrmacht. Persuaded by Hermann Göring and Heinrich Himmler, the Führer finally decided to purge the SA chief. Röhm was taken by Hitler personally from a hotel near Munich on the pretext that he and the SA were preparing a putsch. He was shot without trial.

Rohmer, Eric, original name JEAN-MARIE-MAURICE SCHERER (b. April 4, 1920, Nancy, Fr.), French motion-picture director and writer noted for his sensitively observed studies of romantic passion.

Rohmer, who first earned an advanced degree in history and taught school for a short time, began his writing career in the mid-1940s. In 1957 he and Claude Chabrol coauthored the film study *Hitchcock*. He moved to Paris, where he began to write film criticism for French periodicals. He was a founding editor of *La Gazette du Cinema* in 1950, along with François Truffaut, Jean-Luc Godard, and Jacques Rivette, and he became editor in chief of *Cahiers du Cinema* in 1957, quitting the New Wave publication when he became involved in a dispute in 1963. In 1950 Rohmer began making a series of short, fairly successful films. In 1959 he directed his first full-length feature; *Le Signe du lion* ("The Sign of Leo").

Rohmer next directed a series of six *contes moraux,* or moral tales, the first two of which were *La Boulangère de Monceau* (1962; "The Baker of Monceau") and *La Carrière de Suzanne* (1963; "Suzanne's Career"). Both films were commercial failures, and Rohmer turned his attention to directing television documentaries for a time. Then in 1966 he filmed another of the moral tales: *La Collectionneuse* ("The Collector"), which achieved some critical esteem in Europe. It was not until Rohmer filmed *Ma Nuit chez*

Maud (1968; *My Night at Maud's*), considered by most critics to be the centrepiece of the *contes moraux,* however, that he scored a commercial hit. It is the story of a puritanical engineer marooned in a snowstorm who takes refuge in Maud's apartment. Maud, an attractive divorcée, tries to seduce him, but the engineer resists her efforts, and the two spend the night discussing intellectual matters. The film won critical acclaim and public acceptance in both France and the United States and was awarded the Prix Max Ophüls. Rohmer followed his success with *Le Genou de Claire* (1970; *Claire's Knee*), and it won the best film of the year award at the San Sebastian Film Festival as well as both the Prix Louis-Delluc and the Prix Melies. He completed the series in 1972 with the release of *L'Amour l'après-midi* (*Chloe in the Afternoon*). The scripts were later published as *Six Moral Tales* (1977).

In 1976 Rohmer filmed *Die Marquise von O* (*The Marquise of O*), a well-known short story, and it won the special Jury Prize at the Cannes Film Festival. His later films include *Perceval le Gallois* (1978; *Perceval*) and *La femme de l'aviateur* (1981; "The Aviator's Wife").

Rohmer, Sax, pseudonym of ARTHUR SARSFIELD WADE, or WARD (b. 1883?, Birmingham, Warwickshire, Eng.—d. June 1, 1959, London), internationally popular British writer who created the sinister Chinese criminal genius Fu Manchu, the hero-villain of many novels. The character Fu Manchu later appeared in motion pictures, radio, and television.

Rohmer was interested from childhood in ancient Egypt, the Middle East, and the occult. After working briefly in the financial district of London and as a journalist there, his growing interest in the Far East led him into fiction writing. He published *Dr. Fu Manchu,* the first of the series, in 1913. The inscrutable and aristocratic Fu immediately caught the public's fancy, and Rohmer wrote several more novels about him over the next 45 years. These volumes include *The Devil Doctor* (1916), *The Trail of Fu Manchu* (1934), and *Emperor Fu Manchu* (1959), the latter written while Rohmer was living in the United States. Rohmer gradually transformed Fu Manchu from an entirely self-serving villain into a dedicated anti-Communist.

Rohrer, Heinrich (b. June 6, 1933, Switzerland), Swiss physicist who, with Gerd Binnig, received half of the 1986 Nobel Prize for Physics for their joint invention of the scanning tunneling microscope. (Ernst Ruska received the other half of the prize.)

Rohrer was educated at the Swiss Federal Institute of Technology in Zürich and received his Ph.D. there in 1960. In 1963 he joined the IBM Research Laboratory in Zürich, where he remained. Binnig also joined the laboratory, and it was there that the two men designed and built the first scanning tunneling microscope. This instrument is equipped with a tiny tungsten probe whose tip, only about one or two atoms wide, is brought to within 5 or 10 atoms' distance of the surface of a conducting or semiconducting material. (An atom is equal to about one angstrom, or one ten-billionth of a metre.) When the electric potential of the tip is made to differ by a few volts from that of the surface, quantum mechanical effects cause a measurable electric current to cross the gap. The strength of this current is extremely sensitive to the distance between the probe and the surface, and as the probe's tip scans the surface, it can be kept a fixed distance away by raising and lowering it so as to hold the current constant. A record of the elevation of the probe is a topographical map of the surface under study, on which the contour intervals are so small that the individual atoms making up the surface are clearly recognizable.

Rohtak, city, central Haryāna state, northwestern India. It is connected by rail with Delhi and by road with Bhiwāni and Pānīpat. Rohtak, formerly called Rohtasgarh (Fort of Rohtas), is said to have been founded by Raja Rohtas, a Panwār Rājput. The Dini mosque there dates to 1140; excavations at the nearby Khokra Kot mound have revealed pieces of Buddhist sculpture. Rohtak is a major grain and cotton trade centre, and there is some light industry. Constituted a municipality in 1867, the city has an agricultural research station and is the seat of Maharshi Dayanand University (established 1976) and 12 affiliated colleges, including a medical school.

The surrounding area consists of a high, level plain between the Sutlej and Ganges rivers. Irrigation is chiefly by branches of the Western Yamuna Canal system. Grains, gram (chickpea), sugarcane, and cotton are the chief crops. There are also brine and limestone deposits. Pop. (1981) city, 166,767.

rohu, Indian fish, a species of labeo (*q.v.*).

Roi Et, town, northeastern Thailand. It is a highway junction and is located near the Chi River. The surrounding area is densely settled, hilly, and poor. Between 1960 and 1970 it lost population through out-migration. Its agriculture (rice, corn [maize], beans, tobacco, and cotton) is less productive than in other parts of Thailand. Freshwater fishing is important, however. Pop. (1983 est.) town, 32,502.

Rojas, Fernando de (b. *c.* 1465, La Puebla de Montalbán, Castile—d. April 1541, Talavera de la Reina, Spain), Spanish author whose single work is *La Celestina,* an extended prose drama in dialogue that marked an important stage in the development of prose fiction in Spain and in Europe.

Of Jewish parentage, Rojas received a bachelor's degree in law from the University of Salamanca about 1490. He later moved to Talavera, married, practiced law, and served briefly as lord mayor. The first version of *La Celestina* appeared under the title *Comedia de Calisto y Melibea* (1499) and contained 16 acts. A later version, *Tragicomedia de Calisto y Melibea* (1502), is in 21 acts or chapters. The custom of referring to the work as *La Celestina* began with the Italian (1519) and French (1527) translations. *La Celestina* was one of the first works to present romance in everyday life. It combines a tragic love story with bawdy and picaresque scenes enacted between a cast of secondary characters.

Rojas, Manuel (Sepúlveda) (b. Jan. 8, 1896, Buenos Aires—d. March 11, 1973, Santiago de Chile), Chilean novelist and short-story writer.

As a youth, Rojas traveled along the Argentine and Chilean border while working as an unskilled labourer. Many of the situations and characters he encountered there later became part of his fictional world. He became a linotype operator and ultimately worked on Santiago newspapers and in the national library, and from 1931 he was head of the University of Chile Press.

Rojas began as a poet (*Poeticus,* 1921) and then turned to writing short stories. His collections of short stories, *Hombres del sur* (1926; "Men of the South") and *El delincuente* (1929; "The Delinquent"), showed the influence of the American writers Ernest Hemingway and William Faulkner. Among his later volumes of short stories were *El vaso de leche y sus mejores cuentos* (1959; "The Glass of Milk and Its Best Stories") and *El hombre de la rosa* (1963; "The Man of the Rose"). His fiction, which was largely autobiographical, treats the lives of lower-class individuals and their problems.

His first novel, *Lanchas en la bahía* (1932; "Launches in the Bay"), is an ironic and satirical presentation of some of the social ills afflicting Chile. Rojas' most acclaimed work is *Hijo de ladrón* (1951; "Son of a Thief"; Eng. trans., *Born Guilty*), an autobiographical novel with existential preoccupations. The use of interior monologue, flashbacks, and stream of consciousness foreshadowed some of the techniques later employed in the Latin American new novel. *Hijo de ladrón* was translated into the major European languages and established Rojas as an international writer. Other novels include *Mejor que el vino* (1958; "Better Than Wine"), *Punta de rieles* (1960; "Shining Tip"), and *Sombras contra el muro* (1964; "Shadows Against the Wall"), in which many of the characters of *Hijo de ladrón* reappear.

Rojas Pinilla, Gustavo (b. March 12, 1900, Tunja, Colom.—d. Jan. 17, 1975, Bogotá), professional soldier and dictator of Colombia (1953–57) whose corrupt and authoritarian regime converted his nationwide popularity into united national hostility. Nevertheless, he remained a major force in Colombian political life.

After graduating from the Colombian Military Academy in 1920, Rojas Pinilla earned a civil engineering degree in the United States while on inactive military status (1924–33). He then rose rapidly in the army to the rank of lieutenant general, represented Colombia at several international conferences, and was a member of the Inter-American Defense Board (1951–52). He also played a role in suppressing the riots that followed the assassination of the left-wing leader Jorge Eliécer Gaitán in April 1948.

In 1953, after four years of the brutal and authoritarian regime of President Laureano Gómez, the Colombian people welcomed the seizure of power by Rojas Pinilla. He promised them peace, justice, and liberty. Instead, ruling by decree, he silenced the opposition press, made the secret police an ever-present institution, stirred up violence against Protestant churches and schools, and embezzled government money to buy land for himself until conservatives and liberals jointly forced him into exile. Appointing a military junta to rule in his place, he left for the United States in May 1957.

When he returned to Colombia in October 1958, he was impeached, and in April 1959 he lost his civil rights. He nevertheless reentered politics and in 1962 won 2.5 percent of the votes for president. Disillusionment with the lack of progress under National Front leadership and the disintegration of the left-wing faction of the Liberal Party made Rojas Pinilla's Acción Nacional Popular (Anapo) the leading protest group of the lower classes. In 1967 a Colombian court ruled that he could not be deprived of his civil rights, and he ran again for president in 1970. He received almost as many votes as the National Front candidate, Misael Pastrana Borrero, but the supreme electoral court declared Pastrana Borrero the winner. Rojas Pinilla claimed fraud, his supporters rioted, and martial law was declared. In the presidential election of 1974, Rojas Pinilla's daughter and former campaign manager, María Eugenia Rojas de Moreno Díaz, ran as the Anapo candidate and was soundly defeated.

Rojas Villandrando, Agustín de (b. August 1572, Madrid—d. 1618, Paredes de Nava, Spain), Spanish actor and author whose most important work, *El viaje entretenido* ("The Pleasant Voyage"), a picaresque novel in dialogue form, provides a valuable account of the Spanish theatre in the 16th century and of the life of the actors. He is also considered the cleverest writer of *loas* (laudatory dramatic prologues) of his era.

Rojas served as a soldier in France, was captured and then was ransomed in an exchange

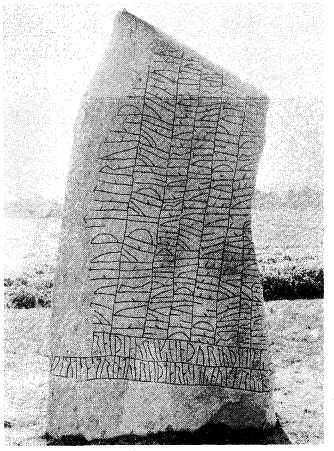
of prisoners. Back in Spain, he joined a touring acting company that traveled throughout the country. After his marriage in 1603, however, he settled down as a public functionary in Zamora.

Rojas Zorrilla, Francisco de (b. Oct. 4, 1607, Toledo, Spain—d. Jan. 23, 1648, Madrid), Spanish dramatist of the school of his more eminent contemporary, Pedro Calderón de la Barca. Rojas Zorrilla was noted for tragedies and a new kind of play, the *comedia de figurón,* in which an eccentric is the chief figure. At their best, his plays have a sense of life and animation that is lacking in other drama influenced by Calderón.

Little is known of Rojas Zorrilla's life. He apparently studied at the University of Toledo and then lived primarily in Madrid, where he became close to the court, wrote plays for the royal theatre, and was awarded the Order of Santiago in 1644.

The few good plays among the 70 that Rojas Zorrilla wrote have a sense of reality that partly overcomes the artificiality of the theatrical conventions, and they have a naturalness in their plots, which marks his best known play, *Del rey abajo, ninguno* ("Below the King, No One").

Rök Stone, 9th-century memorial block bearing the longest runic inscription known, found in Östergötland, Swed. Carved in granite, 725 runes bear a legible text containing secret formulas, perhaps maledictory in nature, verses of epic character, allusions to heroic myths, and a poetic vocabulary. Engraved by Sibbi, the inscription was composed by Varin in memory of his slain son, Vämod. A complete stanza in the middle of the inscription is believed to concern Theodoric the Great. The runes themselves are distinctive, being of a Swedish–Norwegian runic alphabet of 16 characters. Also carved on the stone are nine lines in the older runic alphabet (futhark). The rune carver also used cipher for magical purposes.



Rök Stone

By courtesy of Kungl. Vitterhets Historie Och Antikvitets Akademien, Stockholm

Rokanese (people): *see* Ngada.

Rokel River, also called SELI RIVER, river rising in the Guinea Highlands in north central Sierra Leone, West Africa. It drains a 4,100-sq-mi (10,620-sq-km) basin on its 250-mi (400-km) southwesterly course toward the Atlantic, and empties into the estuary of the Sierra Leone River (*q.v.*). Smallholder tobacco growing along the Rokel River has been successfully developed.

Rokitansky, Karl, Freiherr von (baron of) (b. Feb. 19, 1804, Königgrätz, Austria—d. July 23, 1878, Vienna), Austrian pathologist whose endeavours to establish a systematic picture of the sick organism from nearly 100,000 autopsies—30,000 of which he himself performed—helped make the study of pathological anatomy a cornerstone of modern medical practice and established the New Vienna School as a world medical centre during the latter half of the 19th century.



Rokitansky, detail of an engraving

BBC Hulton Picture Library

A professor of pathological anatomy (1844–74) at the Vienna General Hospital, he inspired the Bohemian student Ignaz Semmelweis, later a martyr to the cause of antiseptic medical practice, to take up the study of medicine (1846) and afterward supported him in his struggle to eliminate childbed fever by cleaning up Europe's maternity wards.

First to detect bacteria in lesions of malignant endocarditis, an often rapidly fatal inflammation of the membrane lining the inner walls of the heart, Rokitansky created the basis for a differentiation of lobar pneumonia (originating in the lower lobe of the lung) and lobular pneumonia, or bronchopneumonia (originating in the finer subdivisions of the branched bronchial tree). He made a fundamental study of acute yellow atrophy of the liver (now known as Rokitansky's disease; 1843), established the micropathology of pulmonary emphysema (a condition of the lung characterized by enlarged air spaces separated from the terminals of the bronchial tree), and first described spondylolisthesis (1839), the forward displacement of one vertebra over another.

His *Handbuch der pathologischen Anatomie,* 3 vol. (1842–46; *Treatise of Pathological Anatomy,* 1849–52), represented an elevation of the discipline to the status of an established science.

Rokka (people): *see* Ngada.

Rokkaku Shisui, original name ROKKAKU CHŪTARŌ (b. 1867, Hiroshima Prefecture, Japan—d. 1950), authority on Japanese lacquer ware.

After graduation in 1893 from the Tokyo Fine Arts School, he toured the provinces with the famous art connoisseur Okakura Kakuzō in search of old art works. He also accompanied Okakura on a study trip to the United States, where he worked at the Boston Museum of Fine Arts and at the Metropolitan Museum of Art in New York City. In 1907 he visited the art museums of Europe. Later he participated in the excavation of Korean *rakurō*—artifacts brought to Korea by Chinese conquerors during the Han dynasty (206 BC–AD 220). He was elected to the National Art Academy in recognition of the quality of his research on lacquer ware.

Rokossovsky, Konstantin Konstantinovich, Rokossovsky also spelled ROKOSSOVSKII (b. Dec. 21 [Dec. 9, old style], 1896, Velikiye Luki, Russia—d. Aug. 3, 1968, Moscow), Soviet military commander noted for his role in the Battle of Stalingrad (1942–43).

The son of a railroad engineer, Rokossovsky served in the imperial army as a noncommissioned officer in World War I. In 1917 he joined the Red Army and served in the Civil War, rising through the ranks to various Far Eastern commands. In 1938 during the Stalinist purges he was imprisoned but was released upon the German invasion of the Soviet Union in 1941 because his military talents were needed. During World War II Rokossovsky had major roles in the battles at Moscow (1941), Stalingrad, and Kursk (1943), as well as in the Soviet drives into Byelorussia (1944), east Prussia, and Pomerania (1945). He won his greatest renown at Stalingrad when he directed six Soviet armies of the Don River front that, along with other Soviet forces, first trapped and then annihilated the 22 divisions of the German 6th Army.

In 1949 he was named Soviet defense minister and deputy chairman of the Council of Ministers of Soviet-dominated Poland and was accorded the title marshal of Poland. He held these positions until the return to power of former Communist Polish Workers' Party secretary Władysław Gomulka, who had been imprisoned in 1948. Upon his expulsion by Gomulka (Oct. 28, 1956, on charges of attempting to stage a pro-Soviet coup), Rokossovsky returned to the U.S.S.R., where he was deputy minister of defense (1956–62) and held various other military posts.

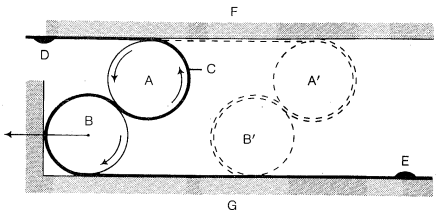
Rokycana, Jan, Czech JAN Z ROKYCAN (b. *c.* 1390, Rokycany, Bohemia—d. Feb. 22, 1471, Prague), priest, archbishop, and follower of Jan Hus (1372/73–1415); he was a chief organizer of the papally denounced Hussite Church and a major figure in Bohemian church history.

Rokycana went to Prague probably in 1410, assisting and later succeeding Jakoubek of Stříbro as organizer of the Hussites. Gaining a reputation as a powerful preacher, Rokycana was made minister of the largest church in Prague in 1423. The next year he negotiated a peace with the Orphans, a left-wing group of Hussites, and in 1432 became their leader.

The Hussites differed with Roman Catholics in particular by asserting that the Eucharist should be given to the laity in both elements of bread and wine, rather than in bread only, as Catholics believed, and in 1433 the Council of Basel was arranged to negotiate the differences. Rokycana, as spokesman for the large Hussite delegation that wanted Roman recognition of the Hussite Church as the sole national Czech church, enabled passage of the Prague articles of agreement. Later called the Prague Compactata, the agreement was ratified by the Bohemian emperor Sigismund. In 1435 Rokycana was made archbishop of the Hussite Church, and in 1436 he signed the Compactata in its name. Sigismund, however, was unfriendly to the Hussites and in 1437 drove Rokycana from Prague. Unable to return until 1448, Rokycana finally achieved general acceptance with the help of George of Poděbrady, who led the Hussites of Prague in Rokycana's absence. When George was elected king of Bohemia in 1458, the security of the Hussite Church was assured in Bohemia, but the papacy was provoked. In 1462 Pope Pius II revoked the peace agreement of 1436, and his successor, Paul II, declared a crusade in 1467 against the Hussites. When both Rokycana and the King died in 1471, the Hussites were still unconquered, and in the remaining battles the papacy was routed. As the first national church that the papacy was unable to restrain or to conquer, the Hussite Church became an ideal for the churches of the Protestant Reformation a half century later.

Rolamite, mechanical roller-band device that functions as an almost frictionless suspension system for rollers; it consists of a flexible metal band formed in an S-shaped loop. In the Figure, rollers A and B are suspended within

the loops of the flexible metallic band C, fastened at D and E to the parallel guide rails F and G. The sum of the roller diameters and twice the band thickness is greater than the distance between the guide rails, so that when



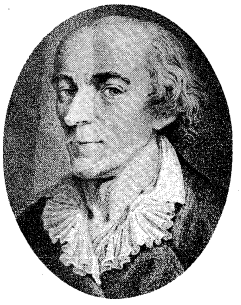
Rolamite

the band is pulled taut and anchored to the guide rails at D and E, the band is wrapped around the rollers so tightly that slippage is prevented. If the guide rails in the figure were tilted clockwise slightly, roller A would rotate counterclockwise and roll out the band on the upper guide rail to some position such as A′, and roller B would rotate clockwise and roll in the band on the lower guide rail to position B′. The frictional forces restraining the motion of the rollers would be about one-tenth the friction for ball and roller bearings.

The Rolamite was invented in 1966 by the U.S. engineer Donald F. Wilkes, who gave it its name.

Roland (de La Platière), Jean-Marie (b. Feb. 18, 1734, Thizy, Fr.—d. Nov. 15, 1793, Bourg-Beaudoin), French industrial scientist who, largely through his wife's ambition, became a leader of the moderate Girondin faction of bourgeois revolutionaries during the French Revolution.

The son of a royal official, Roland became inspector of manufactures in Amiens (1780) and then in Lyon (1784). In February 1780 he married Jeanne-Marie Phlipon, who was 20 years his junior. Over the next decade he



Jean-Marie Roland, engraving by Nicolas Colibert
Giraudon—Art Resource/EB Inc.

wrote a number of books on manufacturing and political economy. Both he and his wife welcomed the outbreak (1789) of the Revolution, which was at first led by bourgeois moderates. The Rolands moved to Paris in December 1791; and on March 23, 1792, Jean-Marie, because of his friendship with Jacques Brissot and the influence of Mme Roland, was appointed minister of the interior in a Cabinet composed mostly of Girondins (as the Brissotins were called). Although he proved an able administrator, Roland came into conflict with King Louis XVI when the King vetoed a decree to establish a national guard camp outside Paris. On June 10, 1792, in a letter drafted by his wife, Roland called upon the King to withdraw his veto. Louis responded by dismissing Roland and most of the other Girondin ministers on June 13; but, when a provisional government was set up after the overthrow of the monarchy on August 10, Roland was again appointed minister of the interior. As a member of the Convention, the Revolutionary legislature that convened in September 1792, he vigorously opposed the economic controls advocated by the radical democrats of the Jacobin Club. At the prompting of his wife, he attacked the leading moderate Georges Danton, thereby driving Danton into an alliance with the Jacobin leader Maximilien Robespierre. On November 20, Roland discovered the King's papers in a secret safe in the Tuileries Palace; but by neglecting to have the papers inventoried before witnesses he left himself open to the charge that he had destroyed documentary evidence of Girondin collusion with the royalists. He worked to prevent the conviction of Louis XVI on a charge of treason; and on Jan. 23, 1793, two days after the King's execution, he resigned his ministerial post. During the Jacobin coup d'etat (May 31–June 2) that purged the Girondins from the Convention, Roland escaped from Paris, but his wife was arrested. On hearing of her execution, he committed suicide.

Consult the INDEX *first*

Roland (de La Platière), Jeanne-Marie, *née* PHLIPON, byname MANON PHLIPON (b. March 17, 1754, Paris—d. Nov. 8, 1793, Paris), wife of Jean-Marie Roland (de La Platière), who directed her husband's political career during the French Revolution, greatly influencing the policies of the moderate Girondin faction of bourgeois Revolutionaries.

Jeanne-Marie Phlipon was the daughter of a Paris engraver. Brilliant and cultured, she absorbed the democratic ideas of Jean-Jacques Rousseau and other 18th-century French philosophers. In 1780 she married Roland. The couple settled in Paris in 1791, and Mme Roland's salon quickly became a meeting place for the group of bourgeois democrats (later called the Girondins) led by Jacques Brissot. Although she was at first on friendly terms with the radical democrat Robespierre, one of the leaders of the Jacobin Club, she broke with him in late 1791. Mme Roland directed the activities of her husband after he became minister of the interior under King Louis XVI in March 1792, and she drafted the letter of protest from Roland to the King that led to Roland's dismissal from the ministry on June 13. The special object of her hatred, however, was the moderate democrat Georges Danton, who overshadowed her husband on the provisional executive council formed after the overthrow of the monarchy (Aug. 10, 1792). By having her husband attack Robespierre and Danton before the Convention (the Revolutionary legislature that convened in September 1792), she alienated Danton from the Girondins and widened the split between the Jacobin and Girondin factions. She was arrested on the outbreak (May 31, 1793) of the Jacobin-inspired insurrection that led to the expulsion (June 2) of the leading Girondins from the Convention. During her five-month imprisonment she wrote her memoirs, *Appel à l'impartiale postérité* ("Appeal to Impartial Posterity"). Just before she was guillotined, she uttered the famous words, "O Liberty, what crimes are committed in thy name!" The *Life of Madame Roland,* a translation of a biography by M. Clemenceau-Jacquemaire, appeared in 1930.

Roland, La Chanson de (epic poem): *see* Chanson de Roland, La.

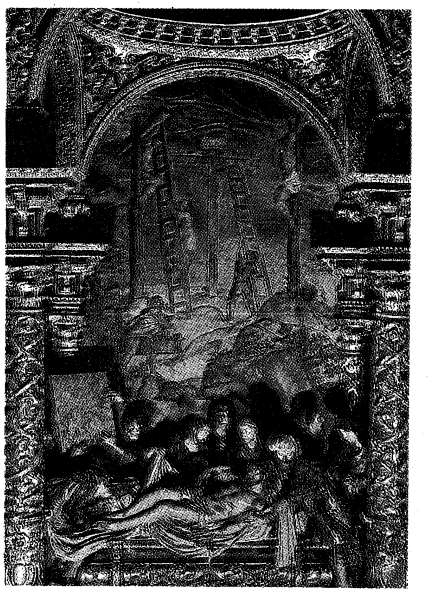
Roland Holst-van der Schalk, Henriëtte Goverdina Anna (b. Dec. 24, 1869, Noordwijk aan Zee, Neth.—d. Nov. 21, 1952, Amsterdam), Dutch poet and active Socialist whose work deals with the humanitarian concerns that informed her politics.

She was a lawyer's daughter. In 1896 she married the painter Richard Nicolaas Roland Holst (1868–1938), himself a talented prose writer. Influenced by the English poet and reformer William Morris, she became a Socialist. Her volumes of poetry *De nieuwe geboort* (1902; "The New Birth") and *Opwaartsche wegen* (1907; "Upward Ways") reflect her political ideals. In her drama *Thomas More* (published 1912), dedicated to the German Marxist leader Karl Kautsky, she depicted the last days of the great Humanist, whom she regarded as having anticipated her own ideals for mankind.

She soon became internationally famous in left-wing circles. She at first eulogized the Russian Revolution, but after visiting Russia in 1925, she expressed her disappointment in Soviet Communism in her poems in *Heldensage* (1927; "Heroic Saga"). She withdrew from active politics but in her later work remained loyal to her ideals, and her pacifist and anticolonial sentiment attracted much attention. She also wrote biographies of such figures as Jean-Jacques Rousseau (1912), Leo Tolstoy (1930), Romain Rolland (1946), and Mahatma Gandhi (1947).

Rolândia, city, northern Paraná state, southern Brazil. It was called Caviúna from 1944 to 1948. The population of the surrounding district has grown dramatically in the 20th century, with the introduction of coffee as a major crop. Rice, cotton, *feijão* (beans), and potatoes are other significant crops, and dairying is also important. Rolândia is connected by highway and railroad with Londrina to the east. Pop. (1980 prelim.) 25,091.

Roldán, Pedro (b. *c.* 1624, Antequera, Spain—d. *c.* 1700, Seville), Spanish sculptor, painter, and architect, best remembered for his work on the main altarpiece at La Caridad, Seville, designed by Simón de Pineda and polychromed by Juan Valdés Leal.



Altarpiece (detail) from the Hospital de la Caridad, Seville, by Pedro Roldán, 1670–75
Archivo Mas, Barcelona

After studying in Granada with Alonso de Mena, the father of the famous sculptor Pedro de Mena, Roldán moved in 1646 to Seville. From 1664 to 1672 he was director of sculpture at the Seville Academy, and from 1670 to 1675 he executed the sculpture for the altarpiece at La Caridad. Influential as a teacher, he trained his daughter Luisa, the only woman to be named Spanish royal sculptor (to King Charles II), and his grandson Pedro Duque

Cornejo, a leading sculptor in the first half of the 18th century.

Very much an artist of the late Baroque, Roldán attempted to cross the boundaries of the different arts in order to combine painting, sculpture, and architecture in a theatrical unity. His work on the altarpiece at La Caridad is a fine example of his gift for bringing the arts together.

Roldós Aguilera, Jaime (b. Nov. 5, 1940, Guayaquil, Ecuador—d. May 24, 1981, near Guachanama), lawyer elected president of Ecuador in 1979.

After graduating from the University of Guayaquil and its law school, Roldós joined the faculty of the Vicente Rocafuerte University in Guayaquil. In 1962 he married Marta Bucaram, a niece of Assad Bucaram, the leader of the Concentration of Popular Forces (Concentración de Fuerzas Populares; CFP), a left-of-centre populist party. In 1968 Roldós, endorsed by the CFP, was elected to the Ecuadorean legislature, which was, however, suspended by President José María Velasco Ibarra in 1970.

In 1976, while Ecuador was ruled by a military junta that had taken control in 1972, Roldós was appointed to one of three committees charged with formulating changes in the constitution and election laws of the nation. A new constitution was adopted in 1978, but a clause inserted in it by the junta disqualified Bucaram from the presidency, which he had been favoured to win. Roldós became the candidate of the CFP, using the campaign slogan, "Roldós in office, Bucaram in power." He received a surprising 31 percent of the votes but was forced into a runoff election. The junta delayed the runoff until April 1979, and Roldós took advantage of the interval to leave the shadow of Bucaram and build up his own identity. In the runoff, Roldós received nearly 69 percent of the votes.

After taking office, Roldós pursued policies more conservative than had been expected; he received little cooperation from the new unicameral legislature, which was led by the alienated Bucaram. Roldós formed his own political party—People, Change, and Democracy—in 1980. He and his wife were killed in an airplane crash near the Peruvian border.

role, in sociology, the behaviour expected of an individual who occupies a given social position or status. A role is a comprehensive pattern of behaviour that is socially recognized, providing a means of identifying and placing an individual in a society. It also serves as a strategy for coping with recurrent situations and dealing with the roles of others (*e.g.,* parent–child roles). The term, borrowed from theatrical usage, emphasizes the distinction between the actor and the part. A role remains relatively stable even though different people occupy the position: any individual assigned the role of physician, like any actor in the role of Hamlet, is expected to behave in a particular way. An individual may have a unique style, but this is exhibited within the boundaries of the expected behaviour.

Role expectations include both actions and qualities: a teacher may be expected not only to deliver lectures, assign homework, and prepare examinations but also to be dedicated, concerned, honest, and responsible. Individuals usually occupy several positions, which may or may not be compatible with one another: one person may be husband, father, artist, and patient, with each role entailing certain obligations, duties, privileges, and rights vis-à-vis other persons. *See also* social status.

Rolf (duke of Normandy): *see* Rollo.

Rolfe, Frederick William, pseudonym BARON CORVO (b. July 22, 1860, London—d. Oct. 25, 1913, Venice), English author and eccentric, best known for his autobiographical fantasy *Hadrian the Seventh.* He provides the curious example of an artist rescued from obscurity by his biographer, for many years after Rolfe's death A.J.A. Symons wrote a colourful biographical fantasy, *The Quest for Corvo* (1934), the publication of which marked the beginning of Rolfe's fame.

Rolfe left school at age 14 and became successively a pupil teacher, an unattached student at the University of Oxford, and a schoolmaster. Reared as a Protestant, he had from boyhood been drawn to religion, and his plans for a career in the church were laid in adolescence. In 1886 he became a Roman Catholic. There followed two unsuccessful attempts to become a priest, but his independence and the homosexuality that marked and embittered his life finally led to his dismissal from the Scots College in Rome. This painful event caused him lifelong frustration.

For eight years he wandered, turning his hand to painting, photography, tutoring, inventing, and journalism. In 1898 he became a professional writer with the publication of retellings of the legends of Roman Catholic saints under the title *Stories Toto Told Me,* which made a name for him at the time. During the next decade his publications included a collection of short stories, *In His Own Image* (1901); a historical work, *Chronicles of the House of Borgia* (1901); and two novels, *Hadrian the Seventh* (1904) and *Don Tarquinio* (1905). Some of his works appeared after his death, notably *The Desire and Pursuit of the Whole* (1934). Rolfe was also a prolific letter writer, engaging in long and violent correspondence with his enemies.

Rolfe went to Venice for a holiday in 1908 but remained there for the rest of his life, varying between appalling privations and short periods of extravagance, mainly at the expense of friends and well-wishers with whom he then quarreled. Yet during this period he contrived to write one of his most notable works, *The Desire and Pursuit of the Whole.*

Rolfe, John (baptized May 6, 1585, Norfolk, Eng.—d. 1622?, Virginia [now in U.S.]), Virginia planter and colonial official who was the husband of Pocahontas, daughter of the Indian chief Powhatan.

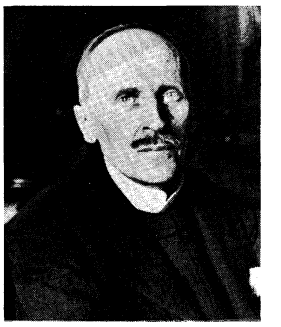
John Rolfe sailed for Virginia in 1609, but a shipwreck in the Bermudas delayed his arrival until the following year. In about 1612 he began to experiment with growing tobacco. When he found that the local variety was too bitter for English tastes, he began cultivating seeds that he brought from the West Indies. In June 1613 Rolfe sent some of the West Indian tobacco to England. Its widespread acceptance there provided needed economic stability for Virginia.

The Indian princess Pocahontas, who was then held captive in Jamestown, was baptized, and Rolfe, a widower, obtained permission to marry her from her father, Powhatan, and the Virginia governor, Sir Thomas Dale. Rolfe and the princess were married on April 5, 1614, an event that assured peace with the local Indians for eight years. The couple had one son, Thomas (b. 1615). In 1616 the Virginia Company sponsored a trip to England for the couple and their infant son. The family was enthusiastically received in England, but Pocahontas (then renamed Rebecca) became ill and died in March 1617 as they were preparing to return to Virginia. (Their son was raised by an uncle and did not return to America until 1640.)

Rolfe returned to Virginia and married again (to one Jane Pierce), and in 1621 he was appointed to the colony's Council of State. (He previously had served as secretary and recorder of the colony.) In 1622, during a massacre, his large farm at Bermuda Hundred was destroyed and Rolfe apparently perished.

Rolla, city, seat (1857) of Phelps county, south-central Missouri, U.S., in the Ozark Mountains, near the Gasconade River and units of the Mark Twain National Forest (headquartered at Rolla). It originated about 1856 as a construction site for the St. Louis–San Francisco Railway and supposedly derived its name from a phonetic spelling of Raleigh, N.C., home of one of the settlers. It was a Federal stronghold during the American Civil War. The University of Missouri at Rolla was founded in 1870 as the Missouri School of Mines. Rolla is the site of the U.S. Bureau of Mines Metallurgical Center, and the U.S. Geological and Missouri Geological surveys also maintain facilities there. The Missouri Trachoma Hospital is in the city. Agriculture, state and federal agencies, and light industry (auto parts, food products) are the city's economic bulwarks. Inc. 1890. Pop. (1987 est.) 13,256.

Rolland, Romain (b. Jan. 29, 1866, Clamecy, Fr.—d. Dec. 30, 1944, Vézelay), novelist, dramatist, essayist, and one of the great mystics of 20th-century French literature. He was, in his life and writings, deeply involved in the major social, political, and spiritual events of his age: the Dreyfus Affair, which exposed



Rolland
EB Inc.

anti-Semitism in the French army; pacifism; communism; the fight against fascism; and the search for world peace.

At age 14, Rolland went to Paris to study and found a society in spiritual disarray. He was admitted to the École Normale Supérieure, lost his religious faith, discovered the writings of Benedict de Spinoza and Leo Tolstoy, and developed a passion for music. He studied history (1889) and received a doctorate in art (1895), after which he went on a two-year mission to Italy at the École Française de Rome. At first, Rolland wrote plays but was unsuccessful in his attempts to reach a vast audience and to rekindle "the heroism and the faith of the nation." He collected his plays in two cycles: *Les Tragédies de la foi* (1913; "The Tragedies of Faith"), which contains *Aërt* (1898), and *Le Théâtre de la révolution* (1904), which includes a presentation of the Dreyfus Affair, *Les Loups* (1898; *The Wolves*), and *Danton* (1900).

In 1912, after a brief career in teaching art and musicology, he resigned to devote full time to writing. He collaborated with Charles Péguy in the journal *Les Cahiers de la Quinzaine,* where he first published his best-known novel, *Jean-Christophe,* 10 vol. (1904–12). For this and for his pamphlet *Au-dessus de la mêlée* (1915; "Above the Battle"), a call for France and Germany to respect truth and humanity throughout their struggle in World War I, he was awarded the Nobel Prize for Literature in 1915. His thought was the centre of a violent controversy and was not fully understood until 1952 with the posthumous publication of his *Journal des années de guerre, 1914–1919* ("Journal of the War Years, 1914–1919"). In 1914 he moved to Switzerland, where he lived until his return to France in 1937.

His passion for the heroic found expression

in a series of biographies of geniuses: *Vie de Beethoven* (1903; *Beethoven*), who was for Rolland the universal musician above all the others; *Vie de Michel-Ange* (1905; *The Life of Michel Angelo*), and *Vie de Tolstoi* (1911; *Tolstoy*), among others.

Rolland's masterpiece, *Jean-Christophe,* is one of the longest great novels ever written and is a prime example of the *roman fleuve* ("novel cycle") in France. An epic in construction and style, rich in poetic feeling, it presents the successive crises confronting a creative genius—here, a musical composer of German birth, Jean-Christophe Krafft, modeled half after Beethoven and half after Rolland—who, despite discouragement and the stresses of his own turbulent personality, is inspired by love of life. The friendship between this young German and a young Frenchman symbolizes the "harmony of opposites" that Rolland believed could eventually be established between nations throughout the world.

After a burlesque fantasy, *Colas Breugnon* (1919), Rolland published a second novel cycle, *L'Âme-enchantée,* 7 vol. (1922–33), in which he exposed the cruel effects of political sectarianism. In the 1920s he turned to Asia, especially India, seeking to interpret its mystical philosophy to the West in such works as *Mahatma Gandhi* (1924). Rolland's vast correspondence with such figures as Albert Schweitzer, Albert Einstein, Bertrand Russell, and Rabindranath Tagore, was published in the *Cahiers Romain Rolland* (1948). His posthumously published *Mémoires* (1956) and private journals bear witness to the exceptional integrity of a writer dominated by the love of mankind.

Rolle, Richard, in full RICHARD ROLLE DE HAMPOLE (b. *c.* 1300, Thornton, Yorkshire, Eng.—d. Sept. 29, 1349, Hampole, Yorkshire), English mystic and author of mystical and ascetic tracts.

Rolle attended the University of Oxford but, dissatisfied with the subjects of study and the disputatiousness, left without a degree. He established himself as a hermit on the estate of John Dalton of Pickering, but later moved to other hermitages, and probably always led a wandering life, rousing some opposition but winning much admiration. He kept in touch with a number of religious communities in the north and seems to have become spiritual adviser to the nuns at Hampole, in south Yorkshire, before his death there.

Rolle's importance lies in the devotional prose he composed in the vernacular for women readers. It is sometimes difficult to distinguish his writings from those of his followers and imitators. Those English or Latin epistles and treatises that have definitely been attributed to Rolle, however, reflect his fervent devotion and his emphasis on a rapturous mystical union with God. Throughout his writings the life of contemplation and solitude is exalted. Rolle's writings in Latin are overly rhetorical, but his English prose style is lively, flexible, and persuasive. His influence and reputation lasted until the Reformation.



Rolle, detail from "Religious Poems," early 15th century; in the British Library (Cotton Ms. Faustina B. VI)

Reproduced by permission of the British Library

roller, any of about 12 species of Old World birds constituting the family Coraciidae (order Coraciiformes), named for the dives and somersaults they perform during the display flights in courtship. The family is sometimes considered to include the ground rollers and cuckoo rollers. Rollers inhabit warm regions from Europe and Africa to Australia.

Ranging in length from 25 to 32 cm (10 to 13 inches), rollers look like stocky, short-legged jays and are predominately blue or violet in colour. They gather in noisy flocks to feed on locusts, flying ants, and lizards. Most nest in tree holes; some burrow in termite nests.

The 30-centimetre- (12-inch-) long common roller (*Coracias garrulus*), found from southern Europe to western Asia, has vivid blue wings with black borders. *See also* cuckoo roller; ground roller.

roller, farm implement used to break up lumps left by harrows and to compact the soil, eliminating large air spaces. The plain roller is often used to compact grassland damaged by winter heaving. Corrugated rollers, single or tandem, crush clods and firm the soil after plowing. A type usually called a roller-packer or land presser has heavy, wedge-shaped wheels about 3 feet (1 m) in diameter and is used in dry seasons to compress the soil after plowing.



Roller-packer, crushing surface clods and firming the seedbed

By courtesy of John Deere

roller bearing, one of the two members of the class of rolling, or so-called antifriction, bearings (the other member of the class is the ball bearing). Like a ball bearing, a roller bearing has two grooved tracks, or races, but the balls are replaced by rollers. The rollers may be cylinders or truncated cones. Only radial loads (*i.e.,* loads perpendicular to the axis of rotation) can be carried when the rollers are cylindrical, but with conical rollers both radial and thrust, or axial, loads (*i.e.,* ones parallel to the axis of rotation) can be carried. A needle bearing has cylindrical rollers that are relatively slender and completely fill the space between the races; in many cases the inner race is dispensed with. Because there is line contact between a roller and the races, while in a ball bearing there is point contact, in a given space a roller bearing can carry a greater radial load than a ball bearing.

roller printing, also called DIRECT PRINTING, method of applying a coloured pattern to cloth, invented by Thomas Bell of Scotland in 1783. A separate dye paste for each colour is applied to the fabric from a metal roller that is intaglio engraved according to the design. The technique can be used with almost any textile fabric. *See also* discharge printing; resist printing.

roller-skating, recreational and competitive sport in which the participants use special shoes fitted with small wheels to move about on rinks or paved surfaces. The invention of roller skates has been traditionally credited to the Belgian Joseph Merlin in the 1760s, but the first practical four-wheel skate was designed in 1863 by James Plimpton of Medford, Mass., U.S., and thereafter the first great recreational roller-skating craze swept the United States and western Europe, where many rinks were built.

As a sport, roller-skating speed events began in the 1890s and were popular through the first quarter of the 20th century. Later, professional speed-skating teams performing in "roller derbies" on banked tracks became a spectator sport in the United States, although these events were as much prearranged spectacle as sport. Major speed roller-skating events for men, women, and relay teams involve racing counter-clockwise around an oval track or on the open road. The rules and techniques for these competitions are much like those established for ice skating.

Figure dancing and figure skating on roller skates, introduced in 1910 and 1923, respectively, correspond in most ways to the parallel ice-skating events; similar systems for judging competitions and for proficiency tests are employed. International competition in artistic, hockey, and speed roller-skating is governed by the International Roller Skating Federation, founded in 1924. The first world championships were held in 1937.

rolling, in technology, the principal method of forming molten metals, glass, or other substances into shapes that are small in cross-section in comparison with their length, such as bars, sheets, rods, rails, girders, and wires. Rolling is the most widely used method of shaping metals and is particularly important in the manufacture of steel for use in construction and other industries. Rolling may be done while the steel is hot (hot-rolling) or cold (cold-rolling). The process consists of passing the metal between pairs of rollers revolving at the same speed but in opposite directions and spaced so that the distance between them is slightly less than the thickness of the metal. The degree of change that can be made in the thickness of the steel depends on its temperature, with higher heat increasing the plasticity of the steel. Cold-rolling, in which unheated bars, sheets, or strips of steel are sent through the rollers, usually requires several rollings to achieve the desired shape. Cold-rolling often follows hot-rolling and is done to gain better mechanical properties, better machinability, special size, a bright surface, or a thinner gauge than hot-rolling can.

Rolling was introduced to steel production in 1783 by Henry Cort, who successfully improved on earlier primitive attempts to use this technique. Since Cort's early rolling mill, which used grooved rollers, there has been a continuous development of the process and of the size of mills. Modern mills have as many as four sets of rollers, one above the other, and steel is rolled in a continuous process through one set, into another, and then back again, until the desired shape is achieved. Semifinishing mills roll the steel into rectangular shapes to be further refined; finishing mills produce steel ready for use in manufacturing.

Rolling is also an important process in glassmaking. A continuous stream or ribbon of molten glass is passed between a pair of rollers that are so spaced as to control the thickness of the glass sheet. Rolling is a very rapid way to produce glass, but the glass produced is not high in surface quality owing to its contact with the metal rollers.

Rolling Stones, English musical group that was one of the most long-lived and popular of all rock bands. The five original members of the group were Mick Jagger (b. July 26, 1943, Dartford, Kent, Eng.), Keith Richards (b. Dec. 18, 1943, Dartford), Brian Jones (b. Feb. 28,

1944, Cheltenham—d. July 3, 1969, London), Bill Wyman (b. Oct. 24, 1941, London), and Charlie Watts (b. June 2, 1941, London). Jones was succeeded by Mick Taylor in 1969 and in turn by Ron Wood in 1976.

The band was formed in 1962 when Jagger, Richards, and Jones, who had been performing sporadically in a blues band in London, recruited Wyman and formed their own group. Watts joined the band in 1963. Jagger was the lead vocalist, while Jones and Richards played guitars, Wyman played bass guitar, and Watts played drums. The name Rolling Stones was adopted from a song by the American blues musician Muddy Waters. The Rolling Stones began to build a following in England in 1963, and a series of outstanding songs had made the band second in popularity only to the Beatles among rock and roll audiences by 1966. Jagger and Richards wrote most of the group's songs from 1964 onward. The group reached the height of its popularity in the late 1960s and early '70s with such albums as "Beggar's Banquet" (1968), "Let It Bleed" (1969), "Sticky Fingers" (1971), and "Exile On Main Street" (1972). The Rolling Stones were still performing in the late 20th century, long after the Beatles and the other classic rock bands of the 1960s had disbanded. The Rolling Stones' music was marked by a driving backbeat, biting and satirical lyrics, simple but expressive instrumental accompaniments, and Jagger's blues-influenced singing.

Rollinia, genus of 65 tropical American trees and shrubs belonging to the family Annonaceae (order Magnoliales). Many have edible fruits similar in flavour and appearance to those of the genus *Annona.* Two species (*R. mucosa* and *R. pulchrinervis*), both called biriba by some authorities, are cultivated for their fruit. Most species of *Rollinia* are spined or segmented, green-skinned, small trees, with soft fruits about 7.6 cm (3 inches) across. The flowers have three spurlike outside petals and three minute inner petals.

Rollins, Sonny, byname NEWK, original name THEODORE WALTER ROLLINS (b. Sept. 7, 1930, New York, N.Y., U.S.), American jazz musician, a tenor saxophonist who was among the finest improvisers on the instrument to appear since the mid-1950s.

Rollins grew up in a neighbourhood where Thelonius Monk, Coleman Hawkins (his early idol), and Bud Powell were playing. After recording with the latter in 1949, Rollins began recording with Miles Davis in 1951. During the next three years he composed three of his best-known tunes, "Oleo," "Doxy," and "Airegin," and continued to work with Davis, Charlie Parker, and others. Following his withdrawal from music in 1954 to cure a heroin addiction, Rollins reemerged with the Clifford Brown–Max Roach quintet in 1955, and the next four years proved to be his most fertile.

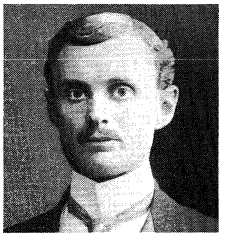
Beginning with a style drawn primarily from Parker, Rollins became a master of intelligent and provocative spontaneity that was combined with an excellent command of the tenor sax. The clarity of thought evident in his improvisations stands out in jazz history. Rollins displayed an interest in unaccompanied saxophone improvisation and gross manipulations of tone colour long before such techniques became common in modern jazz. He was also one of the first to successfully improvise when alternately ignoring tempo and swinging within a single solo while his accompanists adhered to a preset tempo and chord progression. In these respects he was particularly influential with avant-garde saxophonists of the 1960s and '70s.

Rollo, also called ROLF, or ROU, French ROLLON (b. *c.* 860—d. *c.* 932), Scandinavian rover who founded the duchy of Normandy.

Making himself independent of King Harald I of Norway, Rollo sailed off to raid Scotland, England, Flanders, and France on pirating expeditions and, about 911, established himself in an area along the Seine River. Charles III the Simple of France held off his siege of Paris, battled him near Chartres, and negotiated the treaty of Saint-Clair-sur-Epte, giving him the part of Neustria that came to be called Normandy; Rollo in return agreed to end his brigandage. He gave his son, William I Longsword, governance of the dukedom (927) before his death. Rollo was baptized in 912 but is said to have died a pagan.

Rolls, Charles Stewart (b. Aug. 28, 1877, London, Eng.—d. July 12, 1910, Bournemouth, Hampshire), British motorist, aviator, and automobile manufacturer who was one of the founders of the Rolls-Royce Ltd. automobile company. He was the first aviator to fly across the English Channel and back nonstop (June 1910).

Rolls drove a 12-horsepower Panhard car in the Thousand Miles Trial of 1900 and took part in many of the early long-distance European classic races. In 1902 he became a motor



Rolls
BBC Hulton Picture Library

dealer and in 1906 merged his firm with that of Sir Henry Royce to form Rolls-Royce Ltd. Rolls died in a flying accident, the first British pilot to do so.

Rolls-Royce Ltd., British manufacturer of prestige automobiles, automotive and aviation engines, and other engineering products. Founded on March 15, 1906, the corporation entered bankruptcy on Feb. 4, 1971, and was subsequently re-formed into two separate companies: (1) Rolls-Royce Limited, comprising the former jet-engine division, was established in 1971 by the British government and became a government-owned corporation under the control of the National Enterprise Board; (2) Rolls-Royce Motor Holdings Limited, a public corporation owned by remaining shareholders, was formed in May 1973 to operate the divisions engaged in the production of automobiles and diesel engines, automotive and aero components, industrial locomotives, and light aircraft. In 1980 Rolls-Royce Motor Holdings Limited merged with Vickers Ltd., becoming a subsidiary of the latter. A manufacturing and engineering company, Vickers was converted to a public limited company the following year. In 1987 the British government "privatized" Rolls-Royce Limited, selling the company's shares to private investors. The company altered its name to Rolls-Royce PLC. The headquarters of Rolls-Royce Motor Holdings Limited are in Derby, Derbyshire. Those of Rolls-Royce PLC are in London.

Charles S. Rolls, a pioneer motorist and aviator, and Henry Royce, an engineer and manufacturer of electric cranes, met and collaborated in 1904 to produce quality cars; two years later they incorporated Rolls-Royce Ltd. By 1914 their Silver Ghost model (introduced in 1906) had earned its reputation as the "Best Car in the World." The reputation was continued by such descendant models as the Twenty (1922–29), the several Phantoms (begun in 1925 and specially made for heads of states from 1949 onward), the Silver Dawn (from 1949), and the later Silver Cloud, Silver Shadow, and Silver Wraith.

In November 1931 Rolls-Royce acquired Bentley Motors Ltd. (founded 1920 by W.O. Bentley), maker of fine cars, which gradually took on mechanical and design characteristics identical to those of the Rolls-Royce line, except for minor details.

Meanwhile, over the years, Rolls-Royce was also producing engines for airplanes, an enterprise that eventually became by far the largest and most profitable portion of the company's business. The Eagle engine, produced in 1914, became the first in a line of engines that powered such aircraft as the propeller-driven Spitfires and Lancasters and, later, the jet Comets, Caravelles, and Concordes. In the late 1960s and early 1970s, however, under a fixed-price contract with Lockheed Aircraft Corporation to develop the RB-211 engine for the L-1011 Tristar jumbo jet, the Rolls-Royce management made a series of miscalculations, trying to follow confused production schedulings and vastly underestimating development costs. Cost overruns were staggering, driving the company into bankruptcy in 1971. Lockheed itself was saved from bankruptcy only when the U.S. Congress voted to guarantee loans up to $250,000,000, while the British government saved Rolls-Royce by taking over its jet-engine division.

rolltop desk, desk with a sliding roll top, or tambour, that covers the working surface of the upper part and can be locked. The portion of the desk that gives it its name is constructed of narrow slats of wood glued to some flexible material, the slats running along slides or grooves fitted into the upper edges of the desk.

First introduced into England from France in the late 18th century, the rolltop desk had



Rolltop desk, French, 18th century; in the Metropolitan Museum of Art, New York City
By courtesy of the Metropolitan Museum of Art, New York City, gift of Mr. Jacques Seligmann of Paris in memory of J.P. Morgan, 1919

become a standard piece of office equipment by the end of the 19th century and was mass-produced in large quantities. Its popularity waned, however, shortly thereafter.

Rölvaag, O(le) E(dvart) (b. April 22, 1876, Dönna Island, Helgeland, Nor.—d. Nov. 5, 1931, Northfield, Minn., U.S.), Norwegian-American novelist and educator noted for his realistic portrayals of Norwegian settlers on the Dakota prairies and of the clash between transplanted and native cultures in the United States.

Rölvaag immigrated to the United States in 1896 and was naturalized in 1908. Educated at St. Olaf College, Northfield, Minn., and the University of Oslo, Norway, he spent most of his life at St. Olaf as a teacher of Norwegian language and literature and the history of Norwegian immigration. He wrote in Norwegian, the language in which his works were originally published, and worked closely with the translators of the English versions.

Rölvaag gave epic sweep to his picture of pioneering but also deplored its cost in human values. A founder of the Norwegian-American Historical Association in 1925, he tirelessly urged immigrants to retain their customs, their speech, and their church, believing that



Rölvaag, *c.* 1929
By courtesy of St. Olaf College, Northfield, Minn.

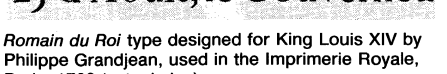
American society would be the richer. Two novels, *I de dage* ("In Those Days," 1924) and *Riket grundlæges* ("The Kingdom Is Founded," 1925), were translated as *Giants in the Earth* (1927), his best novel, representing the positive aspects of pioneering in the character Per Hansa, the negative aspects in his wife Beret. *Peder Victorious* (1929) and *Their Father's God* (1931) continued the story to the second generation.

Roma (Italy): *see* Rome.

Roma, town, south central Queensland, Australia, principal settlement of the Maronoa district, an agricultural and pastoral area, on Bungil Creek. The town, surveyed in 1862 and declared a municipality in 1867, was named after Diamantina Roma Bowen, wife of the state's first governor. Linked to Brisbane (about 315 mi [510 km] east-southeast) by rail, air, and the Carnarvon and Warrego highways, it serves a district of sheep, cattle, wheat, fruit, grape, and dairy farming. The town has slaughterhouses, flour mills and sawmills, butter factories, a winery, and a livestock market. A large deposit of natural gas, discovered in the 1960s, is used for local power generation and is also piped to Brisbane. Productive oil wells have been sunk in the vicinity. Pop. (1981) 5,706.

Romaic language: *see* Demotic Greek language.

Romain du Roi (French: King's Roman), in printing, a roman typeface developed in France at the express order of King Louis

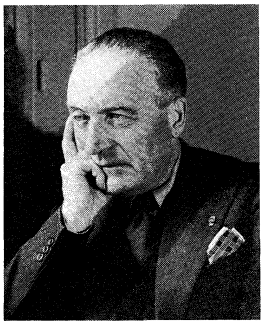


Romain du Roi type designed for King Louis XIV by Philippe Grandjean, used in the Imprimerie Royale, Paris, 1702 (actual size)
EB Inc.

XIV, who, in 1692, directed that a typeface be designed at any necessary expense for the exclusive use of the royal printer. The design was the work, for several years, of a committee of the Academy of Sciences, whose members ignored calligraphic models in favour of analytical and mathematical principles that, in retrospect, are said to have been characteristic of France during the so-called Age of Reason. The letters were then cut by Philippe Grandjean. It has been argued that, even though they strike some eyes as being cold, they would have been successful even without the King's backing. There is at least a legend that the King refused a request from the King of Sweden for a set of the punches. It is a fact that every important French designer imitated the letters as closely as he could without risking royal displeasure. The complete production amounted to 21 different sizes of roman and italic letters in 82 complete fonts. The set was finished in 1745.

Romains, Jules, pseudonym of LOUIS-HENRI-JEAN FARIGOULE (b. Aug. 26, 1885, Saint-Julien-Chapteuil, Fr.—d. Aug. 14, 1972, Paris), French novelist, dramatist, poet, a founder of the literary movement known as Unanimisme, and author of two internationally known works—a comedy, *Knock,* and the novel cycle *Les Hommes de bonne volonté* (*Men of Good Will*).

Romains studied science and philosophy at the École Normale Supérieure in Paris. After teaching philosophy he decided in 1919 to devote his time to writing. In 1940, when the Germans occupied France, he took refuge in the United States and remained there until the end of the war. In 1946 he was elected to the Académie Française.



Romains
H. Roger-Viollet

Before World War I, Romains was known primarily as a poet and as founder (*c.* 1908–11), with the poet Georges Chennevière (1884–1929), of Unanimisme, a movement that combined belief in universal brotherhood with the psychological concept of group consciousness. It emphasized the transcendent power of collective emotion and the life of a human world—such as a village, factory, or school—as a whole, rather than of the individuals composing it. His first notable book of poems, *La Vie unanime* (1908), was published by the Abbaye, a community of artists and writers led by Georges Duhamel and Charles Vildrac with which Romains was closely connected. His first plays, produced by Jacques Copeau at the Théâtre du Vieux-Colombier, were Unanimiste verse dramas.

Romains's most popular work was the comedy *Knock, ou le triomphe de la médecine* (1923; *Dr. Knock,* 1925), a satire in the tradition of Molière on the power of doctors to impose upon human credulity. The character of Dr. Knock, whose long and serious face, scientific double-talk, ominous pauses, and frightening graphs and charts convert a group of robust villagers into confirmed hypochondriacs, was created on the stage by the noted actor-producer Louis Jouvet. It was made into a film, *Dr. Knock* (1932), starring Jouvet.

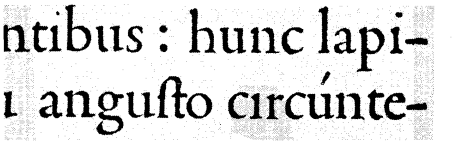
Romains, in his first important collective novel, *Mort de quelqu'un* (1911), described the reactions of a group of people to the death of an insignificant member of society. *Les Copains* (1913), a farcical tale told with Rabelaisian truculence, evokes the bonds that unite seven friends who are determined to shock communities with their practical jokes.

His masterpiece is the vast cyclic epic *Les Hommes de bonne volonté* (27 vol., 1932–46; *Men of Good Will,* 14 vol., 1933–46), an attempt to recreate the spirit of a whole era of French society from Oct. 6, 1908, to Oct. 7, 1933. There is no central figure or family to provide a focus for the narrative, and the work is populated by a huge cast of characters. The action presents, successively, historical events (*Verdun,* 1938), domestic scenes (*Éros de Paris,* 1932), and crimes treated in the manner of a detective story (*Le Crime de Quinette,* 1932). The finest sections, portrayals of collective life and emotion—the frescoes of Paris in the fall of 1908, when the series opens, and the victory parade after World War I—exemplify the Unanimiste method at its best. The two Verdun volumes at the centre of the work are remarkable visions of the soul of a world at war. The "men of good will" are the decent, humane people, men and women with a respect for other people's ideas and a sense of humour, who, often unheeded and groping in the dark, strive for freedom.

Roman, city, Neamț *județ* (district), northeastern Romania, situated at the confluence of the Moldova and Siret rivers. It was founded by Roman Mușat, ruling prince of Moldavia (1392–94); he referred to it as "our town of Roman" in a letter of 1392. It developed as a small trading settlement on the Siret Valley route between Suceava, to the northwest, and the Danube ports. During the reign of Alexander (Alexandru) the Good, a diocesan residence was located there; among its bishops was the scholar Dosoftei, whose translation of the Psalter (1673) was the first work in Romanian in verse. The 16th-century cathedral; the church of Precista Mare (founded in the 16th century by Princess Ruxandra, wife of Prince Alexandru Lăpușneanu); and the remains of the fortifications of Prince Roman Mușat, which stand on the Cetățuia Plateau, are reminders of Roman's history. In addition to a long-established sugar refinery, the city has a pipe- and tube-rolling mill and a building materials factory. Pop. (1982 est.) 64,968.

roman, in printing, one of the three major typefaces in the history of Western typography (the others being italic and black letter, or Gothic) and, of those three, the face that is of the greatest importance and the widest use.

When the art of printing from movable metal type was perfected midway through the 15th century, letter cutters attempted to make their letter forms as much as possible like the handwriting of manuscript scribes; and the earliest instances of printed matter were



Roman type used by Aldus Manutius in *De Aetna* by Pietro Bembo, Aldine Press, Venice, 1495 (twice actual size)
By courtesy of the Monotype Corporation Ltd.

produced in black-letter type—the heavy-bodied, essentially spiky letter forms associated with the Middle Ages—today in many places called Gothic. It was an elaborate ornamental type—probably easier to write than to cut into metal molds—and it was difficult to read and wasteful of space (hence of expensive paper).

Models for a new type—easier to cut and read—were found in the scriptoria, where scribes, at the probable urging of Humanist scholars, were experimenting with a letter face that they believed had been used in ancient Rome. By comparison with black letter, it was a simple, straightforward, unembellished shape. Historians now trace its ancestry less to Rome than to Charlemagne and the "official" letter form developed for his decrees by an English monk, Alcuin, in the 9th century. The first use of a recognizable roman type was

either by Adolf Rusch at Strasbourg in 1464 or by two German printers, Sweynheim and Pannartz, at Subiaco, Italy (1465), the honour depending on how loosely the words "recognizably roman" are interpreted. A Venetian printer actually patented a cutting of a roman face later in the 1460s but died and thus invalidated the patent a year later.

Within a century of its first introduction, roman type had swept all others before it and left Germany as the sole country in which black letter held dominance until well into the 20th century. Adapted by many type designers of genius, it has been the "standard" typeface of book typography.

roman à clef (French: "novel with a key"), novel that has the extraliterary interest of portraying well-known real people more or less thinly disguised as fictional characters. The tradition goes back to 17th-century France, when fashionable members of the aristocratic literary coteries, such as Mlle de Scudéry, enlivened their historical romances by including in them fictional representations of well-known figures in the court of Louis XIV. In the 20th century, Somerset Maugham's *Moon and Sixpence* (1919) is thought to be related to the life of the painter Paul Gauguin, and his *Cakes and Ale* (1930) is said to contain caricatures of the novelists Thomas Hardy and Hugh Walpole. A more common type of roman à clef are Aldous Huxley's *Point Counter Point* (1928) and Simone de Beauvoir's *Mandarins* (1954), in which the disguised characters are immediately recognizable only to a small circle of insiders.

Roman alphabet: *see* Latin alphabet.

Roman Catholic Church of Romania, an Eastern Catholic church of the Byzantine rite, in communion with Rome. The Byzantine rite Catholic Church originated after the Turks ceded Transylvania to the Catholic Habsburgs (1699); at that time a large group of Orthodox Romanians, pressed by the imperial government, accepted the authority of Rome. In 1948 the Byzantine rite church was legally suppressed by the Communist government, and many of its leaders were arrested or dispersed; other priests and the mass of the faithful (numbering about 1,500,000) were accepted into the Orthodox Church.

There are approximately 10,000 Romanian Catholic faithful in the Americas and Europe.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Roman Catholicism, a Christian church characterized by its uniform, highly developed doctrinal and organizational structure that traces its history to the Apostles of Jesus Christ in the lst century AD. Along with Eastern Orthodoxy and Protestantism, it is one of the three major branches of Christianity.

A brief treatment of Roman Catholicism follows. For full treatment, *see* MACROPAEDIA: Roman Catholicism.

History. The history of the Roman church in the early, pre-Constantinian period is essentially that of a small sect composed of recruits attracted from the lower classes of the empire. Its continued existence during these years can be attributed to the relatively tolerant attitude of the imperial authorities, and to a steady influx of converts attracted by the charity and moral tenor of the church's members. The 3rd century witnessed an upsurge in Roman alarm at the spread of the church and the opposition between traditional Roman piety and the apparent misanthropic and unpatriotic atheism of the Christians. Accordingly, the reigns of Decius, Valerian, and Diocletian were marked by persecutions whose severity and scope contrasted with the earlier, sporadic, and largely local troubles which the young church had faced. Even in this early troubled period, however, both the doctrinal and governmental structures of the church were being defined: a scriptural canon emerged; the settled and official three-fold ministry (bishop, priest, and deacon) established itself and displaced other forms of leadership; and the See of Rome began to exercise a universal care over other churches.

The reign of Constantine ushered in a new era in the life of the church. The Edict of Milan (314) recognized the church as a legal religion, and by the end of the 4th century, Christianity was the state religion of the empire. Its privileged position allowed the church to flourish. Moreover, its location in the imperial capital enhanced the prestige of the See of Rome. During this period, the hierarchical structure of the church was further elaborated (along the lines of imperial provincial and metropolitan government), and the emergence of heretical elements was met with a more exact definition of Christological beliefs. The fall of the western empire in 476 and the arrival of the barbarians left the pope as the only effective force for order in the West. In the ensuing centuries the papacy, with the assistance of a remarkably vital and active monastic community, Christianized the invaders and cemented the ties between a distinctly Roman form of Christianity and western European culture. During the Middle Ages, the church's influence in European life was all-pervasive: education, charity, and politics all came under the sway of the church.

The break (1054) with the Eastern churches marked yet another turning point in the history of Roman Catholicism. During the centuries between the reign of Pope Gregory VII (1073–85) and the Reformation, the papacy, with the help of canon lawyers and theologians, articulated a doctrine of papal authority that both drew on precedent and traditional papal claims and escalated these claims to authority in both the spiritual and temporal realms. These claims did not go unanswered. Both secular rulers and scholars challenged the papal position. The prestige and power of the papacy reached a low ebb during the 14th and 15th centuries when the humiliation of Boniface VIII (reigned 1294–1303), the Avignon papacy (1309–77), and the Western Schism (1378–1417) followed one another in quick succession. By the mid-15th century heresy, conciliarism, and corruption had taken their toll on the church. Moreover, the papacy seemed unable either to rule effectively or to reform itself or the church.

During the 16th century a general demand for a thorough reform of the church swept through the Christian West as Luther, Calvin, Zwingli, and a host of others attacked the corruption and lack of spiritual vitality in the church. The Reformation destroyed Rome's spiritual hegemony in the West at the same time that it forced the Roman church to undertake a program of internal renewal. The Counter-Reformation reached its high point at the Council of Trent (1545–63). Trent's decrees, which were to govern church life for four centuries and set the terms both for Roman Catholicism's understanding of itself and its relationships with other Christian bodies, effected some sweeping pastoral reforms but also hardened the church's traditional doctrinal stance. Moreover, in the aftermath of the council, in order to press the church's program of reconquest, the papacy and its newly reorganized and more efficient curia assumed more and more control over the life and government of the church. The Tridentine church was thus a centralized, authoritarian, and traditional church.

In the years that followed the Reformation, the church sought both to win back those areas of Europe that had been lost during the Reformation and to make up for irretrievable losses by missionary activity in the New World and the Orient. In these endeavours the church was aided by the work of new and active religious orders, the most notable of which was the Society of Jesus. The momentum of the Counter-Reformation was lost, however, when in the aftermath of the wars of religion Europe entered into a period of religious decline. During the ages of Reason and Revolution, the church suffered challenges both to its teaching authority and to its very right to exist. During the 19th century the church responded to these threats by assuming a posture of hostility to the modern world and by stressing uniformity of belief and strict obedience to authority. In the century following the first Vatican Council (1869–70), the church continued to be beset by crises. The Papal States were lost in 1870; the church's tardiness in committing itself to the cause of social justice in industrial relations led large segments of the working classes in Europe to turn away from it; and anticlerical regimes succeeded in reducing the political power and freedom of the church. These European losses were offset in large measure by the spectacular and immigrant-fueled growth of the church in the United States, Canada, and Australia. In 1962–65, the church convened the second Vatican Council in an attempt to update its message and internal structure and to soften its opposition to the modern world. In the years following the council, attempts at modernization proved divisive within the church.

Structure and doctrine. For much of its history, the Roman church has believed that the other Christian groups that have sprung up in the course of history do not share with it a demonstrable continuity with the Apostolic church or a marked fidelity to the orthodox interpretation of the Christian faith. The basic hierarchical structure that the church has developed over the centuries to govern its members and to protect the integrity of the deposit of faith from corruption has its roots in apostolic and postapostolic times, when the duties and interrelationships of the three main offices of the church (bishop, priest, and deacon) were defined with some precision.

At the head of the hierarchy stands the pope, the bishop of Rome, who, as the successor of the apostle Peter, enjoys a primacy of power among his fellow bishops. Indeed, in the light of the decrees of Vatican I, Catholics believe that the pope enjoys both supreme jurisdictional power in the universal church and the privilege of infallibility when he teaches concerning faith and morals. The right to elect the pope resides with the College of Cardinals.

Theologically, Roman Catholicism differs from other Christian churches with regard to its understanding of the sources of revelation and the channels of grace. Since the time of the Reformation, Protestants have held that Scripture alone can be the basis of Christian belief and the normative guide both for Christian behaviour and church polity. Roman Catholicism, on the other hand, believes that although scripture holds a special place of authority in the realm of revelation, tradition is revelatory as well and must be recognized as one of the sources of the deposit of faith. The clash between these two concepts has in turn led to markedly different sacramental systems. The Reformers, bound to the Bible, held that there were only two sacraments, namely Baptism and Eucharist, because these and these alone had biblical warrant. Roman Catholicism, however, relying on tradition, sets the number at seven (Baptism, penance, Eucharist, marriage, holy orders, confirmation, and the anointing of the sick). Among these, the celebration of the Eucharist holds a place of particular importance. At the celebration of the Eucharist, Catholics believe that

the events of both the Last Supper and the death of Jesus are repeated and that the Christ is truly present in the communion elements by virtue of transsubstantiation (*q.v.*).

Catholicism's rich sacramental life is supplemented by other devotions, chiefly paraliturgical eucharistic services and devotions to the saints. In marked contrast to Protestant Christians, Catholics have traditionally revered the saints as examples of true Christian life and have sought their assistance in times of need. Liturgical reforms after the second Vatican Council shifted the focus from such devotional activity to the celebration of the Eucharist as the central act of worship.

Roman Curia, Latin CURIA ROMANA, the various Vatican bureaus that assist the pope in the day-to-day exercise of his primatial jurisdiction over the Roman Catholic Church. The result of a long evolution from the early centuries of Christianity, the Curia was given its modern form by Pope Sixtus V late in the 16th century. The work of the Curia has traditionally been associated with the members of the Sacred College of Cardinals, acting either as a body or individually as administrators in the various bureaus. A reorganization, ordered by Pope Pius X, was incorporated into the *Code of Canon Law* (promulgated 1917). Further steps toward reorganization were begun by Pope Paul VI in the 1960s. Among the goals of this curial reform were the modernization of procedures and the internationalization of the curial staff.

Responsibility for coordination of curial activities belongs to the cardinal who, as secretary of state, directs both the Secretariat of State (or Papal Secretariat) and the Council for the Public Affairs of the Church (the latter previously known as the Sacred Congregation for Extraordinary Ecclesiastical Affairs). The various sacred congregations of the Curia are concerned with administrative matters. The Sacred Congregation for the Doctrine of the Faith is responsible for safeguarding the doctrine on faith and morals. Although a successor of the notorious Roman Inquisition and, more recently, of the Holy Office, this congregation is now primarily intended to make positive efforts to promote theological orthodoxy and to protect the rights of those accused of failure in this regard. The *Index of Forbidden Books,* once a responsibility of this congregation, is no longer in effect.

Other sacred congregations are those for the Oriental Churches, Bishops (formerly the Sacred Congregation of the Consistorial), the Sacraments and Divine Worship (formerly Congregation of Rites), the Causes of Saints (concerned with procedures for beatification and canonization and with the preservation of relics, once a responsibility of the now defunct Congregation of Rites), the Clergy (formerly the Sacred Congregation of the Council), Religious and Secular Institutes, Catholic Education (formerly the Sacred Congregation of Seminaries and Universities), and the Propagation of the Faith (also known as the Congregation for the Evangelization of Peoples).

The judicial branch of the Curia consists of three tribunals: the Apostolic Signatura (the highest judicial body), the Sacred Roman Rota (for judging ecclesiastical cases appealed to the Vatican, especially those concerning the nullity of marriage), and the Sacred Apostolic Penitentiary (for various matters of conscience).

In addition there are various offices and three secretariats for Promoting Christian Unity, for Non-Christians, and for Non-Believers; a Council for the Laity; and the Pontifical Commission of Studies—"Justice and Peace." Several permanent commissions reflect papal concern for scholarly studies; they include the Pontifical Commission for Biblical Studies and the Pontifical Commission for the Revision of the Code of Canon Law.

Roman de Fauvel (French: "Romance of Fauvel"), French poem by Gervais du Bus that, in addition to its literary value, is a crucial document for the history of music. The poem condemns abuses in contemporary political and religious life. Its hero is the fawn-coloured (French: *fauve*) stallion Fauvel, the letters of whose name are the initials of the cardinal sins.

A manuscript of the poem dated 1316 and lavishly illuminated (preserved at the Bibliothèque Nationale, Paris) has 130 musical works interspersed in the narrative, representing a remarkably rich anthology stretching back over 150 years. Some are in their original form, some adapted to fit the new context, and some, containing topical references, were presumably written specifically for the *Roman.* Five pieces by the French composer Philippe de Vitry are among the earliest examples of music in the Ars Nova style, which Vitry helped to initiate.

A modern edition of the poem was made in 1914–19 by A. Långfors. The music was transcribed into modern notation by Leo Schrade in *Polyphonic Music of the Fourteenth Century,* vol. 1 (1956).

Roman de la rose (French: "Romance of the Rose"), one of the most popular French poems of the later Middle Ages. Modelled on Ovid's *Ars amatoria* (*c.* 1 BC; *Art of Love*), it is composed of more than 21,000 lines of octosyllabic couplets and survives in more than 300 manuscripts. Nothing is known of the author of the first 4,058 lines except his name, Guillaume de Lorris (a village near Orléans). This section, written about 1240, is a charming dream allegory of the wooing of a maiden, symbolized by a rosebud, within the bounds of a garden, representing courtly society.

No satisfactory conclusion was written until about 1280, when Jean de Meun seized upon the plot of Guillaume de Lorris as a means of conveying a vast mass of encyclopaedic information and opinions on a great variety of contemporary topics. The original theme is frequently obscured for thousands of lines while the characters discourse at length. It was these digressions that secured the poem its fame and success, for Jean de Meun was writing from a bourgeois point of view that gradually superseded the aristocratic code of Guillaume de Lorris. His views were often bitterly contested, but they never failed to hold the attention of the age.

A Middle English version, of which the first 1,705 lines are translated by Geoffrey Chaucer, covers all of Guillaume de Lorris's section and 3,000 lines of Jean de Meun's. The original *Roman* is the most important single literary influence on Chaucer's writings. In it he found not only the vision of idealized love (*fine amour*), to which he was constant from youth to old age, but also the suggestion and poetic example for much of the philosophizing, the scientific interest, the satire, and even the comic bawdry found in his most mature work.

Roman-Dutch law, a system of law that existed in the Netherlands' province of Holland from the 15th to the 19th century. Introduced by the Dutch into their colonies, it was retained in those areas that passed to the British; *i.e.,* the maritime districts of Ceylon (now Sri Lanka), the Cape of Good Hope, and the settlements on the coast of South America that made up British Guiana (now Guyana). In Ceylon it was extended to the Kandyan provinces (annexed by Britain in 1815), while in southern Africa it was carried during the 19th century into the Republic of the Transvaal, the Orange Free State, and the British colony of Natal.

Today, Roman-Dutch law is in force throughout South Africa and South West Africa/Namibia and in Lesotho, Zimbabwe, Swaziland, and Botswana. In Sri Lanka it is present to a lesser degree, and in Guyana it was superseded in 1917 by the common law of England. In all these areas certain aspects of indigenous law and custom are acknowledged, and the general law of these countries has departed in many respects from its original type.

In the 15th and 16th centuries, the Roman law, as interpreted by medieval legists, was "received" in the province of Holland, as in other parts of northern Europe, particularly Germany, and combined in various ways with the general and local customs. These were based on Germanic tribal law—Frankish, Frisian, Saxon—which had already been influenced by Roman law. A third element that went into the Roman-Dutch system was the legislative acts of the Burgundian and Spanish periods, most of which were passed during the 16th century. The result was a mixed system called Roman-Dutch law, which remained in force in the Netherlands until suspended in 1809 by the Napoleonic Code, which gave way in 1838 to the Dutch Civil Code. The old law was also abrogated in those colonies that had remained Dutch. Much of Roman-Dutch law can be found in collections of decided cases and opinions and in the juristic literature that was produced in the 17th and 18th centuries by the Dutch jurist Hugo Grotius and others, who attempted to reduce Roman-Dutch law to a system.

Supplemented by local ordinances of the governor in council and, in the East Indies, by the laws of the governors general established in Batavia (Jakarta), the law of the province of Holland was followed in the colonial empire. With the passing of certain colonies to the British crown, the old law underwent profound modifications, partly because of changed social and economic conditions and partly because of the incursion of rules and institutions derived from English law.

The influence of English law, which was operative even during the period of the Transvaal and Orange Free State republics, has been most marked in criminal law and procedure, civil procedure, evidence, and constitutional law, particularly in the commercial field of companies, bills of exchange, maritime law, and insurance. The law of tort or delict has also been considerably affected by English doctrines. On the other hand, the laws relating to property, persons, succession, and, to a lesser extent, contracts still preserve their predominantly Roman-Dutch character. It is, for example, the case in both South Africa and Sri Lanka that consideration (quid pro quo agreement by both parties) is not necessary for the validity of a contract.

In South Africa much of the law has been amended, explained, and made uniform; many rules have been pronounced obsolete by disuse. In many areas of Roman-Dutch law, however, the texts of the Corpus Juris Civilis of Justinian are still cited as authoritative, and the approach to them is still through the writings of Grotius and others.

Roman Empire, Eastern: *see* Byzantine Empire.

roman-fleuve (French: "novel stream"), series of novels, each one complete in itself, that deals with one central character, an era of national life, or successive generations of a family. Inspired by Honoré de Balzac's *Comédie humaine* and Émile Zola's *Rougon-Macquart* cycle, the *roman-fleuve* was a popular literary genre in France during the first half of the 20th century. Examples include the 10-volume *Jean-Christophe* (1904–12) by Romain Rolland, the 7-part *À la recherche du temps perdu* (1913–27; *Remembrance of Things Past,* 1922–31) by Marcel Proust, the

8-part *Les Thibault* (1922–40) by Roger Martin du Gard, and *Les Hommes de bonne volonté* (27 vol., 1932–46; *Men of Good Will*, 1933–46) by Jules Romains.

Comparable to the French *roman-fleuve* is the English saga novel, represented by such works as John Galsworthy's *Forsyte Saga* (1906–21) and the "Jalna" series of Mazo De La Roche. Proust's work is the masterpiece of the genre.

Roman Forum, Latin FORUM ROMANUM, most important forum in ancient Rome, situated on low ground between the Palatine and Capitoline hills. The Roman Forum was the scene of public meetings, lawcourts, and gladiatorial combats in republican times and was lined with shops and open-air markets. Under the empire, when it primarily became a centre for religious and secular spectacles and ceremonies, it was the site of many of the city's most imposing temples and monuments.

Among the structures surviving in whole or in part are the Temple of Castor and Pollux, the Temple of the Deified Caesar, the Mamertine Prison, the Curia (senate house), the Temple of Saturn, the Temple of Vesta, the Temple of Romulus, the Arch of Titus, the Arch of Septimius Severus, and the Cloaca Maxima.

Roman-Kosh, Mount, Russian GORA ROMAN-KOSH, also spelled GORA ROMAN-KOŠ, the highest mountain on the Crimean Peninsula, Ukrainian Soviet Socialist Republic, reaching a height of 5,069 ft (1,545 m). It is situated on the most southerly coastal ridge of the three ranges that form the Crimean Mountains. It consists mainly of limestones. The lower slopes are forested, but the higher parts are denuded of trees.

Roman law, the law of ancient Rome from the time of the founding of the city of Rome in 753 BC until the fall of the Western Empire in the 5th century AD. It remained in use in the Eastern Empire until 1453. As a legal system, Roman law has affected the development of law in most of Western civilization as well as in parts of the East. It forms the basis for the law codes of most countries of continental Europe (*see* civil law) and derivative systems elsewhere.

A brief treatment of Roman law follows. For full treatment, *see* MACROPAEDIA: Legal Systems, The Evolution of Modern Western.

Roman law was first truly realized with an attempt at codification. The Twelve Tables (*i.e.*, tablets) were promulgated *c.* 451–450 BC to collect and make known rulings and procedures that had hitherto been confined to the pontiffs (*pontifices*), members of the ruling patrician class. Erected in the Roman Forum on tablets of wood or bronze, the law—public and sacred, private and criminal—was now in effect public property and could be appealed to by any Roman citizen. The importance of the Twelve Tables was such that even obsolete rules went unrepealed until Justinian's recodification of all Roman laws in the 6th century AD.

Roman law concerned itself with matters of succession (who was to inherit what), obligations (including contracts, such as loans, entered into by individuals), property and possessions, and persons (which included family, slaves, and citizenship). In the early period, near absolute power (*patria potestas*) was retained by the *paterfamilias*, the landowner and head of the household. It was he who legally owned all the property (including slaves), even what property would normally be thought of as belonging to his wife or children. A daughter remained under her father's *potestas* until she might decide (or have it decided for her) to marry; thereafter she would be put under her husband's power. In time, many of the harsher aspects of this system were mitigated, but much remained until the very end.

Some hint of the multifarious nature of Roman law may be gained from just some of the ways in which ownership of property was established. Under *usucapio* (taking title by use), land was claimed as one's own after two years of continuous use; this later developed into *occupatio*, whereby anything ownerless (and able to be owned) could be claimed. Transfer of property, however, required the presence of a magistrate before whom there was a formal "legal yielding" (*in jure cessio*). In addition to ownership, there were several forms of leasing property: *usus* allowed simply for the use of something and was distinguished from *usus-fructus*, the use of the object and the right to profit from it (say, by eating fruit grown on the property or by renting the property to another).

At first, when Rome was an insignificant town, all laws naturally pertained only to citizens (*cives*), regulating their behaviour with one another. The early law was essentially personal rather than territorial. That is, a foreigner (*peregrinus*) staying in Rome had no rights whatsoever, unless his state and Rome had entered into a formal alliance. The civil law (*jus civile*), as this was called, developed in part by the promotion of unwritten custom to the rank of written law and in part by the need for new legislation as Rome grew increasingly wealthy. Before 287 BC, laws (*leges*) were passed by assemblies dominated by the patrician families, whereas the *plebs*, or common people (still citizens, however), regulated their own behaviour with plebiscites (*plebiscita*), which had the force of law. With the passage of the Lex Hortensia in this year, however, plebiscites became binding on all citizens.

By the middle of the 3rd century BC, especially after the First Punic War (264–241), Rome began to be a world power, visited by *peregrini* of all sorts, all of whom felt the need for legal protection in their dealings with Roman citizens. Hence, although the extent of the *jus civile* spread as Roman citizenship was granted to those living outside the city, there now developed the *jus gentium* ("law of the nations"), which at first regulated commercial activity between citizens and *peregrini*, but which later gained wide currency throughout the Roman Empire for all subjects. Because Rome eventually granted citizenship to all under its power, by the 3rd century AD there were, in effect, no *peregrini* left, so that for all practical purposes, there was no difference between *jus civile* and *jus gentium*.

They had, however, different means of enactment; whereas the *jus civile* was the result of legislation, the *jus gentium* developed from the rulings (*edicta*) of various magistrates (usually a praetor). The first emperors used another means of enacting laws, the *senatusconsultum* (resolution of the Senate), but later emperors directly issued their own *constitutiones principium* (decrees of the emperors), bypassing other forms of legislation. The body of Roman law was now so complex that learned jurists were called upon to interpret the law with *responsa prudentium* (answers of wise men), which, since they themselves had the force of law, rendered the overall situation even more confusing, especially since the various edicts, laws, responses, etc., were usually not to be found in the same place.

Although various attempts had been made by the 5th century AD to gather and simplify all existing laws, the successful execution of the plan was left to the emperor Justinian, resident in Constantinople, who in 529 promulgated his Codex Constitutionum as the chief source of Roman law. Any law not included herein was declared obsolete. This book and his later Digest, the Institutes, and the Novels, or New Constitutions, formed the Roman Empire's legacy to legal history.

Roman legal procedure, long evolving system used in the Roman courts, which in its later stages formed the basis for modern procedure in civil-law countries. There were three main, overlapping stages of development: the *legis actiones*, which dates from the 5th-century BC law code known as the Twelve Tables (*q.v.*) until the late 2nd century BC; the formulary system, from the 2nd century BC until the end of the Classical period (3rd century AD); and the *cognitio extraordinaria*, in operation during the post-Classical period.

The procedure under the *legis actiones* was divided into several steps. First, the plaintiff approached the defendant in public and called for him to come to court. If he refused, he could be taken there by force. The trial itself was divided into two parts. The first was a preliminary hearing held before a magistrate who decided whether there was an issue to be contested, and, if so, what it was. Each step in this procedure was extremely formal. If the wrong words were used by either party, that party might lose the case. After the issues were delineated and sureties set, both parties agreed upon a *judex*, who was neither a lawyer nor a magistrate but a prominent layman, to try the case. The proceedings before the *judex* were more informal: advocates spoke and gave evidence, and witnesses often appeared. The *judex* made a decision but had no power to execute it. If the defendant refused to pay the fine or make restitution within a certain period of time, he could be brought by force to the magistrate. Then his property could be seized, or he could be made slave to the plaintiff to work off the debt or property claim.

During the later republic, as cases became more complex, it became necessary to write down the issues that had to be presented to the *judex*, thus leading to the formulary system, under which the defendant was still summoned by the plaintiff to appear in court, and there were still two parts to the trial, but the magistrate had greater power to determine whether the case would go to the *judex*.

Under the *cognitio extraordinaria* much greater power was placed in the hands of the magistrate and the courts. The summons was issued by the court; the trial was held exclusively before the magistrate; and the court became responsible for the execution of the sentence. Further, there developed a system of appeal. Thus, the state became involved in the administration of justice and the enforcement of its rules of law in a manner similar to that of modern European states.

Roman religion, the religious beliefs, practices, and institutions of the Romans from the 8th century BC to the early 4th century AD, when Christianity became the official religion of the Roman Empire.

A brief treatment of Roman religion follows. For full treatment, *see* MACROPAEDIA: European Religions, Ancient.

Religion was for the Romans the exact observance of established rites on behalf of the entire community. Prosperity and health, bountiful harvests, and success in war could be achieved in no other way than by the strict performance of rituals designed to maintain the favour of the gods, conceived of as abstract powers rather than anthropomorphic deities. Piety therefore was not understood in terms of individual religious experience, but meant the faithful observance of ritual duties.

It is difficult to reconstruct the history and development of Roman religion. Our information about rituals, festival calendars, and the worship of various gods derives from relatively late sources, antiquarians such as the 1st-century-BC Roman scholar Varro. He wrote at a time when Roman religion had already been exposed to the influences of Greek religion, and so tended to confuse contemporary beliefs

and practices with earlier ones. The literary evidence must therefore be supplemented by inscriptions, works of art, coins, and the like.

Early Roman religion. By the earliest-known period of their history (7th century BC), the Romans had developed a few "high gods." Chief among them was Jupiter, whose name is etymologically equivalent to the Greek Zeus and the Sanskrit Dyaus. Like Zeus and Dyaus, Jupiter was a sky- and weather-god, obviously important to farmers. With him were early associated two other gods, Mars and Quirinus. At least one goddess, Juno, was important in earliest-known times. She seems to have had no original connection with Jupiter, or with any other god. Her chief function was to supervise the life of women.

The most characteristic deities of this period, however, were vague figures of limited and sharply defined functions. Like the greater gods, they were regarded as possessing superhuman power. This they could be induced to employ for the benefit of their worshipers if rightly approached. Beyond this, Roman curiosity did not go; the gods have no myths, do not form married pairs, and have no offspring. To name them correctly and to worship them with the proper words and gestures were supremely important. Hence there developed elaborate lists of liturgical formulas. These contain a host of names of lesser gods presiding over the most minute details of human life.

The cults of these and numerous other divinities were regulated in historical times by an elaborate priesthood, which was doubtless much simpler in earlier days. At its head stood a college of three pontiffs. In addition, there were 15 priests of individual gods, including the three chief deities. Lastly came the six Vestal Virgins, who tended the state hearth in the forum. There was no priestly caste, and most of the priesthoods could be held along with a secular magistracy.

Religion in the Etruscan Period. The Etruscan dynasty of the Tarquins (latter half of the 6th century BC) brought numerous innovations in the area of Roman religion. Cult statues were introduced, the worship having been conducted previously without images. Temples of Etruscan type began to appear (*e.g.,* on the Capitol). Elaborate funeral rites appear also to be of Etruscan origin. The Etruscans made known to the Romans the complicated method of divination from the entrails of sacrificial animals, as well as a system of divination from lightning. The primitive Roman religious calendar of 10 months (lunar) was replaced by the Etruscan calendar of 12 months (solar). During this period importations of deities from other than purely Etruscan sources took place. The Capitoline cult gave Jupiter as partners Juno and Minerva. The grouping is the result of Greek influence coming through Etruria, for the two goddesses were identified with Hera and Athena, the wife and daughter of Zeus. Venus, Fortuna, and Diana emerged during this period from native Italian sources. Even among the earliest-known deities are some whose names yield no discoverable Latin etymology, and certain of them are probably Etruscan. Examples are Volcanus, god of fire; Saturnus, deity of very obscure original functions; and Volturnus, apparently a river god, probably of the Tiber.

Religion in the Republic. As Rome expanded, its relations with the Greek communities of southern Italy and later with Greece itself and with the empires of Alexander's successors became closer. As a result Greek cults made their appearance, being sometimes new importations, sometimes modifications of existing cults brought about by the identification of Greek with Roman deities. A new importation was the cult of Apollo (late 5th century BC); he had no generally accepted Roman equivalent. Asclepius (Aesculapius) was introduced to Rome in 293 BC in order to fight a plague. The first Oriental religion recognized in Rome was the cult of the Great Mother (Cybele), accepted in 204 BC at a critical moment in the Second Punic War (although Roman citizens were not permitted to participate in her orgiastic rites). Eighteen years later (186 BC), the equally orgiastic worship of Dionysus (Bacchus) had become so popular that the Roman Senate, suspecting subversion, intervened to suppress it. A landmark in the hellenization of Roman religion was the *lectisternium,* a banquet at which the gods were invited as guests, held in 217 BC. Such a banquet in itself was nothing new, but the old manner was to have the gods invisibly present. On this occasion, however, moved by their early failures against Hannibal, the Romans resorted to a number of measures designed to secure divine favour. At the *lectisternium* of 217, the gods were represented by their statues and paired in a manner wholly Greek (*i.e.,* Jupiter with Juno, Mars with Venus, etc.). Together the figures at the *lectisternium* made up the typical and popular Greek group of 12 gods. As a result, the Roman gods assumed features that Greek beliefs and mythology had ascribed to Greek gods.

Religion in the empire. The age of Augustus saw a revival of traditional Roman cults along with the rebuilding of old temples. However, during the later years of the republic, and still more under the empire, a strong demand had been growing for a more personal religion, a demand that neither the traditional religions of Greece nor those of Rome were able to satisfy. This demand was met by various oriental cults that promised their adherents the personal favour of the deity, or even immortality, if certain conditions were fulfilled. These usually included some form of secret initiation into mysterious rites. First came the cult of Isis, which although of Egyptian origin, had been considerably hellenized in passing to the west. Then there was the cult of Attis, the consort of the Great Mother. Last came the cult of Mithra, of Persian origin and in some ways the most important of all. The worship was for men only and was popular especially in the army. Astrology and magic gained popularity from the time of Augustus onward. Solar worship was very characteristic of the later imperial period. Certain Syrian cults (either originally solar or later held to be so) were promoted by various emperors, and under Aurelian (d. AD 275) Sol Invictus (the unconquerable sun) was hailed as the supreme deity of Rome. Such was the religious world within which Christianity grew up, culminating in the conversion of the emperor Constantine (*c.* 312) and the religious legislation of the emperor Theodosius prohibiting paganism in a decree of 391.

Roman Republic, French RÉPUBLIQUE ROMAINE, Italian REPUBBLICA ROMANA, republic established in February 1798 by French troops occupying Rome and its environs. The pope was forced into exile, and the new republic was set up under an executive of seven consuls. In November 1798 Ferdinand IV of Naples sent an army that recaptured Rome, but the French returned victoriously the next month. The reestablished republic lasted only until 1799, when the Austrian-Russian campaign swept the French out of Italy. Although Napoleon retook Italy in 1800, he desired the pope's goodwill toward the eventual signing of the Concordat of 1801 and thus allowed the pope to retain his states. In 1809, however, Napoleon annexed Rome and the Papal States to the French empire and in 1811 made his newborn son king of Rome.

Roman Republic and Empire, the ancient state that centred on the city of Rome, from the time of the events leading up to the founding of the republic in 509 BC, through the establishing of the empire in 27 BC, to the final eclipse of the Empire of the West in the 5th century AD. (For later events of the Empire of the East, *see* Byzantine Empire.)

A brief treatment of the Roman Republic and Empire follows. For full treatment, *see* MACROPAEDIA: Greek and Roman Civilization, Ancient.

Ancient Rome was the dominant power in the entire Mediterranean basin, most of Europe, and large areas of North Africa at points in its long history, which stretched from the 8th century BC to the 5th century AD. Possessed of a powerful army and gifted in the applied arts of law, government, city planning, and statecraft, the Romans also acknowledged and adopted contributions of other ancient peoples—most notably, the Greeks.

Two distinct characters dominated the Roman world: the philosophical, idealistic, aesthetically concerned Greek and the native Roman, who tended to be militaristic, pragmatic, down-to-earth, and interested in power. Greeks and Romans had many complementary strengths and weaknesses: the Greeks were the inspired creators and innovators; the Romans were the sharp-eyed imitators, developers, and, ultimately, the preservers of Greek culture. Although each had a separate and unique influence on Western civilization, it is the combined effect of their legacy that has been the cornerstone of Western culture as it has developed down through the ages.

Early Rome. Legend has it that Rome was founded about 750 BC by Romulus, conqueror of the Sabines. The Etruscans soon came to rule Rome, dominating the area during most of the 6th century. At this time Rome was also home to the Latins and many Greeks, who contributed much to Roman culture. During the Etruscan monarchy, Rome adopted various coins, units of measure, and fine arts from the Greeks. The Greek alphabet, too, was introduced to, and readily accepted by, the Romans, who were later to change and refine it until it reached the form in which it served as the building block for the writing of many Western languages. Rome's state religion, which had direct equivalents to the Greek deities, was also institutionalized under the monarchy, and a military code was set up. But Roman political thought developed along lines different from those set up by the Etruscans. Roman government took much of its impulse from the needs and desires of the people. Indeed, the word republic, from the Latin *res publica,* means "thing of the people." The concept of monarchy was anathema. The Etruscans were overthrown, and the republic was founded in 509 BC.

Republican Rome. Concurrent with the kings' loss of power came the rising influence of the Senate, a council of elder statesmen who were members for life. The Senate recognized that political power belonged to the people, but for purposes of efficiency that power was granted to elected officials called magistrates, who represented the people in all matters.

It should be noted that the term people refers only to the aristocrats or patricians at this point in the evolution of the republic. Only members of the upper classes sat in the Senate, and it was their interests that the senators advanced. But the Romans were politically astute, and they recognized the valuable military resource that they had in the lower classes, particularly the farmers. To keep the lower classes, or plebeians, in check, the upper classes permitted them to have their own representatives, called tribunes, who, however, eventually gained veto power over the decisions of the magistrates. In 450 BC a further extension of this principle was set down in the 12 bronze tablets of Roman law (*see* Twelve Tables, Law of the). The Law of the Twelve Tables not only provided protection for the proletariat but also laid the groundwork for

a plebeian's holding office. The liberalization of political rights figured prominently in the strengthening of Rome. However, in the early days of the Republic, tradition was strong, and the aristocratic Senate maintained control of the state by general consensus.

As the functions and responsibilities of the Roman government grew more complex, a bureaucracy developed. Quaestors oversaw the financial aspects of government, aided by censors, who kept lists of citizens and of the taxes owed by these citizens. Two praetors were the judges. Because bureaucracy is by nature clumsy and rather time-consuming, however, provision was made for quick action in emergencies. One ruler, a dictator, would take over for a prescribed time in circumstances requiring rapid decision-making.

A stable and strong government at home gave Rome the security and power to enable its armies to invade and conquer foreign lands. The Latin League, an interdependent cluster of neighbouring cities, provided Rome with the necessary defense to back up its conquests. In keeping with Roman tradition, a certain number of captured people were sent back to Rome as slaves, while many others remaining in the provinces were given the privileges of Roman citizenship—not so many that the subject peoples could form power blocs, but enough to keep them loyal and willing to fight for their Roman masters. Soon, Rome's success led it into conflict with Carthage, an established commercial power in North Africa, for control of the Mediterranean. The ensuing battles, known as the Punic Wars, spanned the years 264–146 BC. Two great military geniuses were among the leaders in these wars. Hannibal led the Carthaginian forces from about 220 to 200, when he was defeated by Scipio Africanus Major. The Romans occupied Carthage and eventually destroyed it completely in 146.

The defeat of this powerful rival sustained the Romans' acquisitive momentum, and they set their sights on the entire Mediterranean area. To the east, which was in its final days as part of the decaying Alexandrian empire, the Romans defeated Syria, Macedonia, Greece, and Egypt. They also destroyed the Achaean League and burned Corinth (146 BC). Won through massive effort and with inevitable losses, the newly acquired lands and diverse peoples populating them proved a challenge to govern effectively. The Romans organized the conquered peoples into provinces—small units that were arms of the central government—and stationed troops in each, ready to exercise appropriate force if necessary.

Imperial Rome. In Rome proper, the majority of citizens suffered the consequences of living in a nation that had its eyes invariably trained on the far horizon. Roman farmers were unable to raise crops to compete economically with produce from the provinces, and many migrated to the city. For a time the plebeians were placated with bread and circuses, as the authorities attempted to divert their attention from the gap between their standard of living and that of the aristocracy. Slavery fueled the Roman economy, and its rewards for the wealthy turned out to be disaster for the working classes. Tensions grew, and civil wars erupted. The ensuing period of unrest and revolution marked the transition of Rome from a republic to an empire.

Notable figures in the civil wars included Marius, a proletarian who was elected consul, and Sulla, an army officer. The later stages of the civil wars encompassed the careers of Pompey, the orator Cicero, and Julius Caesar, who eventually took over Rome as its dictator. After his assassination in 44 BC, the triumvirate of Mark Antony, Lepidus, and Octavian, Caesar's nephew, ruled. It was not long before Octavian went to war against Antony in North Africa, and after his victory at Actium (31 BC) he was crowned Rome's first emperor, Augustus. His reign, from 27 BC to AD 14, was distinguished by stability and peace.

Augustus set up a form of government known as a principate, which combined some elements from the republic with the traditional powers of a monarchy. The Senate still functioned, though Augustus, as princeps, or first citizen, remained in control of the government. Under Augustus, Rome began to prosper once again, and the emperor came to be looked upon as a god. Thereafter, all good emperors were worshiped as gods after death. Among the beloved rulers of Rome were Trajan (reigned 98–117), Hadrian (117–138), Antoninus Pius (138–161), and Marcus Aurelius (161–180). Decadent, cruel men also rose to power in these days: Caligula (37–41) and Nero (54–68) were so loathed that their reigns were struck from the official Roman records.

It was during the rule of Tiberius (14–37) that Jesus Christ was crucified. Thereafter, Christians were tolerated at best—but often tortured or killed—until the reign of Constantine I (312–337). From 313 Christianity was an arm of the state, and pagan practices were officially forbidden. But the empire was dying. The last of Constantine's line, Theodosius I (379–395), was the last emperor to rule over a unified Roman Empire. The Western Empire, suffering from repeated invasions and the flight of

Roman emperors*

Augustus (Caesar Augustus)	27 BC–AD 14
Tiberius (Tiberius Caesar Augustus)	14–37
Caligula (Gaius Caesar Augustus Germanicus)	37–41
Claudius (Tiberius Claudius Caesar Augustus Germanicus)	41–54
Nero (Nero Claudius Caesar Augustus Germanicus)	54–68
Galba (Servius Galba Caesar Augustus)	68–69
Otho (Marcus Otho Caesar Augustus)	69
Vitellius (Aulus Vitellius Germanicus)	69
Vespasian (Caesar Vespasianus Augustus)	69–79
Titus (Titus Vespasianus Augustus)	79–81
Domitian (Caesar Domitianus Augustus)	81–96
Nerva (Nerva Caesar Augustus)	96–98
Trajan (Caesar Nerva Traianus Augustus)	98–117
Hadrian (Caesar Traianus Hadrianus Augustus)	117–138
Antoninus Pius (Caesar Titus Aelius Hadrianus Antoninus Augustus Pius)	138–161
Marcus Aurelius (Marcus Aurelius Antoninus)	161–180
Lucius Verus (Lucius Aurelius Verus)	161–169
Commodus (Lucius Aelius Aurelius Commodus)	177–192
Pertinax (Publius Helvius Pertinax)	193
Didius Julianus (Marcus Didius Severus Julianus)	193
Septimius Severus (Lucius Septimius Severus Pertinax)	193–211
Caracalla (Marcus Aurelius Severus Antoninus)	198–217
Geta (Publius Septimius Geta)	209–212
Macrinus (Marcus Opellius Severus Macrinus)	217–218
Elagabalus (Sacerdos dei invicti solis Elagabali Marcus Aurelius Antoninus)	218–222
Alexander Severus (Marcus Aurelius Severus Alexander)	222–235
Maximin (Gaius Julius Verus Maximinus)	235–238
Gordian I (Marcus Antonius Gordianus Sempronianus Romanus Africanus)	238
Gordian II (Marcus Antonius Gordianus Sempronianus Romanus Africanus)	238
Maximus (Marcus Clodius Pupienus Maximus)	238
Balbinus (Decius Caelius Calvinus Balbinus)	238
Gordian III (Marcus Antonius Gordianus)	238–244
Philip	244–249
Decius (Galus Messius Quintus Trianus Decius)	249–251
Hostilian (Gaius Valens Hostilianus Messius Quintus)	251
Gallus (Gaius Vibius Trebonianus Gallus)	251–253
Aemilian (Marcus Aemilius Aemilianus)	253
Valerian (Publius Licinius Valerianus)	253–260
Gallienus (Publius Licinius Egnatius Gallienus)	253–268
Claudius II Gothicus (Marcus Aurelius Valerius Claudius)	268–270
Quintillus (Marcus Aurelius Claudius Quintillus)	269–270
Aurelian (Lucius Domitius Aurelianus)	270–275
Tacitus (Marcus Claudius Tacitus)	275–276
Florian (Marcus Annius Florianus)	276
Probus (Marcus Aurelius Probus)	276–282
Carus (Marcus Aurelius Carus)	282–283
Carinus (Marcus Aurelius Carinus)	283–285
Numerian (Marcus Aurelius Numerius Numerianus)	283–284
Diocletian (Gaius Aurelius Valerius Diocletianus) *East only*	284–305
Maximian (Marcus Aurelius Valerius Maximianus Heraclius) *West only*	286–305
	306–308
Galerius (Gaius Galerius Valerius Maximianus) *East only*	305–311
Constantius I Chlorus (Flavius Valerius Constantius) *West only*	305–306
Severus (Flavius Valerius Severus) *West only*	306–307
Maxentius (Marcus Aurelius Valerius Maxentius) *West only*	306–312
Licinius (Valerius Licinianus Licinius) *East only*	308–324
Constantine I (Flavius Valerius Constantinus)	312–337
Constantine II (Flavius Claudius [or Julius] Constantinus)	337–340
Constans I (Flavius Julius Constans)	337–350
Constantius II (Flavius Julius [or Valerius] Constantius)	337–361
Magnentius (Flavius Magnus Magnentius)	350–353
Julian (Flavius Claudius Julianus)	361–363
Jovian (Flavius Jovianus)	363–364
Valentinian I (Flavius Valentinianus) *West only*	364–375
Valens (Flavius Valens) *East only*	364–378
Procopius *East only*	365–366
Gratian (Flavius Gratianus Augustus) *West only*	375–383
Valentinian II (Flavius Valentinianus) *West only*	375–392
Theodosius I (Flavius Theodosius)	379–395
Arcadius (Flavius Arcadius) *East only*	395–408
Honorius (Flavius Honorius) *West only*	395–423
Theodosius II *East only*	408–450
Constantius III *West only*	421
Valentinian III (Flavius Placidius Valentinianus) *West only*	425–455
Marcian (Marcianus) *East only*	450–457
Petronius Maximus (Flavius Ancius Petronius Maximus) *West only*	455
Avitus (Flavius Maccilius Eparchus Avitus) *West only*	455–456
Leo I (Leo Thrax Magnus) *East only*	457–474
Majorian (Julius Valerius Majorianus) *West only*	457–461
Libius Severus (Libius Severianus Severus) *West only*	461–467
Anthemius (Procopius Anthemius) *West only*	467–472
Olybrius (Anicius Olybrius) *West only*	472
Glycerius *West only*	473–474
Julius Nepos *West only*	474–475
Leo II *East only*	474
Zeno *East only*	474–491
Romulus Augustulus (Flavius Momyllus Romulus Augustulus) *West only*	475–476

*For a list of the Eastern emperors after the fall of Rome, *see* Byzantine Empire.

the peasants into the cities, had grown weak in comparison with the East, where spices and other exports were virtual guarantees of wealth and stability. When Theodosius died, in 395, Rome split into Eastern and Western empires.

The West was severely shaken in 410, when the city of Rome was sacked by the Visigoths, a wandering nation of Germanic peoples from the northeast. The fall of Rome was completed in 476, when the German chieftain Odoacer deposed the last Roman emperor of the West, Romulus Augustulus. The East, always richer and stronger, continued as the Byzantine Empire through the European Middle Ages.

The legacy of Rome. The Roman Empire was distinguished not only for its outstanding army—the foundation upon which the whole empire rested—but also for its accomplishments in scholarly endeavours. Roman law was a considered and complex body of precedents and comments, which were all finally codified in the 6th century (*see* Justinian, Code of). Rome's roads were without match in the ancient world, designed for comparatively fast transportation and adapted to a wide variety of functions: commerce, agriculture, mail delivery, pedestrian traffic, and military movements. Roman city planners achieved unprecedented standards of hygiene with their plumbing, sewage disposal, dams, and aqueducts. Architecture on the whole was a rather coarse imitation of Greek styles, but the structures were boldly planned and lavishly executed. Triumphal arches commemorated important state occasions, and the famous Roman baths were built to stir the senses as well as to cleanse the body.

Government in the Roman manner was exemplified in the development of administrative cities known as civitates, small versions of Rome itself, which were scattered all over Roman-occupied Europe and North Africa. These provincial outposts retained a good deal of the flavour of the native inhabitants; still, they were enough like "home" to Romans abroad to give all of the conquered lands a familiar, unified feel. Roman governments strove toward fairness and uniformity, and the small civitates were evidence of that intent.

Finally, Latin, the language of the Romans, is the medium for some of the most brilliant and original works in Western civilization. Cicero's speeches, the poetry of Virgil and Horace, the histories of Tacitus, and Terence's drama are all part of the legacy of the glory that was Rome.

Consult the INDEX *first*

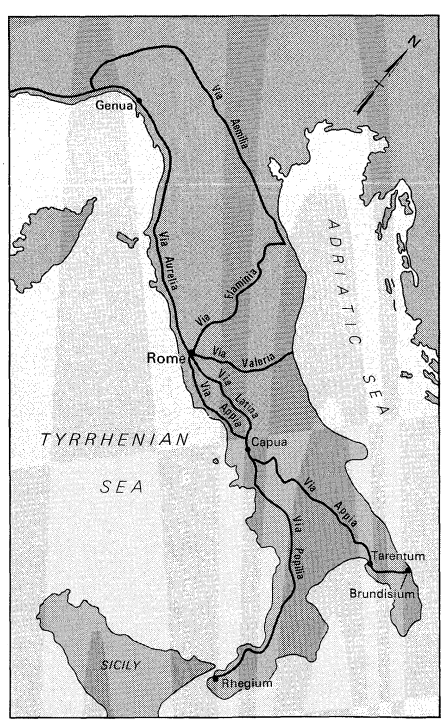
Roman republican calendar, dating system that evolved in Rome prior to the Christian Era. According to legend, Romulus, the founder of Rome, instituted the calendar in about 738 BC. This dating system, however, was probably a product of evolution from the Greek lunar calendar, which in turn was derived from the Babylonian. The original Roman calendar appears to have consisted only of 10 months and of a year of 304 days. The remaining 61¼ days were apparently ignored, resulting in a gap during the winter season. The months bore the names Martius, Aprilis, Maius, Junius, Quintilis, Sextilis, September, October, November, and December—the last six names correspond to the Latin words for the numbers 5 through 10. The Roman ruler Numa Pompilius is credited with adding January at the beginning and February at the end of the calendar to create the 12-month year. In 452 BC, February was moved between January and March.

By the 1st century BC, the Roman calendar had become hopelessly confused. The year, based on cycles and phases of the moon, totaled 355 days, about 10¼ days shorter than the solar year. The occasional intercalation of an extra month of 27 or 28 days, called Mercedonius, kept the calendar in step with the seasons. The confusion was compounded by political maneuvers. The Pontifex Maximus and the College of Pontiffs had the authority to alter the calendar, and they sometimes did so to reduce or extend the term of a particular magistrate or other public official. Finally, in 46 BC, Julius Caesar initiated a thorough reform that resulted in the establishment of a new dating system, the Julian calendar (*q.v.*).

Roman road system, outstanding transportation network of the ancient world, extending from Britain to the Tigris–Euphrates and from the Danube to Spain and North Africa. In all, the Romans built 50,000 miles (80,000 km) of hard-surfaced highway, primarily for military reasons.

The first of the great Roman roads, the Via Appia (Appian Way), begun by the censor Appius Claudius Caecus in 312 BC, originally ran southeast from Rome 162 miles (261 km) to Tarentum (modern Taranto) and was later extended to the Adriatic coast at Brundisium (modern Brindisi). The long branch running through Calabria to the Straits of Messina was known as the Via Popilia. By the beginning of the 2nd century BC, four other great roads radiated outward from Rome: the Via Aurelia, extending northwest to Genua (Genoa); the Via Flaminia, running north to the Adriatic, where it joined the Via Aemilia, crossed the Rubicon, and led northwest; the Via Valeria, east across the peninsula by way of Lake Fucinus (Conca del Fucino); and the Via Latina, running southeast and joining the Via Appia near Capua. Their numerous feeder roads extending far into the Roman provinces led to the proverb "All roads lead to Rome."

The Roman roads were notable for their straightness, solid foundations, cambered surfaces facilitating drainage, and use of concrete made from pozzolana (volcanic ash) and lime. Though adapting their technique to materials locally available, the Roman engineers followed basically the same principles in building abroad as they had in Italy. In 145 BC they began the Via Egnatia, an extension of the Via Appia beyond the Adriatic into Greece and Asia Minor, where it joined the ancient Persian Royal Road.



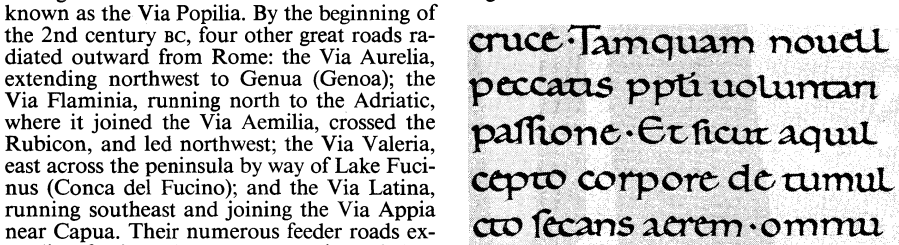
Major road system in Roman Italy, about AD 100

Adapted from H. Schreiber, *Merchants, Pilgrims, and Highwaymen*; Putnam, New York; first published in Germany by Econ Verlag, Dusseldorf, under the title *Sinfonie der Strasse*

In North Africa the Romans followed up their conquest of Carthage by building a road system that spanned the south shore of the Mediterranean. In Gaul they developed a system centred on Lyon, whence main roads extended to the Rhine, Bordeaux, and the English Channel. In Britain the purely strategic roads following the conquest were supplemented by a network radiating from London. In Spain, on the contrary, the topography of the country dictated a system of main roads around the periphery of the peninsula, with secondary roads developed into the central plateaus.

The Roman road system made possible Roman conquest and administration and later provided highways for the great migrations into the empire and a means for diffusion of Christianity. Despite deterioration from neglect, it continued to serve Europe throughout the Middle Ages, and many fragments of the system survive today.

roman script, also called ANTIQUA SCRIPT, Italian LETTERA ANTICA, in calligraphy, script based upon the clear, orderly Carolingian writing that Italian humanists mistook for the ancient Roman script used at the time of Cicero (1st century BC). They used the term roman to distinguish this supposedly classical style from black-letter and national hands. It was upon the model of *antica,* or roman, scripts that Renaissance scribes evolved the varieties of roman and italic, or cursive, styles of handwriting, upon which the corresponding typefaces of Nicolas Jenson and of Aldus Manutius were patterned. *See also* italic script.



"Roman script," actually Carolingian minuscule from 12th-century Italian book of sermons and homilies (British Library, Harley 7183)

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Román y Reyes, Víctor Manuel (b. 1873?, Carazo, Nicaragua—d. May 6, 1950, Philadelphia, Pa., U.S.), president of Nicaragua (1947–1950) under the aegis of the Somoza regime.

An uncle of General Anastasio Somoza, Román y Reyes graduated from Hahnemann Medical College (Philadelphia) in 1896 and practiced medicine in the United States for several years before returning to Nicaragua to serve in various government posts, including minister of finance, director of public health, consul general in San Francisco, and mayor of Carazo. Elected president with Somoza's backing, Román y Reyes pledged that his administration would follow a policy of conciliation. In effect, he was merely a puppet for Somoza to control the country. He died while still in office, shortly after surgery performed (by his son) at Hahnemann hospital.

Romana, Pax: *see* Pax Romana.

romance, literary form, usually characterized by its treatment of chivalry, that came into being in France in the mid-12th century. It had antecedents in many prose works from classical antiquity (the so-called Greek romances), but as a distinctive genre it was developed in the context of the aristocratic courts of such patrons as Eleanor of Aquitaine.

A brief treatment of romance form follows. For full treatment, *see* MACROPAEDIA: Literature, The Art of.

The romance enjoyed its heyday in France and Germany between the mid-12th and mid-13th century in the works of such masters as Chrétien de Troyes, Benoît de Sainte-Maure, and Gottfried von Strassburg. By the time it reached England in about 1250, it was already beginning to show signs of a decline from its original form.

The staple subject matter of romance is chivalric adventure. Love stories and religious allegories can often be found interwoven with this material, but they are not essential to it. The majority of romances drew their plots from three basic areas: classical history and legend, the adventures of King Arthur and the Knights of the Round Table (certainly the most significant group), and the doings of Charlemagne and his knights. To these must be added a number of romances concerned specifically with the deeds of English heroes such as Havelock the Dane and Richard Coeur de Lion and a number of other romances, such as *Sir Orfeo* and *Floire et Blancheflor,* that belong to no particular cycle.

Among the earlier romances were those that took their subjects from classical antiquity. These include the *Roman de Thèbes* and the *Roman d'Enéas,* both adapted from the work of Latin poets. Benoît de Sainte-Maure's *Roman de Troie,* which tells the story of Troy, is notable in this group for containing the first literary treatment of the narrative of Troilus and Cressida, later developed by Boccaccio, Chaucer, and Shakespeare. Also popular were stories based on the life of Alexander the Great, amongst them the *Roman d'Alexandre* and the later *King Alisaunder.*

The most celebrated romances of the Arthurian cycle were those written in the second half of the 12th century by Chrétien de Troyes. It was he who in *Perceval ou li Conte du Graal* introduced the theme of the Holy Grail into European literature. The French Arthurian romances were of particular importance for English literature, since they provided the material that Sir Thomas Malory later adapted in *Le Morte Darthur* (first printed 1485). *Sir Gawain and the Green Knight,* written in the mid-14th century and regarded as one of the most beautiful English poems of the Middle Ages, also belongs in this group. Into the third category fall a number of lesser romances about such figures as Roland and Sir Ferumbras, who fought in the campaigns of Charlemagne.

It is one of the distinguishing characteristics of the romance that it was written in the vernacular rather than in Latin; this indeed is the original meaning of the Old French word *romanz.* There are examples of the genre in both verse and prose, though in general prose romances tend to belong to the later period. From the start, these works share a taste for the exotic, the remote, and the miraculous. Descriptive detail is lavish, and love stories on the whole end happily—*Tristan und Isolde,* written by Gottfried von Strassburg in the early 13th century, being a notable exception. Overall, it can be said that by comparison with the epic form of the *chanson de geste* ("Song of deeds"), which it superseded, the romance shows a general sophistication of narrative method and psychological insight.

In later centuries the romance underwent various transformations. The continued popularity of one form of it, the prose romance of 15th- and 16th-century Spain, is attested by Cervantes' satire in *Don Quixote.* Although the chivalric ideal of the perfect knight was essentially medieval, lingering echoes of romance can be found in the changing connotations of the word itself. So, at the end of the 18th century the Romantic movements in England and Germany were in some respects an attempt to turn back to the spirit of medieval romance in reaction against the prevailing philosophies of the time. And even today, in the popular romantic novel, there can be detected a debased survival of some of the original values.

Romance languages, also called ROMANIC, group of related languages all derived from Vulgar Latin within historical times and forming a subgroup of the Italic branch of the Indo-European language family. Nearly 400,000,000 people today claim a Romance language as their native tongue. There are also about 5,700,000 speakers of French, Portuguese, and Spanish creoles in North America, the West Indies, and various islands of the Pacific and Indian oceans. The most important Romance languages—French, Spanish, Portuguese, Italian, and Romanian—are all national languages.

A brief treatment of the Romance languages follows. For full treatment, *see* MACROPAEDIA: Languages of the World.

Probably the most internationally important of the Romance languages is French. It is the official or co-official language in almost 30 countries in Europe, Africa, and the Americas. Throughout France and Corsica people use it as their first language; it is also the native tongue of substantial numbers of people in Canada, Belgium, Switzerland, Monaco, the Italian Valle d'Aosta, and the United States (especially Maine and Louisiana). Also, numerous Africans and Indo-Chinese use it as their international language.

The first document apparently written in French, the Strasbourg Oaths, ostensibly dates from 842. The authenticity of the text is doubtful, however, and its dialect is uncertain. The second oldest existing text, from 880–882, is definitely in the Picard dialect. Other early texts are in various dialects, Norman and Picard being among the most prestigious. Francien, the dialect of Paris and the Île de France, assumed importance in the second half of the 12th century and was established as the official language in 1459. Writers continued to cherish dialectal features until the 17th century, when French was standardized to an unprecedented degree.

Spanish is the Romance language having the greatest number of speakers and is the official language of 18 American countries and Spain. Spoken widely throughout Central America, South America (with the exception of Brazil), and the Caribbean, Spanish is also the native language of a sizable minority in the United States. There are also many Judeo-Spanish speakers and Spanish speakers in Africa.

The first known texts in Spanish date from the 10th century. Two of these texts from different regions show few dialectal differences; a third is Leonese in character. The next oldest texts are in Mozarabic, a very conservative dialect used by Christian town-dwellers in Arab-occupied Spain. Castilian literature appeared in the 12th century and was destined to gain supremacy, but literary works were produced in Aragonese and Leonese until the beginning of the 15th and the 14th centuries, respectively.

Portuguese is the official language of Brazil and Portugal, and is spoken by sizable groups in Africa and by smaller groups in Goa and the United States. Galician, a Portuguese dialect strongly influenced by Castilian, is widely spoken in northwestern Spain. The first known Portuguese document is dated 1192. During the next two centuries Gallego-Portuguese was used by court poets all over the Iberian Peninsula, save in Catalonia. Galician lost ground in the 15th century and in the year 1500 was replaced by Castilian as the official language of Galicia. In the 16th century, Portuguese and Galician grew further apart with the consolidation of standard Portuguese. All the dialects of Portuguese are mutually comprehensible, and Portuguese speakers have little difficulty speaking and understanding Spanish.

Italian is spoken throughout Italy and by large groups in France, Yugoslavia, and Switzerland. There are also large numbers of Italian speakers in the United States, Argentina, and Brazil.

The earliest known texts that are unquestionably in Italian date from the 10th century. Standard Italian, developed as a literary language in the 14th and 15th centuries, is based on a Florentine dialect. It is understandable to speakers of any of the numerous Italian dialects, which constitute a continuum of intelligibility, although geographically distant dialects may be radically different.

Romanian is the official language of Romania and is spoken in parts of the Soviet Union, Yugoslavia, Bulgaria, Greece, and Albania. Standard Romanian is based on the Walachian dialect of the Daco-Romanian group of dialects. The earliest extant text in this dialect is dated 1521. Writers of the 17th century greatly expanded Romanian. Now Bucharest usage provides the model for standard Romanian. Other Romanian dialects are scattered through the Balkans and Asia Minor.

Two other Romance languages of literary importance that also have many speakers are Occitan and Catalan. Occitan is spoken in southern France. Although in Occitania the language is known by different names (Lemosí, Proensal), all the dialects are homogeneous, except for Gascon. Occitan, also known as Languedoc, or Provençal, was the poetic language of France and northern Spain until the north crushed the political power of the south (1208–29). Since the French Revolution, French has been penetrating into popular usage in Occitania, although in the last 100 years there has been a movement to reestablish Occitan as a literary language.

Northwest of Occitania, along the French, Swiss, and Italian frontiers, are the Franco-Provençal dialects. These dialects share characteristics of both French and Occitan, so that the validity of this grouping is debated. Since the 12th century a small amount of literature has been produced in these dialects, although there is no standard literary language.

Catalan is the official language of Andorra and also is spoken by minorities in Spain, France, and the town of Alghero, Sardinia. The earliest surviving written materials in Catalan date from the 12th century. Catalan was a vigorous literary language from the 13th to the 15th century, when the union of Castile and Aragon set it into decline. From 1137 to 1749 it was the official language of Aragon, but it was not until the 20th century that it received renewed interest as a literary language.

Sardinian, spoken on Sardinia, is incomprehensible to speakers of Italian. Sardinian was used for legal documents from the 11th to the 17th century, but virtually no literature now exists except for folk verse and occasional journals. The Rhaetian dialects, of the southern Switzerland Alps and northern Italy, are of uncertain origin. Texts have been found dating back to the 12th century.

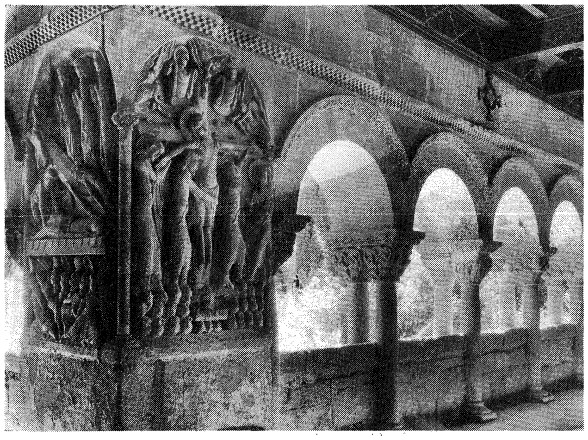
romancero, collective body of Spanish folk ballads, which constitute a unique tradition of European balladry. They resemble epic poetry in their heroic, aristocratic tone, their themes of battle and honour, and their pretense to historicity; but they are, nevertheless, ballads, compressed dramatic narratives sung to a tune.

It was once thought that they were the source of such 12th-century Spanish epics as *El cantar de mío Cid* ("The Song of the Cid"). Now they are believed to be the successors of the epic tradition; the earliest known date from the late 14th and early 15th centuries. Some ballads are brief dramatizations of episodes from known epics. They frequently deal with conflicts or amours between Spaniards and Moors or with the Arthurian or Charlemagne

legends. Unlike the folk poetry of England, Scandinavia, or Germany, which followed a tradition independent of the national literatures, the ballads form a continuous link in the chain of tradition from the earliest Spanish vernacular literature to the literature of the 20th century. As the sourcebook of national history and national character of Spaniards of all classes, they lie at the heart of the national consciousness. They inspired many of the poems, dramas, and novels by the masters of Spanish literature and remain the chosen medium for popular narrative verse.

Romanche Gap, also called ROMANCHE DEEP, or ROMANCHE TRENCH, narrow submarine depression lying near the equator in the mid-Atlantic Ocean, between the shoulders of South America and Africa. Reaching a maximum depth of 25,453 feet (7,758 m), it represents one of the ocean's deepest soundings. The trench is 186 miles (300 km) long and has a mean width of 12 miles (19 km) and a total area of 2,317 square miles (6,000 square km). It is one of the few exceptionally deep trenches found in isolation from submarine mountain ranges or the edges of continental shelves. The Romanche Gap interrupts the north–south-trending mid-Atlantic Ridge; near its midpoint, transverse faults at intervals have relieved slowly accumulating stresses by allowing the rock of the ridge to slip along a line that runs generally east–west. Consequently, the Romanche Gap offsets the mid-Atlantic Ridge by more than 400 miles (640 km). The trench is covered by a debris of coarse, fragmented rocks resulting from gravitational sliding and slumping.

Romanesque art, architecture, sculpture, and painting characteristic of the first of two great international artistic eras that flourished in Europe during the Middle Ages. Romanesque architecture emerged in about 1000 and lasted until about 1150, by which time it had evolved into Gothic. The Romanesque was at its height between 1075 and 1125 in France, Italy, Britain, and the German lands.



Cloister of the Monastery of Santo Domingo de Silos, Spain, *c.* 1150
Authenticated News

The name Romanesque refers to the fusion of Roman, Carolingian and Ottonian, Byzantine, and local Germanic traditions that make up the mature style. Although perhaps the most striking advances in Romanesque art were made in France, the style was current in all parts of Europe except those areas in eastern Europe that preserved a full-fledged Byzantine tradition. Its geographic distribution resulted in a wide variety of local types. (*See* Burgundian Romanesque style; Cistercian style; Norman style.)

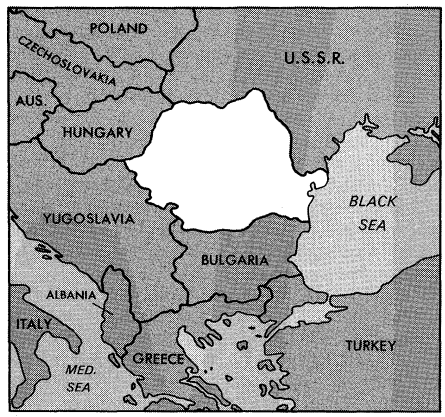
Romanesque art resulted from the great expansion of monasticism in the 10th and 11th centuries, when Europe first regained a measure of political stability after the fall of the Roman Empire. Several large monastic orders, notably the Cistercian, Cluniac, and Carthusian, sprang up at this time and quickly expanded, establishing churches all over western Europe. Their churches had to be larger than previous ones in order to accommodate increased numbers of priests and monks and allow access to pilgrims who wished to view the saints' relics kept in the churches.

To fulfill these functions, Romanesque churches evolved the extensive use of a semicircular ("Roman") arch for windows, doors, and arcades; a barrel vault (*i.e.,* arches forming a half-cylindrical vault over a rectangular space) or groin vaults (formed by the intersection of two arches) to support the roof of the nave; and massive piers and walls (with few windows) to contain the extremely forceful outward thrust of the arched vaults. Two basic church plans evolved in France and became the types most often used; both expanded the early Christian basilica plan (longitudinal with side aisles and an apse) to accommodate the expanding functions of large churches. Each involved a system of radiating chapels (to accommodate more priests during mass), ambulatories (arcaded walkways for visiting pilgrims) around the sanctuary apse, and large transepts (transverse aisles separating the sanctuary from the main body of the church). The typical Romanesque church also had side aisles along the nave with galleries above them, a large tower over the crossing of the nave and transepts, and smaller towers at the church's western end. The barrel vaults of Romanesque churches were typically divided by shafts (engaged columns) and diaphragm arches into square bays, or compartments. This compartmentalization was an essential characteristic that distinguishes Romanesque architecture from its Carolingian and Ottonian predecessors.

The art of monumental sculpture was revived in western Europe during the Romanesque period after almost 600 years of dormancy. Relief sculpture was used to depict biblical history and church doctrine on the capitals of columns and around the massive doors of churches. A relative stylistic freedom from the classical figural tradition, a heritage of angular Germanic design, and the inspiration of religion combined to produce a distinctive style of sculpture. Natural objects were freely transformed into visionary images that derive their power from abstract linear design and from expressive distortion and stylization. This spiritualized art reveals the Romanesque concern with transcendental values, in sharp contrast to the markedly more naturalistic and humanistic sculpture of the Gothic age.

Much of the monumental painting of the Romanesque period covered the interior walls of churches. The fragments that survive show that mural painting imitated sculptural style. Manuscript illumination, in the elaboration of capital letters and marginal decoration, also followed the sculptural trend toward linear stylization. Both sculpture and painting incorporated a broad range of subject matter, reflecting the general revival of learning: contemporary theological works, biblical events, and the lives of saints were common subjects. Gothic art began to supplant Romanesque in the mid-12th century.

Romania, also spelled RUMANIA, Romanian ROMÂNIA, country, southeastern Europe, covering an area of 91,699 square miles (237,500 square km). The capital is Bucharest. Romania is about 300 miles (480 km) from south to north and about 420 miles (680 km) at its widest extent from west to east. It is bordered by the Soviet Union (north and east), Hungary (west), Yugoslavia (southwest), Bulgaria (south), and the Black Sea (east). The population in 1990 was estimated at 23,278,000.



Romania

A brief treatment of Romania follows. For full treatment, *see* MACROPAEDIA: Romania.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. The great arc of the Carpathian Mountains enters northern Romania via the Ukraine and takes a curving course, first southward and then westward across the central part of Romania. The Carpathians then turn south again and cross the Danube River, which forms Romania's southern boundary with Bulgaria. The southern and eastern portions of Romania consist of fertile plains that are drained by the Danube and its tributaries. The Carpathian Mountains may be divided into the Eastern Carpathians, the Western Carpathians, and the Southern Carpathians (or the Transylvanian Alps); they occupy about 30 percent of the country's total area. The highest point in Romania is the peak of Moldoveanu (8,346 feet [2,544 m]) in the Southern Carpathians. The three ranges, with an average elevation of 2,620 feet (800 m), form a semicircle, open to the west, that shelters the Transylvanian tableland in the central part of the country. On the outer fringe of the Carpathians' great arc are the Subcarpathians, reaching elevations between 1,300 and 3,300 feet (400 and 1,000 m). The plains and the Danube River delta to the southeast, with elevations below 650 feet (200 m), occupy one-third of the country's total area.

Romania's climate is intermediate between the temperate and continental types. Average annual temperatures range from 52° F (11° C) in the south to 45° F (7° C) in the north; average annual rainfall ranges from 16 inches (400 mm) in the southeast to 55 inches (1,400 mm) in the Carpathian Mountains. Forests cover about one-fourth of the land; oaks predominate up to elevations of about 2,600 feet (800 m), succeeded by beeches to 4,600 feet

(1,400 m), conifers to 6,000 feet (1,800 m), and alpine and subalpine pastures above that. Fauna include chamois, bear, red deer, wolf, fox, and lynx.

Romania has moderate deposits of coal, iron ore, bauxite, lead, zinc, copper, manganese, and rock salt. Sizable deposits of petroleum are found in the Subcarpathians, the Romanian Plain, and the Black Sea offshore deposits, and natural gas—mainly methane—is found in the Transylvanian tableland.

The people. Romanians represent the largest element in the populace, although there are Hungarian and German minorities of 8 percent and 2 percent, respectively. Serbo-Croats, Ukrainians, Russians, Greeks, Turks, Gypsies, and Jews are smaller minorities. Romanian is the official language, although Hungarian and German are preserved by their communities and may be used as languages of instruction in schools. It is estimated that 70 percent of the population is Romanian Orthodox and 10 percent is Greek Orthodox, and there are small minorities of Roman Catholics, Calvinists, Jews, Lutherans, and Muslims.

Birth and death rates are moderate, but infant mortality is still relatively high. One-fourth of the population is younger than 15 years. Life expectancy at birth is 67 years for males and 73 years for females. About half of the population lives in urban areas.

The economy. Under communist rule from 1948 to 1989, Romania had a centrally planned economy. During that period its mostly agricultural economy was transformed into a modern economy that is based largely on heavy industries and services. The gross national product (GNP) per capita is within the range of other developed eastern European countries.

Agriculture accounts for about one-sixth of the national income and employs more than one-fourth of the labour force. More than two-fifths of the land is arable. Agricultural output of the collective farms under communist rule was low, however, in part because of the emigration of young workers from the countryside. Bread and other basic food items were rationed from the early 1980s until the early 1990s. Major crops include corn (maize), sugar beets, potatoes, wheat, rye, and barley. Cereals and fruit are important sources of foreign exchange. Sheep and pigs are the main livestock reared. Most of the timber removed from the forests annually is used in industry. More than one-half of the annual fish catch is from the Atlantic.

Romania's mineral resources are inadequate. Fuels, minerals, and metals account for approximately one-half of the country's imports. Romania was formerly a large exporter of petroleum but was increasingly relying on imports of that fuel by the 1990s.

Manufacturing and mining account for two-thirds of the national income, are dominated by heavy industries, and employ almost two-fifths of the labour force. The production and availability of durable consumer goods was limited in the early 1990s. The country's major manufactures include crude and rolled steel, machines, motor vehicles, chemicals, and cement. Light industries, which predominated before 1947, centre on the production of textiles and processed foods. Electricity is largely generated from domestic and imported fuels. Hydroelectric power provides one-sixth of Romania's electricity.

Chief trading partners include the Soviet Union, Germany, Poland, Egypt, and China. Machinery, transport equipment, and fuels are major exports.

Romania's railways provide the main method of transportation for both freight and passengers. About two-thirds of the road network is paved. The Danube River and the Danube-Black Sea Canal continue to be major shipping routes. Bucharest and several other cities have international airports.

Government and social conditions. Romania's political system was in a state of transition in the early 1990s. From 1948 to 1989 the country was ruled by the Communist Party of Romania (Partidul Comunist Român), or CPR. The CPR set government policy and dominated the government, bureaucracy, and armed forces. Romania was a one-party state with a political system basically modeled on that of the Soviet Union.

In December 1989 a revolution toppled the country's Communist leader, Nicolae Ceauşescu, and within two months the CPR had been dissolved and banned in Romania. In the course of the revolution a group calling itself the Council of the National Salvation Front took over the reins of government. The council, which represented a broad coalition of former communists and noncommunists alike, held free, multiparty elections to the presidency and the national parliament in May 1990. These elections were won by the National Salvation Front, whose formerly communist leaders called for a gradual and controlled transition to a free-market economy in Romania.

Romania's social-welfare system provides free hospital care to all citizens; cash benefits for sickness, maternity, and work injury; and family allowances, old age, disability, work disability, and survivor pensions. There is a higher proportion of health facilities than in most eastern European countries, although there are fewer physicians. The standard of living, however, remains below that of most European countries. Both urban and rural housing have been in short supply since World War II.

Romania's literacy rate of 96 percent reflects its comprehensive educational system, which is compulsory between the ages of 6 and 16 and free at all levels. In addition to general and secondary schools, a wide range of technical and professional schools is available.

Cultural life. Romanians have made significant contributions in the arts and humanities. Among writers, the poet Mihail Eminescu created a school of poetry that influenced Romanian writers in the 19th and 20th centuries. The 20th-century composer and violinist Georges Enesco, known for his works in a Romanian national style, became a leader of Romanian composers. Modernist tendencies in the 20th-century visual arts are exemplified by the sculptor Constantin Brancusi.

History. Early peoples of Romania during the 1st millennium BC included Illyrians, Thracians, and Scythians. Greek colonies appeared on the shore of the Black Sea in the 7th century BC and Dacian settlements in the 4th century BC. A Dacian state existed between 200 and 31 BC. The Romans subjugated the Thracians, the Illyrians, and the Dacians by AD 106. Goths ousted the Romans from Dacia in the 3rd century, and peoples of Thracian descent lived there safely as nomadic sheepherders until the late 12th century.

The first Romanian state, Walachia ("Land of the Vlachs"), appeared during the early 14th century, and a second, Moldavia, was founded in 1349 east of the Carpathians in the Prut River valley; but in the late 14th century Walachia, and in 1455 Moldavia, became vassal states of the Ottoman Empire. Both remained Turkish dependencies until the 19th century, while other peoples of Romanian descent lived in the mountainous region of Transylvania under Hungarian control. In 1812 Russia gained control of Bessarabia (southeastern Moldavia).

Romanian nationalism began to rise in the mid-19th century. Insurrections erupted in Walachia, Moldavia, and Transylvania but were suppressed by the Ottomans and Russians. Following the Crimean War (1853–56), Walachia and Moldavia became independent principalities once again, and in 1861 both elected a single prince to rule them, creating the de facto state of Romania with its capital at Bucharest. It won international recognition in the Treaty of Berlin (1878) following the Russo-Turkish War.

Romania entered World War I with the Allies, but the Central Powers soon occupied Bucharest and much of the country; with the defeat of the Central Powers in 1918, Romania was ceded Transylvania, Bukovina, and Bessarabia.

In the 1930s a fascist political movement similar to those in Germany and Italy appeared in Romania, and to assure its independence Romania entered into an alliance with Germany. By 1941, 500,000 German soldiers were occupying Romanian soil, and a joint German-Romanian army was formed to invade the Soviet Union; but by 1944 Soviet troops had overrun the country. Under their occupation Romania's economy and political life were coordinated with the Soviet Union, as in the rest of eastern Europe. Conservatives and liberals were gradually eclipsed, and at the end of 1947 the Romanian king was forced to abdicate and local communists formed the Romanian Workers' Party. This group gained complete control of the Grand National Assembly in the March 1948 elections, adopted a Soviet-style constitution, and proclaimed the Romanian People's Republic.

After 1948 Romania entered into a network of alliances with other Soviet Union satellite countries, but in the 1960s, under the leadership of Nicolae Ceauşescu, the nation began to implement a foreign policy independent of Soviet goals. The Workers' Party was renamed the Communist Party of Romania (CPR) in 1965. During the 1970s Romania continued to follow a more independent path on foreign-policy issues. Domestically, Ceauşescu used state ownership and central planning to foster the rapid growth of heavy industry. His grandiose development projects failed, however, and consequently the Romanian people were subjected to a rigorous austerity program in the 1980s in order to pay off the country's accumulated foreign debt. The standard of living plunged as Romania exported much of its food and fuel production.

When communist parties across eastern Europe abandoned their monopoly on power in 1989, Ceauşescu resisted the trend and reasserted his unpopular policies. In mid-December of that year, however, antigovernment demonstrations erupted in the country's cities, and, when the Romanian army joined the uprising against him, Ceauşescu fled. He was arrested by the new provisional government and was tried and executed. The provisional government, composed of communists and noncommunists alike, prepared to hold free, multiparty elections to the national parliament. The CPR was dissolved and banned from the nation's political life. The National Salvation Front, a party dominated by former members of Ceauşescu's government, won an overwhelming victory in general elections held in May 1990.

Romania, Roman Catholic Church of: *see* Roman Catholic Church of Romania.

Romanian language, also spelled RUMANIAN, Romanian ROMÂNA, Romance language spoken primarily in Romania. Four principal dialects may be distinguished: Daco-Romanian, the basis of the standard language, spoken within Romania in several regional variants; Aromanian, or Macedo-Romanian, spoken in scattered communities in Greece, Yugoslavia, Albania, and Bulgaria; Megleno-Romanian, a nearly extinct dialect of northern Greece; and Istro-Romanian, also nearly extinct, spoken on the Istrian Peninsula of northwestern Yugoslavia. Mutual intelligibility between the major dialects is difficult; the Megleno-

Romanian, Istro-Romanian, and Aromanian are sometimes classed as languages distinct from Romanian proper, or Daco-Romanian, which has many slightly varying dialects of its own. Moldavian is a form of Daco-Romanian spoken in the U.S.S.R. and is written in the Cyrillic alphabet.

The first known text in Daco-Romanian dates from 1521, and the earliest inscription in Aromanian is dated 1731. Romanian phonology and grammar have developed in rather different directions from those of most other Romance languages because of the language's relative isolation from other Romance languages and its close contact with the Slavic languages and Hungarian. Romanian continues a Latin distinction between long *o* and short *u*, fused in most other Romance languages, but, like almost all others, it has lost the Latin distinction between long *e* and short *i*. In consonant clusters there has been a tendency to replace velar consonants *k* and *g* with labial consonants, such as *p, b,* or *m* (*e.g.,* Latin *ŏcto* "eight," Romanian *opt;* Latin *cognatum* "relative, kinsman," Romanian *cumnat*). Nouns in Romanian have two cases, direct (nominative-objective) and oblique (possessive-dative), and have separate singular and plural forms for the noun standing alone and the noun with the definite article suffixed. Verbs have a shortened infinitive (*e.g., a cînta* from Latin *cantare* "to sing"), and the future tense is formed by a compound of the verb *a vrea* "to wish" plus the infinitive of the verb—*voi cînta* "I will sing"; an alternative method of future formation is to use the auxiliary verb *a avea* "to have" plus *să* plus the subjunctive of the verb—*am să cînt* "I will sing."

The vocabulary of Romanian is, of course, based on that of Latin, but because of Romanian's isolation, loanwords from non-Romance languages are frequent. Most common are Slavic words, but borrowings from Turkish, Hungarian, and Albanian also occur.

Romanian literature, also spelled RUMANIAN, body of writings in the Romanian language, the development of which is paralleled by a rich folklore—lyric, epic, dramatic, and didactic—that has continued into modern times. Romanian literary history may be divided into five periods: (1) from the first Romanian texts, written in the 15th century, to 1688, when the Bible was translated; (2) the 18th century up to the nationalistic movement of Tudor Vladimirescu in 1821; (3) the national renaissance, from 1820 to World I; (4) the period of national unity and literary integration; and (5) the period after World War II.

The old period. The earliest translations were from Slavonic and consisted of interlinear verses or interpolations in 15th-century religious texts. From the same period date the so-called rhotacizing texts, preserved in 16th-century copies, which were written in Maramureş, northern Transylvania, probably under the impetus of the Hussite movement. These include the Psalter of Şcheia and the Codex of Voroneţ, which contains the Acts of the Apostles and the Psalter of Voroneţ.

The first book printed in Walachia in 1508 was a Slavonic liturgical book. A certain Deacon Coresi printed translations of the Acts of the Apostles (1563). Other publications of his that survive are the *Talcul Evangheliilor şi Molitvenic* ("Sermons and Book of Prayers") and *Evanghelia cu învăţătură* (1581; "Commentary on the Gospels"), and these all encouraged the use of Romanian. In this period some secular literature was also produced, but it consisted mainly of translations from Greek, Slavonic, Byzantine, and Oriental books (*e.g.,* a history of Alexander III the Great, *Aesop's Fables,* and *The Thousand and One Nights*).

The printing of Romanian religious books continued in the 17th century and was given new impetus in Transylvania, Walachia, and Moldavia by the controversy resulting from the Reformation. In Moldavia, where monasteries were centres of theological scholarship, reaction against the Reformation found expression in the *Răspuns* (1645; "Reply") of a metropolitan Varlam to the Calvinist catechism printed in 1642. A Moldavian metropolitan, Dosoftei, a great scholar and theologian, fled to Poland during the fighting between Poland and Turkey and, in 1673, published there the first Romanian metrical psalter, which was also the first poetry to be written in Romanian. He returned to Moldavia in 1675 and in 1679 translated the liturgy from the Greek. His other outstanding contribution to Romanian literature was his *Viaţa şi petrecerea sfinţilor* (1682–86; "Lives of the Saints"), in which he introduced popular idioms and encouraged development of a more flexible prose style.

Toward the end of the 17th century the monastery of Snagov, near Bucharest, became a centre of literary activity, and books were printed in Romanian, Greek, Slavonic, and Arabic. A Romanian printer, Mihai Ştefan, introduced the press into the Caucasus, where he printed the first Georgian books. Religious literature reached its climax with a translation of the Bible (1688) that became the basis for all later translations.

Historiography was at its height with the Humanist historiographers of 17th-century Moldavia, whose leader was Miron Costin. He wrote a chronicle of Moldavia in Romanian and a poem on the history of his country in Polish. The chronicle was continued by his son Nicolae, who also pioneered the collection of folklore and legends. Dmitry Kantemir (Dimitrie Cantemir), prince of Moldavia, a great linguist and historiographer, wrote Latin histories of Romania, Moldavia, and the Ottoman Empire. A special place among Moldavian historians is occupied by Nicolae Milescu, who wrote theological, historical, and travel works.

The 18th century. Most of the 18th century presents a picture of social oppression and decadence. A rich secular and apocryphal literature circulated in manuscript (*Erotocritul, Fiziologul, Istoria lui Archir, Viaţa lui Esop, Halimanaua*); but there was no progress in comparison with that of the past. In Moldavia a new cultural centre arose at Rădăuţi. The achievements of the century were the *Minei* ("Lives of the Saints") of 1776–80 and 1807–15 (each in 12 volumes published in Rîmnicu Vîlcea and in the monastery of Neamţ, respectively), whose rich and lucid language put them alongside the Bible of 1688.

Lyric poetry was cultivated toward the end of the century in love songs (1769–99), in the tradition of the ancient Greek poet Anacreon, by Alecu Văcărescu. His father Ienăchiţă, a moralist poet, also wrote the first grammar of Romanian; his son Iancu, the father of Romanian poetry, overshadowed his predecessors by his poems. The fourth Văcărescu poet was Nicolae. The lyric tradition was carried on in Walachia by B.P. Mumuleanu.

The national renaissance. The first landmark of this period was the rising of Tudor Vladimirescu (1821) in Walachia and the return of the national rulers. Romanticism carried forward the falling wave of the Latinist movement. In the second half of the 19th century a serious literary criticism, which originated in German philosophy and French culture, inaugurated modern literature.

Transylvanian Latinism crossed the Carpathians and had beneficial effects on the Greek-inspired culture of Walachia. Ion Heliade Rădulescu, who came under this influence, founded the first Romanian newspaper in Walachia and the Societatea Filarmonică (1833), which later created a national theatre in Bucharest. He was a pioneer of Italian influence, which was taken up in Moldavia by Gheorghe Asachi, who created the historical short story, wrote verses in Romanian and Italian, and founded a periodical, *Albina Românească.* The outstanding literary personality among a galaxy of minor poets and translators who enriched the Romantic heritage was Grigore Alexandrescu. Alexandrescu wrote *Poezii* (1832, 1838, 1839) and *Meditaţii* (1863), fables and satires influenced mostly by French writers. A literary magazine, *Dacia Literară,* edited by Mihail Kogălniceanu, a leading statesman and father of modern Romanian historiography (1840), marked a beginning of the traditionalist trend in literature. Alecu Russo, another leader of 1848, enriched literature with a biblical prose poem, *Cântarea României.*

Leading writers of the second half of the century were Vasile Alecsandri and Mihail Eminescu. Alecsandri's rich output comprised poetry (*Doine şi lăcrimioare* [1853], *Suvenire si Mărgăritărele* [1856]), prose (*Buchetiera din Florenţa* ["A Bouquet from Florence"], *Călătorii in Africa*), and plays (*Fîntîna Blanduziei, Ovidiu, Despot Vodă*). He also revealed treasures of Romanian folklore in *Balade* (1852–53) and *Poezii populare* (1866). Eminescu, a philosophical lyric poet, created modern Romanian poetry. He was influenced by Hindu thought and German philosophy but remained rooted in tradition. He raised Romanian poetry to new heights and was the guiding star in every aspect of cultural life. His writings include short stories and political and philosophical essays.

Romanian literature of the 20th century was rooted in the traditions of the 19th. Important figures spanned both centuries and established genres, literary groups, and methods of criticism that continued into the 20th century. Thus, Titu Maiorescu, founder of a literary circle Juniminea in 1863, which reacted against interest in form at the expense of content, pointed toward a later reassessment of the uses of literature. Ion Luca Caragiale died in 1912 but was relevant to the 20th century as the creator of Romanian social comedy. Similarly, Barbu Ştefănescu established the historical national drama, and Moses Gaster was important as a pioneer of research into Romanian folklore.

Literary movements of eastern and western Europe at the beginning of the century were reflected in Romania. The periodical *Viaţa Românească* (1901), based on the Russian model of "populism," had a social and political ideology. A critic Constantin Dobrogeanu Gherea's theories followed Karl Marx, although Western modernism also influenced Romanian writers. Ovid Densuşianu clearly followed Symbolism, as did the poets Ion Minulescu and Georghe Bacovia, while Impressionism was taken up by E. Lovinescu and Nicolae Davidescu, whose epic *Cântecul omului* (1928–37; "The Song of Man") aimed at re-creating world history.

After World War I. In the period of national unity in Romania following World War I, the novel began to compete with lyric poetry. Writers took inspiration from society or recent events, principally the war. Liviu Rebreanu wrote of the peasants' need for land and independence and in *Răscoala* (1932; *The Uprising,* 1934) described the 1784 peasant uprising in Transylvania. His best work, inspired by Romanian participation in World War I, was the *Pădurea spînzuraţilor* (1922; *The Forest of the Hanged,* 1967).

Cezar Petrescu and the poet Minulescu also dealt with the war, while other writers examined different areas of society: Ionel Teodoreanu described the disappearance of patriarchal life, Victor Popa wrote about rural subjects, G.M. Zamfirescu depicted the Bucharest suburbs, and D.D. Pătrăşcanu wittily described political life. A leading realist writer early in the century was Mihail Sadoveanu, who to-

gether with I.A. Brătescu-Voineşti represented a link with the older generation and was extremely influential for the development of prose. He concentrated on the place of the peasant in society and in 1924 was awarded the Golden Peace Medal for a description of the peasants' part in the war in *Mitrea Cocor.*

Scholars, philosophers, critics, and translators also made contributions to literature of the period. An archaeologist, Vasile Pârvan, commemorated the sacrificed war generation in *Parentalia;* a historian, Nicolae Iorga, founded literary periodicals and wrote plays, poetry, and criticism; a geographer, S. Mehedinţi (Soveja), edited a periodical and wrote village stories; Lucian Blaga was a philosophic essayist and poet, while Gala Galaction translated the Bible and wrote mystical poems and novels on biblical subjects. Lyric poetry was the most cultivated genre in modern Romanian literature. The diversity of styles was illustrated by Nichifor Crainic's religious traditionalist tendency, the mathematical form of I. Barbu's poems, and the influence of French and German lyric in Ion Pillat's verse. Tudor Arghezi was noteworthy for the expression he instilled into lyric poetry. Both his prose essays of 1935–36 and his verse, *Cuvinte potrivite* (1927; "Suitable Words"), *Flori de mucegai* (1931; "Mold Flowers"), *Versuri de seară* (1935; "Evening Verses"), were landmarks in Romanian letters.

Developments after World War II. Several famous writers continued to write after World War II. Arghezi reached new lyrical heights in *1907* and in a hymn praising mankind's will to live and struggle for freedom. Geo Bogza joined the Social Realist movement. Mihail Beniuc became (as he said) "the drummer of the new age" and, in stirring lyrics, celebrated achievements of the postwar period. Demostene Botez, whose prewar poetry described the sadness of provincial life, later revealed a vigorous optimism, and a poet Eugen Jebeleanu protested on contemporary events and themes. Among those who came to the fore during and after World War II were the poets Maria Banuş, who expressed the struggle for peace; Miron Paraschivescu, a lyrical poet taking themes from folklore; and Marcel Breslaşu, a complex writer on a wide range of themes.

Dramatists included Aurel Baranga, who dealt with the problems of contemporary life; Horia Lovinescu, whose plays depicted changing intellectual attitudes; and M. Davidoglu, author of plays set in mines and factories.

The postwar novel also dealt with topical themes. Zaharia Stancu wrote novels evoking Romanian village life in a vanished age. Eusebiu Camilar, in his novel *Mist,* bitterly indicted Fascism. Essays and criticism were written by Călinescu, by Mihai Ralea, who also published travel books and philosophical and psychological works, and by Tudor Vianu, who revealed a materialistic and methodological approach after first adhering to the aesthetic school.

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A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Romanian Orthodox Church, largest of the Orthodox churches in the Balkans today. Throughout the Middle Ages the Vlachs, who populated the Balkan Peninsula before the Slavic invasions of the 7th century, preserved their linguistic identity under Byzantine, Bulgarian, and Serbian political hegemony. They embraced Orthodox Christianity, but the first ecclesiastical metropolitanates for the Romanian provinces were not created till the 14th century, and then with Church Slavonic as the liturgical language. Translation of Scripture and liturgical texts into Romanian was not begun until the 17th century and was not completed till the 19th.

The present Romanian patriarchate was created in 1925, uniting the Romanian Orthodox population of the former Austro-Hungarian Empire with the autocephalous Romanian church established in Moldavia and Walachia in 1865 and recognized by the ecumenical patriarchate of Constantinople in 1885. The liturgical language of the modern Romanian church is Romanian.

After World War II, the Communist regime did not legally separate church and state. It allowed the church to maintain two theological faculties, in Bucharest and in Sibiu, as well as six seminaries. The church is divided into 14 dioceses. There are also many active monasteries and several ecclesiastical and theological publications. In spite of these substantial advantages—which contrast favourably with the situation of the church in the Soviet Union and in other "people's democracies"—the church has been deprived of the right to teach religion in public schools and to engage in missionary activities. It is also tightly controlled by the state: bishops, upon their accession, promise "to defend the Socialist Republic of Romania against its enemies both internal and external." The remarkable revival of monastic life was severely limited by the government after 1958.

The Eastern rite Roman Catholics of Transylvania were accepted into the Orthodox Church in 1950 after their church was suppressed (1948) by the Communist government.

Romanino, Il, byname of GIROLAMO DI ROMANO, also called GIROLAMO ROMANI, or RUMANI, also called GIROLAMO BRESCIA, or HIERONYMUS DE BRESCIA (b. *c.* 1484, Brescia, Republic of Venice—d. *c.* 1562, Brescia), Italian painter, leading artist of the Brescia school during the Renaissance.

Romanino is believed to have spent his early years in Brescia, Trento, and Cremona. The masterpiece of his early career, his "Madonna and Child with Saints" (1513; Museo Civico, Padua), reflects the influence of Venetian art in its sensuous colour and largeness of form.

In 1521 Romanino painted a series of pictures for the Chapel of the Holy Sacrament in S. Giovanni Evangelista in Brescia. In one of these, "St. Matthew and the Angel," Romanino depicted a scene lit by candlelight, which presaged the innovations of later Baroque artists. Romanino's paintings combine a certain German earthiness with luxurious and subtle colouring. "Portrait of a Man" (Accademia Carrara, Bergamo) shows the development of romantic unease in his work, and his "Christ at Emmaus" (Pinacoteca, Brescia) imparts a genuine pathos to the religious scene. Complex groups of agitated figures appear in some of his larger works. The frescoes in the Castello del Buon Consiglio at Trento display mythological figures in pastoral settings along with scenes from daily life.

Romano, Latin ROMANUS: *see* John XIX (or XX) *under* John (Papacy).

Romano, Ezzelino III da (Italian noble): *see* Ezzelino III da Romano.

Romano, Giulio (*c.* 1499–1546): *see* Giulio.

Romano, Giulio (1550–1618): *see* Caccini, Giulio.

Romano, Luis, byname of LUIS ROMANO MADEIRA DE MELO (b. June 10, 1922, Santo Antão, Cape Verde Islands), Cape Verdean poet, novelist, and folklorist who has written in both Portuguese and Cape Verdean Creole.

Romano lived in both Senegal and Morocco before settling, in 1962, in Brazil. He worked as a coal miner, public functionary, carpenter, tobacco hand, and salt worker, as well as being a trained mechanical and electrical engineer.

Romano's writings include *Famintos* (1962; "The Famished"), a novel influenced structurally and thematically by fiction from the Brazilian northeast. It is a sociorealistic novel, portraying in detail the hardships of life in the Cape Verde Islands. A collection of his poetry, *Clima* (1963; "Climate"), criticizes Portuguese exploitation. *Renascença de uma Civilização no Atlântico Médio* (1967; "Renaissance of a Civilization in the Middle of the Atlantic") is a collection of poems and short stories based primarily on folklore. His poetry signals understanding and racial harmony but, according to some critics, presents misleading stereotypes of Africans. Most importantly, however, Romano wrote a bilingual text of poems and stories (in Portuguese and Cape Verdean Creole) entitled *Negrume/Lzimparin* (1973; "Dusk"), one of the first works to be written completely in the Cape Verdean language. Romano also collaborated on several journals, including *Vertice, Ocidente, Cultura (I),* and *Cabo Verde.*

Romano, Museo Nazionale (Rome museum): *see* Museo Nazionale Romano.

Romano-Germanic law: *see* civil law.

Romanov DYNASTY, rulers of Russia from 1613 until the February Revolution of 1917. Descendants of Andrey Ivanovich Kobyla (Kambila), a Muscovite boyar who lived during the reign of the grand prince of Moscow Ivan I Kalita (ruled 1328–41), the Romanovs acquired their name from Roman Yurev (died 1543), whose daughter Anastasiya Romanovna Zakharina-Yureva was the first wife of Ivan IV the Terrible (ruled as tsar 1547–84). Her brother Nikita's children took the surname Romanov in honour of their grandfather, father of a tsarina. After Fyodor I (the last ruler of the Rurik dynasty) died in 1598, Russia endured 15 chaotic years known as the Time of Troubles (1598–1613), which ended when a *zemsky sobor* ("assembly of the land") elected Nikita's grandson, Michael Romanov, as the new tsar. (For the Romanovs' predecessors, *see* Rurik dynasty; Time of Troubles.)

The Romanovs established no regular pattern of succession until 1797. During the first century of their rule they generally followed the custom (held over from the late Rurik rulers) of passing the throne to the tsar's eldest son or, if he had no son, to his closest senior male relative. Thus Alexis (ruled 1645–76) succeeded his father, Michael (ruled 1613–45), and Fyodor III (ruled 1676–82) succeeded his father, Alexis. But after Fyodor's death, both his brother Ivan and his half-brother Peter vied for the throne. Although a *zemsky sobor* chose Peter as the new tsar, Ivan's family, supported by the *streltsy,* staged a palace revolution; and Ivan V and Peter I jointly assumed the throne (1682).

After Peter became sole ruler (1696), he formulated a law of succession (Feb. 16 [Feb. 5, old style], 1722), which gave the monarch the right to choose his successor. Peter himself (who was the first tsar to be named emperor) was unable to take advantage of this decree, however, and throughout the 18th century the succession remained vexed. Peter left the throne to his wife, Catherine I, who was a Romanov only by right of marriage. On Catherine I's death, however, in 1727, the throne reverted to Peter I's grandson Peter II. When the latter died (1730), Ivan V's second surviving daughter, Anna, became empress. On Anna's death (1740), her elder sister's daughter Anna Leopoldovna, whose father belonged to the House of Mecklenburg, assumed the

regency for her son Ivan VI, of the House of Brunswick-Wolfenbüttel; but in 1741 this Ivan VI was deposed in favour of Elizabeth, daughter of Peter I and Catherine I. With Elizabeth, the Romanovs of the male line died out in 1762, but the name was conserved by the branch of the House of Holstein-Gottorp that then mounted the Russian throne in the person of Elizabeth's nephew Peter III. From 1762 to 1796 Peter III's widow, a German princess of the House of Anhalt-Zerbst, ruled as Catherine II. With Paul I, Peter III's son, a Romanov of Holstein-Gottorp became emperor again.

On April 5, 1797 (Old Style), Paul I changed the succession law, establishing a definite order of succession for members of the Romanov family. He was murdered by conspirators supporting his son Alexander I (reigned 1801–25), and the succession following Alexander's death was confused because the rightful heir, Alexander's brother Constantine, secretly declined the throne in favour of another brother, Nicholas I, who ruled from 1825 to 1855. Thereafter the succession followed Paul's rules: Alexander II, 1855–81; Alexander III, 1881–94; and Nicholas II, 1894–1917.

On March 2 (March 15, New Style), 1917, Nicholas II abdicated the throne in favour of his brother Michael, who refused it the following day. Nicholas and supposedly all his immediate family were executed in July 1918 at Yekaterinburg (modern Sverdlovsk). The other members of the Romanov family either escaped from Russia or were executed.

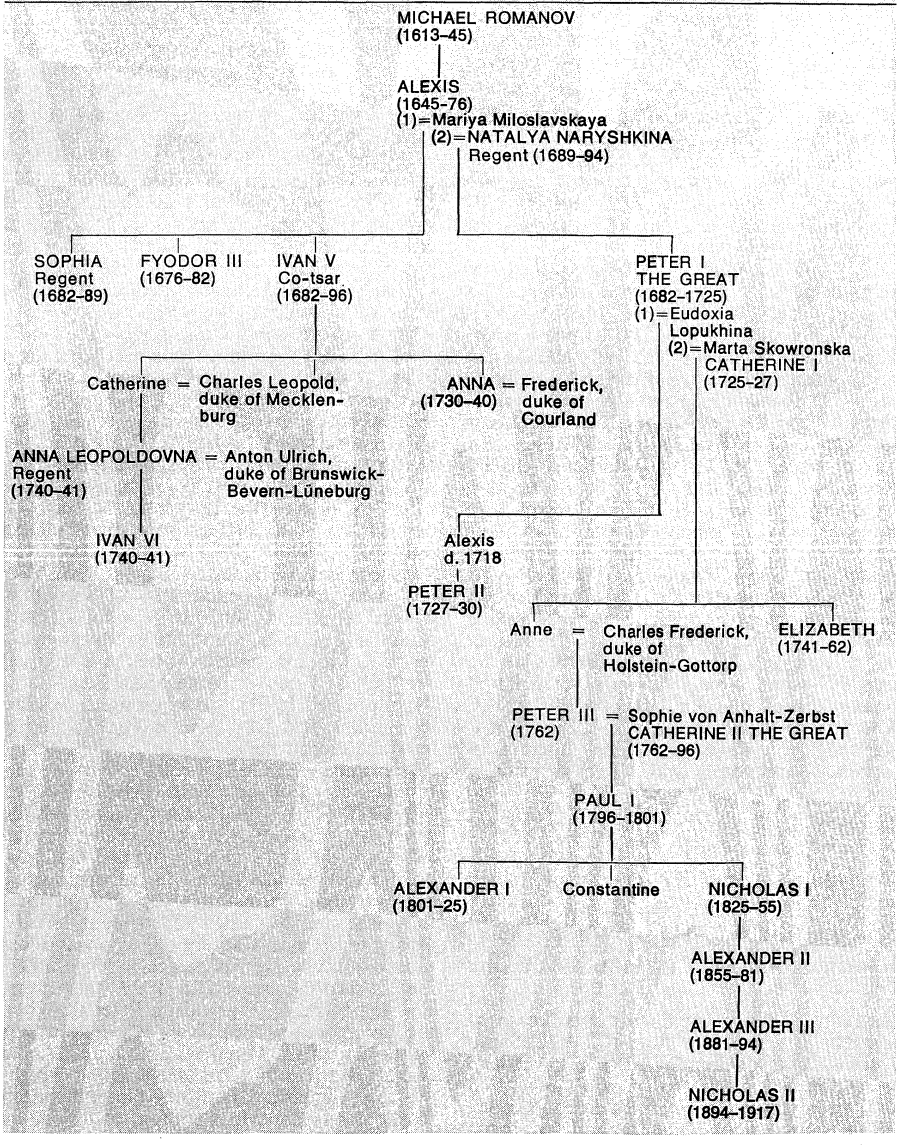
Romanov, Fyodor Nikitich: *see* Philaret.

Romans, Letter of Paul to the, the longest and doctrinally most significant of St. Paul the Apostle's New Testament writings, probably composed at Corinth in about AD 57; it was addressed to the Christian Church at Rome, whose congregation Paul hoped to visit for the first time on his way to Spain. The letter has been intensely studied since early Christian times and was the basis of Martin Luther's teaching on justification by faith alone.

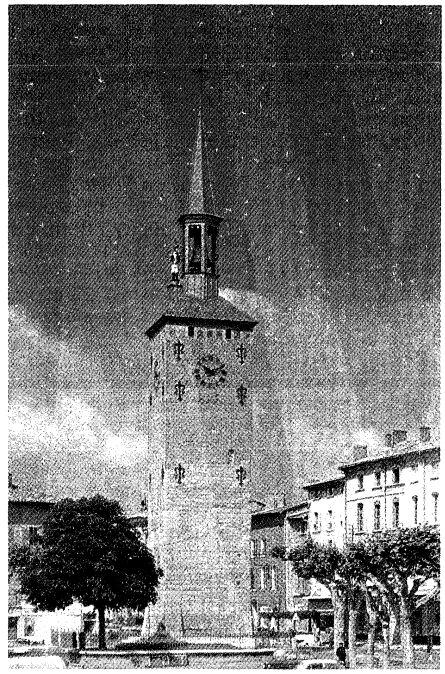
Paul's lengthy presentation is more a treatise than a letter but falls far short of a complete survey of his theology; there is no discussion, for example, of the Eucharist, the Resurrection, or eschatology.

Paul declares that God's righteousness has always been manifest in his dealings with men. Though the Apostle notes with pride the unique religious heritage of the Jewish people (the Covenant, the Law, the patriarchs, and Christ himself), he declares that righteousness no longer comes through observance of the Mosaic Law, not even for Jews, because God now manifests his righteousness through Christ, whose righteousness is the source of righteousness for all mankind. Paul, however, cautions his readers that righteousness is not a license to sin. The letter also contains several specific exhortations, such as to repay evil with good, to support and love one another, and to be obedient to civil rulers.

The Romanov dynasty



Romans-sur-Isère, town, Drôme *département,* Rhône-Alpes region, southeastern France. It lies along the north bank of the Isère River, northeast of Valence. Founded in the 9th century, Romans-sur-Isère was the scene of the transfer of Dauphiné to France by the dauphin Humbert II (1349) and of the last meeting of the Estates of Dauphiné (December 1788), on the eve of the French Revolution. Its 12th-century Romanesque church



The *jacquemart*, or jack, Romans-sur-Isère, Fr.
Editions "La Cigogne"—Hachette

of Saint-Barnard, damaged during World War II, has a 14th-century Gothic chapel with Flemish tapestries. The town is the site of an atomic research centre producing nuclear fuel; automobile equipment is produced, and there is a traditional leather industry. Pop. (1982) 31,555.

Romansh language, German RUMANTSCH, also called GRISHUN, or GRISONS, Romance language of the Rhaetian group spoken in northern Italy and Switzerland, primarily in the Rhine Valley in the Swiss canton of Graubünden (Grisons). Since 1938 Romansh has been a "national" language of Switzerland for cantonal, though not federal, purposes. Romansh occurs in two dialectal forms, Sursilvan (spoken on the western bank of the Rhine) and Sutsilvan (spoken on the eastern bank). The earliest written material in Romansh is a Sursilvan text dating from the early 12th century. *See also* Rhaetian dialects.

Romantic ballet: *see* classical ballet.

Romanticism, attitude or intellectual orientation that characterized many works of literature, painting, music, architecture, criticism, and historiography in Western civilization over a period from the late 18th to the mid-19th century. Romanticism can be seen as a rejection of the precepts of order, calm, harmony, balance, idealization, and rationality that typified Classicism in general and late 18th-century Neoclassicism in particular. It was also to some extent a reaction against the Enlightenment and against 18th-century rationalism and physical materialism in general. Romanticism emphasized the individual, the

subjective, the irrational, the imaginative, the personal, the spontaneous, the emotional, the visionary, and the transcendental.

Among the characteristic attitudes of Romanticism were the following: a deepened appreciation of the beauties of nature; a general exaltation of emotion over reason and of the senses over intellect; a turning in upon the self and a heightened examination of human personality and its moods and mental potentialities; a preoccupation with the genius, the hero, and the exceptional figure in general, and a focus on his passions and inner struggles; a new view of the artist as a supremely individual creator, whose creative spirit is more important than strict adherence to formal rules and traditional procedures; an emphasis upon imagination as a gateway to transcendent experience and spiritual truth; an obsessive interest in folk culture, national and ethnic cultural origins, and the medieval era; and a predilection for the exotic, the remote, the mysterious, the weird, the occult, the monstrous, the diseased, and even the satanic.

Literature. Romanticism proper was preceded by several related developments from the mid-18th century on that can be termed Pre-Romanticism (*q.v.*). Among such trends was a new appreciation of the medieval romance, from which the Romantic movement derives its name. The romance was a tale or ballad of chivalric adventure whose emphasis on individual heroism and on the exotic and the mysterious was in clear contrast to the elegant formality and artificiality of prevailing Classical forms of literature, such as the French Neoclassical tragedy or the English heroic couplet in poetry. This new interest in relatively unsophisticated but overtly emotional literary expressions of the past was to be a dominant note in Romanticism.

Romanticism in English literature began in the 1790s with the publication of the *Lyrical Ballads* of William Wordsworth and Samuel Taylor Coleridge. Wordsworth's "Preface" to the second edition (1800) of *Lyrical Ballads,* in which he described poetry as "the spontaneous overflow of powerful feelings," became the manifesto of the English Romantic movement in poetry. William Blake was the third principal poet of the movement's early phase in England. The first phase of the Romantic movement in Germany was marked by innovations in both content and literary style and by a preoccupation with the mystical, the subconscious, and the supernatural. A wealth of talents, including Friedrich Hölderin, the early Johann Wolfgang von Goethe, Jean Paul, Novalis, Ludwig Tieck, A.W. and Friedrich Schlegel, Wilhelm Heinrich Wackenroder, and Friedrich Schelling belong to this first phase. In Revolutionary France, the Vicomte de Chateaubriand and Mme de Staël were the chief initiators of Romanticism, by virtue of their influential historical and theoretical writings.

The second phase of Romanticism, comprising the period from about 1805 to the 1830s, was marked by a quickening of cultural nationalism and a new attention to national origins, as attested by the collection and imitation of native folklore, folk ballads and poetry, folk dance and music, and even previously ignored medieval and Renaissance works. The revived historical appreciation was translated into imaginative writing by Sir Walter Scott, who invented the historical novel. At about this same time English Romantic poetry had reached its zenith in the works of John Keats, Lord Byron, and Percy Bysshe Shelley.

A notable by-product of the Romantic interest in the emotional were works dealing with the supernatural, the weird, and the horrible, as in Mary Shelley's *Frankenstein* and works by C.R. Maturin, the Marquis de Sade, and E.T.A. Hoffmann. The second phase of Romanticism in Germany was dominated by Achim von Arnim, Clemens Brentano, J.J. von Görres, and Joseph von Eichendorff.

By the 1820s Romanticism had broadened to embrace the literatures of almost all of Europe. In this later, second, phase, the movement was less universal in approach and concentrated more on exploring each nation's historical and cultural inheritance and on examining the passions and struggles of exceptional individuals. A brief survey of Romantic or Romantic-influenced writers across the Continent would have to include Thomas De Quincey, William Hazlitt, and the Brontë sisters in England; Victor Hugo, Alfred de Vigny, Alphonse de Lamartine, Alfred de Musset, Stendhal, Prosper Mérimée, Alexandre Dumas (Dumas Père), and Théophile Gautier in France; Alessandro Manzoni and Giacomo Leopardi in Italy; Aleksandr Pushkin and Mikhail Lermontov in Russia; José de Espronceda and Ángel de Saavedra in Spain; Adam Mickiewicz in Poland; and almost all of the important writers in pre-Civil War America.

Visual arts. In the 1760s and '70s a number of British artists at home and in Rome, including James Barry, Henry Fuseli, John Hamilton Mortimer, and John Flaxman, began to paint subjects that were at odds with the strict decorum and classical historical and mythological subject matter of conventional figurative art. These artists favoured themes that were bizarre, pathetic, or extravagantly heroic, and they defined their images with tensely linear drawing and bold contrasts of light and shade. William Blake, the other principal early Romantic painter in England, evolved his own powerful and unique visionary images.

In the next generation the great genre of English Romantic landscape painting emerged in the works of J.M.W. Turner and John Constable. These artists emphasized transient and dramatic effects of light, atmosphere, and colour to portray a dynamic natural world capable of evoking awe and grandeur.

In France the chief early Romantic painters were Baron Antoine Gros, who painted dramatic tableaus of contemporary incidents of the Napoleonic Wars, and Théodore Géricault, whose depictions of individual heroism and suffering in "The Raft of the Medusa" and in his portraits of the insane truly inaugurated the movement around 1820. The greatest French Romantic painter was Eugène Delacroix, who is notable for his free and expressive brushwork, his rich and sensuous use of colour, his dynamic compositions, and his exotic and adventurous subject matter, ranging from North African Arab life to revolutionary politics at home. Paul Delaroche, Théodore Chassériau, and, occasionally, J.-A.-D. Ingres represent the last, more academic phase of Romantic painting in France. In Germany Romantic painting took on symbolic and allegorical overtones, as in the works of P.O. Runge. Caspar David Friedrich, the greatest German Romantic artist, painted eerily silent and stark landscapes that can induce in the beholder a sense of mystery and religious awe.

Romanticism expressed itself in architecture primarily through imitations of older architectural styles and through eccentric buildings known as "follies." Medieval Gothic architecture appealed to the Romantic imagination in England and Germany, and this renewed interest led to the Gothic Revival (*q.v.*).

Music. Musical Romanticism was marked by emphasis on originality and individuality, personal emotional expression, and freedom and experimentation of form. Ludwig van Beethoven and Franz Schubert bridged the Classical and Romantic periods, for while their formal musical techniques were basically Classical, their music's intensely personal feeling and their use of programmatic elements provided an important model for 19th-century Romantic composers.

The possibilities for dramatic expressiveness in music were augmented both by the expansion and perfection of the instrumental repertoire and by the creation of new musical forms, such as the lied, nocturne, intermezzo, capriccio, prelude, and mazurka. The Romantic spirit often found inspiration in poetic texts, legends, and folk tales, and the linking of words and music either programmatically or through such forms as the concert overture and incidental music is another distinguishing feature of Romantic music. The principal composers of the first phase of Romanticism were Hector Berlioz, Frédéric Chopin, Felix Mendelssohn, and Franz Liszt. These composers pushed orchestral instruments to their limits of expressiveness, expanded the harmonic vocabulary to exploit the full range of the chromatic scale, and explored the linking of instrumentation and the human voice. The middle phase of musical Romanticism is represented by such figures as Antonín Dvořák, Edvard Grieg, and Peter Ilich Tchaikovsky. Romantic efforts to express a particular nation's distinctiveness through music was manifested in the works of the Czechs Antonín Dvořák and Bedřich Smetana and by various Russian, French, and Scandinavian composers.

Romantic opera in Germany began with the works of Carl Maria von Weber, while Romantic opera in Italy was developed by the composers Gaetano Donizetti, Vincenzo Bellini, and Gioacchino Rossini. The Italian Romantic opera was brought to the height of its development by Giuseppe Verdi. The Romantic opera in Germany culminated in the works of Richard Wagner, who combined and integrated such diverse strands of Romanticism as fervent nationalism; the cult of the hero; exotic sets and costumes; expressive music; and the display of virtuosity in orchestral and vocal settings. The final phase of musical Romanticism is represented by such late 19th-century and early 20th-century composers as Gustav Mahler, Richard Strauss, Sir Edward Elgar, and Jean Sibelius.

Romanus, Greek ROMANOS, name of rulers grouped below by country or papacy and indicated by the symbol •.

Byzantine Empire

• **Romanus I** Lecapenus (b. *c.* 872—d. 948), Byzantine emperor who shared the imperial throne with his son-in-law Constantine VII and exercised all real power from 920 to 944. Romanus was admiral of the Byzantine fleet on the Danube when, hearing of the defeat of the army at Achelous (917), he resolved to sail for Constantinople. Soon after the marriage of his daughter Helena to Constantine he was crowned colleague of his son-in-law. His reign was terminated by his own sons, Stephen and Constantine, who in 944 compelled him to become a monk.

• **Romanus II** (b. 939—d. 963), Byzantine emperor from 959 to 963. The son of Constantine VII Porphyrogenitus, Romanus was a politically incapable ruler who left affairs of state to the eunuch Joseph Bringas and military affairs to Nicephorus Phocas; Nicephorus became emperor after Romanus' death with the help of Romanus' widow, Theophano.

• **Romanus III** Argyrus (b. *c.* 968—d. April 11, 1034), Byzantine emperor from 1028 to 1034.

He was an undistinguished Byzantine patrician, who was compelled by the dying emperor, Constantine VIII, to marry his daughter Zoe and to become his successor. Romanus showed great eagerness to make his mark as a ruler but was mostly unfortunate in his enterprises; and in his endeavour to relieve the pressure of taxation he disorganized the

finances of the state. In 1030 he resolved to retaliate against the incursions of the Muslims on the eastern frontier by leading a large army against Aleppo, but he was defeated at Azaz. His death was supposed to have been caused by poison administered by his wife.

• **Romanus IV** DIOGENES (d. 1072), Byzantine emperor from Jan. 1, 1068, a member of the Cappadocian military aristocracy.

Romanus married Eudocia Macrembolitissa, widow of the emperor Constantine X Ducas, in 1068. He led military expeditions against the Seljuq Turks but was defeated and captured by them at the Battle of Manzikert (1071). On his release Romanus found that Constantine X's son had been crowned sole ruler as Michael VII Ducas. Romanus was blinded and exiled to the island of Prote in the Sea of Marmara, where he died.

PAPACY

• **Romanus** (b. near Cività Castellana, near Rome [Italy]—d. November 897), pope from August to November 897.

Romanus was a cardinal when elected pope in August amidst the chaotic aftermath of Pope Stephen VI's murder. For exhuming and desecrating Pope Formosus' corpse and annulling his pontificate in the "Cadaver Synod," Stephen had been imprisoned and probably strangled by Formosus' supporters, leaving Stephen's followers at political war with those who opposed the synod. Under Romanus, Formosus' body was retrieved from the Tiber River and buried. Romanus probably invalidated Stephen's acts, although formal nullification was not promulgated until a few years later by Pope John IX. Romanus was deposed, probably by Stephen's faction.

Romany language, also called GYPSY, or GIPSY, language related to the North Indo-Aryan (Indic) languages, spoken on all five continents by Gypsies, who are generally considered by physical anthropologists to be of Indian origin. The main concentrations of Romany speakers are in eastern Europe. The Romany language, like Gypsies as a minority people, seldom has received any legal recognition.

It is likely, from the evidence of comparative linguistics, that Romany separated from related North Indian languages in about AD 1000. Modern Gypsy dialects all over the world have been classified (by the Slovenian scholar Franz von Miklosich) according to their European originals, of which there are 13: Greek, Romanian, Hungarian, Czecho-Slovak, German, Polish, Russian, Finnish, Scandinavian, Italian, Serbo-Croatian, Welsh, and Spanish. The dialectal differentiations originated during the Gypsies' stay in the regions where these languages were spoken; while living in these regions they accepted many loanwords from the native languages and sometimes phonetic and even grammatical features.

The vocalic (vowel) and consonantal systems of all Romany dialects are clearly derived from Sanskrit. Some of the changes correspond to those undergone by modern Indian languages; others represent a more archaic state (*e.g.*, the preservation of initial consonant clusters *dr-*, *tr-* and medial *st*[*h*], *ṣṭ*[*h*]); and a few are difficult to explain. The vowels of a typical central European dialect (Cracow–Lovari) are *i, e, a, o, u.* Indo-Aryan retroflex consonants have disappeared from the consonantal system, while Slavic fricative and affricate sounds have been accepted.

Romany possesses a grammatical system analogous to that of the modern North Indian languages. The Romany direct case represents the Sanskrit nominative and accusative, while the oblique is derived from the genitive. Various postpositions (elements occurring after the noun) can also be added, as in Hindi or Bengali, for other syntactic purposes. The verbal system has three persons, two numbers, five tenses (present, imperfect, perfect, pluperfect, and future), and three moods.

It is in its vocabulary that Romany best reflects the wanderings of its speakers. The main sources (apart from the original Indian stock) are Iranian (*doshman* "enemy," from Persian *doshman*), Armenian, Greek (*drom* "way," from *δρόμος*), Romanian (*bolta* "shop," from *boltă*), Hungarian (*bino* "sin," from *bűn*), and the Slavic languages (*glas* "voice," *rebniko* "pond," *grob* "tomb," *dosta* "enough," *ale* "but"). Indo-Aryan words include *bokh* "hunger," from Hindi *bhūkh; bāl* "hair," from Sanskrit *bala; gelo* "gone," the past participle of *źa* "go" (compare Bengali *jawa, gælo*); and *rat* "blood," from Prakrit *ratta.*

There is no tradition of writing in Romany, but a rich oral tradition exists. One of the reasons for the survival of the language is its usefulness as an argot, or secret language, since the Gypsy style of life often leads to conflict with neighbouring communities. In the 20th century several eastern European countries have published poems and folktales in Romany, using their national scripts. Non-Gypsies (or Gajos) have also sometimes published in Romany.

Romberg, Sigmund (b. July 29, 1887, Nagykanizsa, Austria-Hungary [now in Hungary]—d. Nov. 9, 1951, New York, N.Y., U.S.), Hungarian-born American composer whose works include several successful operettas.

Romberg was educated in Vienna as an engineer, but he also studied composition and became a skilled violinist and organist. In 1909 he went to New York City. There, as conductor of an orchestra in a fashionable restaurant, he started the practice, then rare, of playing music for dancing.

Employed as staff composer by the impresario Jacob Shubert, Romberg prepared scores for about 40 musical shows. His first outstanding operetta, *Maytime,* was produced in 1917. *Blossom Time* (1921), based on the life of Franz Schubert, featured songs derived from that composer's works. There followed in the 1920s a series of operettas popular for their romantic plots and richly melodic songs. They include *The Student Prince* (1924; after a German operetta, *Alt Heidelberg*), with the songs "Deep in My Heart" and "Drinking Song"; *The Desert Song* (1926), remembered for the title song and "One Alone"; and *The New Moon* (1928), with "Lover, Come Back to Me" (melody adapted in part from Peter Ilich Tchaikovsky's *June: Barcarolle*).

From 1929 Romberg wrote songs for motion pictures and in 1933 composed an operetta, *Rose de France,* produced in Paris. In 1942–43 he led a series of concerts, "An Evening with Sigmund Romberg." His last successful work was a musical comedy, *Up in Central Park* (1945).

Romblon, island and town of the Philippines in the Sibuyan Sea. The island is part of the Visayan group and has an area of 32 square miles (83 square km). Romblon Island is generally low and fertile. Abaca, copra, and rice are the principal crops on the island, and marble quarries are also worked. The town of Romblon is situated on the northwestern coast of Romblon Island. It is a busy port on the interisland passage between San Bernardino Strait (east) and Verde Island Passage (west). Pop. (1980) mun., 24,251.

Rome, Italian ROMA, historic city and capital of Roma *provincia,* of Lazio *regione,* and of Italy. It is located on the Tiber River 15 miles (24 km) inland from the Tyrrhenian Sea, in central Italy. Rome is one of the world's great cultural centres and the administrative and spiritual capital of the Roman Catholic church.

A brief treatment of Rome follows. For full treatment, *see* MACROPAEDIA: Rome.

The historical site of Rome on the famous Seven Hills—the Aventine, Caelian, Capitoline, Esquiline, Palatine, Quirinal, and Viminal—was occupied as early as the Bronze Age (about 1500 BC), but continuous settlement by Indo-European peoples did not take place until the beginning of the 1st millennium BC. By the early 6th century BC a politically unified, regal city had emerged; in subsequent centuries the Romans gradually conquered the Italian peninsula, extended their dominion over the entire Mediterranean basin, and expanded their empire into continental Europe toward the Atlantic. As the capital of this empire, Rome became the site of grandiose palaces, temples, public baths, theatres, stadiums, and other public buildings.

Rome reached the peak of its grandeur and ancient population (estimated at more than 1 million) during the late 1st and early 2nd centuries AD. Refined urban technology was applied only haphazardly to the city's social problems, however, and many citizens were forced to live in overcrowded slum conditions. The city's population decline probably began in the late 2nd century. Plague and economic disaster beset the city during the 3rd century, and massive barbarian invasions of Italy during the 5th century hastened the city's decline.

By the end of the 6th century, with the population less than 50,000, the protection of Rome was entirely in the hands of the Roman Catholic church. A long period of bitter factional struggle followed, pitting the papacy against the local Roman landed nobility; the period was marked by the Roman revolution in 1143 and by absolute papal rule after 1420. Throughout the Middle Ages Rome's population numbered less than 30,000, but in the Renaissance the city began to flourish again, largely owing to the growth of the papal bureaucracy. By 1600 Rome's population had grown to 100,000 people. In 1871 Rome was established as the capital of a united Italy. During the fascist regime of Benito Mussolini in the 1920s and '30s, Rome was transformed into a modern capital, and Mussolini's encouragement of archaeological excavation contributed to the revelation and preservation of many of the monuments of classical Rome.

Rome remains a great administrative and tourist centre, although it still lacks the large-scale commerce or industry characteristic of most cities of its size. Industry is concentrated in northwestern Rome and is largely limited to food processing and textiles; newer industries, however, such as engineering and printing and the production of chemicals, electronics, and plastics, have developed on the south and east sides of the city. Only about one-fifth of the total work force has jobs in industry; most are employed in commerce or government.

The ancient walled city of Rome encloses most of the Esquiline and Caelian hills and all of the other five hills, but the enclosed area constitutes only 4 percent of the modern municipality and is the smallest of the city's 12 administrative zones. Ruins of ancient buildings and archaeological treasures cover most of the Aventine, Caelian, and Palatine hills; the Palatine has a modern public park as well. Crowded commercial districts spread over the Esquiline and Viminal hills, while the Italian presidential palace and some government buildings stand on the Quirinal. The Capitoline is the site of the Piazza del Campidoglio, designed by Michelangelo, as well as most of the city's famous art museums. Rome surrounds Vatican City, which was granted sovereign extraterritorial status in 1929 by the Lateran Treaty and Concordat. The Vatican is located just west of the Tiber River and northwest of the Seven Hills and opens eastward via Saint Peter's Square (Piazza San Pietro), a

popular centre of public and religious life in Rome. Outside the walls but within the city limits on the western and northwestern fringes are six large *suburbi* (suburbs), while beyond the municipal boundaries the commune of Rome spreads out over an area approximately double the size of the city itself.

The main street in central Rome is the Via del Corso, an important thoroughfare since classical times, which begins at the Piazza Venezia at the white marble monument to Victor Emmanuel II, first king of Italy. Located among the street's elegant shops are five churches, eight palaces, and the column of Marcus Aurelius. The Palazzo and Palazzetto Venezia (1445), built around the Church of San Marco (*c.* AD 800), were once Mussolini's headquarters and now house a Renaissance art museum and the Library of the National Institute of Archaeology and Art History. The Via del Corso continues through the Piazza Colonna, at the busy heart of the city, and emerges onto the oval Piazza del Popolo. The piazza is the ceremonial entryway to Rome and contains extremely diverse architectural elements dating from the 13th century BC to the 19th century AD. The church next to the gate, Santa Maria del Popolo (1227), contains tombs by Andrea Sansovino, frescoes by Pinturicchio, a chapel designed by Raphael, and sculptures by Gian Lorenzo Bernini.

Perhaps the best-known piazza in Rome is the Piazza di Spagna, a stopping place for tourists since the 16th century. The renowned Scalinata della Trinità dei Monti (known as the Spanish Steps, or Stairs) ascend to the French-built church and convent of Trinità dei Monti, begun in 1495 with a gift from the French king Charles VIII. The Colosseum, or Flavian amphitheatre (dedicated AD 80), on the slope of the Esquiline, is the city's most impressive surviving building from ancient Rome. The stadium accommodated 50,000 spectators for such events as battles between gladiators and fights with wild animals. The Roman Forum, located between the Palatine and Capitoline hills, was the centre of ancient Roman religious, political, and commercial life, and many of its ruins are still standing.

About 6 miles (10 km) from the centre of Rome, a belt highway encircles the capital, tying together the successors of the ancient roads that fanned out from the city—the Via Flaminia, Via Aurelia, and Via Appia. Subway lines run from central Rome to outlying areas south of the city. Numerous airlines provide domestic and international service. Area city, 582 square miles (1,508 square km). Pop. (1988 est.) mun., 2,817,227.

Rome, city, seat (1834) of Floyd county, northwestern Georgia, U.S. It lies in a valley where the Etowah and Oostanaula rivers form the Coosa River. Founded and incorporated as a town in 1834, it became a clearinghouse for cotton and farm produce between Georgia and Tennessee. The city was captured by Federal forces during the American Civil War and its industrial facilities destroyed. Rebuilt after a disastrous flood (1886), it now has a diversified economy based on manufacturing (including carpets and electric transformers), lumbering, mining, and agriculture. Rome is the seat of Shorter College (1873) and Darlington School (1905). Berry College (1902) is at nearby Mount Berry. Inc. city, 1847. Pop. (1988 est.) 32,080.

Rome, city, Oneida county, east-central New York, U.S. It is situated 15 miles (24 km) northwest of Utica. The site, at the ancient Indian portage between the Mohawk River and Wood Creek, was fortified by the British as early as 1725. Fort Stanwix (1758), which replaced two previous forts there, was where two important treaties (1768, 1784) between Indians and whites were negotiated; the fort has been reconstructed as a national monument. The Battle of Oriskany, which stopped the British advance on Aug. 6, 1777, took place 6 miles (10 km) east of present-day Rome. Mapped in 1786 by Dominick Lynch and named Lynchville, the community was influenced in its early growth by the completion (1797) of a canal that connected the Mohawk River with Wood Creek. The construction of the Erie Canal (1817–25) was begun at Lynchville, and the settlement served as an embarkation point for pioneers moving west. The restored Erie Canal Village, 2.5 miles (4 km) west, commemorates these events. Lynchville was incorporated as a village in 1819 and was renamed Rome for the "heroic defense of the Republic made there"—*i.e.,* at Oriskany. The community later achieved industrial recognition as the "Copper City" through its manufacture of brass, wire, cable, and other products. Machinery industries (road graders, vacuum cleaners, air conditioners, radiators) developed later in Rome. Truck and fruit farms, state developmental centres for the retarded and deaf, and nearby Griffiss Air Force Base are additional economic factors. Inc. city, 1870. Pop. (1988 est.) city, 41,945; Utica–Rome metropolitan area (MSA), 312,600.

Rome, March on, the insurrection by which Benito Mussolini came to power in Italy in late October 1922. The March marked the beginning of fascist rule and meant the doom of the preceding parliamentary regimes of socialists and liberals.

Widespread social discontent, aggravated by middle-class fear of a socialist revolution and



Mussolini's March on Rome
Keystone

by disappointment over Italy's meagre gains from the peace settlement after World War I, created an atmosphere favourable for Mussolini's rise to power. On Oct. 24, 1922, the fascist party leaders planned an insurrection to take place on October 28, consisting of a march on Rome by the fascist armed squads known as Blackshirts and the capture of strategic local places throughout Italy. Waiting in Milan for the outcome of events, Mussolini left the work of organization to his subordinates.

On October 28, to meet the threat posed by the bands of fascist troops now gathering outside Rome, the government of Prime Minister Luigi Facta (which had resigned but continued to hold power) ordered a state of siege for Rome. King Victor Emmanuel III, however, refused to sign the order. This meant that the army, which might have stopped Mussolini, was not called on to oppose the fascists. (The reasons for Victor Emmanuel's refusal have been debated; it has been suggested that he feared he would lose his throne if he refused to cooperate with the fascists, that he wanted to avoid civil war, and that he hoped to neutralize the fascists by associating them with the national government.)

Mussolini, now confident of his control over events, was determined to accept nothing less than control of the government, and on October 29 the king asked him to form a cabinet. Traveling from Milan by train, Mussolini arrived in Rome on October 30, before the actual entry of the fascist forces. As prime minister, he organized a triumphant parade for his followers to show the fascist party's support for his rule.

The March on Rome was not the conquest of power that Mussolini later called it but rather a transfer of power within the framework of the constitution, a transfer made possible by the surrender of public authorities in the face of fascist intimidation.

Rome, Napoléon, king of: *see* Reichstadt, Napoléon-François-Charles-Joseph Bonaparte, Herzog von.

Rome, University of, in full UNIVERSITY OF ROME 'LA SAPIENZA,' Italian UNIVERSITÀ DEGLI STUDI DI ROMA 'LA SAPIENZA,' coeducational, autonomous state institution of higher learning in Rome. Founded in 1303 by Pope Boniface VIII, the university, known as the *studium urbis* ("place of study of the city"), operated for a time alongside the *studium curiae* ("place of study of the [Papal] court"), founded 1244–45. Under Pope Leo X (1513–21), the two institutions were fused into one University of Rome, housed in a building called Sapienza ("wisdom"), which for centuries gave its name to the university.

Under Leo X the university was also reorganized and revitalized, employing 88 lecturers, many of distinction. In 1870, when the papacy lost the city of Rome to the Kingdom of Italy, the Sapienza became the basis of a royal university, which in 1935 became the present-day state university. Among the modern university's faculties are law, medicine and surgery, political science, economics and commerce, letters and philosophy, mathematics, physics, natural sciences, engineering, and architecture. There are schools of aerospace engineering and of librarianship.

Romeo and Juliet, two lovers depicted in literature, music, dance, and theatre and best known from a play (1594–95) written by William Shakespeare. The appeal of the young hero and heroine—whose families, the Montagues and Capulets, respectively, are implacable enemies—is such that they have become, in the popular imagination, the representative type of star-crossed lovers.

Shakespeare's principal source for the plot was *The Tragicall Historye of Romeus and Juliet* (1562), a long narrative poem by the English poet Arthur Broke, or Brooke (d. 1563). Broke had based his poem on a French translation of a tale by an Italian writer, Matteo Bandello (1485–1561).

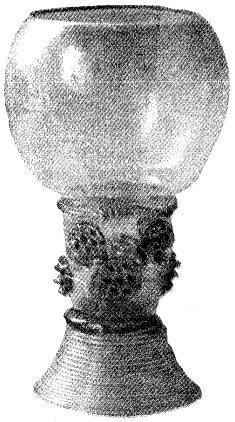
Shakespeare set the scene in Verona, Italy, during July. Juliet, a Capulet, and Romeo, a Montague, fall in love at a masked ball of the Capulets and profess their love when Romeo later visits her at her private balcony in her family's home. Because the two noble families are enemies, the couple is married secretly by Friar Laurence. Tybalt, a Capulet, kills Romeo's friend Mercutio in a quarrel. Romeo kills Tybalt and is banished to Mantua. When Juliet's father insists on her marrying Count Paris, Juliet consults the friar. He gives her a potion that makes one appear to be dead. He proposes that she take it and that Romeo rescue her; she complies. Unaware of the friar's scheme, Romeo returns to Verona on hearing of Juliet's death. He encounters Paris, kills him, and finds Juliet in the burial vault. He gives her a last kiss and kills himself with poison. Juliet awakens, sees the dead Romeo, and kills herself. The families learn what has happened and end their feud.

The story has been adapted for various works, including choral symphony (Hector Berlioz, 1839), opera (Charles Gounod, 1867), orchestral overture (Peter Ilich Tchaikovsky, 1869,

1870, 1880), ballet (Sergey Prokofiev, 1935–36), and film (1908, 1936, 1954, 1968).

To make the best use of the Britannica, consult the INDEX *first*

Römer, type of wineglass evolved in Germany, especially in the Rhineland, and the Netherlands over several centuries, reaching perfection in the 17th century. The shape of the *Römer* is a hemisphere superimposed on



Römer, Rhineland, 17th century; in the Kunstgewerbemuseum, Cologne
By courtesy of Kunstgewerbemuseum, Cologne

a cylinder, with a hollow foot built up by coiling threads of molten glass around a conical core. Applied to the characteristic cylindrical trunk (too thick to be called a stem) are pads of glass formed into shallow or pointed spots or raspberry-like knobs. *Römer*s were distinct from the *Berkemeyer* glasses, which took the form of a funnel-shaped bowl on a cylinder; both have kinship with the German "cabbage stalk" glasses, which were entirely cylindrical and had knobs. *Römer*s are usually coloured in tones of green; many are engraved, including a special class with calligraphic inscriptions, some of which are attributed to the Netherlandish artist Anne Roemers Visscher (*c.* 1583–1651).

An English goblet called rummer (from "*Römer*," not "rum") was first made similar to the German original but in the 18th century evolved into a very different form. Usually thick and heavy, the glasses have short stems, feet that are sometimes square, and bowls with a variety of shapes.

Romer, Alfred Sherwood (b. Dec. 28, 1894, White Plains, N.Y., U.S.—d. Nov. 5, 1973, Cambridge, Mass.), U.S. paleontologist widely known for his concepts of evolutionary history of vertebrate animals. The explicit use of comparative anatomy and embryology in studies of fossil vertebrates underlies his major contributions to biology.

Youth and education. Romer's early life and schooling gave no indication of the direction his career was to follow. His father, a newspaper man, moved frequently, and young Alfred's early days were unsettled. In 1909, when he returned to White Plains to live with his father's mother, a more stable phase of his youth began, though the family was poor. A rather timid boy, he found adjustment to the new environment difficult. In high school, however, he found a place among his peers. A trait that was to dominate his life emerged—an urge to improve things by becoming involved.

In 1913, after a year of doing odd jobs to earn money for college, Romer, entirely on his own and against family tradition, entered Amherst College. He financed his way in college with the help of a scholarship, various kinds of work, and loans from his college fraternity. History and German literature were his major subjects of study, but he liberally sampled courses in other disciplines. Early in his career, while in New York City, young Romer visited the American Museum of Natural History, and its dinosaur exhibits sparked his interest in fossils. After taking a course in evolution under Frederic B. Loomis to fulfill a science requirement, Romer knew what he wanted to do.

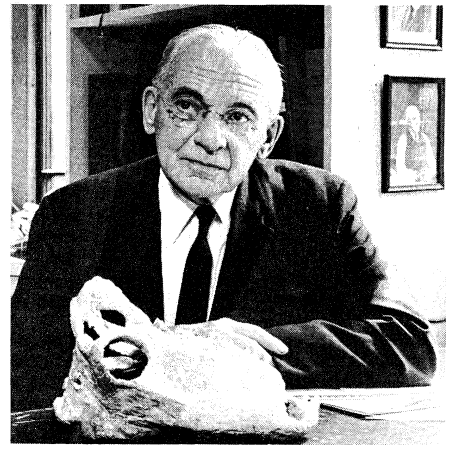
Graduation in 1917, during World War I, found him restless. He joined the American Field Service in France and in the autumn of that year enlisted in the United States Army. On his return to the U.S. in 1919, he entered graduate school at Columbia University to work under William K. Gregory. Romer completed the work for his Ph.D. in two years and produced a thesis that remains a classic in comparative myology, the study of musculature. With others who were students at Columbia at about this time, Romer was deeply influenced by Gregory and helped to spread his ideas, establishing a school of comparative anatomy, functional anatomy, and evolution that still prevails.

Scientific career. After two years as instructor of anatomy at Bellevue Hospital Medical College in New York City, Romer became associate professor in the department of geology and paleontology at the University of Chicago. There he encountered fine collections of Late Paleozoic fossil fishes, amphibians, and reptiles, which set the course for much of his later fieldwork and scientific studies.

Early in his career at Chicago, Romer met and married Ruth Hibbard, who bore him three children and was his companion in fieldwork and travel. *Vertebrate Paleontology* appeared in 1933. In its three editions, this book shaped much of the thinking in the subject for several decades. After 11 years at Chicago, marred only by the problem of training biologically oriented graduate students in a geology department, Romer went to Harvard University as professor of biology in 1934.

His early propensity for leadership emerged when he became director of the biological laboratories in 1945 and of the Museum of Comparative Zoology in 1946. The museum flourished under his guidance.

Romer's scientific career prospered at Harvard with the publication of *Review of the Pelycosauria* (1940), *The Vertebrate Body* (1949), *The Osteology of the Reptiles* (1956), and numerous research papers. *The Vertebrate Body* is a comprehensive textbook of comparative anatomy, widely used in colleges and universities throughout the United States. The *Pelycosauria* and *Osteology* treat various aspects of reptilian evolution. Honours began to come to him—honorary degrees, memberships in foreign societies, and medals. Most important to him, however, was the less renowned Society of Vertebrate Paleontology, which he nurtured through its infancy, becoming its first president after it had become formally established in 1940. Later he initiated action that led to the establishment of the Vertebrate Morphology Section of the American Society of Zoologists. He accepted the presidency of the XIVth International Zoological Congress, which met in Washington, D.C., in 1963. He had long since been elected a member of the National Academy of Sciences of the United States. In 1929 and in 1956, he made trips to South Africa and Argentina to collect fossils. Despite the pace of his life—teaching, travel, administration, scientific study, and honours—Romer remained a relaxed, affable man, with a quiet wit and charm, always in demand as a lecturer. His rigorous dedication and depth of knowledge often emerged from light, colloquial presentations and an informal style.



Alfred Sherwood Romer, 1965
By courtesy of the Harvard University News Service

Romer retired from Harvard in 1965 and, with characteristic energy, used his leisure for world travel, fossil collecting, lecturing, attending conferences, and visiting museums. He continued to write scientific papers, and his studies extended the understanding of the course of evolution of the lower vertebrates. His basically conservative approach focussed attention upon the significance of form and function in relation to environment as the key to evolutionary progress. Documentation of the slowly changing flow through time, as envisaged by Darwin, emerges clearly from Romer's studies of the evolution of extinct fishes, amphibians, and reptiles.

Romer devoted a lifetime of research to the evolution of the vertebrates, with evidence drawn from comparative anatomy, embryology, and particularly paleontology. For many years he collected fossils of fishes, amphibians, and reptiles from geological deposits in Texas dating to the Permian Period. Close attention to anatomical adaptations as responses to environmental change characterized his method. He traced fundamental changes in structure and function that have occurred during the evolution of fishes to primitive land vertebrates and during the subsequent radiation of these vertebrates into modern amphibians, reptiles, and mammals. (E.C.O.)

Rømer, Ole (Christensen), Rømer also spelled RÖMER, or ROEMER, Ole also spelled OLAUS or OLAF (b. Sept. 25, 1644, Århus, Jutland—d. Sept. 23, 1710, Copenhagen), astronomer who demonstrated conclusively that light travels at a finite speed.



Ole Rømer, detail from an oil painting by an unknown artist, *c.* 1700
Archiv fur Kunst und Geschichte, West Berlin

Rømer went to Paris in 1672, where he spent nine years working at the Royal Observatory. While there he noticed that the time elapsed between eclipses of Jupiter's moons by Jupiter became shorter as Earth moved closer to Jupiter and became longer as Earth and Jupiter drew farther apart. He correctly

deduced that this phenomenon was caused by the time needed for light to cross the increased distance between the two planets and in 1676 announced that, according to his observations, the speed of light was 140,000 miles (225,000 kilometres) per second. (Modern measurements have established a figure of 186,282 miles, or 299,793 kilometres, per second.)

In 1679 Rømer went on a scientific mission to England, where he met Sir Isaac Newton and the astronomers John Flamsteed and Edmond Halley. Upon his return to Denmark in 1681, he was appointed royal mathematician and professor of astronomy at the University of Copenhagen. At the university observatory he set up an instrument with altitude and azimuth circles and a telescope, which accurately measured the position of celestial objects. He also held several public offices, including that of mayor of Copenhagen in 1705.

Romeria, extinct genus of early reptiles, found as fossils in Early Permian deposits of North America (the Permian Period began 280,000,000 years ago and lasted 55,000,000 years). *Romeria* is included among the cotylosaurs, a group considered to be the stem reptilian stock, but it occurs too late in the geologic column to have been ancestral to more advanced forms; it probably represents the persistence of a primitive stock alongside more advanced forms.

Romero FAMILY, family of Spanish guitarists prominent in the 20th-century revival of the classical guitar. They appeared individually as soloists, together in a quartet, and in other combinations.

Celedonio Romero (b. March 2, 1918, Málaga, Spain) studied at the Conservatory of Málaga and, later, at the Conservatory of Madrid, where he was a pupil of Joaquin Turina. He first performed in public at the age of 10; following a formal debut at age 22, he played concerts widely in Spain, France, and Italy. By the late 1950s he had settled with his family in the United States. From the early 1960s he and his three sons—Celin (b. 1940), Pepe (b. 1944), and Angel (b. 1946)—toured worldwide. Celedonio Romero wrote music for solo guitar (suites, studies, character pieces) as well as the *Concierto de Málaga* for guitar and orchestra. In 1967 Joaquin Rodrigo composed a concerto for four guitars, *Concierto Andaluz,* for the Romeros.

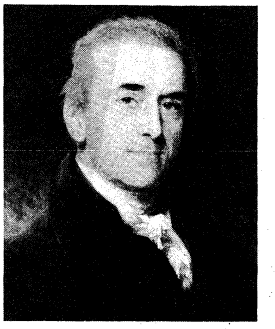
Romero, Francisco (b. *c.* 1700, Ronda, Málaga, Spain—d. 1763), Spanish matador who reputedly invented the bullfighter's muleta, a red cape used in conjunction with the sword; with it the matador leads the bull through the most spectacular passes of the bullfight, finally leading it to lower its head, so that the matador may thrust the sword between the bull's shoulders. Romero is the earliest of the famous matadors.

Romero, whose career in the bullring spanned 30 years, is said to have used the muleta as early as 1726. He is also said to be the first torero to kill a bull face to face. He founded a family of celebrated matadors; his grandson Pedro (1754–1839), who killed some 5,600 bulls in his 28-year career, founded a bullfighting school at Seville in 1830.

Romero, José Rubén (b. Sept. 25, 1890, Cotija de la Paz, Mex.—d. July 4, 1952, Mexico City), Mexican novelist and short-story writer whose vivid depiction of the people and customs of his native state of Michoacán brought him critical acclaim as an outstanding modern *costumbrista,* or novelist of manners, and whose character Pito Pérez, a lovable rascal, won the hearts of a wide audience.

Romero, who in his youth participated in the revolution (1910–11) led by Francisco Madero and whose later diplomatic career included service as ambassador to Brazil (1937) and to Cuba (1939), began his literary career as a poet with *Fantasías* (1908; "Fantasies") and *La musa heroica* (1912; "The Heroic Muse"). Soon, however, he turned almost exclusively to prose. With broad humour that often masked an underlying bitterness, Romero depicted the post-revolutionary milieu in such novels as *Desbandada* (1934; "Disbandment") and *Anticipación a la muerte* (1939; "Anticipation of Death"). He achieved his greatest popularity, however, with *La vida inútil de Pito Pérez* (1938; "The Useless Life of Pito Pérez"), a picaresque novel chronicling the comic adventures of Pito Pérez, who reappeared in *Algunas cosillas de Pito Pérez* (1945; "Some Little Things About Pito Pérez").

Romilly, Sir Samuel (b. March 1, 1757, London—d. Nov. 2, 1818, London), English legal reformer whose chief efforts were devoted to lessening the severity of English criminal law. Partly successful during his lifetime, his attacks on the laws authorizing capital



Romilly, detail of an oil painting by Sir Thomas Lawrence; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

punishment for a host of minor felonies and misdemeanours, such as begging by soldiers and sailors without a permit, contributed to reforms carried out after his death.

Called to the bar in 1783, Romilly became known as the outstanding chancery lawyer in England and served as chancellor of Durham from 1805 to 1815. In 1806 he was appointed solicitor general, entered the House of Commons, and was knighted. Influenced by the libertarianism of Jean-Jacques Rousseau, he supported the French Revolution in its early stages; conservative reaction in England to that revolution's excesses hindered his work. His program for the mitigation of punishment in criminal law was based in part on the criminology of Cesare Beccaria and the utilitarian philosophy of Jeremy Bentham. Distracted by the death of his wife, Romilly committed suicide in 1818. His *Memoirs* appeared in 1840.

Rommel, Erwin (Johannes Eugen), byname THE DESERT FOX, German DER WÜSTENFUCHS (b. Nov. 15, 1891, Heidenheim an der Brentz, Württemberg, Ger.—d. Oct. 14, 1944, Herrlingen, near Ulm), German field marshal, best known for his spectacular victories as commander of the Afrika Korps in World War II.



Rommel, 1941

Ullstein Bilderdienst, West Berlin

Early life and career. Rommel's father was a teacher, as his grandfather had been, and his mother was the daughter of a senior official. A career as an army officer began to be fashionable, even among middle-class southern Germans, after the establishment of the German Empire in 1871, and thus, notwithstanding the absence of a military tradition in his family, Erwin Rommel in 1910 joined the 124th Württemberg Infantry Regiment as an officer cadet.

In World War I Rommel fought as a lieutenant in France, Romania, and Italy. His deep understanding of his men, his unusual courage, and his natural gift of leadership quite early showed promise of a great career. In the Prussian-German army, a career on the general staff was the normal avenue for advancement, yet Rommel declined to take that road. Both in the Reichswehr of the Weimar Republic and in Hitler's Wehrmacht, he remained in the infantry as a front-line officer. Like many great generals, he possessed a pronounced talent for teaching and was accordingly appointed to posts at various military academies. The fruit of his battle experiences in World War I, combined with his ideas on training young soldiers in military thinking, formed the main components of his military textbook *Infanterie greift an* ("Infantry Attacks"), originally published in 1937, which received high initial esteem.

In 1938, after Austria's annexation by Germany, Colonel Rommel was appointed commandant of the officers' school in Wiener Neustadt, near Vienna. At the beginning of World War II he was appointed commander of the troops guarding the Führer's headquarters—not a very satisfying post for an enthusiastic front-line soldier. Rommel's chance to prove himself came in February 1940, when he assumed command of the 7th Panzer Division. He had never commanded armoured units before, yet he quickly grasped the tremendous possibilities of mechanized and armoured troops in an offensive role. His raid on the French channel coast provided the first proof of his boldness and initiative.

Commander of Afrika Korps. A year later, in February 1941, Rommel was appointed commander of the German troops dispatched to aid the all but defeated Italian army in Libya. The deserts of North Africa became the scene of his greatest successes—and of his defeat at the hands of a vastly superior enemy. In the North African theatre of war, the "Desert Fox," as he came to be called by both friend and foe because of his audacious surprise attacks, acquired a formidable reputation, and soon Hitler, impressed by such successes, promoted him to field marshal. He found it difficult, however, to get along with his Italian allies; basically, the British were more to his liking. He was an avid reader of the book on warfare written by Sir Archibald Wavell, the first Allied commander in chief of the Middle East and Rommel's opponent in North Africa.

Rommel had difficulties not only with his Italian allies but with his own supreme command as well. North Africa was, in Hitler's view, only a sideshow. Nonetheless, despite the increasing difficulties of supply and Rommel's request to withdraw his exhausted troops, in the summer of 1942, Hitler ordered an attack on Cairo and the Suez Canal. Rommel and his German–Italian army were stopped by the British at el-Alamein (al-'Alamayn, Egypt) 60 miles (96 kilometres) from Alexandria. At that time Rommel won astounding popularity in the Arab world, where he was regarded as a "liberator" from British rule. At home, the

propaganda ministry portrayed him as the invincible "people's marshal" (*Volksmarschall*).

But the offensive against Egypt had overtaxed his resources. At the end of October 1942, he was defeated in the second Battle of el-Alamein and had to withdraw to the German bridgehead in Tunis. In March 1943 Hitler ordered him home. In 1944 Rommel was entrusted with the defense of the French channel coast against a possible Allied invasion. The master of the war of movement then developed an unusual inventiveness in the erection of coastal defense works. Nevertheless, his recommendation to prevent the enemy by all possible means from establishing large bridgeheads, his insistence that strong forces should be kept in reserve immediately behind the coastal defense line for counterattacks, and his prophecy that, unless the enemy could be successfully driven back into the sea, the fate of the invasion battle would be decided on the first day all fell on deaf ears.

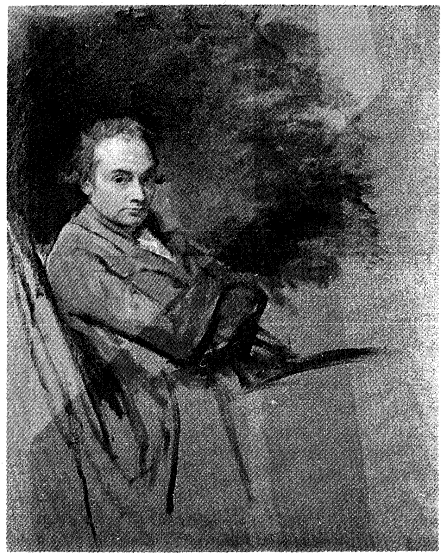
Conspiracy against Hitler. As early as the fall of 1943, Rommel, a purely professional soldier whose judgment was not swayed by political predilections, had been convinced that the war could no longer be won and that Hitler was prepared neither to face that fact nor to draw the inevitable conclusion—the necessity of making peace with the Western powers. In the spring of 1944 some of Rommel's friends who had joined the clandestine opposition to Hitler approached Rommel and suggested to him that it was his duty to take over as head of state after Hitler had been overthrown. Rommel did not reject the suggestion, but the men who wanted to extricate Germany from the war never revealed to Rommel that they planned to assassinate Hitler. They knew that Rommel did not accept the idea of murder for political ends; he had invariably disregarded any execution orders given by Hitler. When the invasion began, Rommel tried on several occasions to point out to Hitler that the war was lost and that he should come to terms with the Western powers. On July 17, 1944, at the height of the invasion battle, Rommel's car was attacked by British fighter-bombers and forced off the road. It somersaulted, and Rommel was hospitalized with serious head injuries. In August he had recovered sufficiently to be able to return to his home to convalesce. In the meantime, after the failure of the attempt on Hitler's life on July 20, 1944, Rommel's contacts with the conspirators had come to light. Hitler did not want the "people's marshal" to appear before the court as his enemy and thence be taken to the gallows. He sent two generals to Rommel to offer him poison with the assurance that his name and that of his family would remain unsullied if he avoided a trial. On October 14 Rommel took poison, thus ending his life. He was later buried with full military honours.

(W.Go.)

BIBLIOGRAPHY. Erwin Rommel, *Infanterie greift an* (1937), is a collection of tactical studies and notes based upon his own experiences in World War I. After World War II his widow and one of his former chiefs of staff published his personal papers and notes: Lucie-Maria Rommel and Fritz Bayerlein, *Krieg ohne Hass* (1950; *The Rommel Papers,* 1953). Ronald Lewin, *Rommel As Military Commander* (1968), is an important study; Desmond Young, *Rommel* (1950), is of great value as the first biography by a British author; Charles Douglas-Home, *Rommel* (1973), is a well-illustrated narrative of Rommel's military career. Friedrich Ruge, *Rommel und die Invasion: Erinnerungen* (1959; *Rommel in Normandy: Reminiscences,* 1979); Hans Speidel, *Invasion 1944: Ein Beitrag zu Rommels und des Reiches Schicksal* (1949; *Invasion 1944: Rommel and the Normandy Campaign,* 1950; British title, *We Defended Normandy,* 1951); and Siegfried Westphal, *Heer in Fesseln: Aus den Papieren des Stabschefs von Rommel, Kesselring und Rundstedt* (1952), are of great value as memoirs.

Romney, town, seat of Hampshire County, in the eastern panhandle of West Virginia, U.S., on the South Branch of the Potomac River, 28 mi (45 km) south of Cumberland, Md. It developed from the settlement of Pearsall's Flats (1738) around Ft. Pearsall (1756) and, with Shepherdstown, lays claim to being the state's oldest incorporated town. Chartered in 1762, it was named by Lord Fairfax for Romney, one of the Cinque Ports in southern England. During the Civil War years, Romney, because of its strategic position near the Baltimore and Ohio Railroad, changed hands 56 times. Fiercely pro-South, it sent two regiments to fight at Harpers Ferry, and the Confederate Monument (1867) in its Indian Mound Cemetery was one of the first monuments in the United States to commemorate the South. Nathaniel Mountain and Short Mountain public hunting areas (wild turkey, deer, and small game) are nearby. Lumbering, limestone quarrying, and agriculture (fruit, cattle, and poultry) are the town's main economic activities. Pop. (1980) 2,094.

Romney, George (b. Dec. 15, 1734, Dalton-in-Furness, Lancashire, Eng.—d. Nov. 15, 1802, Kendal, Westmorland), fashionable portrait painter of late 18th-century English society. In his portraits Romney avoided any



George Romney, "Self Portrait," oil painting, 1782; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

suggestion of the character or sensibilities of the sitter. His great success with his society patrons depended largely on just this ability for dispassionate flattery. Line rather than colour dominates; the flowing rhythms and easy poses of Roman classical sculpture underlie the smooth patterns of his compositions.

From 1755 to 1757 Romney was the pupil of Christopher Steele, an itinerant portrait and genre painter. Romney's career began when he toured the northern English counties painting portraits for a few guineas each. In 1762 he went to London. His history painting "The Death of General Wolfe" won him an award from the Society of Arts; nonetheless he turned almost immediately to portrait painting. In 1764 he paid his first visit to Paris, where he was befriended by Joseph Vernet. Romney especially admired the work of Nicolas Le Sueur, whose use of the antique strongly appealed to him. In 1773 he went to Italy for two years, where he studied Raphael's Stanze frescoes in Rome, Titian's paintings in Venice, and Correggio's at Parma. Travel abroad matured his art, and a new gracefulness appears in portraits such as "Mrs. Carwardine and Son" (1775) and the conscious elegance of the large full-length "Sir Christopher and Lady Sykes" (1786).

Romney was by nature sensitive and introspective. He held himself aloof from the Royal Academy and his fellow artists, making his friends in philosophical and literary circles. About 1781–82 he met Emma Hart (later Lady Hamilton), who exercised a morbid fascination over him. For Romney she became a means of escape into an imaginary, ideal world. His "divine Emma" appears in more than 50 paintings, in guises ranging from a bacchante to Joan of Arc. Almost all were painted from memory.

Romney, Henry Sidney, earl of, also called (from 1689) VISCOUNT SIDNEY OF SHEPPEY, BARON MILTON, Sidney also spelled SYDNEY (b. 1641, Paris—d. April 8, 1704, London), English statesman who played a leading role in the Revolution of 1688–89.

The son of Robert Sidney, 2nd earl of Leicester, he entered Parliament in 1679 and supported legislation to exclude King Charles II's Roman Catholic brother James, duke of York (later King James II), from the succession to the throne. Sent by Charles as envoy to The Hague, Sidney used the opportunity to cultivate the friendship of the Protestant ruler William of Orange in the hope that William could eventually be accepted as Charles II's successor. Charles triumphed over the exclusionists in 1681, however, and Sidney fell into disfavour. After James II came to power in 1685, Sidney lived on the Continent for nearly three years. He secretly encouraged William to seize the English throne, and in December 1687 he returned to England, at William's request, in order to rally support for William among the nobility. He signed, and may have drafted, the document inviting William to take power in England (June 30, 1688), and he sailed from Holland with William in the expedition that landed at Tor Bay, Devon, and deposed James.

Sidney served the new king—with notable lack of success—as secretary of state and then as lord lieutenant of Ireland (1692–93). Created a baron and viscount in 1689 and earl of Romney in 1694, he continued to hold minor posts until the accession of Queen Anne in 1702. His contemporaries viewed him as a proud and drunken man. He died unmarried, and his peerage became extinct.

Romney Marsh, extensive tract of flat land with an area of about 25,000 ac (about 10,000 ha) bordering the English Channel in Shepway district in the county of Kent, England. It extends from Hythe in the north to the Dungeness promontory in the south. It has emerged from the sea since Roman times, partly by natural accretion and partly by dyking and reclamation. This marshland possesses some of the finest grazing land in Britain. Romney Marsh sheep, a long-wool variety, have earned worldwide renown and are especially important in Australia and New Zealand. The Romney, Hythe, and Dymchurch narrow-gauge railway attracts many visitors.

Romny, city, Sumy *oblast* (administrative region), Ukrainian Soviet Socialist Republic, on the Sula River. It was founded as a fortress in the 11th century, and, after a period under Polish rule, it was returned to Russia in 1632. It was captured by Charles XII of Sweden in 1708. Incorporated in 1781, it now has varied industries, including engineering and consumer-goods production. An agricultural college and a medical school are also located there. Pop. (1983 est.) 52,000.

Romsey, parish (town), Test Valley district, county of Hampshire, England, 9 mi (14 km) northwest of Southampton on the River Test. It is dominated by a massive Norman abbey, which replaced an earlier wooden church established for Benedictine nuns in AD 907. Romsey lies on the edge of the New Forest

(one of the great royal hunting grounds of England), and east of the church there is a hunting lodge used by King John in 1210 and now a museum. A market town and rural service centre, Romsey has an old-established brewery and some modern light industries. Pop. (1981 prelim.) 12,941.

Romuald OF RAVENNA, SAINT, Italian SAN ROMUALDO DI RAVENNA (b. *c.* 950, Ravenna—d. June 19, 1027, Val di Castro, Tuscany; feast day February 7), Christian ascetic who founded the Camaldolese Benedictines (Hermits).

After witnessing with horror his father (a member of the Onesti ducal family) kill a relative in a duel, Romuald retired to the monastery of St. Apollinaris near Ravenna, where he later served as abbot. In 975 he went to Catalonia, Spain, and seems to have been impressed by the vigorous life in the monasteries. For several years he wandered through Tuscany, the Romagna district of northern Italy, and southern France, reforming existing or founding new monasteries and new hermitages.

He attempted to go to Hungary but was prevented by illness. In 1001, however, the Holy Roman emperor Otto III founded a monastery at Pereum, near Ravenna, for Romuald and St. Bruno of Querfurt, which served as a mission for the Slavs and Prussians. The most significant monastery founded by Romuald was Camaldoli (*c.* 1012), near Arezzo in Tuscany. It became the motherhouse of the new order, which combined cenobitic and eremitical elements with strict silence. By adding a note of severity to the Benedictine rule and by choosing the life of a hermit, Romuald initiated and helped to mold a movement that was to give birth to the Carthusians and the early Cistercians. His feast day of February 7 marks the date in 1481 when his relics were taken to Fabriano, Italy.

Romulo, Carlos P(eña) (b. Jan. 14, 1899, Camiling, Phil.—d. Dec. 15, 1985, Manila), Philippine general, diplomat, and journalist known for his activities on behalf of the Allies during World War II and his later work with the United Nations.

In 1931 Romulo was made editor in chief of TVT Publications, comprising three newspapers, one in English, one in Spanish, and one in Tagalog—the second most prevalent language in the Philippines. In 1937 he became publisher of another chain of newspapers.

When Japan attacked the Philippines in 1941, he became an aide-de-camp to U.S. General Douglas MacArthur on Corregidor Island, and his broadcasts became widely known as the "Voice of Freedom." After Japan had captured Corregidor, he went with MacArthur to Australia and then joined the Philippine government-in-exile of Pres. Manuel Quezon in Washington, D.C., as secretary of information.

In 1941 Romulo won the Pulitzer Prize for his prewar evaluations of the military situation in the Pacific area. He returned to the Philippines with U.S. forces in 1945. In 1948 he served as president of the United Nations Conference on Freedom of Information in Geneva.



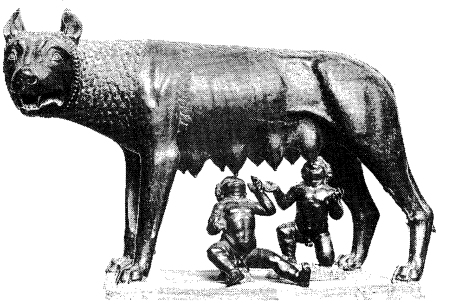
Romulo, bust by G.E. Tolentino, 1948
By courtesy of G.E. Tolentino

He was president of the General Assembly of the UN (1949–50) and in 1950 became secretary of foreign affairs of the Philippines. In 1952 Romulo was named ambassador to the United States. No longer satisfied with the politics of the incumbent Liberal Party, he decided in 1953 to run for the presidency of the Philippines on a third-party ticket, but he withdrew to become campaign manager for the successful Nacionalista Party candidate, Ramon Magsaysay. At the Bandung Conference of Afro-Asian countries in 1955, he criticized the tyranny of both Communist rule and Western colonialism.

When the Philippines was elected to a seat on the United Nations Security Council in 1956, Romulo served as member of the Council and during the month of January 1957 was its chairman. He served as president of the University of the Philippines, near Manila (1962–68), and secretary of education (1966–68). He then became secretary of foreign affairs (1968–78) and minister of foreign affairs (1978–84). In his later years, while serving under Pres. Ferdinand E. Marcos, Romulo became less democratic in his views. He supported Marcos' imposition of martial law in 1972 and, by the mid-1970s, had evolved from a champion of a free press into an advocate of a controlled press, while charging Western journalists with reporting Third World problems unfavourably. Romulo's autobiography, *I Walked with Heroes*, was published in 1961.

Romulus and Remus, the legendary founders of Rome. Traditionally, they were the sons of Rhea Silvia, daughter of Numitor, king of Alba Longa.

Numitor had been deposed by his younger brother Amulius, who forced Rhea to become a vestal virgin (and thereby vow chastity) in order to prevent her from giving birth to potential claimants to the throne. Nevertheless, Rhea bore the war god Mars the twins Romulus and Remus. Amulius ordered the infants drowned in the Tiber, but the trough in which they were placed floated down the river and came to rest at the site of the future Rome, near the *ficus ruminalis*, a sacred fig tree of historical times. There a she-wolf and a woodpecker—both sacred to Mars—suckled and fed them until they were found by the herdsman Faustulus.



Romulus and Remus with their wolf foster-mother, bronze sculpture; in the Museo Nuovo in the Palazzo dei Conservatori, Rome
Alinari—Art Resource/EB Inc.

Reared by Faustulus and his wife Acca Larentia, the twins became leaders of a band of adventurous youths, eventually killing Amulius and restoring their grandfather to the throne. They subsequently founded a town on the site where they had been saved. When Romulus built a city wall, Remus jumped over it and was killed by his brother.

Romulus consolidated his power, and the city was named for him. He increased its population by offering asylum to fugitives and exiles. He invited the neighbouring Sabines to a festival and abducted their women. The women married their captors and intervened to prevent the Sabines from seizing the city. In accordance with a treaty drawn up between the two peoples, Romulus accepted the Sabine king Titus Tatius as his coruler. Titus Tatius' early death left Romulus sole king again, and after a long rule he mysteriously disappeared in a storm. Believing that he had been changed into a god, the Romans worshiped him as the deity Quirinus.

The legend of Romulus and Remus probably originated in the 4th century BC and was set down in coherent form at the end of the 3rd century BC. It contains a mixture of Greek and Roman elements. The Greeks customarily created mythical, eponymous heroes to explain the origins of place names. The story of the rape of the Sabine women was perhaps invented to explain the custom of simulated capture in the Roman marriage ceremony. By including Mars in the legend, the Romans were attempting to connect their origins with that important deity.

Romulus Augustulus, byname of FLAVIUS MOMYLLUS ROMULUS AUGUSTUS (fl. last quarter of the 5th century), the last of the Western Roman emperors (475–476). He was a usurper not recognized as a legitimate ruler by the Eastern emperor.

Romulus was the son of the Western empire's master of soldiers Orestes. His original surname was Augustus but it was changed to the diminutive because he was still a child when his father, after driving the Western emperor Julius Nepos from Italy, elevated him to the throne on Oct. 31, 475. For about 12 months Orestes ruled Italy in his son's name, but eventually his troops mutinied and found a leader in the German warrior Odoacer. Odoacer's forces captured and executed Orestes on Aug. 28, 476. Romulus, however, was spared because of his youth; Odoacer gave him a pension and sent him to live with his relatives in Campania, a province in southern Italy. His subsequent fate is unknown.

Roncalli, Angelo Giuseppe: *see* John XXIII *under* John (papacy).

Roncesvalles, French RONCEVAUX, village, Navarra province and autonomous community (region) of northern Spain. It lies 3,220 ft (981 m) above sea level in the Pyrenees, northeast of Pamplona, near the French frontier. The village is known in relation to the Pass of Roncesvalles or Puerto de Ibañeta (3,862 ft [1,177 m]) above it, the traditional site of the Battle of Roncesvalles (Aug. 15, 778), the massacre by the Basques of the rear guard of Charlemagne's army. The battle is famous as the basis of the legend of the hero Roland recounted in the epics *La Chanson de Roland* and *Roncesvalles.*

Charlemagne, campaigning against the Muslims in Spain, ravaged several towns south of the Pyrenees and razed Pamplona before returning across the mountains to Aquitaine. In the mountains, the Basques ambushed and totally wiped out the rear guard of the Frankish army, which was led by the seneschal Eggihard, the count palatine Anselm, and Roland, prefect of the March of Brittany.

In *La Chanson de Roland* the attackers are the Moors, and the rear guard is commanded by Charlemagne's nephew Roland, accompanied by his comrade Oliver and by Archbishop Turpin. Roland, urged by Oliver to sound his horn to recall the main army, is too proud to do so; when the blast is at last blown, it is too late for the returning army to do anything but avenge their deaths. A similar fate was avoided (811) by Louis I the Pious, or "*le débonnaire,*" then king of Aquitaine, who forced the wives and children of the local inhabitants to go through the pass with his army.

At the summit of the pass are the remains of an early chapel of San Salvador (called Charlemagne's Chapel) and the Charlemagne Monument (1934). In the village is an Augustinian abbey, founded jointly about 1130 by Sancho de la Rosa (bishop of Pamplona) and the king of Navarre, for the use of pilgrims, especially those en route to Santiago de Compostela. The main church was built *c.* 1230 by Sancho VII the Strong of Navarre and contains his tomb and that of his wife, Clemencia. A 13th-century statue of the Virgin of Sorrows (wood covered with gold) stands in the centre of the altarpiece. Roncesvalles is the scene of an annual procession of penitent pilgrims, each carrying a heavy cross and wearing a black hood, on the Wednesday before Whitsunday. Pop. (1981) 44.

Ronda, town, Málaga province, in the Andalusia *comunidad autónoma* ("autonomous community"), southern Spain. It lies in the Ronda Mountains west of Málaga city. The town is situated on two hills divided by a deep ravine (El Tajo de Ronda) containing the Grande River, which is an affluent of the Guadiaro River. The ravine is crossed by several bridges, notably an arch structure 300 feet (90 m) high built in 1761. The town occupies the site of an ancient Iberian settlement and was known in Roman times as Acinipo. It was occupied by the Moors from the 8th to the 15th century. Both Roman and Moorish remains survive, including a Roman theatre and an underground staircase (restored in 1911) built from the town to the river by the Moors to prevent water blockades in times of war. Ronda was reconquered by the Roman Catholic monarchs Ferdinand and Isabella on May 20, 1485.

Ronda is an agricultural (grapes and grain) trade centre, and flour, leather, brandies, clothing, and chocolates are manufactured there. Pop. (1981) 31,383.

Rondane, mountain range in Oppland and Hedmark *fylker* (counties), south-central Norway. For the most part dry, the range has several small glaciers around its highest peaks, which average 7,000 feet (2,100 m); Rondeslottet, at 7,146 feet (2,178 m), is the highest point. Most of the area is part of the Rondane National Park, which is a year-round tourist attraction.

Rondane National Park, Norwegian RONDANE NASJONALPARK, park in south-central Norway established as a nature preserve in December 1962 by royal decree; by a law of 1970 the area became a national park. The park covers an area of 221 square miles (572 square km), with a range of elevation of from 3,000 to 7,000 feet (900 to 2,100 m).

The terrain is mountainous, with a large part of its area comprising impressive peaks, the highest being Rondeslottet at 7,146 feet (2,178 m). Vegetation is comparatively sparse because of the poor soil, and the few trees scattered about the landscape are mostly dwarf birch and conifers. Lichens (especially reindeer moss) predominate nearer the ground, giving the mountains a yellowish-white colour. The most noticeable flowering plant is the glacier crowfoot, a buttercup.

Wild reindeer, stoat, weasel, hare, wolverine, red fox, and other mammals are year-round inhabitants of the park. Various types of birds are found throughout the area, in particular ptarmigan, snow bunting, wheatear, and meadow pipit, which are characteristic of the higher mountain regions.

rondeau (French: "rondo"), one of several *formes fixes* ("fixed forms") in French lyric poetry and song of the 14th and 15th centuries. The full form of a rondeau consists of four stanzas. The first and last are identical; the second half of the second stanza is a short refrain, which has as its text the first half of the first stanza.

The earliest rondeaux had stanzas of two or three lines; later, especially in the 15th century, stanzas of four, five, or even six lines were common. Because of the unwieldy length of the refrains in such cases, the literary rondeau, which in the 15th century began to separate itself clearly from the sung rondeau, often curtailed the refrains in the second and fourth stanzas, leaving only a *rentrement* (reentry) of the opening words. This often produced unexpected changes of meaning as a result of the new context.

Such curtailment probably never took place in the sung rondeau because the musical form required that refrains be complete. The music for the first stanza always had two parts, and was repeated for the third and fourth stanzas; the second stanza returned to the beginning at its midpoint. In the following diagram the repeats of music with new text appear in lowercase, while exact repeats (of text and music) are in uppercase:

I	II	III	IV
A B	a A	a b	A B

To adapt this form to include the curtailed *rentrement* would require adjustment tantamount to overthrowing the form. The musical form of the full rondeau had a peculiar strength because the triple repetition of the "a" section in stanzas II and III made the eventual return of the "b" section in the third stanza a moment of immense significance, its weight requiring the balance provided by the final full refrain.

The earliest-known rondeaux with polyphonic music are by the 13th-century poet-composer Adam de la Halle. These brief pieces already follow the bipartite musical form strictly. The 14th-century poet and composer Guillaume de Machaut wrote fewer than 30 musical rondeaux, but they constitute the most varied and inventive body of music in his whole output. Partly because of the wide range that Machaut found and demonstrated in the rondeau, it had, by the middle of the 15th century, virtually supplanted the other song forms. For Machaut and his successors the rondeau was a highly intimate form compared with the other *formes fixes;* and the texts often display the mood of slightly sentimental longing that was to characterize the courtly love tradition in its later stages.

In the 15th century the Burgundian composers Guillaume Dufay and Gilles Binchois wrote many rondeaux. Perhaps the most memorable song of the century is the rondeau "De plus en plus" ("More and More") of Binchois, while the most widely appreciated at the time was the infinitely more delicate "Par le regart de vos beaux yeulx" ("For a Glance from Your Lovely Eyes") of Dufay. Such songs would represent the peak of the rondeau's history were it not for the long, fine songs of Hayne van Ghizeghem, written in the last years of the supremacy of the Burgundian dukes. The end of the 15th century saw the abandonment of the medieval *formes fixes.* The rondeau was the only one to have survived 200 years without any significant change in its form or content; it was perhaps ideally designed and balanced to express the spirit of its time.

The collective title rondeaux was also often given to anthologies containing some pieces in other forms. The poet Charles d'Orléans gave the title chanson to those of his rondeaux intended for singing. Theorists writing in Latin used the words *rondellus* or *rotundellus,* which have two meanings: elements of canonic writing (strict melodic imitation) and voice exchange (each part singing the other's last phrase) found especially in 13th- and 14th-century English polyphonic music; and a 13th-century form in Latin sacred song, containing several stanzas, each having the form aA bB or aA ab AB. The rondeau possibly developed from the second; but the forms are essentially different.

Rondelet, Guillaume (b. Sept. 27, 1507, Montpellier, Fr.—d. July 30, 1566, Réalmont), French naturalist and physician who contributed substantially to zoology by his descriptions of marine animals, primarily of the Mediterranean Sea.

Rondelet's book, *Libri de Piscibus Marinis* (1554–55; "Book of Marine Fish"), contains detailed descriptions of nearly 250 kinds of marine animals with nearly the same number of illustrations. He included, in addition to fishes, whales, marine invertebrates, and seals, regarding them all as fishes. As professor of anatomy at the University of Montpellier and physician to a cardinal, Rondelet also wrote extensively on fever, diagnosis, and the preparation of medicinal drugs.

rondo, in music, instrumental form characterized by the initial statement and periodic restatement of a particular melody (or section), the various appearances of which are separated by contrasting material. Although any piece built upon this basic plan of alternation or digression and return may be legitimately designated as a rondo, most rondos conform to one of two basic schemes: the five-part (*abaca*) and the seven-part (*abacaba*). The latter is symmetrically balanced, since two basically ternary (three-part) *aba* sections are separated by an often extended, if not always developmental, contrasting *c* section. The recurrent refrain is sometimes called a ritornello (*q.v.*).

The rondo was an extremely popular form during the last half of the 18th and the early 19th centuries, when it frequently formed the final movements of sonatas, symphonies (Haydn), chamber works, and especially concerti (Mozart). During the same period, the rondo also enjoyed a certain vogue as a separate composition, a well-known example being Beethoven's *Rondo a capriccio* (also known as *Rage Over a Lost Penny*), Opus 129. The classical rondo seems to have developed from the French late 17th- and early 18th-century keyboard rondeau, where a refrain of 8 or 16 measures is played in alternation with a succession of couplets (episodes) so as to form a chainlike structure of variable length: *abacad,* etc. Cultivators of the French rondeau include François Couperin, Louis Clérambault, and Jean-Philippe Rameau.

Rondônia, state, west-central Brazil, bordering Bolivia to the south and west. Formerly a part of Amazonas state, it was established in 1943 as Guaporé territory, which was renamed in 1956 after Marshal Cândido Mariano da Silva Rondon, Brazil's famous explorer and protector of Indians. Rondônia became a state in 1982.

Much of Rondônia's 93,840-square-mile (243,044-square-kilometre) area is sparsely inhabited rain forest. The region was important during the Amazon rubber boom but declined after the collapse of the industry in 1912. The Estrada de Ferro Madeira–Mamoré, a railroad operational between Pôrto Velho (*q.v.*), the state capital, and Guajará-Mirim, was built to transport rubber. Rubber exports are still the main source of income. Brazil nuts are also a significant export commodity. The Rondônia hydroelectric project, built at the Samuel Falls, supplies energy for mahogany and tin industries. Transportation on the Madeira, Mamoré, and Guaporé rivers and their affluents is supplemented by air service from Pôrto Velho, Guajará-Mirim, and Príncipe da Beira. Pop. (1987 est.) 818,000.

Rong (people): *see* Lepchā.

Ròngao language: *see* Rengao language.

Ronge, Lac la, lake, central Saskatchewan, Canada; it drains northeastward through the

Rapid River into the Churchill River. Island-studded, it is 36 miles (58 km) long, has an area of 546 square miles (1,414 square km), and is noted for its trout, northern pike, and pickerel (walleye). It has been frequented by fur traders since Peter Pond built a trading post on its shore in 1781. Lac la Ronge Provincial Park, with an area of 377,023 acres (152,576 hectares), extends across its northern end. The resort village of La Ronge on its western shore is linked by road to Prince Albert, 140 miles (225 km) south-southwest. The French place-name is probably derived from *ronger* ("to gnaw"), in reference to the work of the beaver, which inhabits the forested islands and shores.

Ronglu (Chinese official): *see* Jung-lu.

rōnin, any of the masterless samurai warrior aristocrats of the late Muromachi (1138–1573) and Tokugawa (1603–1867) periods who were often vagrant and disruptive and sometimes actively rebellious.

By the 12th century the term *rōnin* began to be used for samurai who, as a result of either losses in battle, the untimely death of their lord, or their own misdeeds, had been dispossessed of their fief and their noble sponsorship. During the tumultuous period before the founding of the Tokugawa shogunate, their numbers increased rapidly; they remained a great cause of disorder throughout the first half of the 17th century.

In the mid-19th century many impoverished samurai were attracted to the movement to expel Western foreigners from the country and restore the old imperial family to their rightful place as the actual rulers of Japan. Large numbers of these samurai left their lords and became *rōnin.* These *rōnin* heightened the revolutionary mood of the country in the years prior to the Meiji Restoration of 1868 by assassinating moderate officials, pro-Western scholars, and foreigners residing in Japan. Although the violence continued for a short while after the restoration, the *rōnin* ceased to exist after samurai privileges were abolished in 1873. The affair of the 47 *rōnin* in the early 18th century, in which the *rōnin* avenged the death of their lord, has been the subject of many popular Japanese theatrical, cinema, and literary works.

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Ronne, Finn (b. Dec. 20, 1899, Horten, Nor.—d. Jan. 12, 1980, Bethesda, Md., U.S.), Norwegian-born American explorer and writer who visited Antarctica nine times, discovering and charting vast areas of the 4,000,000-square-mile (10,400,000-square-kilometre) continent.

On his expeditions Ronne traveled an estimated 3,600 miles (5,800 km) by ski and dogsled. He discovered Weddell Sea areas never before visited by explorers. In the Alexander Island area, he discovered a bay that he named for his father, Martin Richard Ronne, who was also an explorer. The Ronne Ice Shelf in the Weddell Sea region, the second largest body of floating ice in the world, was named for Finn Ronne.

A year after graduating from Horten Technical College (1922), Ronne immigrated to the United States. He was an engineer with the Bethlehem Steel Corporation and Westinghouse Electric Corporation and became a U.S. citizen in 1929. He was a member of Admiral Richard E. Byrd's second Antarctic expedition, in 1933, and six years later he again accompanied Byrd to the south polar regions. In 1947, after wartime service in the U.S. Navy, he led his own expedition to Antarctica. Ronne's wife, Edith, and another scientist, Jenny Darlington, traveled with the Ronne Expedition, becoming the first women researchers to take part in a polar exploration. Ronne won many honours, among them three Congressional Gold Medals. His books include *Antarctic Conquest* (1949) and *Antarctica, My Destiny* (1979).

Ronne Ice Shelf, large body of floating ice, lying at the head of Weddell Sea, which is itself an indentation in the Atlantic coastline of Antarctica. More than 500 feet (150 m) thick and extending inland for more than 520 miles (840 km), it lies immediately west of Filchner Ice Shelf, from which it is partially separated by Berkner Island. Though its exact dimensions are unknown, it is, after Ross Ice Shelf, the second largest body of floating ice in the world. Named for the American explorer Finn Ronne, the ice shelf was claimed by the United Kingdom (1908), Chile (1940), and Argentina (1942).

Ronneby, town, *län* (county) of Blekinge, southern Sweden. It lies along the Ronneby River near its Baltic mouth. Because of its location, it was the most important place in Blekinge from the time it was chartered, *c.* 1230, until the founding of Karlskrona in 1679, when King Charles XI withdrew its charter. Like other Blekinge towns, it suffered greatly during the wars between Sweden and Denmark and from frequent fires. In 1707 it became a market town, but before it received full town privileges again in 1879, it was overshadowed by Karlshamn as a commercial centre.

The town has industries including sugar refining, tanning, stone quarrying, and the manufacture of enamelware. Among its historic buildings is the Church of the Holy Cross (*c.* 13th century), the scene of the "Blood Bath of Ronneby" (1564; the massacre by King Erik XIV's soldiers of about 2,000 people who had taken refuge in it). In the town's main square are two well-known statues by the 19th-century Swedish sculptor Pehr Hasselberg. Nearby, to the south, is Ronneby Well, once a popular spa because of its chalybeate springs, discovered in 1705. Pop. (1986 est.) mun., 29,382.

Ronsard, Pierre de (b. Sept. 11, 1524, La Possonnière, near Couture, Fr.—d. Dec. 27, 1585, Saint-Cosme, near Tours), poet, chief among the French Renaissance group of poets known as La Pléiade.

Ronsard was a younger son of a noble family of the county of Vendôme. He entered the service of the royal family as a page in 1536 and accompanied Princess Madeleine to Edinburgh after her marriage to James V of Scotland. On his return to France two years later, a court appointment or a military or diplomatic career seemed to be open before him, and in 1540 he accompanied the diplomat Lazare de Baïf on a mission to an international conference at Haguenau in Alsace. An illness contracted on this expedition left him partially deaf, however, and his ambitions were deflected to scholarship and literature. For someone in his position, the church provided the only future, and he accordingly took minor orders, which entitled him to hold ecclesiastical benefices, though he was never an ordained priest. A period of enthusiastic study of the classics followed his convalescence; during this time he learned Greek from the brilliant tutor Jean Dorat, read all the Greek and Latin poetry then known, and gained some familiarity with Italian poetry. With a group of fellow students he formed a literary school that came to be called La Pléiade, in emulation of the seven ancient Greek poets of Alexandria: its aim was to produce French poetry that would stand comparison with the verse of classical antiquity.

The title of his first collection of poems, *Odes* (4 books, 1550), emphasizes that he was attempting a French counterpart to the odes of the ancient Roman poet Horace. In *Les Amours* (1552) he also proved his skill as an exponent of the Italian *canzoniere,* animating the compliments to his beloved, entreaties, and lamentations traditional to this poetic form by the vehemence of his manner and the wealth of his imagery. Always responsive to new literary influences, he found fresh inspiration in the recently discovered verse of the Greek poet Anacreon (6th century BC). The more playful touch encouraged by this model is to be felt in the *Bocage* ("Grove") of poetry of 1554 and in the *Meslanges* ("Miscellany") of that year, which contain some of his most exquisite nature poems, and in the *Continuation des amours* and *Nouvelles Continuations,* addressed to a country girl, Marie. In 1555 he began to write a series of long poems, such as the "Hymne du Ciel" ("Hymn of the Sky"), celebrating natural phenomena, abstract ideas like death or justice, or gods and heroes of antiquity; these poems, published as *Hymnes* (following the 3rd-century-BC Greek poet Callimachus, who had inspired them), contain passages of stirring eloquence and vivid description, though few of them can hold the modern reader's interest from beginning to end. Reminiscences of his boyhood inspired other poems, such as his "Complainte contre fortune," published in the second book of the *Meslanges* (1559), which contains a haunting description of his solitary wanderings as a child in the woods and the discovery of his poetic vocation. This poem is also notable for a celebrated denunciation of the colonization of the New World, whose people he imagined to be noble savages living in an unspoiled state of nature comparable to his idealized memories of childhood.



Ronsard, portrait after an engraving by L. Gaultier, 1557

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

The outbreak of the religious wars found him committed to an extreme royalist and Catholic position, and he drew upon himself the hostility of the Protestants. To this period belong the *Discours des misères de ce temps* (1562; "Discourse on the Miseries of These Times") and other *Discours* attacking his opponents, whom he dismissed as traitors and hypocrites with ever-increasing bitterness. Yet he also wrote much court poetry during this period, encouraged by the young king Charles IX, a sincere admirer, and, on the king's marriage to Elizabeth of Austria in 1571, he was commissioned to compose verses and plan the scheme of decorations for the state entry through the city of Paris. If he was by now in some sense the poet laureate of France, he made slow progress with *La Franciade,* which he intended to be the national epic; this somewhat halfhearted imitation of Virgil's great Latin epic, the *Aeneid,* was abandoned after the death of Charles IX, the four completed books being published in 1572. After the accession of Henry III, who did not favour Ronsard so much, he lived in semi-

retirement, though his creativity was undiminished. The collected edition of his works published in 1578 included some remarkable new works, among them the so-called "Elegy Against the Woodcutters of Gâtine" ("Contre les bucherons de la forêt de Gastine"), lamenting the destruction of the woods near his old home; a sequel to *Les Amours de Marie;* and the *Sonnets pour Hélène.* In the latter, which is now perhaps the most famous of his collections, the veteran poet demonstrates his power to revivify the stylized patterns of courtly love poetry. Even in his last illness, Ronsard still wrote verse that is sophisticated in form and rich with classical allusions. His posthumous collection, *Les Derniers Vers,* poignantly expresses the anguish of the incurable invalid in nights spent alone in pain, longing for sleep, watching for the dawn, and praying for death.

Ronsard perfected the 12-syllable, or alexandrine, line of French verse, hitherto despised as too long and pedestrian, and established it as the classic medium for scathing satire, elegiac tenderness, and tragic passion. He was a man of powerful intellect and wide learning, and in his lifetime he was recognized as the prince of poets, as well as a figure of national significance. This prominence, scarcely paralleled until Victor Hugo in the 19th century, faded into relative neglect in the 17th and 18th centuries; but his reputation was reinstated by the Romantic critic C.-A. Sainte-Beuve, and it has remained secure.

To the 20th-century reader Ronsard is perhaps most appealing when celebrating his native countryside, reflecting on the brevity of youth and beauty, or voicing the various states of unrequited love, though he is also effective when identifying himself imaginatively with some classical mythological character or situation and when expressing sentiments of fiery patriotism or deep humanity. He was a master of lyric themes and forms, and his poetry remains attractive to composers; some of his odes, such as "Mignonne, allons voir si la rose . . . ," were set to music half a dozen times in the 16th century alone and have become as familiar to the general public in France as folk songs. (A.E.Ar.)

MAJOR WORKS. *Les Quatre Premiers Livres des Odes* (1550), also including the first *Le Bocage; Les Amours* (1552); *Livret de Folastries* (1553); *Les Amours,* new ed. (1553), with 39 new sonnets; *Le Bocage* (1554); *Les Meslanges* (1554, dated 1555); *Continuation des Amours* (1555); *Les Hymnes* (1555); *Les second livre des hymnes* (1556); *Nouvelle Continuation des Amours* (1556); *Institution pour l'adolescence du roy trèschrestien Charles neufviesme de ce nom* (1562); *Discours des misères de ce temps: À la Royne, mère du Roy* (1562); *Remonstrance au peuple de France* (1562); *Résponce . . . aux injures et calomnies . . .* (1563); *Élégies, mascarades et bergerie* (1565); *Les Quatre Premiers Livre* [sic] *de La Franciade* (1572); *Les Derniers Vers* (1586).

The major collected edition of Ronsard's works in this century is the *Oeuvres complètes,* 18 vol. (1914–67), a critical edition with introduction and commentary by Paul Laumonier, R. Lebegue, and Isidore Silver. This gives the original text of each poem (with the variants, due to subsequent revision by Ronsard, in footnotes) and in the order originally published. It is indispensable for the study of Ronsard's development as a poet. Some translations include *Sonnets pour Hélène: Sonnets for Helen,* trans. by Humbert Wolfe (1934, reprinted 1978); *Sonnets for Helen,* trans. by William Van Wyck (1932). See also *Songs & Sonnets of Pierre de Ronsard, Gentleman of Vandemois,* comp. and trans. by Curtis Hidden Page (1903, reissued 1924); and *Salute to Ronsard,* selected poems trans. by E.J. Dennis (1960). Charles Graves (comp. and trans.), *Lyrics of Pierre de Ronsard, Vandemois* (1967), presents in a pleasant and scholarly form a selection of his poems.

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Studies in English of important aspects of Ronsard's poetry include: Dudley Butler Wilson, *Ronsard, Poet of Nature* (1961); Donald Stone, *Ronsard's Sonnet Cycles: A Study in Tone and Vision* (1966); Elizabeth Armstrong, *Ronsard and the Age of Gold* (1968); Isidore Silver, *The Intellectual Evolution of Ronsard,* 2 vol. (1969–73), and *Three Ronsard Studies* (1978); and Malcolm Quainton, *Ronsard's Ordered Chaos: Visions of Flux and Stability in the Poetry of Ronsard* (1980). A complete bibliography of Ronsard up to about 1950 may be found in Alexandre Cioranescu, *Bibliographie de la littérature française du seizième siècle,* pp. 609–625 (1959, reprinted 1975).

Röntgen, Wilhelm Conrad, Röntgen also spelled ROENTGEN (b. March 27, 1845, Lennep, Prussia [now Remscheid, Ger.]—d. Feb. 10, 1923, Munich), German physicist who was a recipient of the first Nobel Prize for Physics, in 1901, for his discovery of X rays, which heralded the age of modern physics and revolutionized diagnostic medicine.



Röntgen
Historia-Photo

Röntgen studied at the Polytechnic in Zurich and then was professor of physics at the universities of Strasbourg (1876–79), Giessen (1879–88), Würzburg (1888–1900), and Munich (1900–20). His research also included work on elasticity, capillary action of fluids, specific heats of gases, conduction of heat in crystals, absorption of heat by gases, and piezoelectricity.

In 1895, while experimenting with electric current flow in a partially evacuated glass tube (cathode-ray tube), Röntgen observed that a nearby piece of barium platinocyanide gave off light when the tube was in operation. He theorized that when the cathode rays (electrons) struck the glass wall of the tube, some unknown radiation was formed that traveled across the room, struck the chemical, and caused the fluorescence. Further investigation revealed that paper, wood, and aluminum, among other materials, are transparent to this new form of radiation. He found that it affected photographic plates, and, since it did not noticeably exhibit any properties of light, such as reflection or refraction, he mistakenly thought the rays were unrelated to light. In view of its uncertain nature, he called the phenomenon X-radiation, though it also became known as Röntgen radiation. He took the first X-ray photographs, of the interiors of metal objects and of the bones in his wife's hand.

rood screen, in Western architecture, element of a Christian church of the Middle Ages or early Renaissance that separated the choir or chancel (the area around the altar) from the nave (the area set apart for the laity). The rood screen was erected in association with the rood, which in Old English means "cross," or "crucifix." At first the great rood of a medieval church was supported by a single beam, spanning the nave at the entrance to the chancel and known as the rood beam. Later, a rood screen was added, rising from the floor to this beam; the rood loft, above the screen, was also added. Upon this loft, or gallery, were displayed the rood and the two statues (of the Virgin Mary and St. John) that usually flanked it. The loft also held candles to be lighted on festival days. Because minstrels performed there on special occasions, the loft was also known as the singing gallery. The rood stairs, either built into the stone wall of the chancel or housed in a free-standing turret, rose from the church floor to the loft.

From the 14th century until the mid-16th century, rood screens and lofts were prominent features of churches in England and on the European continent. These elements, especially the openwork screens, provided artists with an opportunity for the creation and display of elaborate carvings and paintings. The largest and richest rood screen and loft in France was carved in the Albi cathedral about 1500.

In 16th-century England, with Henry VIII's establishment of the Anglican Church, it was decreed that the rood and everything else above the rood beam had to be removed. Rood screens were allowed to remain, but thereafter they were more often called chancel screens. Some English rood screens have escaped destruction and some have been restored, such as the excellent example of St. James's Church in Avebury, Wiltshire, erected in the 15th century and restored in the 19th century. Late Renaissance church architects preferred an unbroken view into the chancel from the nave, and so by 1800 the rood screen and loft became virtually obsolete throughout Europe.

Roodepoort, city, Transvaal province, South Africa. It lies immediately west of Johannesburg in the Witwatersrand. The first discovery of gold in the Witwatersrand in 1884, which soon thereafter proved unprofitable, occurred within the present city boundaries. Two years later, the Roodepoort gold-mining camp was established after significant finds were made all along the central Witwatersrand. Roodepoort was proclaimed a town in 1904 and a city in 1977. It expanded through the annexation of nearby mining settlements, including Maraisburg. Its eastern section (nearest Johannesburg) is largely an industrial district, while the west is a modern residential area. In addition to the still-profitable goldfields along the southern perimeter, the city has diversified manufacturing. A small memorial west of Roodepoort marks the site of British colonial statesman Leander Starr Jameson's surrender to the Boers in 1896. Pop. (1985) 141,764.

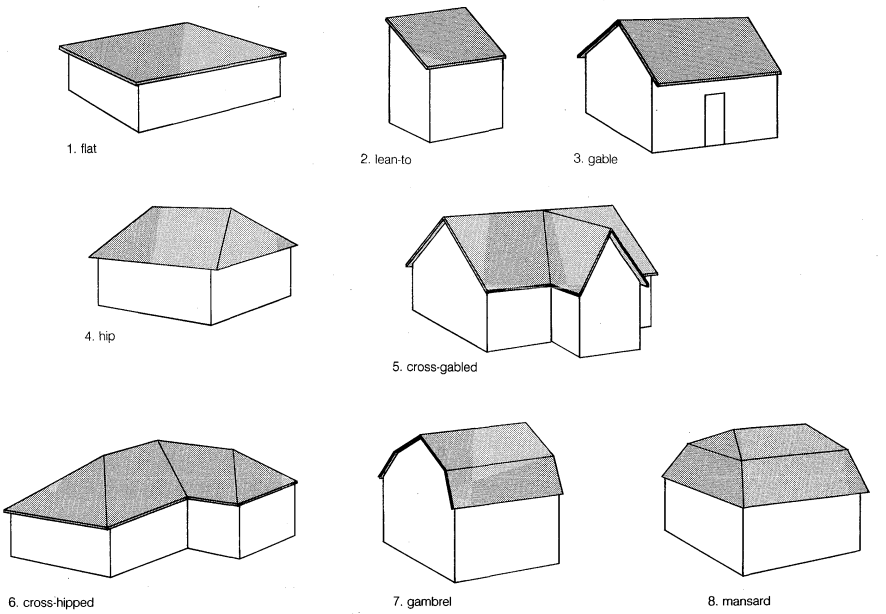
roof, covering of the top of a building, serving to protect against rain, snow, sunlight, wind, and extremes of temperature. Roofs have been constructed in a wide variety of forms—flat, pitched, vaulted, domed, or in combinations—as dictated by technical, economic, or aesthetic considerations.

The earliest roofs constructed by man were probably thatched roofs that were made of straw, leaves, branches, or reeds; they were usually set at a slope, or pitch, so that rainfall could drain off them. Conical thatched roofs are a good example of this type and are still widely used in the rural areas of Africa and elsewhere. Thicker branches and timbers eventually came to be used to span a roof, with clay or some other relatively impermeable substance pressed into the interstices between them. Gabled and flat roofs were possible with these materials. With the invention

of brick and cut stone for building, the basic roof forms of the dome and vault appeared.

Two main types of roofs are flat roofs and sloping ones. The flat roof (*see* 1 in the Figure) has historically been widely used in the Middle East, the American Southwest, and anywhere else where the climate is arid and the drainage of water off the roof is thus of secondary importance. Flat roofs came into widespread use in Europe and the Americas in the 19th century, when new waterproof roofing materials and the use of structural steel and concrete made them more practical. Flat roofs soon became the most commonly used type to cover warehouses, office buildings, and other commercial buildings, as well as for many residential structures.

Sloping roofs come in many different varieties. The simplest is the lean-to, or shed (2), which has only one slope. A roof with two slopes that form an "A" or triangle is called a gable, or pitched, roof (3). This type of roof was used as early as the temples of ancient Greece and has been a staple of domestic architecture in northern Europe and the Americas for many centuries. It is still a very common form of roof. A hip, or hipped, roof (4) is a gable roof that has sloped instead of vertical ends. It was commonly used in Italy and elsewhere in southern Europe and



Several basic roof designs

is now a very common form in American houses. Gable and hip roofs can also be used for homes with more complicated layouts, as in 5 and 6 in the Figure. The gambrel roof (7) is a type of gable roof with two slopes on each side, the upper being less steep than the lower. The mansard roof is a hipped gambrel roof, thus having two slopes on every side (8). It was widely used in Renaissance and Baroque French architecture. Both of the aforementioned roof types can provide extra attic space or other room without building an entire additional floor. They can also have a strong aesthetic appeal.

The vault (*q.v.*) is a parallel series of arches used to form a roof, the most common form being a cylindrical or barrel vault. Vaults came into their greatest prominence in Gothic architecture. The dome (*q.v.*) is a hemispherical structure that can serve as a roof. Domes have surmounted some of the most grandiose buildings of ancient Roman, Islāmic, and post-medieval Western architecture. Vaults and domes do not require a supporting framework directly below the vaulting because they are based on the principle of the arch, but flat and gable roofs frequently require internal supports such as trusses or other bracing. A truss (*q.v.*) is a structural member that is composed of a series of triangles lying in a single plane. Until the later 19th century, such supporting frameworks were made of wooden beams, sometimes in highly complicated systems. Steel and reinforced concrete have for the most part replaced such heavy wooden support systems, and such materials moreover have enabled the development of new and dramatic roof forms. Thin-shell roofs using concrete reinforced with steel rods can produce domes and barrel vaults that are only three inches thick yet span immense spaces, providing unobstructed interior views for stadiums and amphitheatres. In cantilevered roofs, a roof made of thin precast concrete is suspended from steel cables that are mounted on vertical towers or pylons of some sort. The geodesic dome (*q.v.*) is a modern structural variant of the dome form.

The external covering of a roof must prevent rainfall or other precipitation from penetrating a building. There are two main groups of roof coverings. One group consists of a waterproof membrane or film that is applied as a liquid and that repels water by its utter impermeability after it has dried; the tar that is used to coat roofing felt is the prime example of this type. The other group consists of pieces of a waterproof material that are arranged in such a way as to prevent the direct passage of water through the joints between those pieces. This group includes shingles made of various materials, tiles made of baked clay or slate, and corrugated sheets of steel, aluminum, lead, copper, or zinc. Flat roofs are normally covered with roofing felt and tar, while sloped roofs are generally covered with shingles or sheet metal.

roof pendant, downward extension of the surrounding rock that protrudes into the upper surface of an igneous intrusive body. The intrusions that most commonly contain roof pendants are relatively shallow stocks or batholiths; the roof pendants occur as isolated pieces of the surrounding rock within the intrusive mass. Roof pendants usually are strongly metamorphosed through the processes of contact metamorphism, during which heat and fluids from the intrusion have reconstituted the enclosed rock. The presence of roof pendants indicates that the igneous body is being observed near its upper surface; they are exposed by erosion of the overlying rock. Roof pendants can be studied to determine some of the conditions that existed at the time of intrusion, such as the temperature and fluid composition of the magma.

rook (*Corvus frugilegus*), the most abundant Eurasian bird of the crow family Corvidae (*q.v.*). It resembles the carrion crow in size (45



Rook (*Corvus frugilegus*)
Eric Hosking

cm [18 inches]) and in black coloration, but the adult rook usually has shaggy thigh feathers and has bare white skin at the base of its sharp bill. The species ranges discontinuously from England to Iran and Manchuria and is migratory. Rooks nest in large colonies (rookeries) in tall trees, sometimes within towns. Their nests are solidly constructed of twigs and soil and are used year after year. The birds lay three to five light greenish, heavily speckled eggs, and the young are able to fly about a month after birth. Rooks dig for larvae and worms in meadows and plowed fields and may pull up grain seedlings and young potato plants.

Roon, Albrecht Theodor Emil, Graf von (count of) (b. April 30, 1803, Pleushagen, near Kolberg, Pomerania [now Kołobrzeg, Pol.]—d. Feb. 23, 1879, Berlin), Prussian army officer who, with Chancellor Otto von Bismarck and General Helmuth von Moltke, brought the German Empire into being and made Germany the leading power on the continent of Europe.

After his father, a Prussian army officer, died during the French occupation following Prussia's disastrous war with France in 1806, Roon was reared mainly by his maternal grandmother. He received a commission in 1821 and served at the Berlin War Academy from 1824 to 1827. In 1832, after joining the headquarters of the army corps at Krefeld, Roon became aware of the inefficiency of the Prussian army and of the need for reorganization. He published his three-volume *Grundzüge der Erd-, Völker- und Staatenkunde* (1832; 3rd ed., 1847–55; "Principles of Physical, National and Political Geography"), which was widely read in Prussia and abroad.

Roon's rise to power in the Prussian army began after his aid to Crown Prince William (later Emperor William I) in suppressing the insurrection in Baden during the revolutions of 1848. He became a major general in 1850, a lieutenant general and member of the commission to reorganize the army, minister of war in 1859, and minister of the marine in 1861.

As war minister, Roon reorganized the Prussian army, thus contributing to its victories of 1866 and 1870–71. As part of the army reorganization commission, Roon succeeded, with the support of Gen. Edwin von Manteuf-

fel, chief of the royal military cabinet, and of Moltke, chief of the general staff, in getting his plan accepted. Roon's aim was an extension of Gen. Gerhard von Scharnhorst's system: a "nation-in-arms" maintained through universal three-year service and a permanent reserve (*Landwehr*) to defend the country when the army was actively engaged. Roon's system made him the most hated man in Prussia until the quick victory over Austria in the Seven Weeks' War (1866) proved the worth of the remodeled army. Roon rectified the remaining weaknesses exposed during the war with Austria, and by 1871, with the defeat of France, Germany became the leading power in Europe.

Roon, made a count in 1871, succeeded Bismarck as head of the Prussian ministry in



Roon, engraving by K. Tetzel, 1861

By courtesy of Bildarchiv Preussischer Kulturbesitz BPK, West Berlin

December 1871 but resigned in 1872 because of poor health. A practical military administrator rather than a fighting soldier, he liked to be known by his nickname of "the king's sergeant"; his political opponents called him "ruffian Roon."

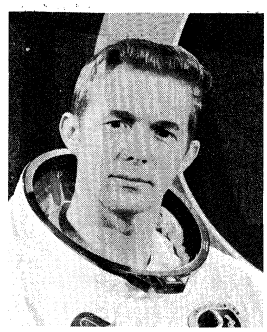
Roos, S(joerd) H(endrik) de (b. Sept. 14, 1877, Drachten, Neth.—d. April 2, 1962, Haarlem), book and type designer who was an important figure in the private press movement in The Netherlands.

De Roos studied lithography at the Royal Academy of Art, Amsterdam. Among his early activities were furniture design and the design of decorations for tin containers. His first book design was for *Kunst en Maatschappij* (1903), a translation of a collection of the writings of the English poet and designer William Morris, whose Kelmscott Press was the beginning of the private press movement in England. In 1907 he joined the Typefoundry Amsterdam, where he remained until he retired in 1942. In about 1928 he founded the Heuvel Press, at Hilversum, the second private press in The Netherlands, for which he designed Meidoorn type. Of the four books printed by Heuvel, the edition of Dante Gabriel Rossetti's *Hand and Soul* (1929) is considered particularly fine.

Among the typefaces designed by de Roos are Holland Medieval (1912), Zilvertype (1915), Egmont (1933), and De Roos Roman (1947).

Roosa, Stuart A(llen) (b. Aug. 16, 1933, Durango, Colo., U.S.), U.S. astronaut, participant in the Apollo 14 mission (Jan. 31–Feb. 9, 1971), in which the uplands region of the Moon, 15 miles (24 kilometres) north of the Fra Mauro crater was explored. While Roosa orbited overhead in the Command Module, Comdr. Alan B. Shepard and Edgar D. Mitchell landed on the Moon.

After spending two years at Oklahoma A & M College, Stillwater, Roosa joined the U.S. Air Force in 1953. Two years later he resumed his studies at the University of Colorado, Boulder, which awarded him a B.S. degree in aeronautical engineering. He piloted both



Roosa, 1970

By courtesy of the National Aeronautics and Space Administration

standard and experimental aircraft before becoming an astronaut in 1966.

Before making the Apollo 14 flight, Roosa had extensive ground experience communicating with men in space.

After 1976, when Roosa left the space program, he held a series of executive positions in private businesses in Greece and the United States.

Roosendaal, in full ROOSENDAAL EN NISPEN, *gemeente* (municipality), Noordbrabant *provincie* (province), southwestern Netherlands, near the Belgian border. It developed after the inhabitants of surrounding hamlets, including Nispen, were granted permission to build a church at Roosendaal (meaning "valley of roses") in 1268. Peat digging, mainly by the monks of Tongerlo (now in Belgium), was an early economic activity. Today Roosendaal is a rail junction on the Rotterdam–Antwerp line, with railway repair shops, and an industrial centre with varied manufactures, including fluorescent-lighting components, machinery for paper and graphic industries, hose fittings and assemblies, and furniture. Pop. (1983 est.) 55,968.

Roosevelt, (Anna) Eleanor (b. Oct. 11, 1884, New York City—d. Nov. 7, 1962, New York City), United Nations diplomat, humanitarian, wife of Pres. Franklin D. Roosevelt of



Eleanor Roosevelt, 1950

Brown Brothers

the United States. She was, in her time, one of the most widely admired women in the world.

Eleanor was the niece of Pres. Theodore Roosevelt (president 1901–09), brother of her father, Elliott. After attending school in England, she returned to traditional East Coast society and was married to her distant cousin Franklin in 1905. During the early years of their marriage, she was preoccupied with raising five children and, after her husband's election to the New York Senate (1911), with learning to be a political hostess in Albany and later in Washington. After 1921, she provided help and inspiration for her husband in his struggle with the crippling effects of poliomyelitis. On his physician's advice, she expanded her own role in public affairs in order to renew and stimulate her husband's political interests. She joined the Women's Trade Union League and became active in the state Democratic Party, serving (1924–28) as financial chairman of the women's division.

During her 12 years as first lady (1933–45), the unprecedented breadth of her activities and her advocacy of liberal causes made her nearly as controversial a figure as her husband. She instituted regular White House press conferences for women correspondents for the first time. In deference to the President's infirmity, she helped serve as his "eyes and ears" throughout the nation, embarking on extensive tours and reporting to him on conditions, programs, and public opinion. These unusual excursions were the butt of some criticism and "Eleanor jokes" by the political opposition, but many people responded warmly to her compassionate interest in their welfare. For many years, beginning in 1936, she wrote a daily syndicated newspaper column, "My Day." A widely sought speaker at political meetings and at various institutions, she showed particular interest in such humanitarian concerns of the New Deal as the National Youth Administration, child welfare, an experimental Appalachian community (in Morgantown, W.Va.), slum-clearance projects, and equal rights. In the late 1930s, she was criticized for her support of the American Youth Congress, with which she finally broke in recognition of its apparent Communist orientation. During World War II, she travelled in Great Britain and the South Pacific as well as to U.S. military bases to help raise morale.

After President Roosevelt's death (April 1945), Pres. Harry S. Truman appointed Mrs. Roosevelt a delegate to the United Nations (1945, 1949–52, 1961), where, as chairman of the UN Commission on Human Rights (1946–51), she played a major role in the drafting and adoption of the Universal Declaration of Human Rights (1948).

An indefatigable traveller, Mrs. Roosevelt circled the globe several times, visiting scores of countries and meeting with most of the leaders of the world. Her autobiography is contained in *This Is My Story* (1937) and *On My Own* (1958). A discerning portrait is drawn by Joseph P. Lash in *Eleanor and Franklin* (1971) and *Eleanor: The Years Alone* (1972).

Roosevelt, Franklin D(elano), byname FDR (b. Jan. 30, 1882, Hyde Park, N.Y., U.S.—d. April 12, 1945, Warm Springs, Ga.), 32nd president of the United States (1933–45), the only president to be reelected three times. He used the federal government's powers to bring about the nation's economic recovery from the Great Depression, in what was called the New Deal; and he was a major Allied leader during World War II.

A brief account of the life and works of Franklin D. Roosevelt follows; for a full biography, *see* MACROPAEDIA: Roosevelt.

Roosevelt attended Harvard (1900–04); after marrying Eleanor Roosevelt (1905), the niece of Theodore Roosevelt, Franklin Roosevelt studied at Columbia University School of Law and qualified for the New York bar. In 1910 he was elected to the New York Senate, and in 1913 he became assistant secretary of the navy. Although he was stricken with polio in 1921, he remained active in Democratic politics and was elected governor of New York in 1928. Inaugurating a program of tax relief for farmers, he was reelected in 1930; the following year he also began establishing state relief agencies. Elected president over Herbert Hoover in 1932, Roosevelt quickly obtained passage of a sweeping economic program that provided relief, loans, and jobs through a variety of federal agencies.

Roosevelt was overwhelmingly reelected in 1936. Despite setbacks, his second administration was marked by increasing acceptance of many New Deal innovations. In the late

1930s, as foreign policy began to assume increasing importance, Roosevelt showed determination to keep the nation out of war. But the outbreak of World War II in 1939 led him to favour aid to Great Britain. After he defeated Wendell L. Willkie in the presidential election of 1940, Roosevelt obtained the Lend-Lease Act to financially support Britain (1941) and denied war supplies to Japan. Once in the war, he mobilized industry for military production, played a leading role in creating an alliance with Britain and the U.S.S.R., and met with the Allied leaders Churchill and Stalin at Teheran, Iran (1943), and at Yalta in the Crimea (1945). Despite declining health, Roosevelt defeated Gov. Thomas E. Dewey of New York for election to his fourth term (1944) but served only briefly before his death.

Roosevelt, Theodore, byname TEDDY ROOSEVELT (b. Oct. 27, 1858, New York City—d. Jan. 6, 1919, Oyster Bay, N.Y., U.S.), 26th president of the United States (1901–09) and writer, explorer, and soldier, who expanded the powers of the presidency and of the federal government on the side of public interest in conflicts between big business and big labour. He also engaged the nation in affairs of Asia and Europe. He won the Nobel Peace Prize



Theodore Roosevelt
By courtesy of the Library of Congress, Washington, D.C.

in 1906 for mediating the end of the Russo-Japanese War, and he promoted the construction of the Panama Canal (1904–14).

The early years. Roosevelt was born into a moderately wealthy family of Dutch ancestry; his mother, Martha Bulloch of Georgia, was of Scots-Irish and Huguenot descent. He received an excellent education from private tutors and at Harvard College; he was one of the few presidents endowed with an encompassing intellectual curiosity. In 1880 he entered Columbia University Law School. But historical writing and politics soon lured him away from a legal career. During the same year he married Alice Hathaway Lee of Boston and after her death, in 1884, married Edith Kermit Carow, with whom he lived for the rest of his life near Oyster Bay, Long Island, N.Y.

Though a physical weakling during his youth, Roosevelt developed a rugged physique by persistent exercise and became a lifelong advocate of strenuous activity. He was a born competitor against both nature and his fellow man, and he used the same enormous energy in public life. At the age of 23 he successfully ran for the New York State Assembly, in which he soon became one of the Republican leaders, known for his opposition to corrupt, party-machine politics. Misfortune then struck in the form of three successive political defeats. But after two years spent ranching in the Dakota Territory he reentered public life and continued his reform activities as a member of the U.S. Civil Service Commission (1889–95) and as the president of the New York City Board of Police Commissioners (1895–97). As assistant secretary of the Navy under Pres. William McKinley he vociferously advocated war with Spain. When war was declared in 1898, he abruptly resigned, organized the 1st Volunteer Cavalry, known as the Rough Riders, and took them to Cuba that year. Roosevelt's leadership was spectacular. Disdaining army red tape and even orders, his colourful exploits, especially in the Battle of Santiago, made him something of a national hero.

Roosevelt returned home just when Thomas C. Platt, the Republican boss of New York, was looking for a respectable candidate for governor. Platt distrusted him, but, upon Roosevelt's promise that he would not attack the machine, he was easily elected. An excellent governor, he removed several corrupt politicians from office and over Platt's opposition secured a corporation franchise tax and a civil service system. Enraged, Platt maneuvered Roosevelt into the 1900 nomination for vice president on the McKinley ticket and thus secured his elimination from state politics.

McKinley and Roosevelt won, but Roosevelt was completely bored by his powerless office until Sept. 14, 1901, when McKinley died after being shot by an assassin, and he himself became president. Although Roosevelt announced that there would be no change in policy, it soon became apparent that a new life-style had been introduced at the White House. Guest lists were expanded to include cowboys, prizefighters, explorers, and distinguished artists. Young, college-educated men were appointed to administrative positions. Presidential speeches overflowed with indignation and moral righteousness. It soon became apparent that Teddy—as he was known nationwide—was enjoying himself immensely. But for all the office's satisfactions, Roosevelt also had reasons for subdued reflection. He was always conscious that he had become president by accident, and his chief ambition was to be elected in 1904. A highly sensitive politician, he was aware that William Jennings Bryan's defeat for the presidency in 1896 had not quieted the popular demands that he represented for control of the trusts, regulation of railroads, and a reduction of import duties. But he also knew that both houses of Congress were controlled by conservative Republicans bitterly opposed to all reforms. He met this perplexing situation by asking for little legislation and by using executive power in appeasing the rising popular discontent.

The Square Deal. In 1902 Roosevelt took three steps that virtually assured his reelection. From Congress he asked for the establishment of a Bureau of Corporations with powers to inspect the books of all businesses engaged in interstate commerce. Even this limited measure was resisted by leading Republican conservatives; the President secured its passage only by promising not to ask for any further regulatory measures. But this bargain did not keep Roosevelt from further executive actions, and on February 18, in one brilliant stroke, he revived the all-but-forgotten Sherman Anti-Trust Act by bringing successful suit against the Northern Securities Company. Roosevelt pursued his policy of "trust-busting" by bringing suit against 43 other major corporations during the following seven years.

In the fall of 1902 Roosevelt again set an important precedent by intervening in the anthracite coal strike. When the strike threatened to result in cold homes, schools, and hospitals, he requested that representatives of capital and labour meet in the White House and accept mediation. By threatening to use the army to operate the mines he won an arbitration agreement that included a modest pay increase for the miners. Never before had the federal government intervened in a labour struggle except to assure the operation of a governmental service or to protect property. Roosevelt promptly labeled his actions against industry and indirectly for labour a manifestation of a "Square Deal" between labour and capital. In the long run, however, the most significant aspects of his actions were the precedents that they set for governmental intervention in the affairs of business and labour for the public interest.

Once overwhelmingly elected in 1904 as president in his own right, Roosevelt immediately asked Congress for substantial powers to regulate interstate railroad rates. The Hepburn Act of 1906, giving the Interstate Commerce Commission authority to set maximum rates, created the first of the government's regulatory commissions and thus was a milestone on the long road to the modern social-service state.

Roosevelt's pressure on Congress also led to the passage of the Pure Food and Drug and the Meat Inspection acts (1906) which laid the basis for the modern concept of consumer protection. Responding to the rapid disappearance of the federal domain, Congress had empowered the president 15 years before to convert portions of the remaining land to national forests. Under Roosevelt's three predecessors only about 40,000,000 ac (16,000,000 ha) had been transferred. Roosevelt not only rapidly accelerated the pace but also broadened the powers of the act to reserve for future generations parks and mineral, oil, and coal lands, as well as waterpower sites. In seven years, 194,000,000 additional acres of the federal domain were closed to commercial development.

Foreign policy. In international affairs Roosevelt believed that strong countries survived while weak ones perished. He also sensed that the relatively peaceful period that had preceded his administration was being replaced by one in which force was the principal arbiter. Every year he asked for larger naval appropriations, and to induce Congress to grant him new ships he occasionally exaggerated the seriousness of international incidents. By the end of his term Roosevelt had built the U.S. Navy into a major sea force.

Twice during Roosevelt's years in office European powers threatened intervention in Venezuela and once in the Dominican Republic, presumably to collect debts owed to their nationals. To meet a threat of possible permanent intervention the secretary of war, Elihu Root, and Roosevelt framed a policy statement in 1904 that eventually became known as the Roosevelt Corollary to the Monroe Doctrine. It stated that not only would the United States prohibit non-American intervention in Latin-American affairs but it would also police the area and guarantee that these countries met their international obligations. The corollary sanctioning U.S. intervention was to be applied in 1905 when, without Congressional approval, Roosevelt forced the Dominican Republic to accept the appointment of a U.S. "economic advisor," who quickly became the financial director of the small state.

Quoting an African proverb, Roosevelt once said that the proper way to conduct foreign affairs was to "speak softly and carry a big stick." Roosevelt was to use big-stick diplomacy again in the acquisition of the Panama Canal Zone from Colombia in 1903, in the formation of a provisional government in Cuba in 1906, and to some extent in the quarrel with Canada over the Alaskan and Canadian border. He also played a notable part in inspiring the subsequent Panamanian revolution that assured U.S. control of the zone and enabled the United States to start construction of the canal before the presidential election of 1904.

If Roosevelt's dealings with small countries were often brusque, his negotiations with major powers were characterized by far more cau-

tion. The U.S. Pacific position, he said in 1903, "is such as to insure our peaceful domination of its waters." But the steadily rising power of Japan caused him to revise that estimate. His efforts to resolve the Russo-Japanese War of 1904–05 included bringing both countries to the Portsmouth Peace Conference and mediating between them. His direct motive, however, was to construct a balance of power in East Asia that might peacefully aid U.S. interests. The friction caused by the anti-Japanese sentiment in California he helped to allay by the so-called Gentlemen's Agreement of 1907, restricting Japanese immigration to the United States. By another informal executive agreement Japan accepted the U.S. position in the Philippines while the United States recognized the Japanese conquest and occupation of Korea. Later, in 1910, Roosevelt became convinced that the Philippines were indefensible against a Japanese thrust and that there was no hope of American "dominance" in East Asian waters.

During his last years as president, Roosevelt was worried by the possibility of a general European war. Because he saw British and U.S. interests generally coinciding, he was strongly inclined to support Great Britain whenever it would not jeopardize official neutrality, violation of which would have brought strong protest from Congress and the country. The secret instructions given to the U.S. representatives to the Algeciras Conference of 1906, called to prevent a European war over Morocco, were therefore ambiguous. The envoys were told to maintain American neutrality but also to do nothing that would imperil the existing Franco-British understanding, the continuation of which was "to the best interest of the United States." But for all the talk of neutrality Roosevelt had in effect deviated from the traditional position of neutrality in non-American affairs. U.S. representatives had attended a strictly European political conference; their actions favoured Great Britain and France as against Germany; and by signing the agreement the United States presumably undertook to sustain it. Algeciras pointed unerringly toward U.S. entry into World War I on the side of the Allied Powers.

Last years as president. The end of Roosevelt's presidency was anything but calm. His crusade against "race suicide," prompted by his alarm at the decreasing birth rate, his public indictment of amateur naturalists, and his order to the government printers to use a simplified system of spelling all developed into national arguments. Especially after the financial panic of 1907 his quarrels with Congress became more vehement. His rather high-handed disciplining of a black regiment involved in a riot at Brownsville, Texas, and his suggestion that members of Congress who were opposed to increasing the secret-service funds had something to hide produced bitter controversy. But most of the trouble with Congress came from the split that had developed in his party between the Roosevelt progressives and the party's conservatives, who blamed the financial panic of 1907 on Roosevelt's attacks on big industry.

Later years. After leaving the White House in March 1909, Roosevelt took a 10-month hunting trip through Africa and made a grand tour of Europe. On his return he was reluctantly drawn into politics. Though he attempted to support both his old progressive friends and Pres. William Howard Taft, the two men soon were violently opposed over policy matters. The conflict became personal in October 1910 when Taft authorized an antitrust suit against the U.S. Steel Corporation regarding a merger to which Roosevelt as president had tacitly agreed. Personal animosity and the developing split in the Republican Party finally prompted Roosevelt to contest Taft's 1912 renomination. The resulting bitter campaign and convention practically insured a Democratic victory. Roosevelt himself made that outcome inevitable by founding the Progressive Party and running for president as an independent after he had lost the Republican nomination. In seeking votes, the former president, through both logic and necessity, was forced to radical proposals. Both the Progressive platform and its candidates' campaign for a "New Nationalism" looked forward to a powerful regulatory and social-service state. The results of the campaign were as expected, with Woodrow Wilson, the Democratic candidate, winning by a large electoral vote.

Because the Progressive Party had managed to elect only a handful of candidates to minor offices, Roosevelt knew immediately that it was doomed. He kept it alive for bargaining purposes and, in the meantime, occupied himself with an expedition into the Brazilian jungles and with writing. After World War I broke out he became a strong partisan of the Allied cause. Although ambitious for the 1916 Republican nomination, he was ready to support almost any candidate who opposed Wilson and who was not personally involved in his own defeat in 1912. Amid much bitterness he abandoned the Progressive Party and vigorously supported the Republican candidate, Charles Evans Hughes, but again his efforts ended in failure. His anger against Wilson increased when his offer to lead a volunteer division to France was rejected. Although he had previously supported an international peace-keeping organization, he was adamantly opposed to Wilson's League. By 1918 he felt that the Republicans might nominate him for president in the next election, but the years of inordinate activity had taken their toll, and he died suddenly in his sleep in 1919.

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For a general history of Roosevelt's times, see George E. Mowry, *The Era of Theodore Roosevelt, 1900–1912* (1958); and Harold U. Faulkner, *The Quest for Social Justice, 1898–1914* (1931). Some of Roosevelt's 2,000 published works including books and hundreds of articles on history, politics, travel, and natural history, and perhaps a few of his personal letters numbering more than 150,000 should be consulted. The most comprehensive collection is the *Memorial* edition, 24 vol. (1923–26). A superb collection of his more important letters appears in Elting E. Morison, *The Letters of Theodore Roosevelt,* 8 vol. (1951–54).

Consult the INDEX *first*

Roosevelt Island, island of Antarctica, situated in the northeastern part of the Ross Ice Shelf, Ross Dependency (New Zealand), south of the Bay of Whales, off the coast of Edward VII Land. The ice-covered island, 90 mi (145 km) long and 35 mi wide, was discovered in 1934 by the U.S. explorer, Richard Evelyn Byrd. The mean absolute elevation of the island exceeds 1,640 ft (500 m) and the thickness of its ice varies from 1,312 ft to 2,953 ft. Pioneering studies of ice-sheet seismology, made on Byrd's second Antarctic expedition (1933–35), demonstrated that a large northwestern section of the shelf (Roosevelt Island) is actually grounded, *i.e.*, not afloat.

Roosevelt Island, island in the East River, between the boroughs of Manhattan and Queens, New York City. Part of Manhattan, it is 1½ mi (about 2½ km) long and ⅛ mi wide, with an area of 139 ac (56 ha). In 1637 the Dutch governor Wouter van Twiller bought it from the Indians, who called it Minnahanonck. In 1828 the city acquired it and built a workhouse and penitentiary, which became notorious. Formerly known as Blackwell's Island, it was renamed Welfare Island in 1921, and in 1973 its name was again changed to honour Pres. Franklin D. Roosevelt. In 1934 the old institutions were replaced by city hospitals. Queensboro Bridge connects it with Manhattan and Queens. In the 1970s it was connected to Manhattan by an aerial tramway system, and moderate-income housing and shopping complexes were constructed there.

root, in botany, that part of a plant normally underground. Its primary functions are anchorage of the plant, absorption of water and dissolved minerals and conduction of these to the stem, and storage of reserve foods.

Many plants develop subterranean structures that are in reality specialized stems (*e.g.*, corms, tubers). The root differs from these mainly by lacking leaf scars and buds, having a root cap, and having branches that originate from internal tissue rather than from buds.

The primary root, or radicle, is the first organ to appear when a seed germinates. It grows downward into the soil, anchoring the seedling. In gymnosperms and dicotyledons, the radicle becomes a taproot. It grows downward, and branch, or secondary, roots grow out laterally from it. This type of root system is referred to as a taproot system. In some plants, such as carrots and turnips, the taproot serves as a storage organ and becomes swollen with foodstuffs.

Grasses and other monocotyledons have a fibrous root system, which is characterized by a mass of roots of approximately equal diameter. This network of roots does not arise as branches of the primary root; instead, it consists of numerous branching roots that emerge from the base of the stem.

Roots grow in length only from their ends. The very tip of the root is covered by a protective, thimble-shaped root cap. Just behind the root cap lies the apical meristem, a tissue of actively dividing cells. Some of the cells produced by the apical meristem are added to the root cap, but most of them are added to the region of elongation, which lies just above the meristematic region. It is in the region of elongation that growth in length occurs. Above this elongation zone lies the region of maturation, where the primary tissues of the root mature, completing the process of cell differentiation that actually begins in the upper portion of the meristematic region.

The primary tissues of the root are, from outermost to innermost, the epidermis, the cortex, and the vascular cylinder. The epidermis is composed of thin-walled cells and is usually only one cell layer thick. The absorption of water and dissolved minerals occurs through the epidermis, a process greatly enhanced in most land plants by the presence of root hairs—slender, tubular extensions of the epidermal cell wall that are found only in the region of maturation. The absorption of water is chiefly via osmosis, which occurs because (1) water is present in higher concentrations in the soil than within the epidermal cells (where it contains salts, sugars, and other dissolved

organic products) and (2) the membrane of the epidermal cells is permeable to water but not to many of the substances dissolved in the internal fluid. These conditions create an osmotic gradient, whereby water flows into the epidermal cells. This flow exerts a force, called root pressure, that helps drive the water through the roots. Root pressure is partially responsible for the rise of water in plants, but it cannot alone account for the transport of water to the top of tall trees.

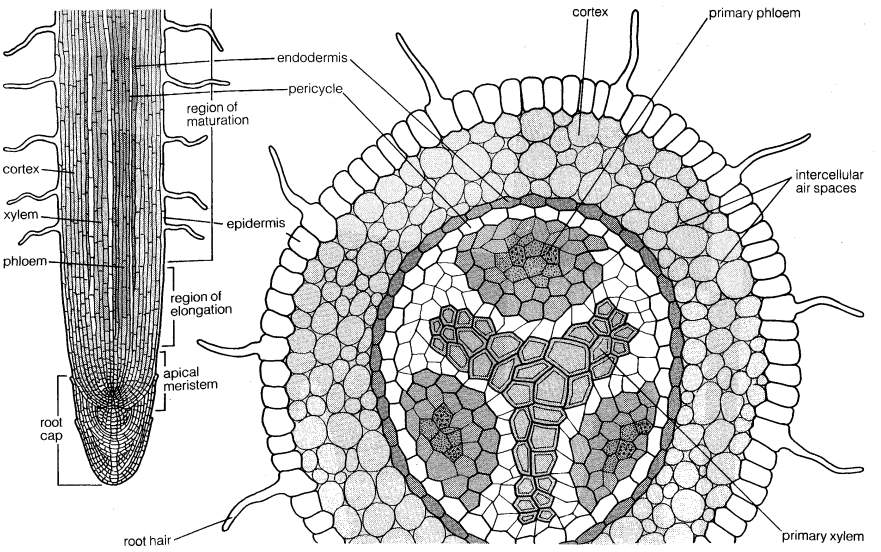
The cortex conducts water and dissolved minerals across the root from the epidermis to the vascular cylinder, whence it is transported to the rest of the plant. The cortex also stores food transported downward from the leaves through the vascular tissues. The innermost layer of the cortex usually consists of a tightly packed layer of cells, called the endodermis, which regulates the flow of materials between the cortex and the vascular tissues.

The vascular cylinder is interior to the endodermis and is surrounded by the pericycle, a layer of cells that gives rise to branch roots. The conductive tissues of the vascular cylinder are usually arranged in a star-shaped pattern. The xylem tissue, which carries water and dissolved minerals, comprises the core of the star; the phloem tissue, which carries food, is located in small groups between the points of the star.

The older roots of woody plants form secondary tissues, which lead to an increase in girth. These secondary tissues are produced by the vascular cambium and the cork cambium. The former arises from meristematic cells that lie between the primary xylem and phloem. As it develops, the vascular cambium forms a ring around the primary vascular cylinder. Cell divisions in the vascular cambium produce secondary xylem (wood) to the inside of the ring and secondary phloem to the outside. The growth of these secondary vascular tissues pushes the pericycle outward and splits the cortex and epidermis. The pericycle becomes the cork cambium, producing cork cells (outer bark) that replace the cortex and epidermis.

Some roots, called adventitious roots, arise from an organ other than the root—usually a stem, sometimes a leaf. They are especially numerous on underground stems. The formation of adventitious roots makes it possible to vegetatively propagate many plants from stem or leaf cuttings.

Roots are not always underground. When they arise from the stem and either pass for some distance through the air before reaching the soil or remain hanging in the air, they are called aerial. They are seen well in corn (maize), screw pine, and banyan, where they eventually assist in supporting the plant.



(Left) Vertical cross section and (right) horizontal cross section of the root tip

(Right) From T. Elliot Weier *et al., Botany,* copyright © 1982 by John Wiley & Sons, Inc., reprinted by permission of John Wiley & Sons, Inc.

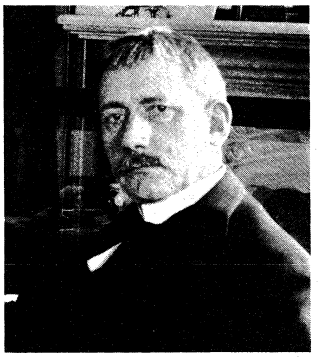
root, in mathematics, a solution to an equation, usually expressed as a number or an algebraic formula.

Ninth-century Arab writers called one of the equal factors of a number a root, and their medieval translators used the Latin word *radix* ("root," adjective "radical"). If a is a positive real number and n a positive integer, there exists a unique positive real number x such that $x^n = a$. This number—the (principal) nth root of a—is written $\sqrt[n]{a}$. The integer n is called the index of the root. For $n = 2$, the root is called the square root and is written $\sqrt{a}$. The root $\sqrt[3]{a}$ is called the cube root of a. If a is negative and n is odd, the unique negative nth root of a is termed principal.

If a whole number (specific integer) has a rational nth root—*i.e.,* one that can be written as a common fraction—then this root must be an integer. Thus 5 has no rational square root since 2^2 is less than 5 while 3^2 is greater than 5. Exactly n complex numbers satisfy the equation $x^n = 1$, and they are called the complex nth roots of unity. If a regular polygon of n sides is inscribed in a unit circle centred at the origin so that one vertex lies on the positive half of the x-axis, the radii to the vertices are the vectors representing the n complex nth roots of unity. If the root the vector of which makes the smallest positive angle with the positive direction of the x-axis is denoted by the Greek letter omega, ω, then ω, ω^2, ω^3, . . . , $\omega^n = 1$ constitute all of the nth roots of unity. Thus $\omega = -\frac{1}{2} + \frac{1}{2}\sqrt{-3}$, $\omega^2 = -\frac{1}{2} - \frac{1}{2}\sqrt{-3}$, $\omega^3 = 1$ are the cube roots of unity. Any root, symbolized by the Greek letter epsilon, ε, that has the property that ε, ε^2, . . . , $\varepsilon^n = 1$ give all of the nth roots of unity is called primitive. Evidently the problem of finding the nth roots of unity is equivalent to the problem of inscribing a regular polygon of n sides in a circle. For every integer n, the nth roots of unity can be determined in terms of the rational numbers by means of rational operations and radicals; but they can be constructed by ruler and compasses (*i.e.,* determined in terms of the rational operations and square roots) only if n is a product of distinct prime numbers of the form $2^h + 1$, or 2^k times such a product, or is of the form 2^k. If a is a complex number not 0, the equation $x^n = a$ has exactly n roots.

All of the nth roots of a are the products of any one of these roots by the nth roots of unity. The term root has been carried over from the equation $x^n = a$ to all polynomial equations. Thus a solution of the equation $f(x) = a_0x^n + a_1x^{n-1} + \ldots + a_{n-1}x + a_n = 0$, $a_0 \neq 0$ is called a root of the equation. If the coefficients lie in the complex field, an equation of the nth degree has exactly n not necessarily distinct complex roots. If the coefficients are real and n is odd, there is a real root. But an equation does not always have a root in its coefficient field. Thus $x^2 - 5 = 0$ has no rational root.

Root, Elihu (b. Feb. 15, 1845, Clinton, N.Y., U.S.—d. Feb. 7, 1937, New York City), American lawyer and statesman, winner of the Nobel Prize for Peace in 1912.



Elihu Root, 1903

By courtesy of the Library of Congress, Washington, D.C.

Root received his law degree from New York University in 1867 and became a leading corporation lawyer. As U.S. attorney for the southern district of New York (1883–85) he came into close contact with Theodore Roosevelt, then a leader in New York Republican politics, and became Roosevelt's friend and legal adviser.

As secretary of war in Pres. William McKinley's (and, after McKinley's assassination, Roosevelt's) Cabinet (1899–1903), Root worked out governmental arrangements for the former Spanish areas then under U.S. control as a result of the Spanish–American War. He was the primary author of the Foraker Act (1900), which provided for civil government in Puerto Rico. He established U.S. authority in the Philippines and wrote the instructions for an American governing commission sent there in 1900. He also effected a reorganization of the army, established the principle of rotation of officers from staff to line, and created the Army War College in 1901.

Root left the Cabinet in 1904 but returned as secretary of state the following year during Roosevelt's second term and remained until 1909. On a tour of South America (1906) he persuaded Latin-American states to participate in the Second Hague Peace Conference, and he negotiated a series of agreements by which Japan undertook to control its immigration to the United States, to arbitrate certain kinds of disputes, and to respect the Open Door Policy in China. He also concluded treaties of arbitration with more than twenty nations. Later, as chief counsel for the United States before the Hague Tribunal, he settled the controversy between the United States and Great Britain over the North Atlantic coast fisheries. For these and other contributions to peace and general world harmony he was awarded the Nobel Prize for Peace.

From 1909 to 1915, as a Republican senator from New York, Root sided with the William Howard Taft wing of the party. After the outbreak of World War I in Europe, he openly supported the Allies and was critical of Pres. Woodrow Wilson's policy of neutrality. He was a leading Republican supporter of the League of Nations and served on the League's commission of jurists, which framed

the statute for the Permanent Court of International Justice (1920–21). Pres. Warren Harding appointed him one of four U.S. delegates to the International Conference on the Limitation of Armaments (1921–22). In his later years Root worked closely with Andrew Carnegie on programs for international peace and for the advancement of science.

BIBLIOGRAPHY. Robert Bacon and James Brown (eds.), *Collected Speeches and Papers of E. Root*, 8 vol. (1916–25); Philip C. Jessup, *Elihu Root*, 2 vol. (1938); Richard W. Leopold, *Elihu Root and the Conservative Tradition* (1954).

Root, John Wellborn (b. Jan. 10, 1850, Lumpkin, Ga., U.S.—d. Jan. 15, 1891, Chicago), architect, one of the greatest practitioners in the Chicago school of commercial American architecture. His works are among the most distinguished early attempts at a mature aesthetic expression of the height and the function of the skyscraper.

Sent to England for safety during the American Civil War (1861–65), Root attended Oxford for a year. Having returned to the United States in 1866, he received a degree in civil engineering from New York University in 1869. After two years (1871–73) as head draftsman for the Chicago architectural firm of Carter, Drake, and Wight, he joined another draftsman, Daniel H. Burnham, in a partnership that became one of the most famous firms in U.S. architectural history. Burnham and Root's first important commercial building was the Montauk Building (1882; demolished 1902). To meet the problem of supporting this 10-story structure on masonry footings (piers) in the soft Chicago soil, Root incorporated into the foundation a grillage of iron rails, thereby distributing the weight over the entire ground area. Another major technical innovation in the Montauk Building was the use of flat tile arches in the floors for fireproofing.

As the firm's chief designing partner, Root created two of the finest works of the Chicago school in that city. The Rookery (1884–86) evidently was influenced by the Romanesque Revival style of H.H. Richardson. The north half of the Monadnock Building (1889–91), 16 stories high, is generally regarded as the world's tallest office building with load-bearing walls. (The south half, designed by the firm of Holabird and Roche and completed in 1893, has an interior frame, or skeleton, of steel.) Root's exterior design of the Monadnock is universally famous for its deceptive simplicity and stark beauty.

Root died of pneumonia while serving on the architectural staff of the World's Columbian Exposition, Chicago. He wrote many papers on the philosophy of the new architectural movement in Chicago.

Root–Takahira Agreement (Nov. 30, 1908), accord between the United States and Japan that averted a drift toward possible war by mutually acknowledging certain international policies and spheres of influence in the Pacific. The inflammatory effect of discriminatory legislation against Japanese labourers in California had been ameliorated in 1907 by the Gentlemen's Agreement (*q.v.*).The United States was uneasy about subtle Japanese violations of the Open Door policy (*q.v.*) in China following the Russo-Japanese War (1904–05). A basic principle of Pres. Theodore Roosevelt's foreign policy was the preservation of good relations with Japan. Therefore, on the heels of a visit by an impressive U.S. fleet to Tokyo harbour in 1908, the U.S. secretary of state, Elihu Root, met with the Japanese ambassador in Washington, Takahira Kogoro. The principles of the resulting agreement emphasized the wish of both governments to maintain the status quo in the Pacific and to defend the Open Door policy and the integrity and independence of China. In addition, they resolved to develop their commerce in East Asia and to respect each other's territorial possessions there. Although the Root–Takahira Agreement acknowledged Japan's right to annex Korea and its special position in Manchuria, it was generally considered a diplomatic victory for the United States, and war was averted.

Ropar, also called RŪPNAGAR, city, administrative headquarters of Ropar district, Punjab state, northwestern India. The city lies on the Sutlej River near the head of the great Sirhind Canal. The terminus of a branch rail line, Ropar is a marketplace for agricultural products and has small weaving and iron products industries. There is a college in the city.

Ropar district, 805 sq mi (2,086 sq km) in area, is a tract of flat floodplain, located just west of Chandīgarh. Pop. (1981) city, 25,165; district, 716,662.

rope, assemblage of fibres, filaments, or wires compacted by twisting or braiding (plaiting) into a long, flexible line. Wire rope is often referred to as cable (*q.v.*). The basic requirement for service is that the rope remain firmly compacted and structurally stable, even while the rope is bent, twisted, and pulled. The prime property of a rope is its tensile strength.

The texture and the nature of a rope is determined by the colour, fineness, stiffness, strength, and stretchability of the fibres or filaments used in its construction. Cotton ropes, for example, are softer, weaker, and stretchier than manila or sisal ropes. Manila ropes are stronger, for a given size, than hemp or jute ropes. Since even short fibres can be spun into long flexible yarns, practically any fibre can be made into a rope.

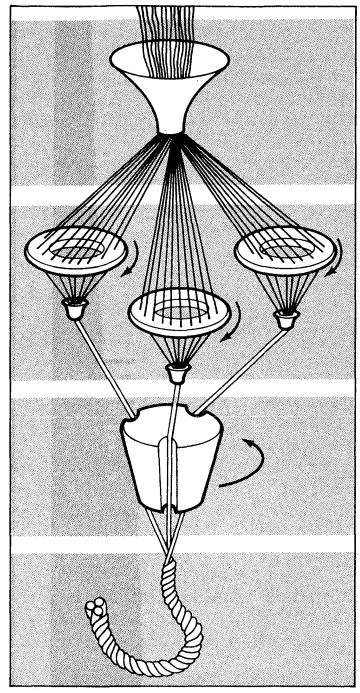
Ropes made of filaments drawn from ductile metals or synthetic polymers differ from natural-fibre ropes in that any particular filament contributing to the rope form runs throughout the entire length of the rope. A thick filament or wire is stiffer than a fine one of the same material; its use results in a stiffer rope for a given size.

In the basic twisted rope structure, alternate stages are twisted in opposite directions to give torsional stability. When the rope twist is seen to spiral in direction upward to the right as the rope is held vertically, it is designated as right-laid or Z-twist; if upward to the left, as left-laid (S-twist). The braided or plaited rope structure provides torsional balance by crossing and recrossing rope components in maypole fashion.

Natural-fibre, man-made filament, and wire ropes ordinarily range upward from a diameter of 3/16 in. (about 5 mm). Smaller ropes are designated cords; similar assemblages in which torsional balance is of no consequence are called twine or yarn. Cables are torsionally balanced structures formed by twisting several ropes together. Compared with organic-fibre ropes, wire ropes are stronger, stiffer, heavier, and less extensible. Man-made filament ropes are stronger than natural-fibre ropes but are generally stretchier.

Manufacturing process. Rope making is divided into four phases: (1) The fibres or filaments are prepared for spinning (twisting) into yarns. (2) The fibres or filaments are spun or bunched into yarns and yarns into cords for the manufacture of man-made filament ropes. (3) A number of yarns are twisted into strands (forming). (4) Three or more strands are twisted into rope (laying).

The fibres are combed or carded, then slivered and spun into yarn by the processes used in the textile industry. Strands, also known as readies, are formed by twisting yarns, or small cords, together. The stranding machines, called formers or bunchers, vary in size and form depending on ability to accommodate continuous strand lengths as well as on production rates and flyer speeds.



Processes through which fibre passes in the manufacture of rope

The twisted rope consists generally of three S-twist strands, twisted (laid) together in the direction of opposing twist (Z-twist). The most common, three-strand rope, is also designated plain, or hawser-laid, rope; a four-strand rope, shroud-laid rope.

The rope-laying operations require machines similar to strand-forming machinery. The strands, on bobbins, are pulled through a compression tube and twisted into rope by a revolving flyer. As twisted, the rope is wound onto a heavy steel bobbin, also turning with the flyer. The three subassemblies of the rope-laying machine, arranged in tandem horizontally, are the foreturn flyers (rotating strand bobbins), the capstan flyer (pulling mechanism), and the receiving flyer (rope-twisting and storage bobbin mechanism). The length of rope twisted in such a laying machine is limited by the dimensions of the receiving flyer.

In another type of horizontal rope-laying machine, the strand bobbins are arranged in tandem within a flyer. As each strand is pulled off its bobbin, it is overtwisted and in this condition combined with its adjacent strands into rope. This machine requires no receiving bobbin in its flyer; the rope is coiled directly into a reel form. The rope length, accordingly, is limited only by the strand length. Such machines may be designed with component parts arranged horizontally or vertically to minimize required floor space.

The ropewalk, a long, low building in which rope and other cordage are made by hand-operated tools, is still in use in certain areas. The length of the walk limits the length of rope that can be made without splicing; yarns spun in the longest walk (about 1,200 feet [370 metres]) form, when fully twisted, a 700-foot (210-metre) rope.

Pictures from Egyptian tombs *c.* 1500 BC show men walking while making rope. The first walks were outdoor level spaces, often having posts at intervals to support long work as it was extended. Later walks were roofed or completely enclosed. A mechanized method based on the ropewalk is used extensively throughout the world.

In addition to the twisted structures, ropes in the size range of 1-in. to 5-in. (2.5-cm to 12.7-cm) diameter are also made in which four sets of strands, equally paired left twist

and right twist, are braided into an eight-strand plaited structure. Another braided rope structure, identified as double-braided rope, consists of a layer of heavy twisted yarns, braided about a coarse braided rope core, to envelop the core. Such braided ropes require specialized machinery and are used to best advantage where rope flexibility and torsional balance are prime service requirements.

Applications. The constructional factor, for a given fibre or filament, that can most influence the strength of the rope is the degree of twist in the rope and strands; the greater the twist, the lower the strength. Repeated loading in tension, short of breaking the rope, will have no adverse effect on the rope strength. Actually, provided the tensile load is not great enough to break inner strand yarns, repeated loadings may result in higher breaking strengths by inducing better mutual adjustment of yarn and strand tensions as the rope is repeatedly stretched.

Natural-fibre ropes deteriorate most readily because of fibre degradation caused by mold growth. Man-made filament ropes deteriorate most readily when exposed to sunlight, elevated temperatures, or damaging chemicals, all of which accelerate filament decomposition.

Rope kinks or strand kinks (cockles) result from an unbalanced twist relationship in the rope structure, the consequence of improper handling. In this respect, braided or plaited ropes are superior to twisted ropes.

The marine rope user, who consumes the major portion of manufactured rope, formerly preferred heavy twisted manila rope but now finds greater serviceability in nylon or in polypropylene because of their higher strength and lighter weight. If stretch or flexibility are also important considerations, ropes of composite filaments or plaited structures are preferred.

The foregoing criteria are applied to many rope structures related to specific uses. Water skiing rope, for example, is generally braided polypropylene, which floats and resists kinking; mountain climbing rope is nylon, which is strong and firm; sail rope is spun (short filament) polyester, braided or twisted to minimize stretching.

Roper, Elmo (Burns, Jr.) (b. July 31, 1900, Hebron, Neb., U.S.—d. April 30, 1971, West Reading, Pa.), American pollster, the first to develop the scientific poll for political forecasting. Three times he predicted the reelection of Pres. Franklin D. Roosevelt (1936, 1940, 1944).

Roper studied at the University of Minnesota and the University of Edinburgh, without receiving a degree. He operated a jewelry store in Creston, Iowa, from 1922 to 1928 and then became a salesman for a succession of clock and manufacturing companies (1928–33). In 1933 he joined with marketing expert Paul T. Cherington and writer Richardson Wood in a marketing research firm—Cherington, Roper and Wood—which lasted (without Wood) until 1938, when Roper went on alone as head of Roper Research Associates, Inc.

Meanwhile, the publisher Henry Luce had engaged Roper's services in 1935 to do *Fortune* magazine surveys of public opinion, services that Roper continued for 15 years. The 1936 presidential election first brought Roper to national attention in his very close predictions of the results. Thereafter, he not only conducted public-opinion research of various kinds (employing the techniques of small samples) but also wrote a syndicated newspaper column and was editor-at-large for *Saturday Review*, a popular magazine. He retired in 1966.

Roper River, river in Northern Territory, Australia, formed by the confluence of Waterhouse River and Beswick Creek east of Mataranka and flowing east for 250 mi (400 km) to Limmen Bight on the Gulf of Carpentaria. It marks the southern limit of the rugged region known as Arnhem Land. The flowage of the river system, which drains an area of 23,500 sq mi (60,860 sq km), increases greatly during the summer. Its main tributaries include the Strangways, Hodgson, and Wilton rivers and Elsey and Flying Fox creeks. Many north-bank tributaries descend steep, narrow canyons from the Arnhem Land plateau. The river, navigable for 100 mi above its mouth, was visited in 1845 by the German explorer Ludwig Leichhardt, who named it for a member of his expedition. The Stuart Highway and North Australia Railway parallel 50 mi of its upper reaches. Roper River (1908), a township 65 mi from the gulf, has a school for Aborigines and produces mixed crops and cattle. North of the mouth is the "Ruined City of Arnhem Land," a region of sandstone whose weathered shapes suggest ruined buildings.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Rops, Félicien (b. July 7, 1833, Namur, Belg.—d. Aug. 22, 1898, Essonnes, Fr.), Belgian painter and graphic artist remembered primarily for his prints.



Aquatint from his series "Pornokrates" by Félicien Rops, 1895

By courtesy of Marcel Mabille, Rhode St. Genese, Belgium; photograph Paul Bytebier, Bruxelles

Rops went to the University of Brussels. His early work on student periodicals attracted the attention of publishers, and he began to produce illustrations, contributing some of his finest lithographs to the satirical journal *Uylenspiegel* in 1859–60. About 1860 he went to Paris, where he worked in the studio of Henri-Alfred Jacquemart. Returning to Brussels, he founded the short-lived Société Internationale des Aquafortistes. In 1865 he produced his famous "Absinthe Drinker" and in 1871 "Lady with the Puppet."

After 1874 Rops lived in Paris, where he became a friend of the poet Charles Baudelaire. Devoting himself principally to illustrating books, he also published *Cent croquis pour réjouir les honnêtes gens* ("One Hundred Sketches to Delight Solid Citizens"). Among his notable book illustrations are *Légendes flamandes* ("Flemish Legends"), by C. de Coster; *Jeune France* ("Young France"), by Théophile Gautier; *Les Diaboliques* (*Weird Women*), by Barbey d'Aurevilly; *Zadig,* by Voltaire; and the poems of Stéphane Mallarmé. He joined the revolutionary art society of the XX (Twenty) formed at Brussels in 1884.

Known for his licentiousness and free choice of subject, Rops was actually a printmaker of brilliant technique and original content whose handling of dry point (etching directly on the plate) marks him as one of the masters of the medium. He was also one of the first modern etchers to revive the neglected medium of soft-ground etching, in which the etching ground is melted into and mixed with tallow, producing the effect of lines drawn with a soft pencil or chalk.

Ropshin, V. (Russian novelist): *see* Savinkov, Boris Viktorovich.

roque (game): *see* croquet.

Roquefort, classic blue cheese made from ewe's milk, often considered the greatest cheese of France; the designation Roquefort is protected by French law.

Roquefort cheese is widely imitated throughout the world, and its name is used rather indiscriminately on processed cheeses and salad dressings. True Roquefort is noted for its sharp, tangy, salty flavour and its rich, creamy texture. In the 20th century, some authentic Roqueforts are made in Corsica, but all still undergo final aging in the limestone caves of Roquefort near Toulouse in southern France, where the stable cool and humid atmosphere promotes growth of the mold *Penicillium roqueforti.* By French law, only cheese that is processed at Roquefort, France, may be labeled "Roquefort cheese."

Roquefort is generally formed in 5-pound (2.3-kilogram) cylinders of 7-inch (18-centimetre) diameter and 4-inch thickness. The white paste of the interior is marbled with blue mold; the cheese is wrapped in foil bearing a traditional insignia of red sheep.

roquette, also called ROCKET SALAD (*Eruca vesicaria sativa*), Mediterranean annual herb, of the mustard family (Brassicaceae), naturalized in parts of North America. Roquette grows to about 70 centimetres (2½ feet)



Roquette, or rocket salad (*Eruca vesicaria sativa*)

G.R. Roberts

tall. Four-petalled, white, purple-veined flowers top its flower stalks. Thick, flat-beaked pods hug the stalk below, interspersed with stalkless, sharp-lobed leaves. The larger basal leaves have stalks and, when young, are used in salads. A medicinal oil is extracted from the seeds.

Roraima, territory, northern Brazil, bordered north by Venezuela and Guyana, east by Guyana, and west by Venezuela. Formerly a part of Amazonas state, it was created by decree in 1943 and until 1962 was named Rio Branco. Its 88,844-sq-mi (230,104-sq-km) area is drained from north to south by the Rio Branco, a tributary of the Rio Negro. Most of Roraima is sparsely inhabited and covered with rain forest, but around Boa Vista (*q.v.*), the territorial capital, there are extensive woodland savannas, used for cattle ranching. Some gold and diamonds are found in the streams. In the 1970s northern Roraima territory was designated as a reserve for some 5,000 Yanomano Indians, Brazil's largest re-

maining isolated tribal group, who previously had inhabited the area as well as other parts of Roraima and Amazonas territories. Pop. (1984 est.) 99,000.

Roraima, Mount, Spanish MONTE RORAIMA, Portuguese MONTE RORAÍMÃ, giant flat-topped mountain in the Pacaraima Mountains, at the point where the boundaries of Brazil, Venezuela, and Guyana meet. About 9 mi (14 km) long and 9,094 ft (2,772 m) high, it is the source of many rivers of Guyana, and of the Amazon and Orinoco river systems.

Rorik (Varangian prince): *see* Rurik.

Rorke's Drift, Battle of (1879): *see* Isandhlwana and Rorke's Drift, Battles of.

rorqual, common name for five species of baleen whales of the genus *Balaenoptera* and the family Balaenopteridae, among them the valuable blue whale, fin whale, and sei whale (*qq.v.*). The term is often extended to include the humpback whale (*q.v.*), the only other member of the family.

Rorschach, Hermann (b. Nov. 8, 1884, Zürich—d. April 2, 1922, Herisau, Switz.), Swiss psychiatrist who devised the inkblot test that bears his name and that is widely used clinically for diagnosing psychopathology.

The eldest son of an art teacher, Rorschach considered becoming an artist but chose medicine instead. As a secondary school student, he was nicknamed Kleck, meaning "inkblot," because of his interest in sketching. He attended several universities before receiving his M.D. from the University of Zürich in 1912, then worked in Russia for a year before returning to Switzerland to practice. For several years, his main interest was in psychoanalysis, and he became a staunch advocate of the then-new psychoanalytic technique in Swiss medical circles, being elected vice president of the Swiss Psychoanalytic Society in 1919.

In 1917 Rorschach discovered the work of Szyman Hens, who had studied the fantasies of his subjects using inkblot cards. In 1918 he began his own experiments with 15 accidental inkblots, showing the blots to patients and asking them, "What might this be?" Their subjective responses enabled him to distinguish among his subjects on the basis of their perceptive abilities, intelligence, and emotional characteristics. The Rorschach test is based on the human tendency to project interpretations and feelings onto ambiguous stimuli, in this case, inkblots. From these cues trained observers are supposed to be able to pinpoint deeper personality traits and impulses in the person taking the test.

Rorschach published the results of his studies on 300 mental patients and 100 normal subjects in *Psychodiagnostik* (1921; *Psychodiagnostics,* 1942). The book attracted little attention before Rorschach died the next year, but his method has since been widely adopted as a tool for psychological evaluation and diagnosis.

Rorschach Test, projective method of psychological testing in which a person is asked to describe what he sees in 10 inkblots, of which some are black or gray and others have patches of colour. Responses are scored as to the location in the blot of the thing seen; the kind of stimulus characteristic emphasized—*e.g.,* form or colour; and the content of the percept—*e.g.,* animal. From response scores, the tester attempts to describe the testee's personality, often by comparing scores to established norms. Interpretation is not highly standardized, however, and though popular, the test has been attacked as being unreliable, even in the areas of diagnosis and prognosis in which it is most frequently used. The test was

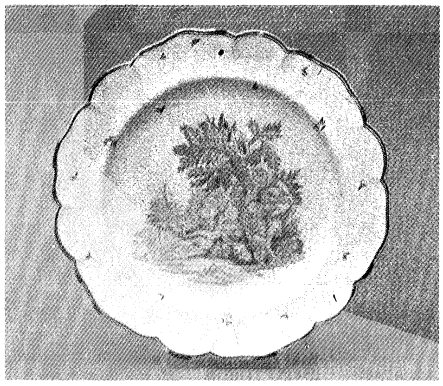


Ink blot, similar to those used in the Rorschach Test

introduced in 1921 by the Swiss psychiatrist Hermann Rorschach. Similar tests have since been devised, notably one with two 45-card forms by U.S. psychologist W.H. Holtzman.

Rörstrand faience, first faience (tin-glazed earthenware) produced in Sweden, at the Rörstrand factory established in 1725 by a Dane, Johann Wolff, near Stockholm. Cristoph Konrad Hunger, an arcanist from Meissen and Vienna, became the manager of the factory in 1729.

Rörstrand faience was either decorated in blue *camaïeu* (monochrome) or imitated Italian *bianco sopra bianco* ("white on white"), sometimes with touches of manganese or purple. It was only when Johann Buchwald, who



Rörstrand faience plate, *c.* 1770; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London; photograph EB Inc.

had worked at Höchst as well as Fulda, joined Rörstrand in 1757, that polychromed decoration was introduced (in 1758), to meet the competition from a rival Swedish faience factory at Marieberg. *Famille rose* designs were then produced as well as flower painting and some work in emulation of Marieberg, which itself was bought finally by Rörstrand in 1782. Anders Stenman, a workman from Rörstrand, is alleged to have discovered transfer printing around 1766 and introduced it to Marieberg.

Rory O'CONNOR, also spelled O'CONOR: *see* Roderic O'Connor.

Ros Mhic Thriúin (Ireland): *see* New Ross.

Rosa, João Guimarães: *see* Guimarães Rosa, João.

Rosa, Monte (Pennine Alps): *see* Monte Rosa.

Rosa, Salvator (b. June 20, 1615, Arenella, Sicily—d. March 15, 1673, Rome), Italian Baroque painter and etcher of the Neapolitan school remembered for his wildly romantic or "sublime" landscapes, marine paintings, and battle pictures. He was also an accomplished poet, satirist, actor, and musician.

Rosa studied painting in Naples, coming under the influence of the Spanish painter and engraver José de Ribera, who worked for a time in the studio of Aniello Falcone. Encouraged by Giovanni Lanfranco, Rosa went to Rome in 1635 to study, but he soon contracted malaria. He returned to Naples, where he painted numerous battle and marine pictures and developed his peculiar style of landscape—picturesquely wild scenes of nature with shepherds, seamen, soldiers, or bandits—the whole infused with a romantic poetic quality.

His reputation as a painter preceded his return to Rome in 1639. Already famous as an artist, he also became a popular comic actor. During the Carnival of 1639 he rashly satirized the famous architect and sculptor Bernini, thereby making a powerful enemy. For some years thereafter the environment of Florence was more comfortable for him than that of Rome. In Florence he enjoyed the patronage of Cardinal Giovanni Carlo de' Medici. Rosa's own house became the centre of a literary, musical, and artistic circle called the Accademia dei Percossi; here also Rosa's flamboyant personality found expression in acting. In 1649 he returned and finally settled in Rome. Rosa, who had regarded his landscapes more as recreation than as serious art, now turned largely to religious and historical painting. In 1660 he began etching and completed a number of successful prints. His satires were posthumously published in 1710.

Rosales, the rose order of flowering plants, belonging to the class known as dicotyledon (characterized by two seed leaves). The order consists of about 115 genera, and 3,200 species classified into three families. Its members include some of the best known ornamental and edible-fruit plants in the temperate parts of the world. Among them are the roses, spireas, hawthorns, apples, peaches, cherries, pears, plums, strawberries, and raspberries.

A brief treatment of Rosales follows. For full treatment, *see* MACROPAEDIA: Angiosperms.

The Rosales are most characteristic of temperate regions of both the Old and the New World, and are particularly abundant in eastern Asia, Europe, and North America. Some species are tropical. An extremely diverse order, its members range from small herbs to shrubs and woody climbers to small and large trees. Woody and partly woody species predominate. Habitats range from sea level to alpine meadows, and many species are found

in association with human activities. The cultivated fruit trees thrive best in well-drained soil, and commercial orchards are frequently in hilly or rolling countryside.

By far the largest family in the order is the Rosaceae, the rose family, with about 3,000 species of trees, shrubs, and perennial herbs. Roses (genus *Rosa*) are probably the most widely recognized and universally favoured of ornamental flowering plants. Hundreds of varieties are cultivated in all types of settings, and many hybrids have been produced by crossbreeding. Spirea (*Spiraea*) and cinquefoils (*Potentilla*) are also popular garden plants. Hawthorn (*Crataegus*), mountain ash (*Sorbus*), and flowering cherry (*Prunus*) are grown as ornamental trees.

The most important fruits of the Rosales order are also members of the rose family. Apples (*Malus*) and peaches (*Prunus*) form an economic base for several regions around the world. Other members of the group are strawberries (*Fragaria*); pears (*Pyrus*); cherries, plums, apricots, and almonds (*Prunus*); quinces (*Cydonia*); and blackberries and raspberries (*Rubus*).

Commercially grown roses furnish petals from which oils are extracted to make perfume. Rose hips, the fruits of wild roses, are gathered for their high vitamin C content. Agrimony (*Agrimonia*) was once looked upon as a cure-all and still forms the basis of folk remedies. Excellent woods come from the hawthorn and the black cherry.

The much smaller Chrysobalanceae family ranges through the tropics, chiefly in the Amazon region of South America. Its members are trees and shrubs, some of which produce edible fruits, medicines, and oils. Some trees grow very tall and provide extremely hard wood. The third, very small, family of the order is the Neuradaceae, a group of annual herbs of African and Indian deserts.

The order Rosales includes a range of lifeforms from small creeping herbs to giant hardwood trees. Many members have thorns or prickles. Leaves are situated alternately on the stems and have stipules (small leaflike appendages). Flowers are often showy, usually with five petals and five sepals arranged in radial symmetry and joined to form a floral cup. The flowers are bisexual (having both female and male reproductive structures), and pollen-bearing stamens are abundant. Fruits may be dry or fleshy; some contain stony pits. Seeds have small embryos and no endosperm (food-storage tissue).

A number of species of the rose family contain dangerous cyanide compounds. Peach pits, bitter almonds, and several kinds of wild cherry are poisonous to animals and humans. The foliage of chokecherry (*Prunus virginiana*), wild black cherry (*P. serotina*), and species of mountain mahogany (*Cercocarpus*) are sometimes fatal to browsing animals.

In members of the Rosales order, colour and scent draw insect pollinators to the flowers to feed on the copious pollen and spread it to receptive female organs of other plants. Seed dispersal depends on the type of fruits produced. Species with fleshy edible fruits attract birds and animals that drop seeds and fruit parts as they feed. Other groups have fruits with hooks or barbs that catch on animal fur or human clothing and are carried from place to place.

Reproduction does not always depend on seeds, however. Many groups in the order reproduce asexually by vegetative propagation. Strawberries send out runners that root and form new plants; raspberries produce rhizomes (underground stem structures), which form new shoots that grow up in another spot. These two plants also retain the ability to form seeds; other species entirely lose their capacity for sexual reproduction. The ability of a species to maintain itself without the need of fertilization is an advantage when pollinators are scarce or when conditions are unfavourable for seed development and germination.

Rosamond, also spelled ROSAMUND, byname THE FAIR ROSAMOND (b. *c.* 1140—d. *c.* 1176), a mistress of Henry II of England. She was the subject of many legends and stories.

Rosamond is believed to have been the daughter of Walter de Clifford of the family of Fitz-Ponce. She is said to have been Henry's mistress secretly for several years but was openly acknowledged by him only when he imprisoned his wife, Eleanor of Aquitaine, as a punishment for encouraging her sons in the rebellion of 1173–74. Rosamond died in or about 1176 and was buried in the nunnery church of Godstow before the high altar. The body was removed by order of St. Hugh, bishop of Lincoln, in 1191 and was, seemingly, reinterred in the chapter house.

The story that she was poisoned by Queen Eleanor first appears in the French Chronicle of London in the 14th century. The romantic details of the labyrinth at Woodstock, including the clue that guided King Henry II to her bower, were the inventions of storywriters of later times. There is no evidence to support the popular belief that she was the mother of Henry's natural son William Longsword, Earl of Salisbury.

Rosario, river port and city, the third largest in Argentina, southeastern Santa Fe *provincia,* on the western bank of the Paraná River.

In 1689 Luis Romero de Pineda, a colonial soldier, built a villa on the site of Rosario, gathering settlers and workers from Santa Fe to establish a *pago,* a rural settlement within a larger administrative *distrito* ("district"). Pago de los Arroyos grew around this site, and in 1725 the site of the villa was named Rosario. In 1731 the Church of Nuestra Señora del Rosario (Our Lady of the Rosary) was erected and became the early centre of the city. The first school in Rosario was founded in 1778 by order of Juan José de Vértiz, viceroy of Río de la Plata. Unlike interior cities such as Córdoba, Rosario supported the May Revolution of 1810 enthusiastically, sending men, horses, and food to its aid. There, in 1812, General Manuel Belgrano hoisted the first Argentine flag after installing long-range guns along the riverbank to defend Rosario. Throughout the struggle for independence and later internal civil wars the town endured many hardships because of its location between Buenos Aires and the interior *provincias.* The worst of these hardships occurred in 1819, when General Juan Ramón Balcarce, supporter of the revolution, burned Rosario to the ground. In 1829 the rebuilt town was again practically destroyed, this time by warships following Juan Galo Lavalle's attempt to take over the government in Buenos Aires. From that point until 1852, when it was declared a city, Rosario slowly rebuilt itself and developed. In 1854 its first bank was established, the Banco de la Confederación. Development was further enhanced in 1860, when Rosario was officially declared a port. Government policy promoted Rosario's natural harbour for domestic and foreign ocean-going ships.

A new era of prosperity began with the construction of the Central Railroad (completed 1863) linking Rosario to Córdoba, the port's first rail link to the interior. Harbour facilities were upgraded in the late 19th and early 20th centuries with French capital, allowing Rosario to remain Argentina's primary port until the 1940s, as well as one of the world's leading grain ports. This also gave a French company the right to profit from Rosario's port facilities until 1942, when the government of Ramon S. Castillo took over its operation. Following the government takeover, Rosario's primacy as a port suffered as the government emphasized a diversified economy and competition among Argentina's ports. It continues to be a major exporter of grain, other agricultural products, meat, and lumber. It is also an industrial city, producing many export items as well as steel, refrigeration equipment, automobiles, and agricultural machinery.

As Rosario industrialized in the late 1800s, it also became a centre of radical activity under Leandro Nicebro Alem in 1890. Revolution there and in other cities in 1905 attacked the government of Manuel Quintana, and radical movements and conspiracies continued through the 20th century. In 1969 the city was hit by violent worker strikes and riots. In 1976 Bolivia was granted a large freeport zone along Rosario's riverfront, thereby gaining access to the sea for that landlocked nation.

In 1919 the School of Economics of the National University of the Littoral was established in Rosario. The National University of Rosario was established in 1968. The city has several fine museums, including the Museum of Provincial History (1939), the Municipal Decorative Arts Museum (1968), and the Municipal Fine Arts Museum (1937). In 1957 the Monument of the Flag was erected, commemorating General Belgrano's raising of the first Argentine flag. Notable buildings are a Renaissance-style cathedral and the Municipal Palace (1896).

There are few transportation links that traverse the Paraná River to the east. Major paved roads and railways give Rosario access to all parts of Argentina. The modern airport is a junction for internal air travel. There are several television stations. Pop. (1980) 875,-664; Greater Rosario, 954,606.

rosary (from Latin *rosarium,* "rose garden"), religious exercise in which prayers are recited and counted on a string of beads or a knotted cord. By extension, the beads or cord may also be called a rosary. The practice is widespread, occurring in Christianity, Hinduism, Buddhism, and Islām.

In Christianity, the practice was adopted in the 3rd century by Eastern Christian monks, and various forms of the rosary were developed. In Roman Catholicism, the rosary became a popular method of public and private prayer. The most common rosary is the rosary of the Blessed Virgin Mary, the prayers of which are recited with the aid of a chaplet, or rosary. The beads of the chaplet are arranged in five decades (sets of 10), each decade separated from the next by a larger bead. The two ends of the chaplet are joined by a small string holding a crucifix, two large beads, and three small beads.

In its most widespread form, the rosary of the Blessed Virgin requires three turns around the chaplet. It consists of the recitation of 15 decades of Hail Marys, each Hail Mary noted by holding a small bead. Each decade is preceded by the Lord's Prayer (a large bead), followed by the Gloria Patri (Glory Be to the Father), and accompanied by a meditation, or mystery. The 15 mysteries are events from the life, death, and glorification of Jesus and Mary; they are divided into three sets of five—the joyous, sorrowful, and glorious mysteries. The introductory and concluding prayers of the rosary vary.

The origin of the rosary of the Blessed Virgin is not certain, although it has been associated with St. Dominic, founder of the Dominican order in the early 13th century. The devotion probably developed gradually among the unlettered as a substitute for the recitation of the psalms or the divine office. It reached its definitive form in the 15th century through the preaching of the Dominican Alan de la Roche and his associates, who organized Rosary Confraternities at Douai in France and at Cologne. In 1520 Pope Leo

X gave the rosary official approbation, and it was repeatedly commended by the Roman Catholic church. Since the 1960s, however, public recitation of the rosary has become rare.

In Eastern Orthodoxy the rosary is almost exclusively a monastic devotion. The *kombologion* ("chaplet") used among the Eastern Orthodox of Greece and Turkey has 100 beads of equal size. The Russian Orthodox *vertitza* ("string"), *chotki* ("chaplet"), or *lievstoka* ("ladder") is made of 103 beads, separated into irregular sections by 4 large beads and joined together so that the lines of beads run parallel, thus suggesting the form of a ladder. In the Romanian church, the chaplet is called *matanie* ("reverence") because the monk makes a profound bow at the beginning and end of each prayer counted on the beads.

In Islām the rosary is an act of piety. It consists of counting 33 beads and requires three turns around the chaplet. Each bead represents one of the "most beautiful names of Allah" found in the Qur'ān, for a total of 99.

rosary pea: *see* jequirity bean.

Rosas, Juan Manuel de (b. March 30, 1793, Buenos Aires—d. March 14, 1877, Southampton, Hampshire, Eng.), military and political leader of Argentina, who was governor (1835–52) of Buenos Aires with dictatorial powers.

Rosas was of a wealthy family that held some of the largest cattle ranches in Argentina. He received his primary education in Buenos Aires but spent most of his youth in the countryside. He gradually acquired land of his own, south of the Salado River, in Buenos Aires province. He gathered a force of men subject to him and became a gaucho (cowboy). He married Encarnación Ezcurra y Arquibel in 1813 and then began to administer a meat-salting plant known as Los Cerrillos.

In 1820 Colonel Manuel Dorrego, governor of Buenos Aires, appointed Rosas head of the provincial militia. After Dorrego was overthrown in 1828, Rosas opposed the new governor, Juan Lavalle. Rosas reconvened the former legislature, which elected him governor on Dec. 5, 1829. As head of the Federalist Party, Rosas was opposed by Lavalle's Unitarios (centralists). Although it appeared that he could remain in office after his three-year term, he decided to leave his post to his legal successor but returned to the governorship once again in 1835. He agreed to return only under the condition that he receive dictatorial powers.

Rosas' 17-year dictatorship, although professing to be federalist, was in fact centralist and noted for its law and order through tyranny. His spies and secret police intimidated all opposition, so that by 1840 few dared to oppose him. He also ordered the display of his portrait in public places and churches as a sign of his supreme command. Finally a coalition of Brazilians, Uruguayans, and native Argentinians, under the leadership of Justo José de Urquiza, overthrew Rosas at the Battle of Caseros (Feb. 3, 1852). Rosas was forced to flee to England.

Roscelin, Latin ROSCELLINUS COMPENDIENSIS, or RUCELINUS (b. *c.* 1050, Compiègne, Fr.—d. *c.* 1125), French philosopher and theologian known as the originator of an extreme form of nominalism holding that universals are nothing more than verbal expressions. His only extant work seems to be a letter to the French philosopher Peter Abelard, who studied under him at Besançon; the little that is otherwise known of Roscelin's doctrines is derived from the works of St. Anselm and of Abelard and from the anonymous work *De generibus et speciebus* ("Of Generals and Specifics"). Roscelin retracted his doctrine on the Trinity, namely that it consisted of three separate persons in God, when it was declared heretical by the Council of Soissons in 1092.

Roscius, in full QUINTUS ROSCIUS GALLUS (d. 62 BC), Roman comic actor of such celebrity that his name became an honorary epithet for any particularly successful actor.

Born into slavery at Solonium, Roscius gained such reknown on the stage that the dictator Sulla freed him from bondage and conferred upon him the gold ring, the emblem of equestrian rank. He reportedly was very well paid for his talent.

Although Roscius was known for his painstaking rehearsal of the fine points of each role, he also had a gift for improvisation. He is said to have instructed Cicero in elocution. Cicero, in turn, defended Roscius in a lawsuit, and his oration on behalf of the actor, *Pro Roscio comoedo,* survives. Among those to acquire the honorary epithet Roscius were the English child star William Henry West Betty (1791–1874), known as the Young Roscius, and the American-born black tragedian Ira Aldridge (1804?–67), dubbed the African Roscius.

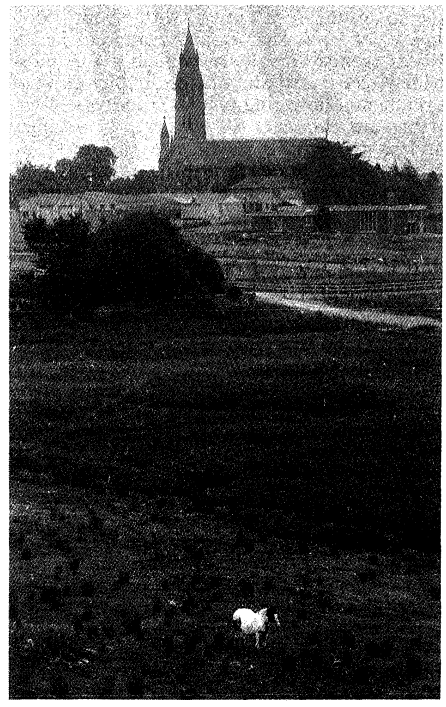
Roscius, The Young (English actor): *see* Betty, William Henry West.

Roscommon, Irish ROS COMÁIN, county in the province of Connaught, Ireland. With an area of 951 square miles (2,463 square km), it is bounded by Counties Sligo (north), Leitrim (northeast), Longford and Westmeath (east), Offaly (southeast), Galway (southwest), and Mayo (west). Most of it lies between the River Shannon and its major tributary, the Suck. Athlone on the Shannon is the main point of entry to the county; north of it lies Lough (lake) Ree and, farther upstream, Loughs Bofin and Boderg. Along most of its course are extensive water meadows known as callows. Between the Shannon and the Suck the landscape is a mixture of limestone surfaces 200–400 feet (60–120 m) high and depressions varying from peat bogs to water meadows. There are also some eskers (long ridges of post-glacial gravel) that are quarried extensively. Within this area sheep and cattle are raised, particularly on the limestone pastures; and oats, hay, and potatoes are the main crops. At Roscommon town there are annual wool sales and a busy trade in lambs and sheep at the fairs. About three-quarters of the area is farmland, the rest is peat bog. To the east of Boyle the rich limestone grasslands, known as the Plains of Boyle, are famed as cattle pastures. Farms are small, with a concentration on cattle. To the northeast of Roscommon, the Slieve Bawn ridge rises to 846 feet (258 m).

In antiquity, northwestern county Roscommon was MacDermott country; and part of the south was in O'Kelly occupation. By the Composition of Connaught (1585) a large number of lords and chieftains of the province were given tenure in their territories under English law. Because Connaught and Clare were left by Oliver Cromwell to Irish proprietors after the English conquest in the 17th century, this part of Ireland retained its Irish social pattern longer than any other, though it was affected by the penal laws, the land acts, and other social changes that were imposed upon Ireland generally.

A county council meets in Roscommon, the county town (seat), and there is a county manager. The area is strongly dependent on agriculture, though industry is increasing. The towns have a strong retail trade and monthly fairs, however, and coal mining has been resumed at Arigna. Pop. (1986) 54,592.

Roscommon, Irish ROS COMÁIN, market and county town (seat), County Roscommon, Ireland, lying northwest of Dublin. A monastery and school were established on the site in the 7th century by St. Coman. In the town and its environs are the remains of a Dominican abbey founded in 1253 by Felim O'Connor, king of Connacht, and a Norman castle built in 1269 by the justiciar of Ireland. The modern



Church of the Sacred Heart at Roscommon, Ire.
James Fraher

Roman Catholic church is noted for its mosaics and stained-glass windows. A royal charter of 1282 gave to the prior of St. Coman's Abbey the right to hold a weekly (Saturday) market, which continues to the present day. The town's monthly fairs also are well known in Ireland, and a cooperative livestock mart has been in operation since 1959. Industry includes the manufacture of mosaics, textile-fabricating machinery, plastics, castings, and leather goods. The town is on the main rail line from Dublin to Westport. Pop. (1981) 1,673.

rose, any perennial shrub or vine of the genus *Rosa,* within the family Rosaceae, an almost universally distributed group of some 100 species. The great majority are native to Asia. Many are cultivated for their beautiful, fragrant flowers. These are commonly white, yellow, orange, pink, or red and, in wild roses,



Prairie rose (*Rosa setigera*)
John H. Gerard

are borne singly or in small clusters. The flowers of wild roses usually have five petals, while the flowers of cultivated roses are often double (*i.e.,* with multiple sets of petals).

Roses are erect, climbing, or trailing shrubs whose stems are usually copiously armed with prickles of various shapes and sizes that are called thorns. The plant's leaves are alternate and pinnately compound (*i.e.,* feather-formed). The rather oval leaflets are sharply toothed. The rose plant's fleshy, sometimes edible, berrylike "fruit" (actually the floral cup) is known as a hip.

Roses are native primarily to the temperate regions of the Northern Hemisphere. Most rose species are native to Asia, with smaller numbers being native to North America and a few to Europe and northwest Africa. Roses from different regions of the world hybridize readily, giving rise to types that overlap the parental forms, and making it difficult to determine basic species. Of the more than 100 species of roses, fewer than 10 species (most native to Asia) were involved in the crossbreeding that ultimately produced today's many types of garden roses.

There are several major classes of garden roses. The best-known and most popular class of rose are the hybrid tea roses, which account for the majority of roses grown in greenhouses and gardens and sold in florist shops. Hybrid teas come in the complete range of rose colours and have large, symmetrical blossoms. Hybrid teas resulted from the crossbreeding of frequently blooming but fragile tea roses with vigorous hybrid perpetual roses. The hybrid perpetuals achieved great popularity until they were supplanted by the hybrid teas in the early 20th century. Polyantha roses are a class of very hardy roses that produce dense bunches of tiny blossoms. Floribunda roses are hardy hybrids that resulted from crossing hybrid teas with polyanthas. Grandiflora roses are relatively new hybrids resulting from the crossbreeding of hybrid teas and floribunda roses. Grandifloras produce full-blossomed flowers growing on tall, hardy bushes. Among the other classes of modern roses are climbing roses, whose slender stems can be trained to ascend trellises; shrub roses, which develop into large bushes; and miniature roses, which are pygmy-sized plants bearing tiny blossoms. Altogether there are approximately 13,000 identifiable varieties of roses in these and other classes.

No other flower is so universally known and admired as that of the rose. Its blossoms range in colour from white through various tones of yellow and pink to dark crimson and maroon. Many varieties have been bred with beautiful blends of colour. Rose flowers' size ranges from tiny miniatures 1.25 cm (0.5 inch) in diameter to flowers measuring more than 17.5 cm (7 inches) across. Roses have a delightful fragrance, which varies according to the variety and to climatic conditions.

Roses can become infected by a number of diseases, most of them caused by fungi. Powdery mildew appears as a grayish white moldlike growth on the surface of young leaves and stems. Black spot fungus appears as conspicuous black spots on leaves and causes them to fall off. Rust is also a common disease of roses.

Attar of rose, used in perfumes, is obtained from the rose blossoms, especially those of the damask rose (*R. damascena*). Rose hips, particularly those of *R. rugosa,* are a source of vitamin C and are sometimes used in preserves.

Rose OF LIMA, SAINT, Spanish SANTA ROSA DE LIMA, original name ISABEL DE FLORES (b. April 20/30, 1586, Lima, Viceroyalty of Peru [now in Peru]—d. Aug. 24, 1617, Lima; canonized April 12, 1671; feast day August 23, formerly August 30), patron saint of Peru and of all South America and the first person born in the Western Hemisphere to be canonized by the Roman Catholic Church.

Born into a wealthy family, Rosa (the name by which she was always known) was drawn to penitential practices and a spiritual life, which was opposed by her mother, who wanted her to marry. The struggle between them lasted 10 years, during which time Rose made a perpetual vow of virginity, taking St. Catherine of Siena as her model. In 1606 her mother relented and allowed Rosa to become a Dominican of the Third Order. She chose strict enclosure and contemplation and withdrew to the seclusion of a hut in the family garden, where she endured a life of severe austerity: she wore a crown of thorns, practiced fasting, slept on a bed of broken glass and potsherds, and experienced numerous visions, particularly of the devil. Only in the last three years of her life did she leave her seclusion. Her funeral was an occasion of public honour, and many miracles were said to have occurred after her death.

She was beatified in 1668 by Pope Clement IX and declared patron of Lima; she was canonized by Pope Clement X, who proclaimed her patron saint of South America, the Indies, and the Philippines.

Rose, Billy, original name WILLIAM SAMUEL ROSENBERG (b. Sept. 6, 1899, Bronx, N.Y., U.S.—d. Feb. 10, 1966, Montego Bay, Jam.), American theatrical impresario and composer of more than 50 song hits.

Rose became an expert at taking shorthand dictation and during World War I was the chief stenographer for the financier Bernard Baruch, head of the War Industries Board. In the 1920s he began to write songs and eventually composed about 400, including "Barney Google," "That Old Gang of Mine," "It's Only a Paper Moon," "Me and My Shadow," and "Without a Song." As a theatrical producer, Rose's successes included *Crazy Quilt* (1931); *Jumbo* (1935), an extravagant circus musical; and *Carmen Jones* (1943), the musical comedy version of the opera *Carmen,* with an all-black cast. Rose owned several nightclubs,



Billy Rose
Culver Pictures

and his varied career also included astute real estate and stock market investments, art collecting, and highly publicized philanthropy. One of his several marriages was to Fanny Brice, the singing comedienne of the *Ziegfeld Follies* (1929, divorced 1938).

Rose, Hugh Henry, BARON STRATHNAIRN OF STRATHNAIRN AND OF JHĀNSI (b. April 6, 1801, Berlin, Prussia [Germany]—d. Oct. 16, 1885, Paris, Fr.), British field marshal and one of the ablest commanders during the Indian Mutiny (1857).

Son of the diplomat Sir George Rose, he was educated and received his military training in Berlin and entered the British army in 1820. From 1841 to 1848 he was consul general in Syria. As British liaison officer at French headquarters during the Crimean War, he was present at all the battles of the war and was promoted to major general in 1854.

At the beginning of the Indian Mutiny, Rose became commander of the Central India force and conducted the most difficult and successful operations of the war. After a series of victories he laid siege to Jhānsi, the principal hostile stronghold of the area, and finally (April 3–4, 1858) overcame the vigorous resistance. Other victories followed. In 1860, as commander in chief in India, he took command of the Bombay army with the delicate



Hugh Henry Rose, engraving after a photograph
The Mansell Collection

task of amalgamating the queen's and the East India Company's forces in that province.

Returning to England in 1865, Rose became commander in chief in Ireland (1865–70), where he maintained peace and kept the revolutionary Fenians under control. He was knighted (K.C.B.) in 1855, raised to the peerage in 1866, and made a field marshal in 1877. He died unmarried, and the peerage became extinct.

rose, otto of: *see* attar of roses.

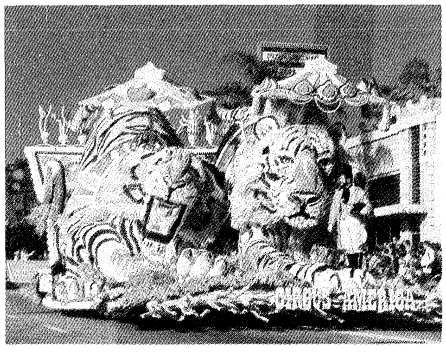
Rose, Pete, byname of PETER EDWARD ROSE (b. April 14, 1942, Cincinnati, Ohio, U.S.), American professional baseball player who was noted for his all-around ability and enthusiasm. In 1985 he exceeded Ty Cobb's record of hits in a career (4,191) to become baseball's player with the most hits.

Rose was directed to sports in his childhood by his father, and at the age of eight Rose began to play in organized youth baseball. At his father's insistence, he became a switch hitter (either right- or left-handed) at the age of 10. He played second base at Western Hills (Cincinnati) High School and at the age of 18 signed with the National League Cincinnati Reds. After three seasons in the minor leagues, Rose came up to the Reds in 1963 and for nine years (1965–73) batted more than .300. He played second base, the outfield, third base, and first base (exclusively from 1980), leading the league in fielding in 1970, 1974, 1976, and 1980 and leading both leagues in 1971. In 1979 he went to the Philadelphia Phillies. By 1984 Rose had had 17 seasons in which he was at bat 600 times or more and had collected 3,990 hits. After that season he was released by the Phillies. In the 1984 season he played for the Montreal Expos, but he made his hitting record in 1985 as player-manager of the Cincinnati Reds. By the time he retired as a player in 1986, Rose had a record career total of 4,256 hits. His other records included most games played, 3,562; most times at bat, 14,053; and most seasons with 200 hits or more, 10. His lifetime batting average was .303.

In 1989 Rose came under investigation by professional baseball's commissioner because of reports that he had bet repeatedly on major league baseball teams, including his own Cincinnati Reds, in the mid-1980s. In August 1989 Rose was banned from major league baseball for life as a consequence of the investigation.

Rose Bowl, formally PASADENA TOURNAMENT OF ROSES, oldest American postseason college football contest, held annually in Pasadena, Calif., U.S., on New Year's Day (or January 2, if New Year's Day falls on a Sunday). Each Rose Bowl game is preceded by a Tournament of Roses Parade, or Rose Parade, which is one of the world's most elaborate and famous of annual parades.

The first festival, originally called the Battle of Flowers, was held on Jan. 1, 1890, under the auspices of the Valley Hunt Club and consisted of local citizens decorating their carriages and buggies with flowers and driving



Circus float in a Tournament of Roses Parade
By courtesy of the Pasadena Tournament of Roses

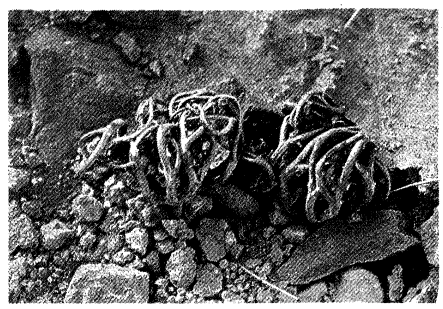
over a prearranged route; the parade was followed by amateur athletic events. From 1897 on, the tournament was conducted by a newly established Pasadena Tournament of Roses Association. In 1902 the first football game was held (between the University of Michigan and Stanford University) in Tournament Park; but chariot races and other contests were thereafter substituted, and football was not introduced as the annual contest until 1916. The Rose Bowl stadium opened in 1922, ready for the 1923 game. Originally, the championship team of the Pacific Coast Conference simply invited a winning team from anywhere in the eastern United States. Since 1947 participation has been limited to teams of the Big Ten Conference (in the Midwest) and the Pacific Coast (later Pacific Eight, then Ten) Conference. For Rose Bowl football scores, *see* Sporting Record: *Football.*

The morning parade now consists of about 60 floats of intricate design, elaborately decorated with flowers and illustrating some aspect of the parade's theme of the year. Interspersed among the floats are marching bands and costumed horses and riders; and included in the five-and-a-half-mile-long procession are a grand marshal and a Rose queen.

rose fever: *see* hay fever.

rose moss (*Rhodobryum roseum;* formerly *Bryum roseum*), plant of the order Bryales, found throughout most of the world in woods or sheltered grassy places. Rose moss seldom forms capsules (spore cases); it reproduces primarily by stolons (horizontal stems that root at the nodes). Each vertical caulid (stem) is topped by a rosette of dark-green phyllids (leaves) that is usually about 2 cm (about 0.8 inch) in diameter.

rose of Jericho, also called RESURRECTION PLANT (*Anastatica hierochuntica*), plant that is the only species of the genus *Anastatica,* of the mustard family (Brassicaceae), native to western Asia. The small, gray plant curls its branches and seedpods inward in the dry season, forming a ball that opens only when moistened. In this form, it can be stored for years and is often sold as a curiosity. The ball rolls with the wind like a tumbleweed. When moistened, it spreads into a fernlike plant



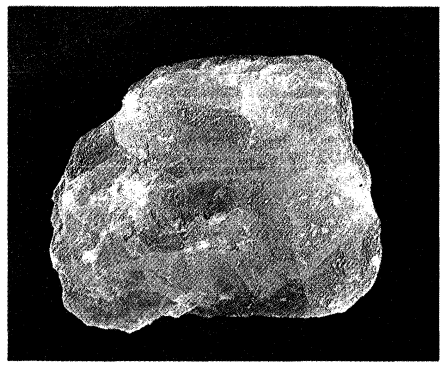
Rose of Jericho (*Anastatica hierochuntica*)
V-DIA—SCALA from Art Resource/EB Inc.

as much as 30 cm (1 foot) wide and bears minute, white flowers.

rose of Sharon, also called SHRUB ALTHAEA (*Hibiscus syriacus,* or *Althaea syriaca*), shrub or small tree, in the mallow family (Malvaceae), native to eastern Asia but widely planted as an ornamental for its showy flowers. It can attain a height of 3 m (10 feet) and generally assumes a low-branching pyramidal growth habit. The mallowlike flowers range in the different varieties from white and pinkish lavender to purple, generally with a crimson base; certain varieties have double flowers.

rose oil: *see* attar of roses.

rose quartz, translucent, usually turbid, very coarse-grained variety of the silica mineral quartz found in pegmatites. Rose quartz is valued for its pale- to rich-pink colour, which may be due to titanium. It has been carved since early times and has been faceted to provide gems of good brilliance. Its milky aspect



Rose quartz from Brazil
B.M. Shaub

is attributed to tiny needlelike inclusions of rutile, which, when oriented, give the polished stone an asterism (optical phenomenon of a star-shaped figure) like that found in sapphire, but not as sharp or intense. Rose quartz occurs in Brazil, Sweden, Namibia, California, and Maine. Its properties are those of quartz (*see* silica mineral [table]).

Rose Theatre, London playhouse built by Philip Henslowe and in active use from 1587 until about 1605. Henslowe and his partner, John Cholmley, had the theatre constructed on a leased rose garden on the South Bank of the Thames. The building was octagonal in shape, partly thatched, and made of timber and plaster on a brick foundation.

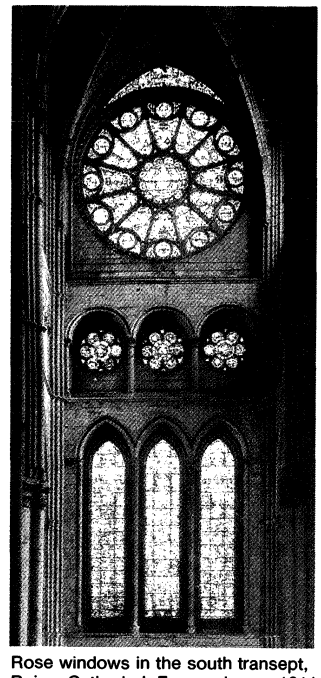
Details of the early years of operation are unknown, but in 1592 Lord Strange's Men, in company with some of the Admiral's Men and the actor Edward Alleyn, took up residence at the Rose. They presented Robert Greene's *Friar Bacon and Friar Bungay,* Thomas Kyd's *The Spanish Tragedy,* Christopher Marlowe's *The Jew of Malta,* and William Shakespeare's *Henry VI, Part I.* Sussex's Men occupied the Rose in 1593–94, giving the first performance of Shakespeare's *Titus Andronicus.* Alleyn, who had married Henslowe's stepdaughter, brought the Admiral's Men to the Rose in 1594. In 1600, with the Rose in bad repair and suffering from the competition of the newly opened Globe Theatre, Henslowe built a new theatre, the Fortune, to the north of the city, and the Admiral's Men transferred there. The Rose was used sporadically until Henslowe's lease expired in 1605 and was torn down shortly thereafter.

In 1989 the building foundations of the Rose Theatre were rediscovered in London during a construction project. From these remains it was calculated that the theatre had had a diameter of about 70 feet (21 m) and a seating capacity of about 2,200. The foundations were subsequently preserved as an unofficial historic site.

rose window, also called WHEEL WINDOW, in Gothic architecture, decorated circular window, often glazed with stained glass. Scattered examples of decorated circular windows existed in the Romanesque period (Santa Maria in Pomposa, Italy, 10th century). Only toward the middle of the 12th century, however, did the idea appear of making a rich decorative motif out of a round window. At this time the simple rose window became a distinguishing characteristic of many transitional and early Gothic churches. It was used mainly at the west end of the nave and the ends of the transepts. The introduction of developed bar tracery in the 13th century gave a compelling impetus to rose window design.

The general scheme of a rose window's tracery consisted of a series of radiating forms, each of which was tipped by a pointed arch at the outside of the circle. The bars between these forms were joined at the centre by a pierced circle of stone, and the forms themselves frequently were treated like little traceried windows with subsidiary, subdividing bars, arches, and foiled circles. The major examples of this High Gothic type are largely French, in which the rose window achieved its greatest medieval popularity. Those of the cathedrals of Reims, Amiens, and Notre-Dame at Paris, all of the 13th century, are particularly noteworthy.

The introduction of Flamboyant tracery changed the character of the French rose window. The radiating elements consisted of an intricate network of wavy, double-curved bars, creating new geometric forms and flame shapes, as well as furnishing a diagonal bracing



Rose windows in the south transept, Reims Cathedral, France, begun 1211
SCALA—Art Resource/EB Inc.

to the whole composition, adding to its structural strength. The early 16th-century transept rose of the Beauvais cathedral is an example.

Early in its development, the rose window spread throughout Europe. Examples are to be found in Italy (S. Zeno Maggiore in Verona, the cathedral of Carrara), Spain (Burgos cathedral), England (Lincoln cathedral), and Germany and central Europe.

Roseau, capital and chief town of Dominica, an independent island republic in the Caribbean Sea. It lies on the island's southwestern coast, at the mouth of the Roseau River. Its port, an open roadstead, exports limes, lime juice, essential oils, tropical vegetables, and spices. The main buildings include a Roman Catholic cathedral, St. George's Church (Anglican), Government House, and Victoria Memorial Museum. There are botanic gardens and nearby waterfalls and thermal springs. The town, formerly called *Charlotte Town,* was burned by the French in 1805 and again suffered nearly total destruction by a hurricane in 1979. Pop. (1981) 8,300.

Rosebery, town, western Tasmania, Australia, on the Pieman River. Named after British prime minister Lord Rosebery, it was founded around 1900 after the discovery in 1893 of gold in Rosebery Creek and lead ore at nearby Mt. Read. Lead smelters were in operation there until 1913, but the high zinc content of the ore made commercial exploitation unprofitable. The mines were reopened in 1936 with the introduction of new processing methods. In the 1970s reserves were estimated at 9,000,000 tons. Much of this ore, which also contains silver, gold, and cadmium, is transported by aerial buckets from a pit, 5 mi (8 km) northeast, to a refinery in town. Zinc ore and lead are railed to Burnie, the former for shipment to Risdon, near Hobart, and the latter for export to the U.S. Montezuma Falls and Cradle Mountain-Lake St. Clair National Park are nearby. Pop. (1981) 2,675.

Rosebery, Archibald Philip Primrose, 5th earl of (b. May 7, 1847, London—d. May 21, 1929, Epsom, Surrey, Eng.), British prime minister from March 3, 1894, to June 21, 1895; faced with a divided Cabinet and a hostile House of Lords, his ministry achieved little of consequence.

His father, Archibald Primrose, son of the 4th Earl, died before Archibald was four; as heir to the earldom he therefore bore the title of Lord Dalmeny at Eton. He studied at Christ



Rosebery, ink drawing by an unknown artist; in the Scottish National Portrait Gallery, Edinburgh

By courtesy of the Scottish National Portrait Gallery, Edinburgh

Church, Oxford, without receiving a degree, and in 1868 he succeeded to the earldom and to large estates in Scotland. Early on, he had taken an interest in politics, leaning toward Liberalism, but he never sat in the House of Commons.

At Rosebery's suggestion and with his help, William Ewart Gladstone conducted the Midlothian campaigns (November 1879 and March 1880) that inspired the Liberals to a decisive victory in the national election of 1880. In Gladstone's second government Rosebery served as undersecretary of state in the Home Office, with special responsibility for Scottish affairs (August 1881–June 1883), and as lord privy seal (March–June 1885). Associated with the Progressives in London politics, he became the first chairman (1889) of the London County Council. In Gladstone's final governments, he was secretary of state for foreign affairs from February to July 1886 and from August 1892 to March 1894.

Mistrusting Russia and (to a lesser extent) France, Rosebery largely continued Lord Salisbury's policy of secret collaboration with the Triple Alliance powers (Germany, Austria-Hungary, and Italy). His Liberal Imperialism clashed with the views of his chief; in 1894 he established a protectorate over Uganda, from which Gladstone had wished to withdraw all British influence. At home he headed a committee that effected (Nov. 17, 1893) a compromise settlement of a major coal strike.

A controversy over an increased appropriation for the navy resulted in the fall of Gladstone, who had opposed the measure, and his replacement by Rosebery, who favoured a stronger battle fleet. Rosebery proved unable to resolve the conflicts within the Liberal Party, and the determinedly Conservative House of Lords rejected all Liberal legislation except the budget. When his government lost a House of Commons vote on a minor issue, Rosebery hastily and gladly resigned. On Oct. 8, 1896, he also resigned as leader of the Liberal Party. During the South African War (1899–1902) his enthusiasm for the British Empire led to his estrangement from the bulk of the party, and, late in 1905, a few weeks before the Liberals returned to power, he completely broke with them by declaring his opposition to Irish Home Rule. He thereafter ceased to play any major role in public life. He wrote widely read biographies of Chatham, Pitt, Napoleon, and Lord Randolph Churchill; and he was noted throughout his life for his stable of racehorses. The 1st Marquess of Crewe (his son-in-law) wrote *Lord Rosebery,* 2 vol. (1931); *Rosebery,* by Robert Rhodes James, appeared in 1963.

Roseburg, city, seat (1854) of Douglas County, southwestern Oregon, U.S., on the South Umpqua River, between the Coast (west) and Cascade (east) ranges. Settled in 1851, it was known as Deer Creek but was renamed for Aaron Rose, who laid out the townsite in 1854. A forest economy maintains sawmills and wood industries while agriculture is based chiefly on sheep raising. There is some nickel mining and smeltering. Headquarters for Umpqua National Forest, Roseburg is a gateway to Crater Lake National Park and mountain resorts, and tourism is an important source of income. Umpqua Community College (1964) is located there. Inc. 1872. Pop. (1980) 16,644.

Rosecrans, William S(tarke) (b. Sept. 6, 1819, Kingston Township, Ohio, U.S.—d. March 11, 1898, Redondo Junction, Calif.),



Rosecrans

By courtesy of the Library of Congress, Washington, D.C.

Union general and excellent strategist early in the American Civil War (1861–65); after his defeat in the Battle of Chickamauga (September 1863), he was relieved of his command.

Graduated from the U.S. Military Academy at West Point, N.Y., in 1842, Rosecrans served 12 years as an army officer and then resigned to become an architect and civil engineer in Ohio and Virginia. Returning to active service upon the outbreak of the war, he served under Gen. George B. McClellan and Gen. John Pope, each of whom he succeeded when he moved east to larger commands. During 1862 Rosecrans led Union forces to victory in the battles of Iuka and Corinth, Miss., after which he moved on to Nashville, Tenn., to take command of the Army of the Cumberland. He fought well at the intense but indecisive Battle of Stones River, or Murfreesboro (Dec. 31, 1862–Jan. 2, 1863).

About this time, Rosecrans' earlier aggressive quality seemed to give way to an excess of caution and a disposition to worry and to argue with his superiors, who he felt were hampering the effectiveness of his command. Finally, on June 23, 1863, after six months of delay in the face of official pressure to take the offensive, he began an advance that forced Confederate Gen. Braxton Bragg into Chattanooga, Tenn., then manoeuvred him out of the city without a battle. There his customary hesitancy vanished, and he followed Bragg, who turned upon him and precipitated the bloody Battle of Chickamauga (September 19–20). An ill-advised move opened a gap in Rosecrans' lines and allowed Southern forces to pour through and put to rout part of his army, which was driven back into Chattanooga. Only the strong stand of Gen. George H. Thomas on the North's left averted complete defeat. Gen. Ulysses S. Grant was now charged with the relief and defense of the besieged city; Grant promptly removed Rosecrans, ending any important role for him in the war.

Rosecrans resigned his army commission in 1867, serving as minister to Mexico during the next two years. Later he represented California in the U.S. House of Representatives (1881–85) and served as register of the U.S. Treasury (1885–93).

rosefinch, any of the 21 or so species of the genus *Carpodacus,* of the songbird family Carduelidae, sometimes placed in the Fringillidae. Rosefinches are about 15 centimetres (6 inches) long and mostly gray or brownish; males are red on the head, breast, and rump. The common, or scarlet, rosefinch (*C. erythrinus*) of Eurasia, sometimes called scarlet grosbeak, and the purple finch (*C. purpureus*), breeding in northern North America, are alike in having the head wholly red and the underparts virtually unstreaked. The house finch (*C. mexicanus*), with red forehead band and streaked underparts, is a dooryard bird throughout western North America; it is often called linnet. This species was introduced (1940) on Long Island, N.Y., and is spreading along the Atlantic seaboard; it is also established in Hawaii. The rose-breasted rosefinch (*C. puniceus*) breeds at 5,500 metres (18,000 feet) in the Himalayas—perhaps higher than any other songbird.

Rosegger, Peter (b. July 31, 1843, Alpl, Austria—d. June 26, 1918, Krieglach), Austrian writer known for his novels describing provincial life.

The son of a peasant, Rosegger became a travelling tailor and then studied at a commercial school in Graz. His first published work (1869) was a collection of poems in dialect, but he soon began to write mildly didactic stories and novels about the people, customs, and landscape of his native Styria.

Rosegger's most famous novels are *Waldheimat* (1877; *The Forest Farm,* 1912) and *Die Schriften des Waldschulmeisters* (1875; *The Forest Schoolmaster,* 1901). Always concerned with social reform, he especially favoured the spread of rural education. His autobiographical and religious writings were widely read and include *Der Gottsucher* (1883; *The God-Seeker,* 1901) and *Mein Weltleben* (1898). His *Gesammelte Werke,* 40 vol. ("Collected Works") appeared in 1914–16.

rosella, any of several species of popular caged birds, particularly certain Australian species, classified as parakeets. *See* parakeet.

roselle (*Hibiscus sabdariffa*), also called ROSELLA, JAMAICAN SORREL, or JAVA JUTE, plant of the mallow family (Malvaceae), and its fibre, one of the bast fibre (*q.v.*) group. Roselle is probably native to West Africa and includes *H. sabdariffa* variety *altissima,* grown for fibre, and *H. sabdariffa* variety *sabdariffa,* cultivated for the edible external portion of its flower (calyx). The plant, known in the West Indies early in the 16th century, was growing in Asia by the 17th century. Extensive cultivation in the Dutch East Indies (now Indonesia) began in the 1920s under a government-subsidized program established to obtain fibre for sugar-sack manufacture.

Although a perennial, roselle is usually grown as an annual and propagated from seed. It grows best in loamy, well-drained soil, mainly in tropical climates, and requires rainfall averaging about 10 inches (25 centimetres) each month throughout the growing season. Stalks and leaves range from dark green to reddish colour; flowers are creamy white or pale yellow. For fibre crops, seeds are sown close together, producing plants 10 to 16 feet (3 to 5 metres) high, with little branching. The stalks, cut when buds appear, are subjected to a retting process, then stripped of bark or beaten, freeing the fibre. In some areas retting time is reduced by treating only the bark and its adhering fibre. Plants for fruit crops, more widely spaced, are shorter and many-branched, and their calyxes are picked when plump and fleshy.

The fibre strands, 3 to 5 feet (1 to 1.5 metres) long, are composed of individual fibre cells. Roselle fibre is lustrous, with colour ranging from creamy to silvery white, and is moderately strong. It is used, often combined with jute, for bagging fabrics and twines. India, Java, and the Philippines are major producers.

In many tropical areas, the red, somewhat acid calyxes of *H. sabdariffa* variety *altissima* are used locally for beverages, sauces, jellies, preserves, and chutneys; the leaves and stalks are consumed as salads or cooked vegetables and used to season curries; and in Africa the oil-containing seeds are eaten.

Roselle and Roselle Park, boroughs in Union County, New Jersey, U.S., adjoining Elizabeth on the west. Roselle was settled before the American Revolution, and Abraham Clark, one of New Jersey's signers of the Declaration of Independence, was a native son. Mainly residential suburbs of New York City, both communities have some industry. Manufactures include pumps, luggage, furniture, toys, fire extinguishers, machinery, and metal products. The site of some of Thomas A. Edison's experiments on the electric light, Roselle was the first community to have an incandescent electric street-lighting system. In Roselle Park, once called North Roselle, Guglielmo Marconi, inventor of the wireless, established a plant in 1913, which during World War I was a leading manufacturer of communications equipment. KDY, a pioneer commercial radio station, began broadcasting in Roselle Park in 1921. Roselle was incorporated in 1894 and Roselle Park in 1901. Pop. (1980) Roselle, 20,641; Roselle Park, 13,377.

rosemary (*Rosmarinus officinalis*), small perennial evergreen shrub of the mint family (Laminaceae, or Labiatae) whose leaves are used to flavour foods. Rosemary leaves have a tealike fragrance and a pungent, slightly bitter taste. They are generally used sparingly, dried or fresh, to season foods, particularly lamb, duck, chicken, sausages, seafood, stuffings, stews, soups, potatoes, tomatoes, turnips, other vegetables, and beverages. Whole sprigs are removed before food is served because of their powerful taste.



Rosemary (*Rosmarinus officinalis*)
Dorothea W. Woodruff—EB Inc.

In ancient times rosemary was believed to strengthen the memory; in literature and folklore it is an emblem of remembrance and fidelity. Rosemary is slightly stimulating; in traditional medicine it was a popular aromatic constituent of tonics and liniments. Today, its fragrant oil is an ingredient in numerous toiletry products and in vermouth. Native to the Mediterranean region, it has been naturalized throughout Europe and temperate America and is widely grown in gardens in the warmer parts of the U.S. and in Great Britain, where an old garden legend reads "where rosemary thrives the mistress is master."

The rosemary bush has a main stem usually around 3 feet (1 metre) but sometimes up to 7 ft tall, and linear leaves about 0.4 inch (1 centimetre) long resembling curved pine needles, dark green and shiny above, white beneath, and with margins rolled back onto the under face. The flowers are bluish, in small axillary clusters. Bees are particularly fond of rosemary.

The essential oil content is from 0.3 to 2 percent, and it is obtained by distillation. Its principal component is borneol.

Rosemeyer, Bernd (b. Oct. 14, 1909, Lingen, Ger.—d. Jan. 28, 1938, near Mörfelden), German automobile racing driver who established himself as one of the world's great drivers in three seasons of racing (1935–37).

Rosemeyer began racing as a member of the Auto Union motorcycle team but switched to racing cars in 1935. In 1935 he won his first major race, the Masark Grand Prix. In 1936 he won the German, Swiss, and Italian Grand Prix to become European champion. His victory during a German race driven in misty weather earned him the nickname Nebelmeister ("mist master"). In 1937 he won the German Grand Prix again, the Vanderbilt Cup (U.S.), the Acerbo Cup (Italy), and the Donnington Grand Prix (England). He set a track record at the German Avus circuit of 171.75 mph (276.38 kmph). He was killed on the Frankfurt-Darmstadt autobahn when his car lost a tire and hit a bridge while he was attempting to set a flying kilometre record.

Rosenbach, A(braham) S(imon) W(olf) (b. July 22, 1876, Philadelphia—d. July 1, 1952, Philadelphia), U.S. book and manuscript collector and dealer who combined solid scholarship and exceptional business acumen.

Rosenbach attended the University of Pennsylvania (B.S. 1898; Ph.D. 1901), where as a freshman he bought for $3.60 a first edition of Dr. Johnson's prologue at the reopening of Drury Lane Theatre in 1747; he later refused $5,000 for it. From 1895 to 1901 he was a teaching fellow in the English department, and before 1903 he joined his brother Philip in launching the Rosenbach Company, A.S.W. handling books and Philip the antiques. The firm was soon able to buy entire libraries, expanding their business into what may have been the most lucrative book concern in the world. Among his clients were Henry E. Huntington, founder of the library bearing his name at San Marino, Calif., and J. Pierpont Morgan, founder of the library bearing his name in New York City. In 1947 Rosenbach bought a copy of *The Bay Psalm Book* for $151,000, then a record price. A shrewd bibliophile, Rosenbach came to be the most formidable bidder of his time at auctions in the U.S. and Europe. The total of his purchases was estimated to exceed $75,000,000.

In addition to a wealth of English literature and Americana, Rosenbach acquired a magnificent collection of children's books, which he later presented to the Philadelphia Free Library; he bought eight Gutenberg Bibles and more than 30 Shakespeare first folios. He published a great many bibliographical and literary articles; his checklist *Early American Children's Books* (1933) is a standard reference. In 1930 he established the Rosenbach Fellowship in Bibliography at the University of Pennsylvania and willed his estate to the Rosenbach Foundation, established in 1950 to foster interest in books, paintings, and art works. His other works include *Books and Bidders* (1927), *The Unpublished Memoirs* (1917), and *A Book Hunter's Holiday* (1936).

Rosenberg, Alfred (b. Jan. 12, 1893, Reval, Estonia—d. Oct. 16, 1946, Nürnberg), German ideologist of Nazism.

Born the son of a cobbler in what was at the time a part of Russia, Rosenberg studied architecture in Moscow until the Revolution of 1917. In 1919 he went to Munich, where he joined Adolf Hitler, Ernst Röhm, and Rudolf Hess in the nascent Nazi Party. As editor of the party newspaper, *Völkischer Beobachter,* he drew on the ideas of the English racist Houston Stewart Chamberlain and on the *Protocols of the Learned Elders of Zion,* a 19th-century fabrication concerning a supposed Jewish plot for world domination. When Hitler was imprisoned after the Munich Beer Hall Putsch (November 1923), he made Rosenberg leader of the party, knowing him



Alfred Rosenberg
Camera Press

to be incompetent as an organizer and thus unlikely to establish a position of power.

In *Der Zukunftsweg einer deutschen Aussenpolitik* (1927; "The Future Direction of a German Foreign Policy"), Rosenberg urged the conquest of Poland and Russia. *Der Mythus des 20. Jahrhunderts* (1934; "The Myth of the 20th Century") was a tedious exposition of German racial purity. According to Rosenberg, the Germans descended from a Nordic race that derived its character from its environment: a pure, cold, semi-Arctic continent, now disappeared. The Germans, as representatives of this race, were entitled to dominate Europe. Their enemies were "Russian Tartars" and "Semites." The latter included Jews, the Latin peoples, and Christianity, particularly the Catholic Church. Rosenberg's anti-Semitism and advocacy of "Nordic" expansionism gave a certain order and direction to Hitler's own violent prejudices.

At the beginning of World War II, Rosenberg brought Vidkun Quisling, the Norwegian Fascist, into contact with Hitler to discuss a possible Nazi coup d'etat in Norway. After the fall of France, Rosenberg was in charge of transporting captured works of art to Germany. From July 1941 he was a largely powerless *Reichsminister* for the occupied eastern territories. At the Nürnberg trials Rosenberg was adjudged a war criminal and was hanged. His writings and speeches were published under the title of *Blut und Ehre* (1934–41; "Blood and Honour").

Consult the INDEX *first*

Rosenberg, Harold (b. Feb. 2, 1906, New York City—d. July 11, 1978, New York City), U.S. writer, educator, and philosopher particularly known for his insightful contributions to the understanding of 20th-century visual art.

Rosenberg was educated at the City College of New York and Brooklyn Law School. From 1939 to 1942 he worked for the WPA and wrote the *American Guide*. His published works include *Trace Above the Streets* (1942; a collection of poems), *The Tradition of the New* (1959), *The Anxious Object* (1964), *The De-Definition of Art* (1972) and monographs on Arshile Gorky, Willem de Kooning, Saul Steinberg, and Barnett Newman. Rosenberg taught and lectured in colleges and universities throughout the United States and wrote myriad articles about art and literature for the *Partisan Review* and *Art News*. He was the art critic for *The New Yorker* from 1967 until his death.

Many of Rosenberg's writings about such artists as Jackson Pollock, Hans Hofmann, Mark Rothko, and Philip Guston helped to clarify concepts and answer questions about various components of abstract painting. He seemed to often understand a work of art from the artist's perspective, which made many of his commentaries educational and provocative. Rosenberg was significant in the development of public awareness of the Abstract Expressionist art movement that emerged in New York during the 1940s. The now commonly used term "Action painting" was his original phrase used to describe particular aspects of that movement.

Rosenberg, Isaac (b. Nov. 25, 1890, Bristol, Gloucestershire, Eng.—d. April 1918, France), British poet and painter killed in World War I.

Rosenberg first trained to be a painter, winning several prizes at the Slade School of Art, London. He enlisted in the British Army in 1915 and is best known for his "trench poems," written between 1916 and 1918, which showed great imaginative power and originality in imagery. His *Collected Works*, with a foreword by Siegfried Sassoon, first appeared in 1937; an edition by Ian Parsons including poetry, prose, letters, paintings and drawings, was published in 1979.

Rosenberg, Julius and Ethel, *née* GREENGLASS (respectively b. May 12, 1918, New York City—d. June 19, 1953, Ossining, N.Y., U.S.; b. Sept. 28, 1915, New York City—d. June 19, 1953, Ossining), the first U.S. civilians to be put to death for espionage.

Julius Rosenberg, who earned a degree in electrical engineering in 1939, was even then an active member of the Communist Party. In 1940 he became an engineer with the U.S. Army Signal Corps; from this vantage he and his wife Ethel attempted to turn over to the Soviet Union military secrets that came into their possession. Ethel's brother, Sgt. David Greenglass, assigned by the army to the atomic bomb project at Los Alamos, N.M., as a machinist, gave the Rosenbergs data on nuclear weapons. This information was turned over to Harry Gold, a Swiss-born courier for the U.S. espionage ring, and by him to Anatoly A. Yakovlev, Soviet vice consul in New York City.

Gold was arrested on May 23, 1950, in connection with the case of the British spy Klaus Fuchs, and the Rosenbergs and Greenglass were taken into custody shortly thereafter. Another conspirator, Morton Sobell, fled to Mexico City but was deported to the United States for trial. Greenglass was sentenced to 15 years' imprisonment after acting as the government's chief witness against the Rosenbergs. Gold and Sobell each drew terms of 30 years. The Rosenbergs, brought to trial in New York City on March 6, 1951, were found guilty under the Espionage Act of 1917 and sentenced to death. After several appeals and a worldwide campaign for mercy had failed, they were executed at Sing Sing Prison.

Rosenberg, William Samuel (U.S. theatre figure): *see* Rose, Billy.

Rosenbusch, Karl Heinrich Ferdinand, also called HARRY ROSENBUSCH (b. June 24, 1836, Einbeck, Hanover—d. Jan. 20, 1914, Heidelberg, Ger.), German geologist who laid the foundations of the science of microscopic petrography (the study of rocks in thin section, based on the optical properties of constituent mineral grains). He was appointed professor (extraordinary) of petrography at Strasbourg in 1873 and ordinary professor of mineralogy at Heidelberg in 1878. From 1888 to 1907 he was also director of the geological survey of Baden.

In the 19th century the study of the optical properties of minerals was in its infancy, and the research of Rosenbusch was fundamental. His monumental *Mikroskopische Physiographie der petrographische wichtigen Mineralien* (1873; "The Microscopic Physiography of the Petrographically Important Minerals") outlines the practical means by which rocks can be identified according to the morphological, physical, and chemical properties of their component minerals. He also described new instruments and techniques for studying the optical properties of minerals. Utilizing new methods and results of petrographic research, Rosenbusch wrote a companion volume, *Die mikroskopische Physiographie der massigen Gesteine* (1877; "The Microscopic Physiography of the Massive Rocks"), presenting a scheme for classifying rocks. Both works became classic contributions to mineralogy and petrography. He also wrote *Elementen der Gesteinslehre* (1898; "Elements of Petrology").

Rosenfeld, Lev Borisovich: *see* Kamenev, Lev Borisovich.

Rosenfeld, Otto (psychologist): *see* Rank, Otto.

Rosenheim, city, Bavaria *Land* (state), southeastern Germany, at the confluence of the Inn and Mangfall rivers, southeast of Munich, just west of the scenic Chiemsee (lake) and north of the Austrian border. An important medieval trading town on the route from Italy to northern Europe, its many flat-roofed buildings reflect the Italian influence. Chartered in 1864, it is an administrative centre and the economic and communications centre of the Bavarian lower Alpine region. Medieval squares and old houses survive, and the 15th-century parish church was rebuilt in 1881. There is a technical school for the city's important timber industry. Pop. (1989 est.) 54,304.

Rosenwald, Julius (b. Aug. 12, 1862, Springfield, Ill., U.S.—d. Jan. 6, 1932, Chicago), U.S. merchant and unorthodox philanthropist who opposed the idea of perpetual endowments



Rosenwald
By courtesy of the University of Chicago

and frequently offered large philanthropic gifts on condition that they be matched by other donations. He was especially noted for his aid to the education of blacks.

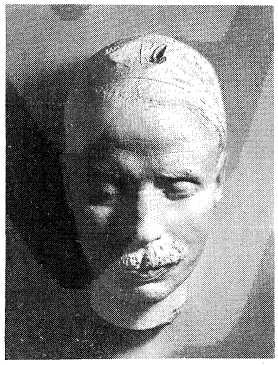
After moderate success in the clothing business in New York City (1879–85) and Chicago (1885–95), Rosenwald bought a one-fourth interest in Sears, Roebuck and Co., which became the world's largest mail-order house and chain of retail stores. In 1910 he succeeded Richard Warren Sears as president, and in 1925 he was named chairman of the Sears board of directors. Rosenwald and A.H. Loeb, treasurer of the company, established an exemplary savings and profit-sharing program for employees. Under Rosenwald's leadership, Sears began to manufacture its own merchandise and instituted the policy of guaranteeing full refunds to dissatisfied customers.

Generous to Jewish charities, Rosenwald nonetheless opposed Zionism. From the early 1900s he was concerned with the welfare of U.S. blacks, and in 1917 he established the Julius Rosenwald Fund (to be expended within 25 years after his death and liquidated in 1948), the chief purpose of which was the improvement of education for blacks. Augmented by local taxes and private gifts, the fund paid for the construction of more than 5,000 schools in 15 southern states. In Chicago, he established (1929) the Museum of Science and Industry, contributed heavily to the University of Chicago, and founded dental infirmaries in the public schools.

Rosenzweig, Franz (b. Dec. 25, 1886, Kassel, Ger.—d. Dec. 10, 1929, Frankfurt am Main), German-Jewish religious Existentialist who, through his fresh handling of traditional religious themes, became one of the most influential modern Jewish theologians. In 1913, although his conversion to Christianity had seemed imminent, a religious experience caused him to devote his life to the study, teaching, and practice of Judaism. While on active service in World War I, he began his magnum opus, *Der Stern der Erlösung* (1921; *The Star of Redemption,* 1971). From 1922 he was afflicted with progressive paralysis but continued work on numerous projects, includ-

ing a new German translation of the Hebrew Bible in collaboration with Martin Buber.

Franz Rosenzweig was born in 1886, the only child of Georg and Adele (*née* Alsberg) Rosenzweig. His father was a well-to-do dye



Rosenzweig, death mask, 1929
By courtesy of N.N. Glatzer

manufacturer and member of the city council; his mother, a deeply sensitive and cultured woman. Franz grew up in an environment of civic responsibility and cultivation of literature and the arts; religious beliefs and observance were no longer evident, beyond perfunctory participation on some occasions. In his university days the gifted young man first started to study medicine (at Göttingen, Munich, and Freiburg) but after a few semesters turned to his real interest: modern history and philosophy (at Berlin and Freiburg). In 1910 he embarked on a study of Hegel's political doctrines. His doctoral dissertation (1912) was to become a section of *Hegel und der Staat* ("Hegel and the State"), a comprehensive work completed some years later. Yet, while steeped in this research, Rosenzweig developed a critical attitude toward Hegel's overemphasis on history and his treatment of the individual person's life as irrelevant to the "whole." In rejecting Hegel, Rosenzweig opposed the philosophic movement known as German Idealism, with its attempt to construct reality out of abstract concepts. Increasingly he tended toward an "existential" philosophy that found its starting point in the experience and concerns of the concrete individual person.

Some of his friends (especially the jurist and historian Eugen Rosenstock-Huessy), who were equally critical of the academic philosophy of the day, had found the solution to the problem of man in religious faith (specifically, conversion to Christianity) and in a dialogical relationship between man and God. After an intense inner struggle Rosenzweig decided in July 1913 to relinquish his Jewish heritage (barely known to him), to accept his friends' interpretation of modern Protestantism as an existential, dialogical faith, and to undergo Baptism. At this critical point in his life, however, he attended the Day of Atonement service in a small, traditional synagogue in Berlin (Oct. 11, 1913). The liturgy of this fast day focusses on the motifs of human sinfulness and divine forgiveness, the realization of life as a standing before God, the affirmation of the oneness of God and of his love. The drama of the liturgy had a powerful effect on Rosenzweig. What he thought he could find only in the church—faith providing an orientation in the world—he found that day in the synagogue. He felt he had to remain a Jew. There followed a period of self-examination to determine whether the emotional experience of that Day of Atonement would stand up to rational criteria. After this clarification, Rosenzweig was determined to devote his life to the study, teaching, and practice of Judaism. The academic year 1913–14 was entirely devoted to an intensive reading of classical Hebrew sources and to attending lectures by Hermann Cohen, an eminent German-Jewish thinker, the founder of the Neo-Kantian school in philosophy.

With the outbreak of World War I, Rosenzweig joined the armed forces and spent most of the duration of the war at the Balkan front, in an anti-aircraft gun unit. The relatively undemanding service allowed Rosenzweig time for study and writing. In 1916–17 he engaged in an exchange of letters with Rosenstock-Huessy on core theological problems in Judaism and Christianity, published in *Judentum und Christentum* (*Judaism Despite Christianity,* 1969), wrote newspaper articles on political and strategic questions, drew up a plan for a reform of the German school system, and wrote "Zeit ist's" ("It Is Time"), a program for a reorganization of Jewish education and scholarship (included in *On Jewish Learning,* 1955). In 1918, while attending an officers' training course near Warsaw, in German-occupied Poland, he had opportunity to observe the life and the customs of eastern European Jews and was deeply impressed by the vitality and richness of their faith. Upon returning to the trenches he felt ready to embark on what was to become his magnum opus: an existentialist religious philosophy demonstrating the mutual relationships between God, man, and the world. This "new thinking" is based on human experience, common sense, and the reality of language and dialogue. The central point of the architectonically arranged work in which this thought is expressed is the act of "revelation" in which God in his love turns to man and awakens within him the consciousness of an "I." *Der Stern der Erlösung,* completed in 1919, appeared in 1921. The work was ignored by the various trends in academic philosophy but highly regarded by Existentialist and, especially, younger Jewish theologians.

In early 1920 Rosenzweig married Edith Hahn of Berlin and wrote "Bildung und kein Ende" (included in *On Jewish Learning* as "Towards a Renaissance of Jewish Learning"), outlining a plan for a Jewish adult study centre. Later in the year he was appointed head of such a centre (the Freies Jüdisches Lehrhaus) in Frankfurt am Main. There students were encouraged to examine classical Hebrew sources, searching for what is vital and relevant. The school became a model for similar institutions elsewhere in Germany. Rosenzweig's active directorship did not last long; early in 1922 he was afflicted with amyotrophic lateral sclerosis, an often fatal form of progressive paralysis. In September 1922 his son Rafael was born. The child brought comfort to the father, whose paralysis affected his whole body, including the vocal organs. In a true heroism of the spirit, although unable to speak or write in a direct physical sense, he managed to continue living as an active scholar, writer, and friend, deeply concerned for his fellowman and community. With the help of his wife, a system of signals between them, and a specially constructed typewriter, he produced important essays and an annotated German version of the medieval Hebrew poetry of Judah ha-Levi.

From 1925 on he embarked, together with Martin Buber, the eminent German-Jewish philosopher and biblical interpreter, on a new German translation of the Hebrew Bible (Old Testament). The translation occasioned a series of articles by him on aspects of biblical thought and style. As a hobby he also wrote reviews of records of classical and sacred music. Nowhere in these works of his paralytic years did the reader detect that the author was mortally ill. Everywhere in them there is evidence of a fresh, keen spirit, intellectual clarity, religious faith, and a sense of humour. He died in 1929. His influence on Jewish religious thought grew remarkably in the decades after his death. (N.N.G.)

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roseola infantum, also called EXANTHEM SUBITUM, infectious disease of early childhood marked by rapidly developing high fever (to 106° F) lasting about three days and then subsiding completely. A few hours after the temperature returns to normal, a mildly itchy rash develops suddenly on the trunk, neck, and behind the ears but fades rapidly after two days. The disease appears to be caused by a filterable virus and is especially contagious. Treatment is to relieve symptoms. Roseola infantum is distinguished from measles by the height and duration of fever preceding the appearance of the rash.

roses, attar of: *see* attar of roses.

Roses, Wars of the (1455–85), in English history, the series of dynastic civil wars whose violence and civil strife preceded the strong government of the Tudors. Fought between the Houses of Lancaster and York for the English throne, the wars were named many years afterward from the supposed badges of the contending parties: the white rose of York and the red of Lancaster.

Both houses claimed the throne through descent from the sons of Edward III. Since the Lancastrians had occupied the throne from 1399, the Yorkists might never have pressed a claim but for the near anarchy prevailing in the mid-15th century. After the death of Henry V in 1422 the country was subject to the long and factious minority of Henry VI. Great magnates with private armies dominated the countryside. Lawlessness was rife and taxation burdensome. Henry later proved to be feckless and simpleminded, subject to spells of madness, and dominated by his ambitious queen, Margaret of Anjou, whose party had allowed the English position in France to deteriorate.

Henry lapsed into insanity in 1453, causing a powerful baronial clique, backed by Richard Neville, the earl of Warwick (the "kingmaker"), to install Richard, duke of York, as protector of the realm. When Henry recovered in 1455 he reestablished the authority of Margaret's party, forcing York to take up arms for self-protection. The first battle of the wars, at St. Albans (May 22, 1455), resulted in a Yorkist victory and four years of uneasy truce. Civil war was resumed in 1459. The Yorkists were successful at Blore Heath (September 23) but were scattered after a skirmish at Ludford Bridge (October 12). In France Warwick regrouped the Yorkist forces and returned to England in June 1460, decisively defeating the Lancastrian forces at Northampton (July 10). York tried to claim the throne but settled for the right to succeed upon the death of Henry. This effectively disinherited Henry's son, Prince Edward, and caused Queen Margaret to continue her opposition.

Gathering forces in northern England, the Lancastrians surprised and killed York at Wakefield in December and then marched south toward London, defeating Warwick on the way at the Second Battle of St. Albans (Feb. 17, 1461). Meanwhile, York's eldest son and heir, Edward, had defeated a Lancastrian

force at Mortimer's Cross (February 2) and marched to relieve London, arriving before Margaret on February 26. The young Duke of York was proclaimed King Edward IV at Westminster on March 4. Then Edward, with the remainder of Warwick's forces, pursued Margaret north to Towton. There, in the bloodiest battle of the war, the Yorkists won a complete victory. Henry, Margaret, and their son fled to Scotland. The first phase of the fighting was over, except for the reduction of a few pockets of Lancastrian resistance.

The next round of the wars arose out of disputes within the Yorkist ranks. Warwick and his circle were increasingly passed over at Edward's court; more seriously, Warwick differed with the King on foreign policy. In 1469 civil war was renewed. Warwick and Edward's rebellious brother George, duke of Clarence, fomented risings in the north; and in July, at Edgecote (near Banbury), defeated Edward's supporters, afterward holding the King prisoner. By March 1470, however, Edward regained his control, forcing Warwick and Clarence to flee to France, where they allied themselves with the French king Louis XI and their former enemy, Margaret of Anjou. Returning to England (September 1470), they deposed Edward and restored the crown to Henry VI. Edward fled to the Netherlands with his followers and, securing Burgundian aid, returned to England in March 1471. Edward outmanoeuvred Warwick, regained the loyalty of Clarence, and decisively defeated Warwick at Barnet on April 14. That very day, Margaret had landed at Weymouth. Hearing the news of Barnet, she marched west, trying to reach the safety of Wales; but Edward won the race to the Severn. At Tewkesbury (May 4) Margaret was captured, her forces destroyed and her son killed. Shortly afterward, Henry VI was murdered in the Tower of London. Edward's throne was secure for the rest of his life (he died in 1483).

In 1483 Edward's brother Richard III, overriding the claims of his nephew, the young Edward V, alienated many Yorkists, who then turned to the last hope of the Lancastrians, Henry Tudor (later Henry VII). With the help of the French and of Yorkist defectors, Henry defeated and killed Richard at Bosworth Field on Aug. 22, 1485, bringing the wars to a close. By his marriage to Edward IV's daughter Elizabeth of York in 1486, Henry united the Yorkist and Lancastrian claims. Henry defeated a Yorkist rising supporting the pretender Lambert Simnel on June 16, 1487, a date which some historians prefer over the traditional 1485 for the termination of the wars.

Roset, Michel (b. June 15, 1534, Geneva—d. Aug. 28, 1613, Geneva), Swiss political figure who, with Theodore Beza, played the most important role in the affairs of Geneva after the death of John Calvin in 1564.

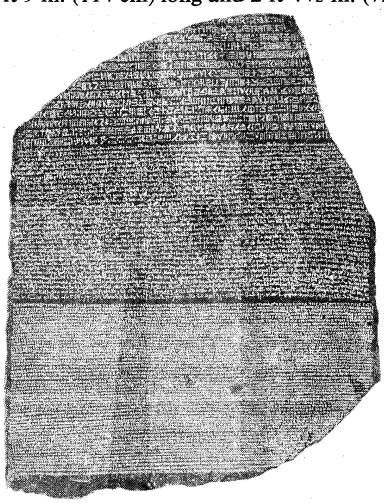
A supporter of the theocracy and an opponent of the anti-Calvinist Libertine Party, Roset assisted Beza in maintaining the Calvinist legacy at Geneva. Elected chief syndic (municipal magistrate) 14 times between 1568 and 1612, he consistently pursued a twofold policy for the city: attachment to the Swiss Confederation and resistance to the influence of Savoy. He secured French support for Geneva in the Treaty of Soleure (1579) and effected a perpetual alliance with Zürich and Bern (1584), the most powerful states in the confederation. Following the long, intermittent war with Savoy (1589–1603), Roset led the peace negotiations of the second Treaty of St. Julien (July 27, 1603). His influence in Genevese politics was pervasive, and he served on more than 100 diplomatic missions for the city. At his death he was honoured by the city council with the title Father of the Country.

Rosetta, Arabic RASHĪD, town, northern al-Buḥayrah *muḥāfaẓah* (governorate), in the northwestern Nile Delta, Lower Egypt. It lies on the left bank of the Rosetta (ancient Bolbitinic) Branch of the Nile River, 8 mi (13 km) southeast of its entrance into the Mediterranean and 35 mi northeast of Alexandria. The town was founded *c.* AD 800 by the caliph Hārūn ar-Rashīd, whence its Arabic name. Although important until the 17th and 18th centuries as a trading centre, it declined with the growth of Alexandria. During prosperity it flourished as a cosmopolitan coastal port with a virtual monopoly on delta-grown rice. The town was guarded from sea attacks by two flanking forts. Many mosques, as well as Greek Orthodox and Coptic churches, were built there.

Just north of Rosetta, in the vicinity of Fort-Saint-Julien, an officer of the French Napoleonic forces discovered (1799) the famed Rosetta Stone, which provided the French scholar Jean-François Champollion with the key to his successful decipherment of Egyptian hieroglyphic writing (1822).

A former port of the British East Indies trade, Rosetta still maintains a coastal trading function and has rice milling and fishing industries. It has highway and rail links with Alexandria and Damanhūr. Pop. (1983 est.) 47,200.

Rosetta Stone, ancient Egyptian stone bearing inscriptions the decipherment of which led to the understanding of hieroglyphic writing. An irregularly shaped stone of black basalt 3 ft 9 in. (114 cm) long and 2 ft 4½ in. (72 cm) wide, and broken in antiquity, it was found near the town of Rosetta (Rashīd), about 35 mi (56 km) northeast of Alexandria. It was discovered by a Frenchman named Bouchard or Boussard in August 1799. After the French surrender of Egypt in 1801, it passed into British hands and is now in the British Museum.



The Rosetta Stone, with Egyptian hieroglyphics in the top section, demotic characters next, and Greek at the bottom; in the British Museum

By courtesy of the trustees of the British Museum

The inscriptions, apparently written by the priests of Memphis, summarize benefactions conferred by Ptolemy V Epiphanes (205–180 BC) and were written in the ninth year of his reign in commemoration of his accession to the throne. Inscribed in two languages, Egyptian and Greek, and three writing systems, hieroglyphics, demotic script (a cursive form of Egyptian hieroglyphics), and the Greek alphabet, it provided a key to the translation of Egyptian hieroglyphic writing.

The decipherment was largely the work of Thomas Young of England and Jean-François Champollion (*qq.v.*) of France. The hieroglyphic text on the Rosetta Stone contains six identical cartouches (oval figures enclosing hieroglyphs). Young deciphered the cartouche as the name of Ptolemy and proved a long-held assumption that the cartouches found in other inscriptions were the names of royalty. By examining the direction in which the bird and animal characters faced, Young also discovered the way in which hieroglyphic signs were to be read.

In 1821–22 Champollion, starting where Young left off, began to publish papers on the decipherment of hieratic and hieroglyphic writing based on study of the Rosetta Stone and eventually established an entire list of signs with their Greek equivalents. He was the first Egyptologist to realize that some of the signs were alphabetic, some syllabic, and some determinative, standing for the whole idea or object previously expressed. He also established that the hieroglyphic text of the Rosetta Stone was a translation from the Greek, not, as had been thought, the reverse. The work of these two men established the basis for the translation of all future Egyptian hieroglyphic texts.

Roseville, city, Macomb County, southeastern Michigan, U.S., near Lake St. Clair, just northeast of Detroit. Although a post office was established in 1836, the community developed because of an influx of Irish and German settlers about 1843. With the industrial expansion of Detroit after 1918, Roseville increased in size, remaining part of Erin Township until incorporated as a village in 1926. Now mainly residential, it includes some light industry. Inc. city, 1958. Pop. (1980) 54,311.

Rosewall, Ken, byname of KENNETH RONALD ROSEWALL (b. Nov. 2, 1934, Sydney), Australian tennis player who was a major competitor for 25 years, winning 18 Big Four titles.

Although he was short and had a slight build, Rosewall remained a powerful force in tennis far longer than many stronger players and was never badly injured. In 1953 he won his first major titles, the Wimbledon doubles (with fellow Australian Lew Hoad) and the French singles title. In 1956 he and Hoad combined to take the Davis Cup from the United States and were also victorious in several Australian and French doubles championships.

Rosewall turned professional in 1956, winning U.S. pro singles titles in 1963, 1965, and 1971. His real achievement, however, came from his victories after open tennis started in 1968. Rosewall defeated favourite Tony Roche to win the 1970 U.S. title, 14 years after beating Lew Hoad. He won the Australian singles championship in 1972, 19 years after his first victory there, and helped Australia win the 1973 Davis Cup. In 1974 Jimmy Connors defeated him in finals for both the British and U.S. singles championships, but many thought it remarkable that 40-year-old Rosewall had made it to the finals.

rosewood, any of several ornamental timbers, products of various tropical trees native to Brazil, Honduras, Jamaica, Africa, and India. The most important commercially are the Honduras rosewood, *Dalbergia stevensoni,* and the Brazilian rosewood, principally *D. nigra,* a leguminous tree up to 125 feet (38 metres) called *cabiúna,* and jacaranda in Brazil. Jacaranda (*q.v.*) also refers to several species of *Machaerium,* also of the Fabaceae (or Leguminosae) family, and a source of commercial rosewood.

Rosewood is a deep, ruddy brown to purplish-brown colour, richly streaked and grained with black resinous layers. It takes a fine polish but because of its resinous nature is difficult to work. The heartwood attains large dimensions, but squared logs or planks are never seen because before the tree arrives at maturity, the heartwood begins to decay,

making it faulty and hollow at the centre. Once much in demand by cabinetmakers and piano makers, the wood is still used to fashion xylophone bars, but waning supplies restrict its use. Rosewood earlier was exported in quantity from Brazil, Jamaica, and Honduras.

Rosh: *see* Asher ben Jehiel.

Rosh Hashana (Hebrew: Beginning of the Year), Hashana also spelled HASHANAH, or HA-SHANAH, also called DAY OF JUDGMENT, or DAY OF REMEMBRANCE, a major Jewish observance now accepted as inaugurating the religious New Year on Tishri 1 (September or October). Because the New Year ushers in a 10-day period of self-examination and penitence, Rosh Hashana is also called the annual Day of Judgment; during this period each Jew reviews his relationship with God, the Supreme Judge. A distinctive feature of the liturgy is the blowing of the ram's horn (*shofar*) as prescribed in Numbers 29:1; the notes of the *shofar* call the Jewish people to a spiritual awakening associated with the revelation to Moses on Mt. Sinai. During the Additional Service in the synagogue, the *shofar* is sounded after the recital of each of three groups of prayers.

Rosh Hashana is also known as the Day of Remembrance, for on this day Jews commemorate the creation of the world, and the Jewish nation recalls its responsibilities as God's chosen people.

On the first night of Rosh Hashana a New Year's custom dictates that delicacies be prepared as omens of good luck. On the following night bread and fruit, dipped in honey, are customarily eaten, and a special blessing is recited. Rosh Hashana is the only festival observed for two days in Israel.

Rosh Ḥodesh (Judaism): *see* New Moon.

Rosicrucian, member of a worldwide brotherhood claiming to possess esoteric wisdom handed down from ancient times. The name derives from the order's symbol, a combination of a rose and a cross. The teachings of Rosicrucianism combine elements of occultism reminiscent of a variety of religious beliefs and practices.

The origins of Rosicrucianism are obscure. The earliest extant document that mentions the order is the *Fama Fraternitatis* ("Account of the Brotherhood"), first published in 1614, which may have given the movement its initial impetus. The *Fama* recounts the journeys of Christian Rosenkreuz, the reputed founder of Rosicrucianism, who was allegedly born in 1378 and lived for 106 years. He is now generally regarded to have been a symbolic rather than a real character, whose story provided a legendary explanation of the order's origin. According to the *Fama,* Rosenkreuz acquired secret wisdom on trips to Egypt, Damascus, Damcar in Arabia, and Fès in Morocco, which he subsequently imparted to three others after his return to Germany. The number of his disciples was later increased to eight, who went to different countries.

Paracelsus, a Swiss alchemist who died in 1541, is also regarded by some as the real founder of Rosicrucianism. Others, however, view 16th- and 17th-century developments as simply a revival of the order and contend that Rosicrucian doctrines not only flourished in ancient Egypt but were espoused by such outstanding figures as Plato, Jesus, Philo of Alexandria, Plotinus, and others. There is, however, no reliable evidence to date the order's history earlier than the 17th century.

rosin, also called COLOPHONY, or COLOPHONIUM, translucent, brittle, friable resin used for varnish and in manufacturing many products. It becomes sticky when warm and has a faint pinelike odour. Gum rosin consists of the residue obtained upon distillation of the oleoresin (a natural fluid) from pine trees (the volatile component is spirit of turpentine); wood rosin, obtained by solvent extraction of the stumps, is usually of a darker colour.

Rosin and its chemical derivatives are used chiefly to make soaps, varnishes, sealing wax, printing inks, driers, sizes for paper, adhesives, binders, soldering fluxes, gloss oils for paints, and pitch for casks. Rosin is also used on bows of violins and other stringed instruments, on the shoes of dancers, and on floors of studios and stages to prevent slipping.

In Europe, the main source of supply is the cluster pine, *Pinus pinaster,* extensively cultivated in France in the *départements* of Gironde and Landes. In the north of Europe rosin is obtained from the Scotch pine, *P. sylvestris,* and throughout European countries local supplies are obtained from other species of pine. In the United States, rosin is obtained from the longleaf pine, *P. palustris,* and the loblolly pine, *P. taeda,* of the southern Atlantic and eastern Gulf states.

Roskilde, city, seat of Roskilde *amtskommune* (county), eastern Sjælland (Zealand), Denmark, at the head of Roskilde Fjord. Of ancient origin, it is named for its legendary founder, Hroar (Ro), and the sacred springs (*kilde*), several of which remain nearby. The former seat of Danish kings (*c.* 1020–1416) and capital of Denmark (until 1443), it has been a bishopric since *c.* 1060 and was Denmark's most important ecclesiastical centre until the Reformation. The Treaty of Roskilde with Sweden was drafted there in 1658.

The largest rail junction and traffic centre on Sjælland, its development has been stimulated by proximity to Copenhagen (with which it was connected by the first Danish railway in 1847). There are tanneries, distilleries, bacon factories, a meat-research institute, and a folk high school (voluntary high school for men and women over 18 emphasizing Danish literature and history) for industrial workers. The Danish Atomic Power Plant and Research Station (1959) is on nearby Risø Peninsula.

The city's partly Romanesque, partly Gothic cathedral was begun by Bishop (later archbishop) Absalon *c.* 1170 (consecrated 1464) on the site of two earlier churches, including one founded in Viking times (*c.* 960) by Harald Bluetooth (Blåtand), the first Christian king of Denmark. The cathedral is the royal mausoleum where 38 Danish kings and queens are buried, including 16 in an unbroken line from the Reformation to 1972. A museum of Viking relics, including 1,000-year-old longboats, opened in 1969.

Roskilde *amtskommune* (area 344 sq mi [890 sq km]) was created in 1970 from the Roskilde county council district of the former Københavns *amtskommune* (county) and the northern part of the former Præstø *amtskommune.* The county is closely linked with the city of Copenhagen. Roskilde and Køge are the major urban centres. The University Centre of Roskilde opened in 1972. Pop. (1981) city, 39,659; (1982 est.) mun., 48,274; (1982 est.) *amtskommune,* 203,975.

Rosmead, Hercules (George Robert) Robinson, 1st Baron: *see* Robinson, Sir Hercules (George Robert).

Rosmini-Serbati, Antonio (b. March 24, 1797, Rovereto, County of Tyrol, Austria—d. July 1, 1855, Stresa, Lombardy), religious philosopher and founder of the Institute of Charity, or Rosminians, a Roman Catholic religious organization for educational and charitable work.

The child of a noble family, Rosmini studied philosophy at Padua before being ordained in 1821. In his writing and activities in support of the Italian nationalist movement, he participated in a renewal of Italian philosophy,



Rosmini-Serbati, detail of a portrait by F. Hayez; in the Brera, Milan, Italy
Brogi—Alinari from Art Resource/EB Inc.

which, although it had little impact outside Italy, was of major importance there.

Influenced by Maddalena di Canossa, founder of the Daughters of Charity, Rosmini in 1828 organized the Institute of Charity at Domodossola. Modelled on the Jesuit rule, the order required absolute devotion to the church and strict obedience to superiors; it was approved by Pope Gregory XVI in 1839.

Rosmini's philosophical writings, beginning with *Nuovo saggio sull' origine delle idee,* 3 vol. (1830; *The Origin of Ideas*), embroiled him in theological controversies throughout his lifetime. His philosophy attempted to reconcile Catholic theology with modern political and social thought. Although he welcomed the Italian national movement, he was strongly critical of its anticlerical and anti-Catholic tendencies; he looked to the papacy for spiritual and political leadership.

In 1848 Rosmini came into close association with Pope Pius IX when he acted as special envoy for the government of Piedmont to enlist the Pope's support of King Charles Albert against the Austrians. Pius then sought Rosmini's counsel in formulating a definition of the Immaculate Conception, and, after the outbreak of the Roman revolution Rosmini accompanied Pius into exile in November 1848.

In 1849, however, Rosmini began to fall out of favour with the Pope when, for obscure reasons, two of his writings, *Delle cinque piaghe della santa Chiesa* (1848; *Of the Five Wounds of the Holy Church*) and *La costituzione secondo la giustizia sociale* (1848; "A Constitution Based on Social Justice"), were put on the *Index of Forbidden Books.* Rosmini submitted to the papal authority and retired to Stresa. In the year before his death, however, after further attacks and papal scrutiny, all of Rosmini's works were declared acceptable to read.

Rospigliosi, Giulio (pope): *see* Clement IX.

Ross, Betsy, *née* GRISCOM (b. Jan. 1, 1752, Philadelphia—d. Jan. 30, 1836, Philadelphia), seamstress who, according to legend, fashioned the first flag of the United States.

As a young girl in Philadelphia, Elizabeth Griscom showed considerable aptitude for fine needlework. She married John Ross in 1773, worked with him in his upholsterer's shop, and carried on the business after he was killed in 1776 while serving in the militia.

According to her grandson, William Canby, in a paper presented in 1870, Betsy Ross was visited in June 1776 by George Washington, Robert Morris, and George Ross, her late husband's uncle. The story is that they asked her to make a flag for the new nation that would declare its independence the following month. A rough sketch presented to her was redrawn by Washington incorporating her suggestions. Betsy Ross then fashioned the flag in her back parlour—again, according to the legend. Evidence that Ross did make flags and the absence of evidence contrary to Canby's claim lent credence to the popular account of the

flag's creation. (*See also* Hopkinson, Francis.) On June 14, 1777, the Continental Congress adopted the stars-and-stripes as the national flag of the United States.

Betsy Ross was widowed twice more before spending her final years at the home of one of her seven daughters.

Ross, Sir (William) David (b. April 15, 1877, Thurso, Caithness, Scot.—d. May 5, 1971), Scottish Rationalistic moral philosopher and critic of Utilitarianism who proposed a form of "cognitivist nondefinitism" based on intuitional knowledge rather than "naturalism." He distinguished his views from Kantian philosophy by subscribing to an ethic of obligation that depended more on immediate knowledge and belief than on objective absolutes. By claiming that duty was intuitive, he suggested that "good" and "right" could not be identified.

Schooled in the classics at the University of Edinburgh and Balliol College, Oxford, Ross gained recognition as an Aristotelian scholar by editing the Oxford English translations of Aristotle (1908–52); he translated the *Metaphysics* (1908) and *Ethica Nicomachea* (1925) himself. Ross's notable academic and public career included his rise from lecturer to provost at Oriel College (1900–47), his appointment as vice-chancellor of Oxford University (1941–44), president of the Union Academique Internationale (1947), chairman of several government committees (1936–52) and of the Royal Commission on the Press (1947–49), and his knighthood in 1938 for outstanding munitions work during World War I. Among his writings are *Aristotle* (1923), *The Right and the Good* (1930), *Foundations of Ethics* (1939), *Plato's Theory of Ideas* (1951), and *Kant's Ethical Theory* (1954).

Ross, Edward A(lsworth) (b. Dec. 12, 1866, Virden, Ill., U.S.—d. July 22, 1951, Madison, Wis.), a founder of sociology in the United States and one of the first sociologists to attempt to create a comprehensive sociological theory. Ross was also a prolific writer whose flair for popular presentation greatly stimulated interest in social science research. He was an advocate of melioristic sociology, that is, dedicated to the application of the discipline to the ends of social reform.

He joined the faculty at Stanford University, California, in 1893 as professor of administration and finance but became more interested in sociology, which he believed should be an instrument of reform. His political views (he was an adherent of Populism in U.S. politics) so antagonized Mrs. Leland Stanford, widow of the university's founder, that she procured his dismissal in 1900. He taught at the University of Wisconsin from 1906 until 1937.

His best known work, *Social Control* (1901), on the reasons for and the means of societal limitation of the individual, was long regarded as a classic. Another widely read book by Ross



Edward A. Ross

By courtesy of the University of Wisconsin, Madison

was *Social Psychology* (1908), one of the first U.S. works written specifically on that discipline. *Sin and Society* (1907) was his argument in favour of sociological jurisprudence. His *Principles of Sociology* (1920) was for years a standard introductory textbook.

Ross, Harold (Wallace) (b. Nov. 6, 1892, Aspen, Colo., U.S.—d. Dec. 6, 1951, Boston), editor who founded and developed *The New Yorker,* a weekly magazine that from its birth in the 1920s decisively influenced American humour, art, fiction, and reportage.

Ross quit high school to become a reporter, and in World War I he edited *Stars and Stripes,* the serviceman's newspaper, in France. When he launched *The New Yorker* in 1925 he quickly toppled many conventional literary forms in his quest for ways to capture the contemporary scene in the magazine's pages.

Young, new writers and artists, attracted by the innovative style were drawn to the magazine. Under Ross's guidance, satire and parody flourished, reporting became lighthearted and searching, humour was allowed to infect everything, biography achieved bold strokes in the "Profiles," the short story enjoyed a reprieve from the heavy burden of plot, and social cartooning became more vigorous as it ceased to belabour the obvious. In Ross's *New Yorker,* the unknown writer was on equal footing with the established one; the editor sought good writing, not great names. Such writers as E.B. White, James Thurber, and Wolcott Gibbs established their reputations as regular contributors to the magazine, as did such artists of the cartoon as Helen Hokinson, Peter Arno, Charles Addams, and Mary Petty. Ross was credited with being the guiding force behind the steady rise of the magazine's popularity.

Ross, Henry Stewart, earl of: *see* Darnley, Henry Stewart, Lord.

Ross, Sir James Clark (b. April 15, 1800, London—d. April 3, 1862, Aylesbury, Buckinghamshire, Eng.), British naval officer who



Sir James Ross, plaster cast of a medallion by Bernhard Smith, *c.* 1842–48

By courtesy of the National Portrait Gallery, London

carried out important magnetic surveys in the Arctic and Antarctic and discovered the Ross Sea and the Victoria Land region of Antarctica.

Between 1819 and 1827 Ross accompanied Sir William E. Parry's Arctic voyages. On the second Arctic expedition of his uncle, Sir John Ross, he located the north magnetic pole on June 1, 1831. His own Antarctic expedition of 1839–43 was undertaken to conduct magnetic observations and to reach the south magnetic pole. Commanding the "Erebus" and "Terror," he discovered the Ross Sea in 1841 and, while sailing toward the position assigned to the magnetic pole, also discovered Victoria Land. He wintered at Hobart, Tasmania, and in November 1841 sailed again for Antarctica. He charted part of the coast of Graham Land and sailed around the Weddell Sea ice. Knighted following his return to England (1843), he published *A Voyage of Discovery and Research in the Southern and Antarctic Regions* (1847).

Ross, John, Indian name TSAN-USDI (b. Oct. 3, 1790, near Lookout Mountain, western district of N.C., U.S.—d. Aug. 1, 1866, Washington, D.C.), Cherokee chief who, after devoting his life to resisting U.S. seizure of his people's



John Ross, detail of a lithograph

By courtesy of the Library of Congress, Washington, D.C.

lands in Georgia, was forced to assume the painful task of shepherding the Cherokees in their removal to the Oklahoma Territory.

Born of a Scottish father and a mother who was part Cherokee, the blue-eyed, fair-skinned Tsan-Usdi (Little John) grew up as an Indian, although he was educated at Kingston Academy in Tennessee. In the early 19th century he became the leader of the Cherokee resistance to the white man's acquisition of their valuable land, some 43,000 square miles (111,000 square kilometres) on which they had lived for centuries. From 1819 to 1826 Ross served as president of the National Council of Cherokees, who by this time had become a settled people with well-stocked farms, schools, and representative government. In 1823 he exposed attempts by federal commissioners to bribe him into approving Cherokee land sales.

Five years later Ross became principal chief of the Cherokee Nation, headquartered at New Echota, Ga., under a constitution that he helped to draft. His spirited defense of Cherokee freedom and property utilized every means short of war. In the process he was imprisoned for a time and his home confiscated. His petitions to Pres. Andrew Jackson, under whom he had fought during the Creek War (1813–14), went unheeded, and in May 1830 the Indian Removal Act forced the tribes, under military duress, to exchange their traditional lands for unknown western prairie.

In 1838–39 Ross had no choice but to lead his people to their new home west of the Mississippi River on the journey that came to be known as the infamous "Trail of Tears." In the West Ross helped write a constitution (1839) for the United Cherokee Nation. He was chosen chief of the new government, an office he held for the remainder of his life.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Ross, Sir John (b. June 24, 1777, Balsarroch, Wigtownshire, Scot.—d. Aug. 30, 1856, London), British naval officer whose second Arctic expedition in search of the Northwest Passage, the North American waterway linking the Atlantic and Pacific oceans, located the north magnetic pole and made important contributions to oceanography.

On his second expedition, to what is now Canada's Northwest Territories (1829–33), Ross discovered and surveyed Boothia Peninsula, King William Island, and the Gulf of Boothia. During a sledge journey in 1831, his nephew James Clark Ross located the mag-

netic pole. The following year the party's ship was crushed in the ice. John Ross and his men were rescued by a whaler in the summer of 1833 and returned to England. In 1834 he was knighted. After serving as British consul at Stockholm from 1839 to 1846, in 1850 he undertook a third and unsuccessful voyage to the North American Arctic to find the lost explorer Sir John Franklin. Knighted in 1834, he became a rear admiral in 1851. He published a number of works, including *Narrative of a Second Voyage in Search of a North-West Passage* (1835).

Ross, Martin (19th–20th-century Irish novelist): *see* Somerville and Ross.

Ross, Nellie Tayloe, *née* WYNNS (b. Nov. 29, 1876, St. Joseph, Mo., U.S.—d. Dec. 20, 1977, Washington, D.C.), first woman in the United States to serve as governor of a state and the first woman to direct the U.S. mint.

Ross was elected governor of Wyoming in 1924, succeeding her husband, incumbent Democrat William Bradford Ross, who died just prior to the election. After narrowly losing to a Republican candidate for governor in 1926, Ross was appointed vice chairman of the Democratic National Committee.

In 1933 President Franklin D. Roosevelt named Ross director of the U.S. Mint, making her one of the first women to hold a federal post of that importance. During her 20-year term the mint introduced the Roosevelt dime, the Jefferson nickel, and the steel penny, the latter an emergency measure during World War II.

Ross won the distinction of becoming the first woman governor by a small margin; Miriam Ferguson was inaugurated governor of Texas just 16 days later.

Ross, Sir Ronald (b. May 13, 1857, Almora, India—d. Sept. 16, 1932, Putney Heath, London, Eng.), British bacteriologist who received the Nobel Prize for Physiology or Medicine in 1902 for his work on malaria. His discovery



Sir Ronald Ross, bronze relief by Frank Bowcher, 1929; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

of the malarial parasite in the gastrointestinal tract of the *Anopheles* mosquito led to the realization that malaria was transmitted by *Anopheles,* and laid the foundation for combating the disease.

After graduating in medicine (1879), Ross entered the Indian Medical Service and served in the third Anglo-Burmese War (1885). On leave he studied bacteriology in London (1888–89) and then returned to India, where, prompted by Patrick Manson's guidance and assistance, he began (1892) a series of investigations on malaria. He discovered the presence of the malarial parasite within the *Anopheles* mosquito in 1897. Using birds that were sick with malaria, he was soon able to ascertain the entire life cycle of the malarial parasite, including its presence in the mosquito's salivary glands. He demonstrated that malaria is transmitted from infected birds to healthy ones by the bite of a mosquito, a finding that suggested the disease's mode of transmission to humans.

Ross returned to England in 1899 and joined the Liverpool School of Tropical Medicine and later the University of Liverpool. He was knighted in 1911. In 1912 he became physician for tropical diseases at King's College Hospital, London, and later director of the Ross Institute and Hospital for Tropical Diseases, founded in his honour. In addition to mathematical papers, poems, and fictional works, he wrote *The Prevention of Malaria* (1910).

Ross and Cromarty, former county, northern Scotland, since the reorganization of 1975 in Ross and Cromarty (*q.v.*) district of Highland (*q.v.*) region. The former county spanned the entire width of Scotland from the North Sea on the east to the Atlantic on the west and included the island of Lewis in the Outer Hebrides, now part of the Western Isles (*q.v.*).

The area was originally occupied by Gaelic Picts, who in the 6th and 7th centuries AD were converted to Christianity by followers of St. Columba. For the next three centuries the region's inhabitants were continually harassed by Norse pirates. In the 12th century the area was resettled with Anglo-Normans by King David I of Scotland, who was anxious to break the power of the local Celts. The earldom of Ross arose at this time. By the 16th century the whole area was occupied by different clans, chiefly the Rosses, Munroes, Macleods, Macdonalds, and Mackenzies. Apart from occasional conflicts between these feuding clans, the only battles in the county were those of Invercarron (1650), when James Graham Montrose's Royalist forces were crushed by the Parliamentary troops of Colonel Archibald Strachan; and Glenshiel (1719), when a small Jacobite uprising led by the Earl of Seaforth was defeated by General Joseph Wightman.

The county of Ross was constituted in 1661, and Cromarty became a county in 1685 and 1698. Cromarty county formed a relatively small area around Cromarty Firth, in the east, while Ross covered the rest of the land stretching to the Atlantic Ocean in the west. These two counties were consolidated into one county in 1889.

Ross and Cromarty, district, Highland region, northern Scotland; it was created by the reorganization of 1975 from part of the former county of Ross and Cromarty. The district has an area of 1,921 square miles (4,976 square km). It stretches across northern Scotland from the rugged, deeply indented Atlantic coast in the west to Moray Firth of the North Sea in the east. The district is a predominantly highland area of ancient rocks with dissected plateau surfaces, glacially scoured valleys in the uplands, and deposits of fertile glacial clay in the lowlands along the east coast. The grandeur of the mountain and Atlantic coastal scenery of the district's western portion contrasts with the pastoral landscape of its eastern part. The climate is mild and wet in the west and drier in the east. The area in the east, with its deeper, more fertile soils and longer hours of sunshine, supports large farms producing both arable crops, mainly cereals and potatoes, and large numbers of sheep and cattle. The western highlands with thin, poor soils still support the traditional subsistence economy of the tenant farmers, or crofters, and there are extensive sheep farms and forestry plantations. Fishing, particularly for herring and whitefish, is pursued on the western coast.

Traditional industries are whisky distilling and some processing of agricultural produce. Large-scale industry was introduced in the 1960s with the building of an aluminum smelting plant at Invergordon. Since the discovery and exploitation of North Sea oil in the last decade, the shore of the Cromarty Firth has experienced rapid industrial growth. Deep, sheltered coastal waters adjacent to the North Sea oil fields led to the development of oil-related industries such as the platform fabricating yards and submarine pipecoating works at Nigg and Invergordon. Industrial development, however, is largely concentrated on the shores of the Cromarty Firth, and the familiar pattern of rural depopulation persists in the remoter areas. There are no large towns in the county. Dingwall, the seat of the district authority, Invergordon, and Cromarty are all situated in the more prosperous eastern coastal area; in the west scattered crofting townships and fishing villages prevail. Pop. (1986 est.) 47,900.

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Ross Ice Shelf, world's largest body of floating ice, lying at the head of Ross Sea (*q.v.*), itself an enormous indentation in the continent of Antarctica. The ice shelf lies between about 155° W and 160° E longitude and about 78° S and 86° S latitude. Estimates of its area range from about 192,000 to 208,000 square miles (496,000 to 540,000 square km), making it approximately the size of France. The shelf has served as an important gateway for explorations of the Antarctic interior, including those carried out by many of the most famous expeditions.

The great white barrier wall of the shelf's front, first seen in 1841 by the British polar explorer James Clark Ross, rises in places to 160 or 200 feet (50 or 60 m) high and stretches about 500 miles (800 km) between fixed "anchor points" on Ross Island to the west and the jutting Edward VII Peninsula on the east. With its immense, gently undulating surface reaching back nearly 600 miles (950 km) southward into the heart of Antarctica, the Ross Ice Shelf provides the best surface approach into the continental interior. The McMurdo Sound region on the shelf's western edge thus became the headquarters for Robert F. Scott's 1911–12 epic sledging trip to the South Pole and also served several Antarctic research programs later in the century. The eastern barrier regions of the ice shelf were headquarters for the Norwegian Roald Amundsen's first attainment of the South Pole on Dec. 14, 1911; for Richard E. Byrd's three U.S. expeditions of 1928–41 at Little America I–III stations; and for several subsequent expeditions and research programs.

The Ross Ice Shelf is fed primarily by giant glaciers, or ice streams, that transport ice down to it from the high polar ice sheet of East Antarctica. The ice shelf has been likened to a vast triangular raft because it is relatively thin and flexible and is only loosely attached to adjoining lands. Giant rifts develop behind the ice shelf's barrier wall and occasionally rupture completely to spawn the huge tabular icebergs that are so characteristic of the Antarctic Ocean. Thus, although the barrier's position appears almost stationary, it actually undergoes continual change by calving and melting that accompany northward movement of the shelf ice. The shelf's mean ice thickness is about 1,100 feet (330 m) along a line at about 79° S latitude. In a southward direction along about 168° W longitude, the ice shelf's thickness gradually increases to more than 2,300 feet (700 m). Estimates suggest that at distances of 100 to 200 miles (160 to 320 km) inland from the barrier, 15 to 20 inches (380 to 500 mm) of ice may be added to the shelf each year by bottom freezing. An estimated net of 4×10^{13} pounds (1.8×10^{13} kg) per year is added to the whole shelf by bottom freezing.

Ross Island, volcanic formation in Antarctica, located in the western Ross Sea, Ross Dependency (New Zealand), at the northern margin of the Ross Ice Shelf, just off the coast of Victoria Land. The island is 43 mi (69 km) long and 45 mi wide. On it are Mt. Erebus (an active volcano 12,450 ft [3,800 m] high) and Mt. Terror (10,750 ft) among a series of mountain ranges intersected by deep valleys. Mt. Erebus was the site in 1979 of a crash that claimed 257 lives on a sightseeing and photographic flight over Antarctica. The ranges are free of snow except for hanging glaciers on the highest slopes. McMurdo, a U.S. base, is located on the island just north of Cape Armitage, its southernmost extremity. About one mi south is Scott Base, a New Zealand station. A steep pyramid of rock called Observation Hill rises between the two stations. In 1907 Ernest H. Shackleton, a British explorer, established a camp at Camp Royds, and Robert F. Scott, in 1910, set up a camp at Cape Evans on his return expedition. These are now maintained as historic monuments.

Ross-on-Wye, parish (town), South Herefordshire district, county of Hereford and Worcester, England. The historic market town is characterized by narrow streets, ancient buildings, and a pillared market house (1670). The parish Church of St. Mary is in the Decorated and Perpendicular Gothic styles. The town, a centre of the beautiful Wye Valley region, is famous for its panoramic views and attracts many tourists. It is also the centre of a highly productive agricultural district. Pop. (1981 prelim.) 7,182.

Ross Sea, southern extension of the Pacific Ocean, which, along with the vast ice shelf (*see* Ross Ice Shelf) at its head, makes a deep indentation in the circular continental outline of Antarctica. The sea is a generally shallow marine region, approximately 370,000 sq mi (960,000 sq km) in area, centred at about 75° S, 175° W, and lying between Cape Adare in northern Victoria Land on the west and Cape Colbeck on Edward VII Peninsula on the east. The northern limit lies approximately along the edge of the continental shelf and the southern limit along a great barrier wall of ice marking the front of the Ross Ice Shelf.

Overshadowed by the towering ranges of Victoria Land, the floor of the Ross Sea extends northward as a broad shelf before plunging into the deeps of the Southeast Pacific Basin along a line from Scott Island to Cape Colbeck. The broader, western half of the sea shoals to less than 1,000 ft (300 m) in several wide areas, the southwesternmost culminating in the small and rocky volcanic pile of Franklin Island. Most of the floor is less than 3,000 feet deep. The coastal region is dotted with modern volcanos and older dissected volcanic piles of an extensive alkaline–basalt area (McMurdo Volcanics) consisting of Cape Adare, Cape Hallett, Mount Melbourne, Franklin and Ross islands, on the western coast, and a number of lesser known centres in western Marie Byrd Land, on the eastern coast.

The Ross Sea is one of the least iced and most accessible of Antarctica's fringe seas. Relatively easy access made this region the traditional avenue for mounting expeditions into the continental interior. The sea was first penetrated on January 5, 1841, by the HMS "Erebus" and HMS "Terror," commanded by James Clark Ross on an unsuccessful attempt to reach the south magnetic pole. Since then various points on the Ross Ice Shelf have served as bases for exploration parties from Norway, Great Britain, Japan, the United States, and New Zealand. All coastal regions have been geologically explored, at least in reconnaissance, and the southern Victoria Land region near McMurdo Sound has become the most thoroughly known on the continent. Rich with history and scenery, the Ross Sea is now regularly traversed by tourist vessels.

Several possibilities exist with regard to the origin of the Ross Sea continental embayment. Early geologists believed the Ross Sea to extend as a subglacial trench, the hypothetical Ross–Weddell Graben, to connect with the Weddell Sea. Since then, discovery of the intervening Ellsworth Mountains has disproved the hypothesis. Geophysical studies on the Ross Ice Shelf indicate the presence of an underlying thick section of seismically low-velocity, probably sedimentary, rocks. The embayment, therefore, may be either a down-faulted block of continental rocks, including the Beacon Group, or it may be a downwarped basin filled with sedimentary rocks.

Flora and fauna are typical of other southerly Antarctic marine regions. The nutrient-rich sea water supports abundant planktonic life which in turn provides food for larger forms, including fish, seals, whales, and sea- and shore-birds. Among the latter, hordes of Adélie and emperor penguins populate rookeries at a number of places around the Ross Sea.

The Ross Sea is strongly influenced by the coastal East-Wind Drift that sets up a vast, clockwise gyre accompanied by deep-water upwelling. Surface currents move generally westward along the ice-shelf front and thence northward along Victoria Land, where they meet the West-Wind Drift. Movements are complicated by shoals and tidal currents. Water less than 1,000 feet deep has a minimum temperature of about 28.2° F (−2.1° C). Mean surface water temperature in McMurdo Sound is about 28.8° F (−1.8° C).

Ross seal (*Ommatophoca rossi*), Antarctic seal of the family Phocidae. It has a short face, very large eyes, and coarse fur that is greenish gray above with yellowish stripes on the sides and paler below. Length in both sexes is to about 2.3 metres (7.6 feet) and weight is about 150–215 kilograms (330–470 pounds). The Ross seal feeds on cephalopods and some fish and plankton and is usually solitary. Little else is known about it.

Rossby, Carl-Gustaf Arvid (b. Dec. 28, 1898, Stockholm—d. Aug. 19, 1957, Stockholm), Swedish-U.S. meteorologist whose innovations in the study of large-scale air movement and introduction of the equations describing atmospheric motion were largely responsible for the rapid development of meteorology as a science.

Rossby moved to the United States in 1926, where he worked in Washington, D.C., as a fellow of the American-Scandinavian Foundation for Research at the U.S. Weather Bureau. In 1928 he became professor and head of the department of meteorology (the first in the United States) at the Massachusetts Institute of Technology, Cambridge. There he made important contributions to the understanding of heat exchange in air masses and atmospheric turbulence and investigated oceanography to study the relationships between ocean currents and their effects on the atmosphere.

Rossby became a U.S. citizen in 1938. One year later he became assistant chief of the Weather Bureau in charge of research and education and began his studies of the general circulation of the atmosphere. He became chairman of the department of meteorology at the University of Chicago in 1941. In his studies he identified the long sinusoidal waves of air in the upper westerlies (a band running around the Northern Hemisphere in which the winds generally blow from the west), now known as Rossby waves (*q.v.*), and developed the theory of their movement. He is credited with having identified the jet stream and with having developed the principal theories describing its behaviour. He also worked on mathematical models for weather prediction and introduced the Rossby equations, which were used in 1950 with an advanced electronic computer to forecast the weather.

In 1950 Rossby returned to Sweden to work with the Institute of Meteorology, which he founded in connection with the University of Stockholm. From 1954 to 1957 he was instrumental in arousing interest in atmospheric chemistry and the interaction of airborne chemicals with the land and the sea.

Rossby wave, in meteorology, large symmetrical undulation that develops in a jet stream's axis of flow and separates cold, polar air from warm, tropical air. These waves are named for Carl-Gustaf Arvid Rossby, who first identified them and explained their movement.

Rossby waves are formed when polar air moves toward the Equator while tropical air is moving poleward. Because of the temperature difference between the Equator and the poles due to differences in the amounts of solar radiation received, heat tends to flow from low to high latitudes; this is accomplished, in part, by these air movements. The tropical air carries heat poleward, and the polar air absorbs heat as it moves toward the Equator. When the waves become very pronounced, masses of cold and warm air enclosed in the loops are detached, and these become the low-pressure cells (cyclones) and high-pressure cells (anticyclones) that are important in producing the climate of the middle latitudes.

Rosse, William Parsons, 3rd earl of, also called (1807–41) LORD OXMANTOWN (b. June 17, 1800, York, Eng.—d. Oct. 31, 1867, Monkstown, County Cork, Ire.), Irish astronomer and builder of the largest reflecting telescope, the "Leviathan," of the 19th century.

In 1821 Rosse was elected to the House of Commons as Lord Oxmantown. He resigned his seat in 1834 but in 1841 inherited his father's earldom and served as one of the Irish peers in the House of Lords.

Lord Rosse was obsessed with the idea of constructing a truly large telescope. He worked for five years to find an alloy suitable for the mirror. His final choice was composed of four atoms of copper to each atom of tin. This alloy was quite brittle, however, and his first 36-inch-diameter mirror was composed of 16 thin plates soldered to a brass framework.

The moderate success of this telescope encouraged Lord Rosse to try to cast a solid 36-inch mirror. After much experimentation he succeeded in casting and cooling the mirror without cracking it, a serious problem in the construction of all large telescopic mirrors. In 1842 he began work on a mirror of 72-inch diameter. Three years later the four-ton disk was mounted and the installation completed. Fifty-four feet in length, Lord Rosse's telescope was used primarily to observe nebulae on those rare occasions when weather conditions around his estate permitted.

With his telescope, however, he discovered the remarkable spiral shape of many objects then classed as "nebulae," which are now recognized as individual galaxies. He studied and named the Crab Nebula. He also made extensive, detailed observations of the Great Nebula in Orion. Though his telescope was dismantled in 1908, it was not until the 100-inch reflector was installed in 1917 at the Mt. Wilson Observatory, California, that a larger telescope was used.

Rossellini, Roberto (b. May 8, 1906, Rome—d. June 3, 1977, Rome), one of the most widely known post-World War II motion-picture directors of Italy. His films *Roma città aperta* (1945; *Open City*) and *Paisà* (1946; *Paisan*) focussed international attention on the Italian Neorealist movement in films.

The son of a successful sculptor and architect, he travelled extensively throughout Europe. In 1931 his father's fortune was confiscated by

the Italian Fascist government, and three years later Rossellini began working at odd jobs in the cinema industry. He directed a full-length feature, *La nave bianca* (1941; *White Ship*), but navy officials objected to its antiwar tone. His name was removed from the film, and it was released anonymously.

During World War II he directed government propaganda short subjects but was also affiliated with the underground cinema movement that secretly recorded the activities of the resistance. *Roma,* which incorporated this documentary footage shot during the war, set the style for postwar Italian films in its use of natural settings and its realistic portrayal of life in Italy during the German occupation. It starred Anna Magnani in her first film role of substance. Internationally recognized as one of the most outstanding films of the postwar period, it earned Rossellini the title of "inventor" of Neorealism. *Paisà,* a series of six episodes of the war in Italy, also achieved worldwide recognition.

Rossellini's technique of reconstructing actuality was continued in *Germania, anno zero* (1947; *Germany, Year Zero*) and *India* (1958). A concern with religion is evident in *Francesco, giullare di Dio* (1950; *The Flowers of St. Francis*), a series of anecdotes about St. Francis of Assisi. *Stromboli, terra di Dio* (1949; *Stromboli,* 1950) and *Viaggio in Italia* (1953; *The Lonely Woman*) were outstanding in a series of films exploring the meaning of freedom. They starred the actress Ingrid Bergman, whose love affair with Rossellini caused an international scandal. Their marriage in 1950, after both sought divorces from their first spouses, was annulled in 1958.

Rossellini's next films—*Il generale della Rovere* (1959; *General Della Rovere*), which starred Vittorio De Sica, another leading Italian director; *Viva l'Italia* (1960; "Long Live Italy"); *Era notte a Roma* (1960; "It Was Night at Rome"); and *Vanina Vanini* (1961; *The Betrayer*)—exemplify a recurring patriotic theme. During the 1950s and '60s Rossellini also directed a number of works for the stage, and he directed his first film for television in 1956. From 1964 he devoted himself to television films including the biographical *Socrate* (1970).

Rossellini's realistic style strongly influenced the development of important cinema talents, such as the director Federico Fellini, who came into prominence in the 1950s.

Rossellino, Antonio (b. 1427, Settignano, Republic of Florence—d. 1479, Florence), notable and prolific Italian Renaissance sculptor who was the youngest brother of the architect and sculptor Bernardo Rossellino.

Antonio was presumably trained by Bernardo, whom he assisted on numerous commissions; the tomb of Neri Capponi (after 1457) is an important work by the brothers. Antonio was a master of portraiture, as is shown by the busts of Giovanni Chellini (1456) and Matteo Palmieri (1478?), among others.

Antonio Rossellino's greatest work is the Chapel of the Cardinal Prince of Portugal in S. Miniato al Monte, outside Florence, which is an elaborate and decorative combination of architecture and figurative sculpture. He worked in the traditions established by his brother and Desiderio da Settignano, and as his style evolved, Rossellino's figures developed strong form and intense characterization. His subtle carvings and reliefs generated a calm, gentle sentiment, and he is known for many works of the Madonna, a recurrent Renaissance theme (*e.g.*, "Madonna and Child," 1468). Other works include the "Shrine of the Marcolino de Forlì" (1458) and the monument of Filippo Lazzari.

Rossellino, Bernardo (b. 1409, Settignano, Republic of Florence—d. Sept. 23, 1464, Florence), influential early Italian Renaissance architect and sculptor.

Rossellino was trained by Brunelleschi and was influenced by Luca della Robbia and Ghiberti. His style exhibited a moderate classicism, as observed in an early tabernacle (1449, S. Egidio, Florence). Rossellino's masterpiece, the tomb of Leonardo Bruni (1444–50) in Sta. Croce, Florence, was executed for the eminent chancellor and inaugurated a new type of sepulchral monument that ranks with the greatest achievements of early Renaissance sculpture. The work, establishing a fine balance between sculpture and architecture, figure and decoration, became the prototypical wall monument of its time. Other significant works include the tomb of Orlando de' Medici (1455) in SS. Annunziata, Florence; the tomb of Giovanni Chellini (1462–64) in S. Domenico, San Miniato; and the "Tomb of the Blessed Villana delle Botte" (1451–52) in S. Maria Novella, Florence.

As an architect, Rossellino worked for Pope Nicholas V, who employed him (1451–53) on the building of St. Peter's in Rome, and for Pope Pius II. From his uncompleted reconstruction of Pienza, the native city of Pope Pius, the cathedral and the Piccolomini Palace (1460–64) are two of his most celebrated works.

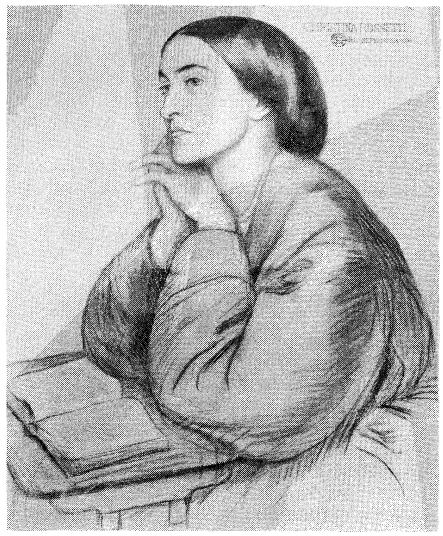
Rossendale, district (borough), county of Lancashire, England. It occupies 53 sq mi (138 sq km) immediately north of Greater Manchester, in the ancient Forest of Rossendale, from which it takes its name. The River Irwell flows through the borough. The towns of the district grew during the 18th and 19th centuries as the cotton textile industry developed; economic development owed something as well to coal mining and stone quarrying. Textiles and footwear manufacture are still important, and other more recent industries include light engineering and the production of felt, plastics, and valves. The borough also includes large tracts of Pennine moorland where hill farming is the main occupation. Pop. (1983 est.) 64,200.

Rossetti, Christina (Georgina), pseudonym ELLEN ALLEYNE (b. Dec. 5, 1830, London—d. Dec. 29, 1894, London), English poet and writer who excelled in poems of fantasy, verse for children, and religious poetry, homilies, and discourses. She was considered a possible successor to Tennyson as poet laureate before developing fatal cancer in 1891.

Christina, the younger daughter of Gabriele Rossetti and Lavinia Polidori, exhibited a precocious taste for letters. She, in certain ways, resembled her elder brother Dante Gabriel. She, too, was a born poet. She, too, combined a melancholy and tormenting conscience with a lively sense of humour and a keen critical perception. She suffered much from ill health and, in the 1870s, from the painful and disfiguring Graves' disease (a disease of the thyroid gland); but religious scruple also caused suffering.

Christina was haunted by an ideal of spiritual purity that demanded self-denial. This, perhaps combined with a sectarian strictness, has been suggested as the reason for her never having married. There may have been other reasons, too, but ostensibly she broke off her engagement to James Collinson, a painter whom her brother had introduced into the Pre-Raphaelite Brotherhood, because he left the Church of England and became a Roman Catholic. Fourteen years later, in 1864, she refused Charles Bagot Cayley, one of her father's old pupils, supposedly because he had no religious belief, though they remained on friendly terms until Cayley's death, in 1883.

Christina began to write poetry at an early age; the verses written before she was 17 were



Christina Rossetti, chalk drawing by Dante Gabriel Rossetti, 1866; in a private collection

Reproduced with permission from Harold Rossetti; photograph, J.M. Cotterell

printed in 1847 on Gaetano Polidori's private press. The transience of material things is a motif that recurs throughout her poetry. The verses beginning "Passing away, saith the World, passing away," from *Old and New Year Ditties III,* were hailed by the poet Algernon Swinburne as "the noblest of sacred poems in our language." The title poems of two major collections, *Goblin Market* . . .(1862) and *The Prince's Progress* . . .(1866), are more than fairy tales: the vendors of magic fruit in the one are symbols of temptation; the "progress" in the other represents the pilgrimage and trials of the soul. The literary critic Sir Edmund Gosse did not exaggerate in acclaiming Christina as "[a] wonderful woman who stands almost alone in the forefront of the world's female poets." (W.Ga.)

MAJOR WORKS. *Poetry. Goblin Market and Other Poems* (1862); *The Prince's Progress and Other Poems* (1866); *Sing-Song: A Nursery Rhyme Book* (1872, enlarged 1893); *A Pageant and Other Poems* (1881); *Verses* (1893); *New Poems* (1896); *Poetical Works* (1904).

Other works. Commonplace and Other Short Stories (1870); *Annus Domini* (1874), a book of prayers; *Seek and Find* (1879), religious meditations; *Time Flies* (1885), a reading diary of mixed verse and prose; *The Face of the Deep* (1892), a commentary on the Apocalypse.

BIBLIOGRAPHY. A comprehensive bibliographical reference to members of the family is contained in William E. Fredeman, *Pre-Raphaelitism: A Bibliographical Study* (1965). Janet Camp Troxell (ed.), *Three Rossettis* (1937), studies the brothers and sister through their letters and has much interesting detail of the stay at Penkill and the arrangments for exhuming Rossetti's manuscript poems. W.M. Rossetti edited and added a memoir to *The Family Letters of Christina Georgina Rossetti* (1908, reprinted 1968). A major edition of literary works is *The Poetical Works of Christina Rossetti,* ed. with memoir and notes by W.M. Rossetti (1904, reprinted 1971). R.D. Waller, *The Rossetti Family* (1932), is an account of Gabriele Rossetti and the family in his lifetime (1824–54). Lona Mosk Packer, *Christina Rossetti* (1963), supplements the *Life* by Mackenzie Bell of 1898 with fresh research and revised psychological analysis.

Rossetti, Dante Gabriel, original name GABRIEL CHARLES DANTE ROSSETTI (b. May 12, 1828, London—d. April 9, 1882, Birchington-on-Sea, Kent, Eng.), English painter and poet, who helped found the Pre-Raphaelite Brotherhood, a group of painters treating religious, moral, and medieval subjects in a nonacademic manner. Dante Gabriel was the most illustrious member of the Rossetti family.

Early life and works. After a general education in the junior department of King's College (1836–41), where he may have had lessons from the watercolourist John Sell Cotman, Rossetti hesitated between poetry and painting as a vocation. When about 14 he went to "Sass's," an old-fashioned drawing school in Bloomsbury (Central London), and thence, in 1845, to the Royal Academy schools, where he became a full student.

Meanwhile, he read omnivorously—romantic and poetic literature, Shakespeare, Goethe, Byron, Scott, and Gothic tales of horror. He was fascinated by the work of the American writer Edgar Allan Poe, and a dramatic illustration of Poe's poem "The Raven" was one of a number of early drawings inspired by his reading. In 1847 he discovered the 18th-century English painter, poet, and visionary William Blake through the purchase of a volume of Blake's designs and writings in prose and verse; the volume has since been known as the Rossetti MS. The diatribes of Blake against the painter and art critic Sir Joshua Reynolds delighted Rossetti and encouraged him to attempt lampoons of his own against convention and the triviality of early Victorian paintings of anecdotal subjects, those of Sir Edwin Landseer being a special target of his derision.

By the time he was 20, he had already done a number of translations of Italian poets and had composed some original verse, but he was also much in and out of artists' studios and for a short time was (in an informal way) a pupil of the painter Ford Madox Brown. He acquired some of Brown's admiration for the German "Pre-Raphaelites," the nickname of the austere Nazarenes, who had sought to bring back into German art a pre-Renaissance purity of style and aim. It remained to initiate a similiar reform in England.

Largely through Rossetti's efforts, the English Pre-Raphaelite Brotherhood was formed in 1848 with seven members, all Royal Academy students except for William Michael Rossetti. They aimed at "truth to nature," which was to be achieved by minuteness of detail and painting from nature outdoors. This was, more especially, the purpose of the two other principal members, William Holman Hunt and John Everett Millais. Rossetti expanded the Brotherhood's aims by linking poetry, painting, and social idealism and by interpreting the term Pre-Raphaelite as synonymous with a romanticized medieval past.



"Astarte Syriaca," oil painting by Dante Gabriel Rossetti, 1877; in the City of Manchester Art Galleries

By courtesy of the City of Manchester Art Galleries

In this the High Church movement, leaning toward the ritual and ornament of the Gothic period, influenced him, its aesthetic aspect attracting him apart from any question of religious belief. He entitled his manuscript poems *Songs of an Art-Catholic;* and, while his first two oil paintings—"The Girlhood of Mary" and "Ecce Ancilla Domini" ("The Annunciation")—were simple in style, they were elaborate in symbolism. The "art-catholic" appears, though not with any specifically religious intent, in the rich word-painting and emotional force of his poem "The Blessed Damozel," published in 1850 in the first issue of *The Germ,* the Pre-Raphaelite magazine.

Exhibited in 1850, "Ecce Ancilla Domini" received severe criticism, which Rossetti could never bear with equanimity. In consequence, he ceased to show in public and gave up oils in favour of watercolours, which he could more easily dispose of to personal acquaintances. He also turned from traditional religious themes to scenes from Shakespeare, Robert Browning, and Dante, which allowed more freedom of imaginative treatment. After 1856 he was led by Sir Thomas Malory's *Morte Darthur* and Tennyson's *Idylls of the King* to evoke an imaginary Arthurian epoch, with heraldic glow and pattern of colour and medieval accessories of armour and dress.

The 1850s were eventful years for Dante Gabriel Rossetti. They began with the introduction into the Pre-Raphaelite circle of the beautiful Elizabeth Siddal, who served at first as model for the whole group but was soon attached to Rossetti alone and, in 1860, married him. Many portrait drawings testify to his affection for her.

In 1854 he gained a powerful but exacting patron in the art critic John Ruskin. By then, as his talented sister signalized in some quietly humorous verses, the Pre-Raphaelite Brotherhood was at an end, splintered by the different interests and temperaments of its members. But Dante Gabriel Rossetti's magnetic personality aroused a fresh wave of enthusiasm. His contributions to the Oxford and Cambridge magazine in 1856 brought him into contact with the then Oxford undergraduates Edward Burne-Jones and William Morris. With these two young disciples he initiated a second phase of the Pre-Raphaelite movement. The two main aspects of this fresh departure were a romantic enthusiasm for a legendary past instead of the realism of "truth to nature" and the ambition of reforming the applied arts of design. Rossetti's influence not only led to easel pictures illustrating Arthurian legend but also into other fields of art. A new era of book decoration was foreshadowed by Rossetti's illustration for the Moxon edition of Alfred Lord Tennyson's *Poems* (1857). His commission in 1856 to paint a triptych ("The Seed of David") for Llandaff Cathedral was a prelude to the ambitious scheme of 1857 to decorate the Oxford Union debating chamber with mural paintings of Arthurian themes. Though Rossetti and his helpers (Burne-Jones, Morris, and others) failed through want of technical knowledge and experience, the enterprise was fruitful in suggesting that the scope of art could be expanded to include the crafts.

The later years. From 1860 onward, trials were part of Dante Gabriel's much disturbed life. His marriage to Elizabeth Siddal, clouded by her constant ill health, ended tragically in 1862 with her death from an overdose of laudanum. Grief led him to bury with her the only complete manuscript of his poems. That he considered his love for his wife similar to Dante's mystical and idealized love for Beatrice is evident from the symbolic "Beata Beatrix," painted in 1863.

Dante Gabriel's life and art were now greatly changed. He moved from riverside premises in London's Blackfriars to Chelsea. The influence of new friends—Swinburne and the American painter James McNeill Whistler—led to a more aesthetic and sensous approach to art. Literary themes gave way to pictures of mundane beauties, such as his model and mistress of long standing, Fanny Cornforth, gorgeously apparelled and painted with a command of oils he had not previously shown. These paintings were popular, and Rossetti grew affluent enough to employ studio assistants to make copies and replicas. He collected antiques and filled his large, ill-kept Chelsea garden with a menagerie of animals and birds.

Rossetti had enjoyed a modest success in 1861 with his published translations, *The Early Italian Poets;* and, toward the end of the 1860s, when his weakening eyes inclined him to give up painting for a while, his thoughts turned to poetry again. At that time, he and Christina were frequent visitors to Penkill Castle in Scotland, home of their friend Alice Boyd. There Dante Gabriel composed new poems and planned the recovery of the manuscript poems buried with his wife in Highgate Cemetery. Carried out in 1869 through the agency of his unconventional man of business, Charles Augustus Howell, the exhumation visibly distressed the superstitious Dante Gabriel. Publication followed in 1870. The *Poems* were well enough received until a misdirected, savage onslaught by "Thomas Maitland" (pseudonym of the journalist-critic Robert Buchanan) on "The Fleshly School of Poetry" singled out Rossetti for attack. Rossetti responded temperately in "The Stealthy School of Criticism," published in the *Athenaeum;* but the attack, combined with remorse and the amount of chloral and alcohol he now took for insomnia, brought about his collapse in 1872. He recovered sufficiently to paint and write, though the last 10 years of his life were passed in semi-invalid seclusion. Until 1874 he spent much time at Kelmscott Manor (near Oxford), of which he took joint tenancy with William Morris in 1871. His lovingly idealized portraits of Jane Morris at this period were a return to his more poetic and mystical style.

Dante Gabriel's life in Chelsea was subsequently that of a recluse, varied only by visits to his mother and sister and the company of his old friend Ford Madox Brown, a number of late disciples, and Theodore Watts-Dunton, a lawyer and man of letters who did his best to put Rossetti's financial affairs in order. He occupied himself with a replica of an early watercolour, "Dante's Dream" (1880), a revised edition of *Poems* (1881), and *Ballads and Sonnets,* containing the completed sonnet sequence of "The House of Life," in which he described the love between man and woman with tragic intensity. From a visit to Keswick (in northwestern England) in 1881, he returned in worse health than before. He died the following spring in southeastern England, tended at the last by members of the family and a few loyal intimates.

John Ruskin described Dante Gabriel Rossetti as "a great Italian lost in the Inferno of London," though in fact he was never happy out of London and never visited Italy. With his appreciation of Italian poetry went a mastery of the various forms and rhythms of English as a poetic medium, ranging from the ballad style to the philosophical reflections of *The Burden of Nineveh* (1856). Quite different in tone is the easy and genial style of his intimate correspondence, which ranks him among the great letter writers. As a painter he claims respect, in present-day perspective, as the initiator of a form of symbolism influential in continental Europe as well as England.

(W.Ga.)

MAJOR WORKS. *Poetry.* "The Blessed Damozel," with six sonnets and four lyrics in *The Germ,* the Pre-Raphaelite periodical (1850); *The Early Italian Poets from Ciullo d'Alcamo to Dante Alighieri (1100–1200–1300) in the Original Metres Together with Dante's Vita Nuova* (1861); *Poems* (1870); *Ballads and Sonnets* (1881), including "The House of Life," "The White Ship," and "The King's Tragedy."

Paintings. "The Girlhood of Mary" (1849; Tate Gallery, London); "Ecce Ancilla Domini" ("The Annunciation"; 1850; Tate Gallery); "Found" (1854; Samuel and Mary R. Bancroft Pre-Raphaelite Collection, The Wilmington Society of the Fine Arts, Wilmington, Del.); "Paolo et Francesca" (1855; Tate Gallery); "The Tune of the Seven Towers" (1857; Tate Gallery); "The Wedding of St. George and Princess Sabra" (1857; Tate Gallery); "Arthur's Tomb" (1860; Tate Gallery); "Beata Beatrix" (*c.* 1863; Tate Gallery); "Monna Vanna" (1866; Tate Gallery); "Dante's Dream" (1871; Walker Art Gallery, Liverpool); "The Blessed Damozel" (1871–79; Lady Lever Art Gallery, Port Sunlight, Eng.); "The Bower Meadow" (1872; City of Manchester Art Galleries); "Proserpine" (1874; Tate Gallery); "Astarte Syriaca" (1877; City of Manchester Art Galleries).

Other art works. "How They Met Themselves" (1851–60; Fitzwilliam Museum, Cambridge, Eng.), drawing; "Portrait of Miss Siddal" (1855; Ashmolean Museum, Oxford); "Maids of Elfinmere" (1855; wood engraving, engraved by Dalziel); "The Palace of Art," sometimes called "St. Cecilia" (1857; engraved by Dalziel), wood engraving; decoration of the Oxford Union with William Morris and Sir Edward Burne-Jones (1857, now largely obliterated). The major collection of Rossetti's drawings is in the City Art Gallery, Birmingham, Eng.

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To make the best use of the Britannica, consult the INDEX *first*

Rossetti, Gabriele (Pasquale Giuseppe) (b. Feb. 28, 1783, Vasto, Kingdom of Naples—d. April 24, 1854, London), Italian poet, revolutionary, and scholar, known for his esoteric interpretation of Dante but best known as the father of several talented children, all of whom were born in England, to which he had fled as a political refugee from his native land.

Gabriele was the son of a blacksmith and was clever enough to be able to study at the University of Naples. In 1807 he was librettist at the San Carlo opera house in Naples and was later appointed curator of Ancient Marbles and Bronzes in the Museo e Gallerie Nazionale di Capodimonte, Naples.

He frequently improvised spirited verses on contemporary politics; one indignant outburst directed against Ferdinand II, the tyrant king of Naples who had revoked the Constitution in 1821, added to Gabriele's membership in the revolutionary society Carbonari, provoked the sentence of death. After a time in hiding, he escaped to England via Malta in 1824. There he supported himself by giving Italian lessons and in 1831 was appointed professor of Italian at King's College, London, a post he held until 1847, when his sight was seriously impaired.

In 1826 he had married Frances Mary Lavinia Polidori, deemed the cleverest and best looking of four daughters of another Italian teacher and man of letters, Gaetano Polidori, Tuscan by birth but Londoner by adoption.

When Gabriele became professor, he received fellow exiles, busied himself with propaganda for a liberally governed and united Italy, and—studying the writings of Italy's 14th-century national poet Dante Alighieri—elaborated a theory of Dante's profound symbolic meaning (*La Beatrice di Dante,* 1842). His love of Italian poetry and in particular his reverence for Dante's *La vita nuova* and *La divina commedia* were transmitted to his sons and daughters.

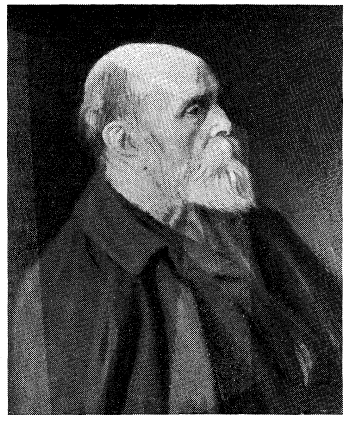
There were four Rossetti children: Maria Francesca (b. Feb. 17, 1827—d. Nov. 24, 1876); Gabriel Charles Dante, who later called himself Dante Gabriel; William Michael; and Christina Georgina. All were born in London and baptized in the Church of England. The Rossetti family was a remarkable group. All its members were endowed with unusual intelligence, were equally at home with the languages and literary traditions of both England and Italy, and were united among themselves by close ties of affection and mutual understanding. The talents and characteristics they shared were combined with creative gifts of a high order. (W.Ga.)

MAJOR WORKS. Two-volume commentary on the *Divina Commedia* (unfinished, 1825 and 1826); *Sullo spirito antipapale che produsse la Reforma . . .* (1831; *Disquisition on the Antipapal Spirit which Produced the Reformation: Its Secret Influence on the Literature of Europe in General, and of Italy in Particular,* trans. by C. Ward, 2 vol., 1834); *Iddio e l'uomo, salterio* (1833), poems; *Il mistero dell'amor platonico nel medio evo,* 5 vol. (1840), a philosophico-literary treatise; *La Beatrice di Dante* (1842; complete ed., 1935), study of Dante; *Il Veggente in solitudine poema polimetro* (1846; *A Versified Autobiography,* trans. by W.M. Rossetti, 1901); *Versi* (1847); *L'Arpa evangelica* (1853), lyrics; *La vita mia* and *Opere inedite e rare* (1910; 3 vol., 1931, both ed. by D. Ciampoli).

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Rossetti, William Michael (b. Sept. 25, 1829, London—d. Feb. 5, 1919, London), English art critic, literary editor, and man of letters, brother of Dante Gabriel and Christina Rossetti. He was a co-founder of the Pre-Raphaelite Brotherhood and editor of its journal *The Germ.*

Even as a child William Michael was in many ways a contrast to his more flamboyant brother—in his calm and rational outlook, financial prudence, and lack of egotism, for



William Michael Rossetti, portrait by Sir William Rothenstein, 1909; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

example. At the age of 16 he became a clerk in the Excise (later Inland Revenue) Office at £80 a year and became a mainstay of the entire Rossetti family. His appointment as art critic to *The Spectator* magazine in 1850 and subsequent modest advancement in the civil service enabled him, in 1854, to establish his father, mother, and two sisters in a more comfortable home. His mother and his sister Maria helped by giving lessons in Italian, though efforts to start a school, first in Camden Town and then at Frome in Somerset, came to nothing.

William disliked and rejected religion in any form. He was 45 when he married, in 1874, and would have kept his mother and Christina as permanent parts of his household; but after two years the psychological difficulties of the situation were apparent both to his sister and his wife, Emma Lucy (daughter of Ford Madox Brown); Christina and her mother moved out, to a house in Torrington Square.

William, though quietly self-sacrificing in the family interest, was by no means a nonentity, however. He had sterling qualities as a critic and Pre-Raphaelite historian. Independent in judgment, he hailed Walt Whitman's controversial *Leaves of Grass* (1855) as a work of genius, in spite of the scoffing remarks of his brother, Dante Gabriel. His enthusiasm for Blake was no less great than Dante Gabriel's. He was the judicious editor of numerous collections of the work of English poets and could make learned comparison between such medieval writers as Geoffrey Chaucer and Giovanni Boccaccio. He dealt conscientiously with a vast amount of family correspondence and material relating to Pre-Raphaelism and his brother's place in the movement, proving himself an indispensable chronicler.

(W.Ga.)

MAJOR WORKS. *Inferno* (1865), blank verse translation; *Fine Art, Chiefly Contemporary: Notices Reprinted with Revisions* (1867), art criticism; *Troylus and Cryseyde* (1875), parallel text to

Chaucer; *Filostrato* (1883), parallel text to Boccaccio; *Ruskin: Rossetti: Preraphaelitism. Papers 1854–62* (1899); *Preraphaelite Letters and Diaries* (1900); *Dante and His Convito: A Study with Translations* (1910).

Rössing, open-pit uranium mine, largest (in area) of its kind in the world, located in the extremely arid Namib Desert of Namibia, about 40 miles (65 km) northeast of the small Atlantic port of Swakopmund. Prospecting in the 1960s led to the development of the mine, financed by British, South African, French, and Canadian interests. It was opened in 1976 and by itself has made Namibia, in terms of tonnage, one of the largest producers of uranium in the world. A town was not developed at the mine site; workers are housed in Swakopmund.

Rossini, Gioacchino (Antonio) (b. Feb. 29, 1792, Pesaro, Papal States [Italy]—d. Nov. 13, 1868, Passy, near Paris, Fr.), Italian composer noted for his operas, particularly his comic operas, of which *The Barber of Seville* (1816),



Rossini, photograph by Étienne Carjat, *c.* 1868
George Eastman House Collection

Cinderella (1817), and *Semiramide* (1823) are among the best known. Of his later, larger scale dramatic operas, the most widely heard is *William Tell* (1829).

Early years. Gioacchino Rossini was the son of Giuseppe Rossini, an impoverished trumpeter who played in miscellaneous bands and orchestras, and Anna Guidarini, a singer of secondary roles. Thus Rossini spent his entire childhood in the theatre. Though a lazy student, the young Gioacchino found it easy to learn to sing and play. At the age of 14 he entered Bologna's Liceo Filarmonico (now the Conservatorio Statale di Musica G.B. Martini) and composed his first opera seria—*Demetrio e Polibio* (1806; staged in 1812)—for the Mombelli, a family of singers. At 15 he had learned the violin, horn, and harpsichord and had often sung in public, even in the theatre, to earn some money.

When his voice broke and he was unable to continue singing, Rossini became an accompanist, and then a conductor. He had already realized the importance of the German school of composition, perceiving the new elements by which Joseph Haydn and Wolfgang Amadeus Mozart had enriched music. These influences can be found in the early cantata he wrote for the Liceo Filarmonico, performed there in 1808. During the next 20 years (from 1808) this genial lazybones was to compose more than 40 operas.

Italian period. By taste, soon by obligation, Rossini threw himself into the genre then fashionable: opera buffa (comic opera). His first opera buffa, *La cambiale di matrimonio* (*The Bill of Marriage,* 1810), was performed in Venice and had a certain success, although his unusual orchestration made the singers indignant. Back in Bologna again, he gave the cantata *La morte di Didone* (*Dido's Death,* 1811) in homage to the Mombelli family, who had helped him so much, and scored a triumph with the two-act opera buffa *L'equivoca stravagante* (*The Extravagant Misunderstanding,* 1811). The following year, two more of his comic operas were produced in Venice.

Rossini had already broken the traditional form of opera buffa: he embellished his melodies (he was the true creator of bel canto, a florid style of singing), animated his ensembles and finales, used unusual rhythms, restored to the orchestra its rightful place, and put the singer at the service of the music. In 1812 Rossini wrote the oratorio *Ciro in Babilonia* (*Cyrus in Babylon*) and *La scala di seta* (*The Silken Ladder*), another comic opera.

The same year, Marietta Marcolini, who had already sung in Rossini's operas and who was interested in the young composer, recommended Rossini to the committee of La Scala opera house in Milan. It was under contract to them that he wrote *La pietra del paragone* (*The Touchstone,* 1812), a touchstone of his budding genius. In its finale, Rossini—for the first time—used the crescendo effect he was later to use and abuse indiscriminately.

By this time Rossini's experience in writing seven operas and several cantatas and his intimate contact with the theatre had given him a profound knowledge of his profession. Singers no longer held terrors for him. He was now ready for his major works. Venice, the most refined city in Italy, was to offer him his true glory. After the comic opera *Il signor Bruschino* (1813), written for the Teatro San Moisè, he next wrote—for La Fenice—his first serious opera, *Tancredi* (1813), in which he tried to reform opera seria (the formula-ridden, serious operas of the 18th century), and he composed an authentically dramatic score. This work, spirited and melodious, was an instant success. Tancredi's famous song, "Di tanti palpiti," was whistled all over town. The success of *L'Italiana in Algeri* (*The Italian Girl in Algiers,* 1813) followed, showing further refinements in his reforms of opera buffa. These two successes opened wide the doors of La Scala. With *Aureliano in Palmira* (1814) the composer affirmed his authority over the singers; he decided to prescribe and write the ornaments for his arias, but the work was not a success. After *L'Italiana* he wrote *Il Turco in Italia* (*The Turk in Italy,* 1814) for the Milanese and a cantata for Princess Belgioioso, "one of the most likeable of protectresses," as the French novelist Stendhal referred to her. His next work, *Sigismundo* (1814), was a failure.

Rossini's fame soon spread to Naples, where the reigning impresario was Domenico Barbaia, an ambitious former coffeehouse waiter, who by gambling and running a gaming house had amassed a fortune and was now in charge of the two great Neapolitan theatres. Barbaia realized Rossini's growing fame and went to Bologna to offer him a contract. Impressed by the terms of this contract—security, two operas a year—as well as by Barbaia, a millionaire rather than the customary fourth-rate impresario on the verge of bankruptcy, Rossini did not hesitate to accept. How could anyone refuse a tempting impresario whose favourite was none other than the imposing diva Isabella Colbran?

Colbran's first Rossini opera, *Elisabetta, regina d'Inghilterra* (*Elizabeth, Queen of England,* 1815), was a triumphant success. Rossini admired Colbran very much and soon fell in love with her. The brilliant success of *Elisabetta* prompted an invitation from Rome to spend the carnival season of 1816. The first of Rossini's Rome operas was unsuccessful. So was the second, *Almaviva,* soon to become *Il barbiere di Siviglia* (*The Barber of Seville*). The Romans, who knew and loved Giovanni Paisiello's version of Eugène de Beaumarchais's play, took a dislike to this new setting, but when it was given elsewhere in Italy it was received with unbounded success. Written in 16 days, the work is a piece of inspired inventiveness that has delighted opera lovers ever since. There followed *La cenerentola* (*Cinderella*). As with *The Barber,* this work uses a contralto for the heroine's role (though both roles are often sung by sopranos); it proved no less successful. In between these two comedies came *Otello* (*Othello;* Rome, 1816), a setting of Shakespeare's play that held the stage until superseded by Giuseppe Verdi's greater opera of the same name. *La gazza ladra* (*The Thieving Magpie,* 1817), a semi-serious work, was a triumph in Milan.

Armida, a grand opera requiring a trio of tenors and a dramatic soprano (Colbran) appeared in 1817. Rossini was now finding interpreters that suited his music. Colbran, the tenor Manuel Garcia, the bass Filippo Galli ("the most beautiful voice in Italy"), and the contralto Benedetta Pisaroni (whose art had no equal in depth) were his usual exponents and carried forward his art of bel canto.

La donna del lago (based on Sir Walter Scott's poem "The Lady of the Lake") failed at its premiere in 1819 but soon came into favour. After several more or less successful works, he left Naples for Vienna, along with Colbran (whom he had just married), anxious to meet Ludwig van Beethoven. Disappointed by the economic situation of the composer of *Fidelio,* he returned to Venice, where he attempted to crown his Italian career with *Semiramide.* The old-fashioned Venetians, however, did not understand the astonishing work, his longest and most ambitious, and so he resolved not to write another note for his countrymen. Following his resolution, he decided to leave Italy.

Parisian period. Rich, married, unstable, and by nature an epicurean, Rossini wanted to travel. He arrived in Paris in November 1823 and was enthusiastically welcomed in the French capital. The Academy in Paris received him; all of the town fawned upon him. At the end of the year, he visited London, where he conducted and sang in concerts with his wife and met King George IV. Back in Paris, he embarrassed the old musicians. "Rossini," wrote the Escudier brothers, Paris music publishers,

> was then 31 years old and in his prime. His countenance revealed a lofty and congenial expression. His subtle, quick penetrating eye held one magnetically before him. His smile, benevolent and caustic at the same time, reflected his whole disposition. The clear line of his aquiline nose, his vast and prominent brow, which his prematurely receding hairline entirely revealed, the even oval of his face enclosed in jet-black sideburns, all formed a kind of virile and fascinating beauty. He has a marvelously shaped hand, which he displayed somewhat coquettishly through his cuff. He dressed in a simple manner, and, under his clothes, which were more proper than elegant, the appearance of a newly disembarked provincial into the capital.

If the old nicknamed him "Monsieur Crescendo," the young very quickly paraded their admiration for him. Paris was then the centre of the world and Rossini knew it. After some of his works had been staged, he composed *Il viaggio a Reims* ("The Journey to Reims"), a cantata improvised for the coronation of Charles X.

For a long while Rossini hoped to modify his style: to replace the comparative artificiality and coldness of florid opera coloratura with declamatory and lofty singing—that is, with truth and intensity. In order to do that, he also had to reform the orchestra and give more importance to the chorus. Thus appeared *Le*

Siège de Corinthe (*The Siege of Corinth,* 1826), a revision of the earlier *Maometto II* (1820), which was saluted by the prominent composer Hector Berlioz. *Le Siège* was followed by *Moïse* (*Moses,* 1827) and *Le Comte Ory* (*Count Ory,* 1828), an adaptation of opera buffa style to French opera.

His final opera, *Guillaume Tell* (*William Tell*), is on the noble themes of nationalism and liberty, and Rossini's music is worthy of the elevated subject. The Parisian public gave him an ovation, and, in a single work, he had responded to all the critics in the most elegant manner. Then he decided, at the age of 37, not to write again for the theatre. *Tell* was to have been the first of five operas for the Opèra, but the new government following the Revolution of 1830 set aside his contract.

The reasons for his musical silence remain only suppositions. Some cite his legendary laziness as the cause, while others point to the Parisian hostility to his work and Rossini's resulting sulkiness. Another cause might have been his jealousy over the Parisian success of the opera composer Giacomo Meyerbeer.

In 1845, Colbran passed away. In 1847 Rossini married Olympe Pélissier. During his retirement he had written, returning to his first loves, some religious pieces: the *Stabat Mater* (1832), *Petite messe solennelle* (1864), and a few songs and piano pieces the good taste of which endeavoured to establish their reputation. Rossini never agreed to their publication.

After a period in Italy, he returned to Paris in 1855, never again to leave it. His parents being deceased, his new wife less demanding than the preceding one, and he himself a wealthy man whose retirement was assured, Rossini gave way to the sweetness of life and to being a wise man who permitted himself to shine in society with a few clever expressions and witticisms. His bons mots, in fact, are legendary, as were his caustic wit and low humour. At his Paris home and later at his villa in Passy, Rossini gave superb gourmet dinners attended by many of the greats of the musical and literary world of the mid-19th century. In 1860 the renowned German composer Richard Wagner visited him, and their fascinating conversation was recorded by Wagner in his essay "Eine Erinnerung an Rossini."

For years Rossini was known virtually only by the omnipresent *Barber of Seville* and an occasional revival of *William Tell.* From the 1950s more and more of his operas were revived, particularly at festivals, and nearly always with public and critical acclaim.

(J.-L.Ca.)

MAJOR WORKS. *Operas.* Some 35 including *La pietra del paragone* (*The Touchstone,* first performed 1812); *Tancredi* (1813); *L'Italiana in Algeri* (*The Italian Girl in Algiers,* 1813); *Il Turco in Italia* (*The Turk in Italy,* 1814); *Elisabetta, regina d'Inghilterra* (*Elizabeth, Queen of England,* 1815); *Il barbiere di Siviglia* (*The Barber of Seville,* 1816); *La cenerentola* (*Cinderella,* 1817); *Armida* (1817); *La gazza ladra* (*The Thieving Magpie,* 1817); *La donna del lago* (*The Lady of the Lake,* 1819); *Semiramide* (1823); *Le Siège de Corinthe* (*The Siege of Corinth,* 1826); *Moïse* (*Moses,* 1827); *Guillaume Tell* (*William Tell,* 1829).

Choral music. Il viaggio a Reims (cantata with ballets, completed 1825); *Stabat Mater* (1832, revised 1842); *Petite messe solennelle* (1864).

Chamber music. Five string quartets (1808).

Songs. Various, among them *Les Soirèes musicales* (published 1835).

Piano. Pèchès de vieillesse (*Sins of Old Age*), about 180 pieces for piano or for various instruments, voice, and piano.

BIBLIOGRAPHY. There are very few works devoted to Rossini. All of them are in fact inspired by A. Azevedo, *G. Rossini, sa vie et ses oeuvres* (1864), an extremely well-documented work written by an unconditional admirer; and Stendhal, *Vie de Rossini* (1824; Eng. trans. 1956, new ed. 1970), a study of the man and his early works by a contemporary. In English, Francis Toye, *Rossini: A Study in Tragi-comedy* (1963); Herbert Weinstock, *Rossini* (1968); and James Harding, *Rossini* (1971).

Rossland, city, southeastern British Columbia, Canada, at the head of Trail Creek Valley, part of the Trail metropolitan area, in the Selkirk Mountains, just north of the U.S. (Washington) border. Once a booming gold-mining town (1890–1916), it is now chiefly residential. Most of its working population is employed at nearby plants at Warfield, Tadanac, and Trail. Rossland's Red and Granite Mountain complex forms a huge ski resort development. The Rossland Historical Museum is near the top of Le Roi Mine. Originally claimed in 1887, the townsite and surrounding area were acquired in 1892 by a prospector, Ross Thompson, for whom it was named. Inc. city, 1897. Pop. (1981) 3,967.

Rosso, town and capital of the Trarza administrative region, southwestern Mauritania, West Africa, on the Sénégal River. It lies on the road between Saint-Louis, Senegal, and Nouakchott, Mauritania. It serves as the centre for an agricultural area that produces gum arabic, millet, corn (maize), beans, melons, and livestock. Pop. (1977) 16,466.

Rosso, Giovanni Battista di Jacopo, also called ROSSO FIORENTINO, or IL ROSSO (b. March 8, 1495, Florence—d. Nov. 14, 1540, Paris), Italian painter and decorator, an exponent of the expressive style that is often called



"Deposition," fresco by Rosso, 1521; in the Pinacoteca Comunale, Volterra, Italy
SCALA—Art Resource/EB Inc.

early or Florentine Mannerism, and one of the founders of the Fontainebleau school.

Rosso received his early training in the studio of Andrea del Sarto, alongside his contemporary, Pontormo. The earliest works of these two young painters combined influences from Michelangelo and from northern Gothic engravings in a novel style, which departed from the tenets of High Renaissance art and was characterized by its highly charged emotionalism. Rosso's most remarkable paintings from this period are the "Assumption" (1517; fresco at SS. Annunziata, Florence), the "Deposition" (1521; Pinacoteca Comunale, Volterra), and "Moses Defending the Daughters of Jethro" (*c.* 1523; Uffizi, Florence).

At the end of 1523 Rosso moved to Rome, where his exposure to Michelangelo's Sistine ceiling, the late art of Raphael, and the work of Parmigianino resulted in a radical realignment of his style. His "Dead Christ with Angels" (*c.* 1526) exemplifies this new style with its feeling for rarefied beauty and subdued emotion. Fleeing from the sack of the city in 1527, he worked briefly in several central Italian towns. In 1530, on the invitation of Francis I, he went to France (by way of Venice) and remained in the royal service there until his death. His principal surviving work is the decoration of the Galerie François I at the palace of Fontainebleau (*c.* 1534–37), where, in collaboration with Francesco Primaticcio, he developed an ornamental style whose influence was felt throughout northern Europe. His numerous designs for engravings also exercised a wide influence on the decorative arts both in Italy and in northern Europe.

Rosso, Medardo (b. June 20, 1858, Turin, Italy—d. March 31, 1928, Milan), 19th-century Italian sculptor generally credited, along with Rodin, with introducing the technique of Impressionism into sculpture. Rosso's work has been much studied since World War II by sculptors interested in its free, delicate modelling and subtle forms.

From his youth, Rosso rejected the strictures of academic art; in 1884 he was expelled from the Brera Academy for his rebellious influence on fellow students. Like the Impressionist painters of his time, he sought to capture in his work the immediate, elusive sensations of light and movement. As in the work of the painters and also that of his fellow sculptor Rodin, explicit detail is usually subordinated to texture, suggestion, and effect; the features of his portraits emerge in shimmer and shadow (*e.g.* "Lady with a Veil"; 1893).

Rosso's success grew steadily after his first major exhibition, at the Exposition Universelle in Paris in 1889. His early friendship with Rodin deteriorated in later years over the issue of originality, each claiming credit for the innovations exploited by both. His influence on the Italian Futurists and on Brancusi was marked. Rosso's social consciousness is evident in such portrayals of the mundane as "Impression of an Omnibus" (1883–84; destroyed).

Rostand, Edmond (b. April 1, 1868, Marseille—d. Dec. 2, 1918, Paris), successful French dramatist of the period immediately preceding World War I whose plays may be seen as a final, very belated example of Romantic drama in France.

Rostand's name is indissolubly linked with that of his most popular and enduring play, *Cyrano de Bergerac.* First performed in Paris in 1897, with the famous actor Constant Coquelin playing the lead, *Cyrano* made a great impression in France and all over Europe and the United States. The plot revolves around the emotional problems of Cyrano, who, despite his many gifts, feels that no woman can ever love him because he has an enormous nose. The connection between the Cyrano of the play and the 17th-century nobleman and



Rostand, 1905
Harlingue—H. Roger-Viollet

writer of the same name is purely nominal. But Rostand's stirring and colourful historical play, with its dazzling versification, skillful blend of comedy and pathos, and its fast-moving plot, provided welcome relief from the grim dramas of the Naturalists and Symbolists.

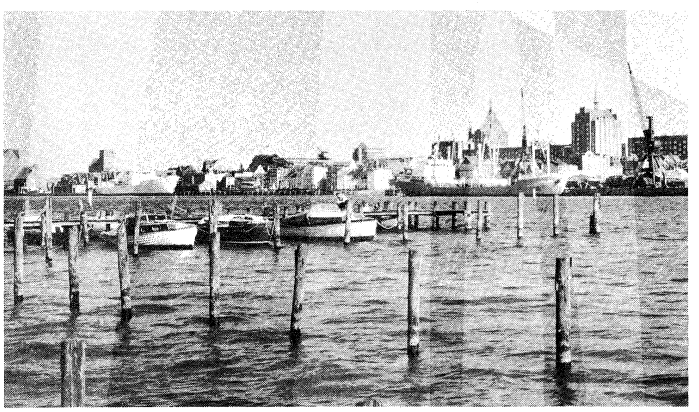
Rostand wrote a good deal for the theatre, but the only other play of his that is still much remembered is *L'Aiglon* (1900). This highly emotional patriotic tragedy in six acts centres on the Duke of Reichstadt, who never ruled but died of tuberculosis as a virtual prisoner in Austria. Rostand always took pains to write fine parts for his stars, and *L'Aiglon* afforded Sarah Bernhardt one of her greatest triumphs.

Rostand's son Jean Rostand (1894–1977) was a noted biologist, moralist, and writer.

Rostock, until 1990 a *Bezirk* (district) of northern East Germany, created in 1952 from northern Mecklenburg and West Pomerania. It had an area of 2,731 square miles (7,074 square km) and extended along the entire Baltic coast, which is irregular with alternating cliffs and sand dunes. The fertile morainic soil of the western part of the former *Bezirk* supports wheat, sugar beets, rye, and oats. Cattle breeding is widespread, and coastal fishing is important. The principal ports are Rostock, Wismar, Stralsund (*qq.v.*), and Sassnitz (on Rügen Island), which has a rail link by ferry to Trelleborg, Swed. Industry, mainly in the towns, includes shipbuilding, woodworking, sugar refining, and the manufacture of machinery. The coast is noted for its tourist resorts. Pop. (1989 est.) 914,927.

Rostock, city, Mecklenburg-West Pomerania *Land* (state), northern Germany, at the head of the Warnow River estuary, 8 mi (13 km) south-southeast of its Baltic outport at Warnemünde. A Wendish settlement in the 12th century, the German town was chartered in 1218. The Hops market and New Town developed separately from the Old Town until the three were united in 1265. A powerful member of the Hanseatic League in the 14th century, Rostock passed to Mecklenburg in 1314 and to the dukes of Mecklenburg-Schwerin in 1352. Later, it was a joint possession of the Schwerin and Güstrow lines until the extinction of the latter in 1695. From 1952 to 1990 it was the capital of Rostock *Bezirk*.

The town centre was extensively reconstructed after suffering heavy air raid damage during World War II. Notable Gothic churches include the Church of St. Mary (begun in 1230), the early 14th-century Church of St. Nicholas, and the early 15th-century St. Peter's Church. Wooden ships were built in the Rostock shipyards from the medieval period until 1851, when the first German steam-propelled vessel was built there. The Wilhelm Pieck University of Rostock (1419) was at one time a stronghold of Lutheranism. The town hall is a 15th-century structure with a Baroque facade (1727). Parts of the old town walls and gates from the 14th to 16th centuries survive. Rostock was extensively developed after World War II as East Germany's principal ocean port. The Volkstheater Rostock (People's Theatre of Rostock) is known throughout Germany. The city is also an important fishing and shipbuilding centre. Industries include fish processing, metalworking, and the manufacture of diesel engines, machinery, chemical products, matches, and furniture. Pop. (1989 est.) 253,990.



A wharf on the Warnow Estuary at Rostock, Ger.
W. Krammisch—Bruce Coleman Inc./EB Inc.

Rostopchin, Fyodor Vasilyevich, Graf (Count) (b. March 23 [March 12, old style], 1763, Livny, Russia—d. Jan. 30 [Jan. 18, O.S.], 1826, Moscow), military officer and statesman who was a close associate and adviser to Emperor Paul I of Russia (ruled 1796–1801) and served as military governor of Moscow during Napoleon's invasion of Russia (1812).

Descended from an ancient noble family of Tatar origin, Rostopchin joined the army in 1785; when Paul ascended the throne (Nov. 17 [Nov. 6, O.S.], 1796), he was promoted to the rank of major general and made the Emperor's personal adjutant general. Appointed foreign minister in 1798, Rostopchin, who opposed both Great Britain and Napoleonic France, prevented the formation of an anti-British Franco-Russian alliance and was dismissed on March 4 (Feb. 20, O.S.), 1801.

Retiring to his estate at Voronovo, near Moscow, he subsequently became closely associated with the conservative, patriotic circle sponsored by the dowager empress Maria Fyodorovna, mother of the new emperor, Alexander I (ruled 1801–25), and the Emperor's sister, Grand Duchess Yekaterina.

In 1809 the Grand Duchess introduced Rostopchin to Alexander, who appointed him commander and military governor of Moscow in May 1812. Convinced that Moscow was riddled with pro-Napoleonic secret societies that would, if encouraged by reports of Russian defeats, incite peasant uprisings and obstruct the Russian war effort, Rostopchin persistently issued statements falsely proclaiming Russian victories. When the failure of Russia's army to halt the French march on Moscow could no longer be denied, he assured the populace that a defense plan was in operation; and only when he was notified, at the last minute, that Moscow was to be yielded to the enemy without a fight did he organize an evacuation. It is also alleged (although Rostopchin denied it in a pamphlet published in Paris in 1823, "La Vérité sur l'incendie de Moscou") that he was responsible for setting the fires that during the first days of Napoleon's occupation (September 1812) burned three-quarters of Moscow, destroyed the supplies that could have sustained the French army through the winter, and became a major factor in Napoleon's decision to withdraw from Moscow and begin the retreat that ultimately destroyed his army.

Following Napoleon's defeat, Rostopchin accompanied Alexander to the Congress of Vienna, but shortly afterward he fell into disgrace and did not return to Russia until 1825.

Rostov, *oblast* (administrative region), southwestern Russian Soviet Federated Socialist Republic, occupying an area of 38,900 sq mi (100,800 sq km) athwart the lower Don and Manych rivers.

The Donets Ridge in the west and the Don Ridge in the north form areas of mildly accented relief, but most of the *oblast* is a low, rolling plain cut by the wide floodplains of the rivers. The natural vegetation of steppe grass, on fertile soils, has almost entirely disappeared under the plow. Along the floodplains are meadows and marshy areas, with occasional groves of trees. Large reservoirs have been created by barrages (dams) at Tsimlyansk on the Don and at Vesyoly on the Manych; the former has a hydroelectric station. The northern part of the *oblast,* which in 1954–57 formed the separate Kamensk *oblast,* includes the eastern end of the Donets Basin coalfield and is particularly rich in anthracite.

A large group of heavy-industrial cities—headed by Shakhty, Kamensk-Shakhtinsky, and Novoshakhtinsk—is engaged in coal mining, steel making, engineering, and chemicals. At Volgodonsk on the Don River is a large factory for producing atomic reactors. There is a heavy flow of freight through the *oblast* by the Volga–Don Shipping Canal, leading to the Volga River, and by rail and oil and gas pipeline through Rostov, between the Caucasus and central U.S.S.R. Rostov-na-Donu, the administrative centre, and Taganrog are major ports.

Agriculture is highly developed, dominated by grains, wheat, barley, and corn (maize), which occupy two-thirds of the arable land. Sunflowers, mustard, and melons are also important. Along the lower Don, water from the Tsimlyansk Reservoir is used to irrigate vineyards and market gardens, the area of which has expanded greatly since 1950. Pop. (1983 est.) 4,187,000.

Rostov, formerly (12th–17th century) ROSTOV VELIKY (Rostov the Great), city, Yaroslavl *oblast* (administrative region), northwestern Russian Soviet Federated Socialist Republic, on Lake Nero and the Moscow–Yaroslavl railway. First mentioned in the chronicles in 862, Rostov was an outstanding centre of early medieval Russia. In 1207 Rostov became the capital of a princedom, which remained under Tatar rule in the 14th and 15th centuries. In 1474 it came into the possession of Moscow under Dmitry Donskoy. At the end of the 16th century, Rostov grew in importance as a trade centre on the route between Moscow and the White Sea. Surviving buildings include the kremlin, the Cathedral of the Assumption (1230), the 15th-century Terem Palace, and the 17th-century White Palace (Belaya Palata). Modern Rostov maintains a traditional handicraft of enamel on metal. Pop. (1974 est.) 31,000.

Rostov-na-Donu, English ROSTOV-ON-DON, city and administrative centre of Rostov *oblast* (region), southwestern Russian Soviet Federated Socialist Republic, on the lower Don River, 30 mi (50 km) above its mouth on the Sea of Azov. It was founded in 1749 as the customs post of Temernika, when the river mouth was still in Turkish hands; it then became a flourishing trade centre. Between 1761 and 1763 the fortress of St. Dmitry of Rostov was built there, and a town developed around it, near the Armenian settlement

of Nakhichevan-na-Donu, which later merged with Rostov. In 1797 town status was granted, and in 1806 it was named Rostov-na-Donu.



Theatre Square, Rostov-na-Donu, Russian S.F.S.R.
Novosti Press Agency

Because of its key position as a transport centre and port, the town grew steadily with the 19th-century Russian colonization and development of the north Caucasus region and conquest of the Transcaucasia.

These functions remain of great importance. The Don River route to the interior was improved by the opening of the Volga-Don Shipping Canal in 1952, linking the town to the entire Volga basin; a dredged channel gives access to the sea. Rostov lies on road, rail, and oil and natural-gas pipeline connections between central European Russia and the Caucasus region. This nodal location and the nearness of the great Donets Coal Basin have led to major industrial development, especially in engineering. Two huge plants make Rostov the largest producer of agricultural machinery in the Soviet Union. Other engineering products include ball bearings, electrical and heating equipment, wire, self-propelled barges, road-construction equipment, and industrial machinery. There are ship and locomotive repair yards and a range of consumer-goods industries. Rostov State University was founded in 1917, and there are numerous other institutions of higher education and scientific-research. Pop. (1989 prelim.) 1,020,000.

Rostovtsev, Iakov Ivanovich, Graf (Count) (b. Jan. 9, 1804 [Dec. 28, 1803, Old Style], St. Petersburg [now Leningrad], Russia—d. Feb. 18 [Feb. 6], 1860), leader in the formulation of the statutes emancipating the Russian serfs.

Rostovtsev was a career military man. He was a young officer at the time of the Decembrist uprising in 1825. After being invited by several Decembrist officers to participate in the plot, he informed Tsar Nicholas I of the intended rebellion without naming names.

During the 1840s and '50s Rostovtsev held staff posts concerned with military education and the administration of the cadet corps. After the Russian government publicly announced in 1857 its intention to reform serfdom, General Rostovtsev was named to the secret committee to deliberate the means of reform. His report to the tsar was based on research and his foreign travels rather than on personal familiarity with the problems of the peasantry, but the report was carefully reasoned and caused him to be made chairman of the Editing Commission that would draft the preliminary statutes for emancipation. In this capacity he won the trust of Tsar Alexander II, who delegated broad responsibility to him. Rostovtsev led this group as it formulated the government's new policy regarding the peasantry and was largely responsible for the emancipation statutes of Feb. 19, 1861, issued a year after his death. His own concept of the principles to be followed in the reforms was based on the notions of complete and immediate abolition of the landowner's power over the serf, the administrative and judicial autonomy of peasant communes, and state aid to enable the freed peasants to purchase land allotments.

After his death Rostovtsev was succeeded as chairman of the commission by the conservative Prince V.N. Panin.

Rostovtzeff, Michael Ivanovich, Russian MIKHAIL IVANOVICH ROSTOVTSEV (b. Nov. 10 [Oct. 29, Old Style], 1870, near Kiev, Ukraine, Russian Empire—d. Oct. 20, 1952, New Haven, Conn., U.S.), Russian-born archaeologist and one of the 20th century's most influential authorities on ancient Greek and Roman history, particularly their economic and social aspects.

Professor of Latin at the University of St. Petersburg (1898–1918), he was unsympathetic to the Russian Revolution and left Russia to go first to the University of Oxford and then to the United States.

While teaching at the University of Wisconsin, Madison (1920–25), and at Yale University (1925–44), Rostovtzeff produced the works for which he is best known: *The Social and Economic History of the Roman Empire* (1926, 2nd ed. 1957); *A History of the Ancient World,* 2 vol. (1926–28, 2nd ed. 1930–33); and *The Social and Economic History of the Hellenistic World* (1941, 2nd ed. 1953).

Based in some measure on his own archaeological observations, Rostovtzeff's works are characterized by a broad outlook, vivid illustration, and sometimes daring interpretation; *e.g.,* the decadence of the Roman Empire was caused by the rebellion of the rural population against the urban.

From 1928 to 1937 Rostovtzeff directed the excavation of a Hellenistic city in Syria and published *Dura-Europos and Its Art* (1938). He also is noted for works on the art and archaeology of southern Russia.

Rostropovich, Mstislav (Leopoldovich) (b. March 27, 1927, Baku, Azerbaijan S.S.R.), Soviet conductor and pianist and one of the best-known cellists of the 20th century.

Trained by his parents (a cellist and a pianist) and at the Moscow Conservatory (1943–48), Rostropovich won the Stalin Prize in 1951 and in 1956 became professor of cello at the Moscow Conservatory. He began touring abroad in the 1950s. Rostropovich also performed as a pianist in recitals with his wife, the soprano Galina P. Vishnevskaya, and in 1968 he made his debut as a conductor.

In 1970 Rostropovich supported the dissident Soviet writer Alexander Solzhenitsyn; the government thereafter sharply curtailed his opportunities to perform and travel. In 1974, however, he and his wife were permitted two years abroad, and in 1975 they announced their decision not to return to the Soviet Union. The Soviet government deprived them of their citizenship in 1978. In 1977 he became music director of the National Symphony Orchestra in Washington, D.C. The Soviet government restored to Rostropovich and his wife their citizenship in 1990.

Although sometimes criticized for occasional overromanticism, Rostropovich was admired for his keen musicianship, both in contemporary works and in the established concert repertory. His exploitation of the tonal resources of the cello was considered exceptional. Composers who wrote works for him include the Russians Aram Khachaturian, Sergei Prokofiev, and Dmitry Shostakovich, the British Benjamin Britten, and the American Lukas Foss.

Roswell, city, seat (1889) of Chaves county, southeastern New Mexico, U.S. It lies along the Hondo River near the Pecos River. Founded as a trading post in 1871 by Van C. Smith, it was named for his father, Roswell, and developed as a ranching and agricultural centre supported by irrigation. The surrounding area produces cotton, truck crops, alfalfa, and livestock. The establishment of Walker Air Force Base in 1941 and the discovery of oil and natural gas in the 1950s stimulated Roswell's economic growth. The New Mexico Military Institute was founded there in 1891, and the city's museum houses paintings by Peter Hurd (born in Roswell). Bottomless Lakes State Park is just east of the city, and Lincoln National Forest is to the west. Inc. 1891. Pop. (1988 est.) 43,911.

Roswitha (German poet): *see* Hrosvitha.

Rosyth, town and naval base in Fife region, Scotland, on the north shore of the Firth of Forth. Its naval base played a vital role in both world wars as a ship-repair and dry-dock complex. During World War II, the dockyard was greatly expanded, and more than 3,000 warships were repaired or refitted there. Rosyth is now Britain's only refitting base for nuclear-powered submarines. Pop. (1981) 10,061.

rot, also called DECAY, any of several plant diseases, caused by any of hundreds of species of soil-borne bacteria and fungi. They are characterized by plant decomposition and putrefaction. The decay may be hard, dry, spongy, watery, mushy, or slimy and may affect any plant part.



Shelf fungus (*Polyporus betulinus*), which causes decay of birch trees
William D. Griffin

Seed rot results in row skips and a poor, irregular stand; it is especially troublesome in cold, wet, heavy soils.

Root rot is caused by numerous fungi, especially *Armillaria mellea, Clitocybe tabescens,* and many species of *Pythium, Phytophthora, Aphanomyces,* and *Fusarium.* Plants lose vigour, become stunted and yellow, and may wilt or die back and drop some leaves. They do not respond to fertilizer and water. Trees so affected die gradually; roots decay and may be covered with mold or black stringlike strands called rhizomorphs (*Armillaria, Clitocybe*). Root rot can be avoided by growing disease-free plants and resistant varieties in well-drained, well-prepared soil with a high content of organic matter; rotating annuals and biennials; avoiding overcrowding and root or crown injury; maintaining vigour by proper fertilization, watering, pruning, and cultivation; and controlling rodents, insects, nematodes, and weeds. Seedbed drenches of fungicides are often beneficial for limited areas of flowers, shrubs, and trees. Soil for use in seedbeds and in pots can be sterilized by heating or by chemical treatment.

Wood rot destroys more timber each year than fire does: some 20,000,000,000 board feet in the United States alone. It is caused

by hundreds of fungi, including species of *Daedalea, Fomes, Lenzites, Polyporus, Poria,* and *Stereum.* Affected wood is often discoloured or stained, lightweight, soft, crumbly, or powdery. Damage usually occurs slowly, often over a period of many years. Infection occurs almost entirely through wounds. Hoof- to shelf-shaped fruiting bodies (conks) develop along the trunk and branches; or mushrooms may form at the trunk base or at the sites of wounds. A fruiting body or mushroom cluster indicates extensive decay. Wood rot can be avoided by removing dead and dying branches, making pruning cuts flush with the stems (leaving no stubs as possible entry for fungi), and wrapping young trees to protect against tree borers that can carry the causal fungi. Tree wound dressings are of doubtful value in preventing rots.

Rota, formerly SARPAN, one of the Mariana Islands, part of the U.S. Commonwealth of the Northern Mariana Islands, in the western Pacific Ocean. It lies 32 miles (51 km) north of Guam. Of volcanic formation, it has a total land area of 33 square miles (85 square km) and rises to 1,612 feet (491 m). Under Japanese administration before World War II, it became a sugar-growing and sugar-processing centre. It has an international airport. The indigenous Chamorro culture of the Marianas survives in its purest form on Rota. Pop. (1989 est.) 1,612.

rotary engine, internal-combustion engine in which the combustion chambers and cylinders rotate with the driven shaft around a fixed control shaft to which pistons are affixed; the gas pressures of combustion are used to rotate the shaft. Some of these engines have pistons that slide in toroidal (doughnut-shaped) cylinders; others have single- and multiple-lobed rotors. Early rotary engines were used in World War I aircraft. They were air cooled, with cylinders arranged circularly around a crankshaft fastened rigidly to the fuselage. The propeller was attached directly to the circular frame on which the rotating cylinders were mounted. Various inefficiencies in these engines led to their abandonment after the war.

After World War II the development of a new kind of rotary engine reawakened interest. The Wankel is the most fully developed and widely used of the rotary engines. In the Wankel engine the rotor, in the form of an equilateral triangle, rotates with an orbital motion in a specially shaped casing and forms rotating crescent-shaped combustion chambers between its sides and the curved wall of the casing. The three apexes of the rotor are provided with spring-loaded sealing plates that maintain a continuous sliding contact with the concave inner surface of the casing, and the combustion chambers increase and decrease successively in size as the rotor turns. The fuel charge from a carburetor enters the chamber through an intake port, is compressed as the size of the chamber is reduced by the rotation of the rotor, and at the appropriate time is ignited by a spark plug.

The Wankel engine was first tested for use in automobiles in 1956. It has since come to be used for such industrial applications as driving air compressors, where small, light-weight, high-speed engines with mechanical simplicity are needed. *See* gasoline engine.

Rotary International, civilian service club founded in the United States in 1905 by Paul P. Harris, a Chicago attorney, to foster the "ideal of service" as a basis of enterprise, to encourage high ethical standards in business and the professions, and to promote a world fellowship of business and professional men. When Harris initiated the idea of a civilian service club in 1905, his plans also included the classification principle that restricts membership in a given club to a quota from each business or profession.

The name Rotary was proposed because meetings were to be held in rotation in members' offices. In 1912 the name became the International Association of Rotary Clubs; the present name was adopted in 1922.

In addition to its general community service projects, Rotary International has an ambitious international program; it administers a fund to provide fellowships and scholarships to graduate students to study or work in countries other than their own.

Rotary International has members in some 150 countries. Its world headquarters are located in Evanston, Ill., U.S.

rotary press, printing press that prints on paper passing between a supporting cylinder and a cylinder containing the printing plates. It may be contrasted to the flatbed press (*q.v.*), which has a flat printing surface. It is primarily used in high-speed, web-fed operations, in which the press takes paper from a roll, as in newspaper printing. Many of these large presses not only print as many as four colours but cut and fold and even bind in a cover—in one continuous automatic process. Paper passes through some presses at nearly 20 miles (30 kilometres) per hour, the speed limited partly by the tensile strength of the paper; large presses can print up to 60,000 copies of 128 standard-size pages in an hour.

In its simplest form a rotary press consists of two cylinders turning in opposite directions, with the plate cylinder having curved printing plates attached to its surface and the impression cylinder working to press the paper to the inked plates as the paper passes between the cylinders. A simple two-colour rotary press uses two plate cylinders in succession, each bearing a different typeform and each having its own inking system. The same side of the same sheet of paper receives two successive impressions of two different colours as it passes through the press. Printing on both sides of a sheet of paper and printing in three, four, or even five colours can be achieved in a rotary press by using different combinations and successions of plate and impression cylinders. Extremely high rates of production can be achieved in very large, highly automated roll-fed rotary presses. These machines have cylinders with a circumference large enough to accommodate two or more plates, so that with each revolution the cylinder prints two or more copies of the same page. Similar arrangements enable a cylinder to print eight copies of the same page in a single revolution.

Quality control is extremely important in colour printing, because the various colour impressions received by a page must be in perfect register with each other. This control is achieved in rotary presses by photoelectric cells that selectively pick up guide marks printed in each colour as they go by and that react to any irregularities in the distance between these guide marks. Any error is automatically corrected by modifying either the speed of one group of cylinders or the pressure of the rollers that control the tension of the paper between one cylinder group and the next. *See* printing.

rotational stress, physiological changes that occur in the body when it is subjected to intense gyrational or centrifugal forces, as in tumbling and spinning. Tumbling and spinning are a hazard to pilots who have been ejected from a moving aircraft.

Tolerance levels to rotational stress depend somewhat upon which part of the body is acting as the centre of rotation and how long the stress is endured. When the heart is the centre of rotation, unconsciousness can occur at 169 revolutions per minute for only a 3- to 10-second exposure, and the results can be fatal if such rotation is sustained for two minutes. At 150 revolutions per minute the blood pressure is drastically lowered so that output from the heart is almost stopped. Hemorrhages can occur in the eyes, brain tissue, skin, sinus cavities, and middle ears; pain and severe headaches can be produced and may last for several days after the exposure. Other complications that can arise are nausea, vomiting, pooling of blood in the extremities, disorientation, and blurring of vision.

rote (musical instrument): *see* rotta.

Ròtea language: *see* Sedang language.

Roth, Henry (b. Feb. 8, 1906, Tysmenica, Galicia, Austria-Hungary [now in Ukrainian S.S.R.]), American teacher, farmer, machinist, and sporadic author whose novel *Call It Sleep* (1934) was one of the neglected masterpieces of American literature in the 1930s.

The son of Jewish immigrants, Roth graduated from the College of the City of New York in 1928 and held a variety of jobs thereafter. His novel *Call It Sleep* appeared in 1934 to laudatory reviews and sold 4,000 copies before it went out of print and was apparently forgotten. But in the late 1950s and '60s, Alfred Kazin, Irving Howe, and other American literary figures were able to revive public interest in the book, which came to be recognized as a classic of Jewish-American literature and as an important proletarian novel of the 1930s. Roth himself published virtually nothing for 30 years after the book's appearance and contented himself with tutoring, raising waterfowl on a farm, and raising a family. He began writing again in the late 1960s, and his second book, *Shifting Landscape: A Composite, 1925–87,* a collection of short stories and essays, appeared in 1987.

Call It Sleep centres on the character and perceptions of a young boy who is the son of Yiddish-speaking Jewish immigrants living in a ghetto in New York City. Roth uses stream-of-consciousness techniques to show the boy's psychological development and to relay his perceptions of his family and of the larger world around him. The book powerfully evokes the terrors and anxieties the child experiences in his anguished relations with his father, and the squalid urban environment in which the family lives is realistically described.

Roth, Joseph (b. Sept. 2, 1894, Brody, Galicia, Austria-Hungary [now in Ukrainian S.S.R.]—d. May 27, 1939, Paris, Fr.), journalist and regional novelist who, particularly in his later novels, mourned the passing of an age of stability he saw represented by the last pre-World War I years of the Habsburg empire of Austria-Hungary.

Details about Roth's early years, religious beliefs, and personal life are little known; Roth himself made a practice of concealing or transforming such biographical information. It is known that he studied at Lemberg and Vienna and then served in the Austrian army from 1916 to 1918. After the war he worked as a journalist in Vienna and Berlin and was a regular contributor to the *Frankfurter Zeitung* (1923–32). During this period he wrote several novels, including *Radetzkymarsch* (1932; *Radetzky March*), considered his best novel, an excellent portrait of the latter days of the monarchy. Roth was concerned with the dilemma of individual moral heroes in a time of decadence and moribund traditions. Many of his plots treat the difficulties of the father–son relationship; the aged emperor Francis Joseph appears repeatedly as a paternal figure. In 1933 Roth immigrated to Paris, where he spent the remainder of his life. In his final years he viewed the past with increasing nostalgia, a sentiment evident in the six novels written during this exile period. *Die Kapuzinergruft* (1938; "The Capuchin Tomb") is an example. *Der stumme Prophet* (1966; *The Silent Prophet*), the story of a failed revolutionary, was written in 1929.

Roth, Philip (Milton) (b. March 19, 1933, Newark, N.J., U.S.) novelist and short-story writer, whose early works are characterized by an acute ear for dialogue, a concern with Jewish middle-class life, and the painful entanglements of sexual and familial love. Other works deal satirically with political and sexual themes.

Roth received an M.A. from the University of Chicago and taught there and elsewhere. He first achieved fame with *Goodbye Columbus* (1959), a collection of short stories. *Letting Go* (1962) was Roth's first novel; it was followed in 1967 by *When She Was Good.* His controversial novel *Portnoy's Complaint* (1969) explores the sexual experiences of a contemporary Jewish male. *The Breast* (1972) deals with the experience of a man who turns into a huge breast. *My Life as a Man* (1974) is reminiscent of *Portnoy's Complaint. The Professor of Desire* (1977) revives the hero of *The Breast* in action preceding his transformation. Later works include *The Ghost Writer* (1979) and *Zuckerman Unbound* (1981).

Rothaargebirge, southernmost mountain region of the Sauerland in the Middle Rhine Highlands of southeastern North Rhine-Westphalia *Land* (state), western Germany. The round-topped hills reach their highest point at the heath-covered Kahler Asten (2,759 feet [841 m]). Heavily forested slopes fall steeply to the Lenne and Sieg valleys in the north and west but drop gradually to the southwest, where they are drained by the Lahn and Eder rivers of Hesse *Land.* Heavy rainfall and long, cold winters prevent arable cultivation. The local economy is dependent largely on forestry, stock raising, and tourism. A number of health spas and holiday resorts have developed in the region, including those at Winterberg, the chief winter sports centre, and Schmallenberg.

Rothe, Richard (b. Jan. 28, 1799, Posen, Prussia—d. Aug. 20, 1867, Heidelberg, Baden), Lutheran theologian of the German Idealist School, which held, in general, that reality is spiritual rather than material and is discerned by studying ideas rather than things.

Rothe was educated at the University of Heidelberg, where he studied under the leading German Idealist philosopher G.W.F. Hegel (1770–1831). He was a professor there for most of his career after 1837. In that year he published his celebrated monograph on the origins of the church and its polity, *Die Anfänge der christlichen Kirche und ihrer Verfassung* ("The Beginnings of the Christian Church and Its Constitution"). In this work Rothe discussed the relationship between church and state, contending that the state needs the church to reach its goal of demonstrating moral conduct in everyday life. He believed that, eventually, the earthly communities of the state would arrive at such perfection that the church and state would become congruent and the church would wither away in favour of a Christian state, which would be both a religious and moral society. Rothe's Idealism is evident especially from his assertion that the goal of all history is the elevation of man to a totally spiritual level that approaches the life of God himself.

Rothe is also remembered for *Theologische Ethik* (3 vol., 1845–48; "Theological Ethics"), which reflects his ideas on the relationship between church and state, and *Stille Stunden* (1886; "Still Hours"), gathered from his devotional writings.

Rothenburg ob der Tauber, city, Bavaria *Land* (state), southern Germany, above the deep valley of the Tauber River, on the scenic "romantic route" between Würzburg and the



Old blacksmith's shop, a medieval landmark in Rothenburg ob der Tauber, Ger.
De Wys Inc.

Bavarian Alps. First mentioned as Rotinbure in the 9th century, it developed around a Hohenstaufen fortress and was a free imperial city from 1274 until 1803. It attained its zenith under burgomaster Heinrich Toppler (1373–1408) and declined after the Thirty Years' War, during which it was besieged and captured (1631) by Catholic League forces under Johann Tserclaes Tilly. At that time, the city was supposedly spared when a citizen accepted a dare from the enemy to drink more than three quarts of wine at one gulp. The event is commemorated every Whitsuntide by the performance of a play, *Der Meistertrunk* ("The Master Gulp"). The old city is encircled by medieval walls and towers. Notable landmarks include the Gothic and Renaissance town hall with a Baroque arcade and the Church of St. Jacob (1373–1528) with a wooden altar by Tilman Riemenschneider. Industries include electronics, textiles, steel, and motor vehicles. Pop. (1989 est.) 11,071.

Rother, district, county of East Sussex, England, covering 197 sq mi (511 sq km) in the eastern third of the county near (but not including) the borough of Hastings. It extends along the Channel coast for 22 mi (34 km) and includes the ancient ports of Winchelsea and Rye and the site of the Battle of Hastings (1066). Bexhill is the administrative seat. The district is named for the River Rother, which rises in the Wealden Hills, flows east along part of the boundary between East Sussex and Kent, and enters the English Channel at Rye. Pop. (1983 est.) 78,000.

Rother, König, English KING ROTHER, medieval German romance (*c.* 1160), earliest record of the type of popular entertainment literature circulated by wandering minstrels. It combines elements from German heroic literature (without the grimness of the older tales) with Orientalisms derived from the Crusades. In the story, the young king Rother sends 12 envoys to the Emperor in Constantinople to ask his daughter's hand, but, before they leave, he takes a harp and plays three tunes, which they are to listen for if in danger. After their arrival, the Emperor throws the envoys in prison, so Rother sets out, assuming the name Dietrich. He is accompanied by his vassal Berchter, whose seven sons are among the envoys, and by a great army. Dietrich tells the Emperor he has been banished by Rother. He contrives to meet the Princess, learns she intends to marry only King Rother, and reveals his true identity. The Princess persuades her father to release the starving prisoners for three days, and Rother signals his presence by playing the harp. He rescues them and carries off the Princess. Her father, however, sends a cunning *Spielmann* (minstrel) after them, who then tricks the Princess into returning. To get her back, Rother has to undertake a second series of adventures.

Rotherham, district (borough), metropolitan county of South Yorkshire, England, at the confluence of the Rivers Don and Rother. Rotherham expanded rapidly after the foundation of ironworks in 1746, and in the 19th century it became part of a continuous industrial belt extending along the Don Valley from Sheffield to Mexborough. The economy continues to be dominated by steelworks and engineering, but new light industries such as clothing manufacture provide some diversification. The district has an area of 109 sq mi (283 sq km). Pop. (1983 est.) 253,200.

Rotherham, Alan (b. July 31, 1862, Eng.—d. Aug. 30, 1898, Eng.), English rugby player who was a member of the Oxford University team during their golden age, between 1882 and 1884, and who helped to revolutionize the half-back play. He was educated at Balliol College, Oxford, and became a barrister. He won 12 caps for England and played for Coventry and Richmond as well as for Oxford. In the 1882 university match, Rotherham bounced the ball into play instead of waiting for a line-out and scored the winning try (touchdown).

Rothermere (of Hemsted), Harold Sidney Harmsworth, 1st Viscount (b. April 26, 1868, Hampstead, London—d. Nov. 26, 1940, Bermuda), British newspaper proprietor who, with his brother Alfred Harmsworth, 1st Viscount Northcliffe, built the most successful journalistic empire in British history and created popular journalism. A shy individual, he let his brother handle the public and journalistic side of the business, while he handled financial problems with great skill. An extremely astute businessman, he also gave generously to philanthropies.

Leaving school early, Harmsworth became a tax clerk before joining his brother's magazine-publishing firm in 1888. In 1894 the brothers bought London's *Evening News,* with which they made a great success. Two years later they launched a morning paper, the highly profitable *Daily Mail.* They took over the *Daily Mirror* in 1914, adding a popular *Sunday Pictorial,* the first Sunday picture newspaper to appear in London. Harmsworth papers, aimed at large popular audiences, featured short articles in simple, exciting language, much scandal and sensationalism, and many pictures. Though often criticized as vulgar and illiterate, the papers made fortunes for their owners. In 1910 Harmsworth was made a baronet and in 1914 a baron.

During World War I, Harmsworth served with distinction as air minister and was later publicly thanked by Prime Minister Lloyd George. After the war he was made a viscount (1919) and returned to private life. His brother's death in 1922 made him heir to the entire group of newspapers and magazines, which he managed with mixed results. During the 1930s he favoured British rearmament, sympathized with Hitler and Mussolini, and wrote several books on foreign affairs. His charitable activities met with greater favour. Asked in 1940 by Lord Beaverbrook to undertake a mission to the U.S., he suffered a breakdown in health and died in Bermuda, where he had gone to recover.

Rothesay, royal burgh and chief town of the island of Bute, Strathclyde region, Scotland, lying on its eastern coast. It has developed as a resort near the entrance to the Firth of Clyde. In the centre of the town are the ruins of an 11th-century castle. Rothesay was made a royal burgh by Robert III of Scotland, who, in 1398, created his eldest son David duke of Rothesay, a title that became the highest Scottish title of the heir apparent to the throne of the United Kingdom. The Rothesay cotton-spinning mill, first of its kind to

be erected in Scotland, used waterpower from nearby Loch Fad. Manufacture of fine tweed cloth is now important. The sheltered bay is headquarters of a submarine squadron and a centre for pleasure cruises. Pop. (1981) 5,456.

Rothko, Mark, original name MARCUS ROTHKOVITCH (b. Sept. 25, 1903, Dvinsk, Russia—d. Feb. 25, 1970, New York City), U.S. painter whose works introduced contemplative introspection into the melodramatic post-World War II Abstract Expressionist school; his use of colour as the sole means of expression led to the development of Colour Field Painting.

In 1913 Rothko's family emigrated from Russia to the U.S., where they settled in Portland, Ore. During his youth he was preoccupied with politics and social issues. He entered Yale University in 1921, intending to become a labour leader, but dropped out after two years and wandered about the U.S. In 1925 he settled in New York City and took up painting. Although he studied briefly under the painter Max Weber, he was essentially self-taught.

Rothko first worked in a realistic style that culminated in his "Subway" series of the late 1930s, showing the loneliness of persons in drab urban environments. This gave way in the early 1940s to the semi-abstract biomorphic forms of the ritualistic "Baptismal Scene" (1945; Whitney Museum of American Art, New York City). By 1948, however, he had arrived at a highly personal form of Abstract Expressionism. Unlike many of his fellow Abstract Expressionists, Rothko never relied on such dramatic techniques as violent brushstrokes or the dripping and splattering of paint. Instead, his virtually gestureless paintings achieved their effects by juxtaposing large areas of melting colours that seemingly float parallel to the picture plane in an indeterminate, atmospheric space.

Rothko spent the rest of his life refining this basic style through continuous simplification. He restricted his designs to two or three "soft-edged" rectangles that nearly filled the wall-sized vertical formats like monumental abstract icons. Despite their large size, however, his paintings derived a remarkable sense of intimacy from the play of nuances within local colour.

From 1958 to 1966 Rothko worked intermittently on a series of 14 immense canvases (the largest was about 11×15 feet [3×5 metres]) eventually placed in a nondenominational chapel in Houston, Texas, called, after his death, the Rothko Chapel. These paintings were virtual monochromes of darkly glowing browns, maroons, reds, and blacks. Their sombre intensity reveals the deep mysticism of Rothko's later years. Plagued by ill health and the conviction that he had been forgotten by those artists who had learned most from his painting, he committed suicide.

After his death, the execution of Rothko's will provoked one of the most spectacular and complex court cases in the history of modern art, lasting for 11 years (1972–82). The misanthropic Rothko had hoarded his works, numbering 798 paintings, as well as many sketches and drawings; and his daughter, Kate Rothko, accused the executors of the estate (Bernard J. Reis, Theodoros Stamos, and Morton Levine) and Frank Lloyd, owner of Marlborough Galleries in New York City, of conspiracy and conflict of interest in selling the works—in effect, of enriching themselves. The courts decided against the executors and Lloyd, who were heavily fined. Lloyd separately was tried and convicted on criminal charges of tampering with evidence. In 1979 a new board of the Mark Rothko Foundation was established, and all the works in the estate were divided between the artist's two children and the Foundation. In 1984 the Foundation's share of works was distributed to 19 museums in the United States, Great Britain, The Netherlands, Denmark, and Israel; the best and the largest proportion went to the National Gallery of Art, Washington, D.C.

A biography, *About Rothko* by Dore Ashton, a fellow artist, was published in 1983.

Rothschild FAMILY, most famous of all European banking dynasties, which for some 200 years exerted great influence on the economic and, indirectly, the political history of Europe. The house was founded by Mayer



Mayer Amschel Rothschild, engraving
By courtesy of the Historisches Museum, Frankfurt am Main

Amschel Rothschild (b. Feb. 23, 1744, Frankfurt am Main—d. Sept. 19, 1812, Frankfurt) and his five sons, Amschel Mayer (b. June 12, 1773, Frankfurt—d. Dec. 6, 1855, Frankfurt), Salomon Mayer (b. Sept. 9, 1774—d. July 27, 1855, Vienna), Nathan Mayer (b. Sept. 16, 1777—d. July 28, 1836, Frankfurt), Karl Mayer (b. April 24, 1788—d. March 10, 1855, Naples), and Jakob, or James (b. May 15, 1792—d. Nov. 15, 1868, Paris). Starting out in a Frankfurt banking house, Mayer and his sons became international bankers, establishing branches in London, Paris, Vienna, and Naples by the 1820s.

Mayer Amschel Rothschild. The founder of the house was Mayer Amschel. The family's name derived from the red (*rot*) shield on the house in the ghetto in which Mayer's ancestors had once lived. Intended for the rabbinate, Mayer studied briefly, but his parents' early death forced him into an apprenticeship in a banking house. Soon after becoming court factor to William IX, landgrave of Hesse-Kassel, Mayer set the pattern that his family was to follow so successfully—to do business with reigning houses by preference and to father as many sons as possible who could take care of the family's many business affairs abroad.

Mayer's five sons. Starting as dealers in luxury items and traders in coins and commercial papers, Mayer and his sons eventually became bankers to whom the French Revolutionary and Napoleonic Wars of 1792–1815 came as a piece of great good fortune. Mayer and his oldest son, Amschel Mayer, supervised the growing business from Frankfurt, while Nathan Mayer established a branch in London in 1804, James (or Jakob) settled in Paris in 1811, and Salomon Mayer and Karl Mayer opened offices in Vienna and Naples, respectively, in the 1820s. The wars, for the Rothschilds, meant loans to warring princes; smuggling as well as legal trading in key products such as wheat, cotton, colonial produce, and arms; and the transfer of international payments between the British Isles and the Continent that Napoleon vainly attempted to close to British trade. Peace transformed the growing Rothschild business: the banking group continued its international business dealings but became more and more an agent in government securities (Prussian or English, French or Neapolitan), in insurance-company stocks, and in shares of industrial companies. Thus, the family successfully adapted to the Industrial Revolution and participated in eco-



Amschel Mayer Rothschild, lithograph by Robert Theer after an engraving by Franz Lieder
By courtesy of Osterreichische Nationalbibliothek, Vienna

nomic growth throughout Europe with their railway, coal, ironworking, and metallurgical investments. The banking group continued to expand after the 1850s and, in particular, achieved an important position in the world trade of oil and nonferrous metals. But its previous "oligopolistic" position was seriously threatened by new joint-stock banks and "commercial," or deposit, banks both in England and in France, as well as in the German states. By the last quarter of the 19th century, the Rothschild group was no longer the first banking consortium. Other groups, in Europe and in the United States, had become stronger, richer, and more enterprising.

Yet the two guidelines laid down by Mayer Amschel for the Rothschild business operations (which, indeed, became a family tradition)—to conduct all transactions jointly and never to aim for excessive profits—helped to



Salomon Mayer Rothschild, lithograph by Robert Theer
By courtesy of Osterreichische Nationalbibliothek, Vienna

compensate to a notable extent for the inevitable risks inherent in handing down a business to future generations not all of whose members are qualified to run it. Amschel Mayer, Nathan, James, Salomon, and Karl—the founders of the Rothschild consortium—were themselves unequally endowed: Nathan and James stood out among their brothers by the force of their personalities, particularly Nathan, who was hard, deliberately boorish,

and sarcastic. James, who was his brother's equal in all these things, possessed an alleviating air of some refinement as a result of living



Nathan Mayer Rothschild, detail of a lithograph by Karl von Stur, 1886
By courtesy of Osterreichische Nationalbibliothek, Vienna

in the more polished atmosphere of Paris. The five founders in turn had unequal successors. For example, if Alphonse in Paris (1827–1905) was a worthy successor to his father, James, his own son, Édouard (1868–1949), was not as strong a figure as his position required. But Édouard's son (Guy [b. 1909]), and his cousins (Alain [1910–1982] and Elie [b. 1917]) showed exceptional adaptability and ambition, thus confirming the constant element in the group's history for a century and a half: a remarkable capacity for seizing opportunities and for adapting in business as well as in politics. Successive generations of the Rothschild family have been similarly active in international finance and politics.

The second generation. In separating the circumstantial from the personal and individual aspects of the dynasty's hegemony during the 19th century, one must note that, although the first group of Rothschilds arrived as strangers in their new countries, unfamiliar with the languages and the customs and subject to the jealousy and competition of local bankers, they stood out from those around them by their fierce will to acquire a place in the sun. By the second generation, when the sons of the five founding brothers (notable among them Anthony and Lionel Nathan in London, Alphonse and Gustave in Paris) entered the business, the Rothschilds were polished and refined, as well as naturalized and nationalized to the point of blending



Karl Mayer Rothschild, detail of a lithograph by Karl von Stur, 1886
By courtesy of Osterreichische Nationalbibliothek, Vienna

into leadership positions without losing any of their family attributes. It is possible that the young Rothschilds' education and the extremely worldly existence of the heads of the various houses helped to create this true mutation. On the other hand, the Rothschilds were influencing the national economy and politics of their countries as greatly as they were being influenced themselves. Alphonse, for example, as the head of the international banking syndicate that in 1871 and 1872 placed the two great French loans known as liberation loans after France's defeat by Prussia, could boast without immodesty that his influence had maintained the chief of the French government, Adolphe Thiers, in power. At the same time, in 1875, Lionel, in London (where he had been a member of the House of Commons since 1858), was able to give on a few hours notice the £4,000,000 that allowed the British government to become the principal stockholder in the Suez Canal Company. Obviously, the two cousins had become important citizens in their respective countries.

There were frequent marriages between Rothschild cousins, and marriages generally were—with very rare exceptions—with Jews. In spite of the number of their descendants and the complexity of their family tree, the Roth-



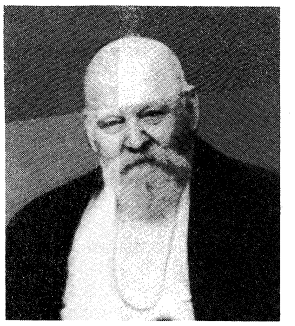
James Rothschild, engraving
By courtesy of the Historisches Museum, Frankfurt am Main

schilds, particularly those of Vienna and Paris during the Nazi period, preserved the kind of family unity necessary to weather great misfortunes.

The Rothschilds were much-honoured. Mayer's five sons were made barons of the Austrian Empire, a Rothschild was the first Jew to enter the British Parliament, and another was the first to be elevated to the British peerage. The head of the British branch of the family has always been considered the unofficial head of British Jewry. Members of the British and French families—the only ones still engaged in banking after the seizure by the Nazis of the Austrian house—have distinguished themselves as scientists and often as philanthropists. Baron Philippe de Rothschild (1902–88) became a premier winemaker, of the vineyard Mouton-Rothschild. (Je.B.)

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Rothschild (of Tring), Lionel Walter Rothschild, 2nd Baron (b. Feb. 8, 1868, London—d. Aug. 27, 1937, Tring, Buckinghamshire, Eng.), British zoologist who became a great collector and founded the Rothschild Natural History Museum in London. The el-



Lord Rothschild, 1930
BBC Hulton Picture Library

dest son of Nathan Mayer Rothschild, 1st Baron Rothschild, he received his titles on the death of his father in 1915.

Rothschild studied at the University of Bonn and then at Magdalene College, Cambridge, where his interests and ambitions in zoology developed under the influence of the distinguished zoologist Alfred Newton. Rothschild's boyhood collections of insects increased to include birds and mammals, which he housed in buildings on his father's estate at Tring. After joining the bank of N.M. Rothschild and Sons, he had less time to devote to his museum and, consequently, hired others to continue its development; the museum was opened to the public in 1892.

He served as a Conservative member of Parliament from 1899 to 1910. In 1917, because of his Zionist sympathies and his eminent position in the Anglo-Jewish community, he received the letter from Arthur James (later Lord) Balfour, then British foreign secretary, declaring the British government's interest in establishing in Palestine a national home for the Jewish people; this letter became known as the Balfour Declaration.

Rothschild was a member of many scientific societies; alone and in collaboration with his staff he published many papers and monographs on biological subjects. His museum held the largest collection of natural history specimens ever assembled by one man; in 1932 the bird collection was sold, because of a shortage of funds, to the American Museum of Natural History in New York City. Rothschild willed his museum and its unique library to the British Museum (London), of which he was a trustee.

Rothschild, Louis-Georges: *see* Mandel, Georges.

Rothstein, Arnold (b. 1882/83, New York City—d. Nov. 6, 1928, New York City), American big-time gambler, bootlegger, and friend of high-placed politicians and businessmen, who dominated influence-peddling in the 1920s in New York City. He was the prototype for F. Scott Fitzgerald's character Meyer Wolfsheim in *The Great Gatsby,* "the man who fixed the World's Series back in 1919." Rothstein allegedly masterminded the bribery in the Black Sox baseball scandal.

Born on New York's East Side, of a middle-class Jewish family, Rothstein in his teens was already involved in gambling and loan-sharking and, by the 1920s, had cultivated the friendship of politicians and businessmen as well as crime lords. He became the paramount fixer, one who acted as go-between in business contracts with the city, in the quashing of arrests, in extralegal permissions to operate speakeasies and other criminal enterprises, and in other bargainings that paid off politicians and police. He was also a banker for bootlegging and other illegal enterprises.

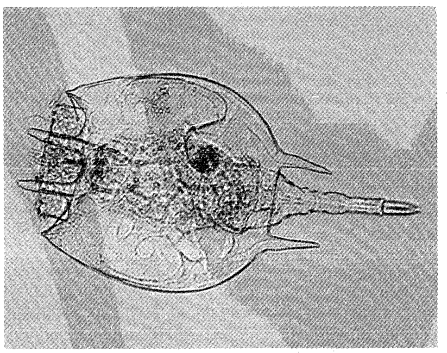
Rothstein was independent, without a con-

tinuing gang, working for all ethnic gangsters—Jewish, Italian, and Irish—and hiring them indiscriminately. His well-tailored, well-mannered, quiet look of respectability—contrasting with the garishness of such mobsters as Al Capone—would prove the model for later heads of organized crime.

On the evening of November 4, 1928, Rothstein was shot in a high-stakes poker game at the Park Central Hotel in New York City and died two days later in a hospital, without naming his killer. The trial of a suspect, Hump McManus, led to an acquittal.

Roti Island, Indonesian PULAU ROTI, island about 10 miles (16 km) southwest of Timor, across the narrow Roti Strait, Nusa Tenggara Timur *provinsi* (province), Indonesia. Roti lies between the Indian Ocean on the west and the Timor Sea on the east. It is 50 miles (80 km) long (southwest-northeast) and about 14 miles (23 km) wide and has an area of 467 square miles (1,210 square km). The island is generally level, with hills in the central portion covered with hardwood forests. Heavy rainfall and the warm and humid climate favour cultivation of rice, corn (maize), fruits, and vegetables. Cattle and ponies are raised, and fishing is important. The island is densely populated, and Islām is the dominant religion. The principal settlement and port is Baa on the northwestern coast; it is linked by road with Nembrala on the southern tip of the island. Trade (by boat) is mainly with nearby Timor.

rotifer, also called WHEEL ANIMALCULE, any of the approximately 2,000 species of microscopic invertebrates that constitute the class Rotifera, or Rotaria (phylum Aschelminthes). Rotifers are so named because the circular arrangement of moving cilia (tiny hairlike structures) at the front end resembles a rotating wheel. Although common in fresh water on all continents, some occur in salt water



Rotifer (*Platyias quadricornis*)
Runk/Schoenberger from Grant Heilman—EB Inc.

or brackish water; others live in damp moss or lichens. Most are free-living; some are parasitic. Some live as individuals; others live in colonies. Most rotifers are 0.1 to 0.5 mm (0.004 to 0.02 inch) long.

The body may be spherical, flattened, baglike, or wormlike. The body wall consists of a thin cuticle. Tufts of cilia at the anterior end comprise the corona, which is used for feeding and locomotion. Small organisms are extracted as food from water currents created by the ciliated corona. Larger organisms, such as other rotifers, crustaceans, and algae, are also eaten. A mouth and digestive tract are usually present. The muscular pharynx, or mastax, contains hard, tiny jaws.

In addition to the swimming rotifers, some (order Bdelloidea) loop along the bottom of ponds, alternately attaching the head and tail ends; other forms remain anchored by means of tubes or cases of jelly attached to the bottom.

Members of each species consist of an exact number of cells. Most females produce two types of eggs. One type must be fertilized by sperm; the other type produces a new individual without fertilization.

rotogravure printing, system of printing based on the transfer of fluid ink from depressions in a printing plate to the paper. It is an intaglio process, so-called because the design to be printed is etched or engraved below the surface of the printing plate. At the start of the gravure printing process, the plate is covered with ink and the surface is then wiped clean. When paper is pressed against the inked plate, the paper penetrates the sunken parts slightly and draws out the ink.

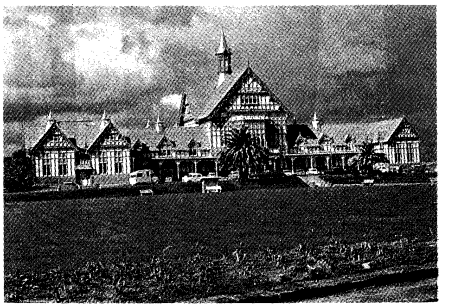
All copy (the material to be reproduced, or printed) in rotogravure printing is prepared as positive film. A gravure printing plate made of copper is then prepared to accept photomechanical transfer by means of a gravure screen; this is a grid of closely intersecting lines that create thousands of tiny squares on the plate, which will in turn react differentially to an etching bath after the plate has been exposed to light through the positive film. The varying depths of the etched cells determine the tones of the printed image, with deeper cells holding more ink (and thus printing darker) than shallow cells, which may hold no ink at all.

In the printing process, the cylinder bearing the printing plates is usually arranged so that during its rotary movement it passes through a trough filled with a thin solution of fast-drying ink, or is sprayed with ink instead. A thin steel blade (called the doctor blade) moves across the cylinder and removes the ink from the plate's surface but not from the tiny depressions in its cells. The plate cylinder then comes in contact with the paper, and the paper draws the ink out of the depressions in the plate. In colour rotogravure printing, a separate cylinder is prepared for each colour.

Because cells of different depths can hold varying amounts of ink, the rotogravure process can print a rich, full range of tonal values, making it ideal for reproducing photographs and other continuous-tone copy in large quantities. Rotogravure is thus widely used to print newspaper supplements (*e.g.*, colour magazine sections), catalogues, illustrated magazines, illustrated books, advertising, calendars, and so on. It is also employed for printing labels and wrappers on cellophane and similar materials. A high-speed printing process, rotogravure is best used for printing long runs of material bearing black-and-white or colour illustrations.

Rotorua, city, north-central North Island, New Zealand. It lies at the southwestern end of Lake Rotorua, for which it is named. Founded in the early 1870s, the settlement was constituted a special town district in 1883, a borough in 1922, and a city in the early 1960s.

The city, on the volcanic plateau in the heart of the thermal belt of North Island, is the centre of a remarkable array of hot springs, boiling mudpools, and spouting geysers. Its spa, with its mineral waters, and the adjacent gardens and lakeside government sanatorium were formerly the main attraction for visitors. Linked to Auckland and Wellington by road and rail, Rotorua remains the chief resort and convention centre of the region. It is also expanding as the commercial focus of a sheep-, beef-, and dairy-farming area that has undergone intensive land development since 1970. Other local industry provides concrete and building products, insecticides, engineering goods, and butter. There are extensive tree plantations, begun in the 1920s, which supply large sawmills and pulp and paper plants. The Forest Research Institute, founded at Rotorua in 1947, coordinates all research of the New Zealand Forest Service. A high proportion of the area's population is Maori. Pop. (1989 est.) 53,200.



Blue Baths building and mineral spa, Rotorua, N.Z.
G.R. Roberts

Rotorua, Lake, lake in north-central North Island, New Zealand, and largest of a group of about 20 lakes, including Rotoiti and Tarawera, that were formerly called the Hot Lakes. The lake is pear-shaped and measures 7.5 miles (12 km) by 6 miles (9.5 km). Lake Rotorua (Maori: Crater Lake) has a total surface area of 31 square miles (80 square km). Lying at an elevation of 920 feet (280 m), the lake fills a crater probably created by an immense volcanic explosion and reaches a depth of 85 feet (26 m). The lake drains a 203-square-mile (526-square-kilometre) basin and discharges through the Ohau River to Rotoiti. Subsurface thermal activity, the basis for the health-spa city of Rotorua (southwest), discolours the lake's water in places. Volcanic Mokoia Island, sacred to the Arawa Maoris, lies in the lake. The first European to visit the lake was Peter Tapsell, in 1830.

Rotrou, Jean de (baptized Aug. 21, 1609, Dreux, Fr.—d. June 28, 1650, Dreux), one of the major French Neoclassical playwrights of the first half of the 17th century. He shares with Pierre Corneille the credit for the increased prestige and respectability that the theatre gradually came to enjoy in Paris at that time.

Rotrou wrote his first play, the comedy *L'Hypocondriaque* ("The Hypochondriac"), before he was 20. He soon won Cardinal de Richelieu's support and became house dramatist at the Hôtel de Bourgogne, the most important theatre in Paris. Rotrou's best plays owe much of their vigour and exuberance to the tradition of the tragicomedy, the favourite dramatic form in the 1630s. For his tragedies, Rotrou, like Corneille, favoured stories about characters who must resolve moral conflicts within themselves; these works are marked by closely knit plots and powerful rhetoric. But in *Le Véritable Saint-Genest* (1647), for example, Rotrou also showed an interest in illusion and surprisingly violent change, characteristics typical of Baroque drama. Rotrou's best-known tragedies are *Venceslas* (1648) and *Cosroès* (1649).

rotta, also spelled ROTE, medieval European stringed musical instrument. The name is frequently applied to the boxlike lyres with straight or waisted sides frequently pictured in medieval illustrations of musical instruments. Some surviving writings, however, indicate that contemporary writers may have applied the name to the harp. The rotta probably originated in Ireland as the *cruit* and spread to the European continent. The Irish name is related to crwth, the Welsh bowed lyre.

rotten borough, depopulated election district that retains its original representation. The term was first applied by English parliamentary reformers of the early 19th century to such constituencies maintained by the crown or by an aristocratic patron to control seats in the House of Commons. Just before the passage of the Reform Act of 1832, more than 140 parliamentary seats of a total of 658 were

in rotten boroughs, 50 of which had fewer than 50 voters. *See also* pocket borough.

Rotterdam, major European port and second largest city of The Netherlands, in the *provincie* of Zuid-Holland (South Holland). It lies about 19 miles (30 km) from the North Sea, to which it is linked by a canal called the New Waterway. The city lies along both banks of the Nieuwe Maas River, which is a northern distributary of the Rhine River.

The name Rotterdam was first mentioned in 1283, when a small tract of reclaimed land was created by draining the mouth of the Rotte River (another distributary in the Rhine River delta). Rotterdam developed as a fishing village and was chartered in 1328. In 1340 the town received permission to dig a canal to the Schie, and it became the major port of the province. In the 17th century, when the discovery of the sea route to the Indies gave an enormous impetus to Dutch commerce and shipping, Rotterdam expanded its harbours and accommodations along the Maas. Before the end of the century it was, after Amsterdam, the second merchant city of the country.

Rotterdam adjusted to the changed circumstances after the French occupation, which, from 1795 until the fall of Napoleon in 1815, halted most trade. Transit trade grew more important, and between 1866 and 1872 the New Waterway was dug from Rotterdam to the North Sea to accommodate larger oceangoing steamships. In 1877 the city was connected with the southern Netherlands by a railroad crossing the Maas River. The simultaneous construction of a traffic bridge across the Maas opened that river's south bank, where large harbour facilities, extending westward, sprang up between 1892 and 1898. Between 1906 and 1930 Rotterdam's Waal Harbour was built; it is now the largest dredged harbour in the world.

Rotterdam's central city and more than one-third of the port's equipment were destroyed by the Germans during World War II. The city hall (1918), the main post office (1923), and the stock exchange were among the few public buildings that escaped destruction. The 15th-century Grote of St. Laurenskerk (St. Lauren's Church) was burned in 1940 but has since been restored.

Rotterdam literally rose from its ashes after the complete devastation of its city centre by German and Allied bombing during World War II. A totally new inner city came from the drawing boards, with a spacious and functional architecture oriented toward the river and a series of experiments at complete city planning that have attracted both professional and touristic admiration. The Lijnbaan Shopping Centre became the prototype for similar centres in Europe and America that allowed only pedestrian traffic.

Rotterdam's economy is still almost completely based on shipping. The port lies at the heart of the densely populated and industrialized triangle of London, Paris, and the German Ruhr district and at the mouths of two important rivers (the Rhine and the Maas), yet it is also open to the North Sea, the world's most heavily navigated sea. The amount of sea-transported goods that pass through Rotterdam's harbour and that of its outport, Europoort (*q.v.*), is among the largest in the world, with much of it consisting of crude oil or petroleum products. Rotterdam is also one of the largest grain and general-cargo harbours on the continent. It is a major transshipment port for inland Europe, with tens of thousands of Rhine River barges using its facilities.

Since the late 1940s Rotterdam's oil-processing, or petrochemical, industry has grown in importance. The city has several large oil refineries. Pipelines transport seaborne crude oil from Rotterdam to Amsterdam, Antwerp, and Germany, refinery products to Germany, naphtha to the province of Limburg, and ethylene gas to Terneuzen in the southern island district of Zeeland. Rotterdam is served by Zestienhoven Airport to the northwest of the city.

Cultural institutions in Rotterdam include the De Doelen concert hall (1966), noted for its acoustical perfection. The Boymans-van Beuningen Municipal Museum has a remarkable collection of paintings by Dutch and Flemish masters. Other museums in the city include the Museum for Geography and Ethnography, the Prince Henry Maritime Museum, and the Historical Museum. The city is also the home of the Erasmus University of Rotterdam. The Royal Rotterdam Zoological Garden Foundation (*q.v.*) is a well-known zoo. Pop. (1989 est.) city, 576,232; metropolitan area, 1,039,566.

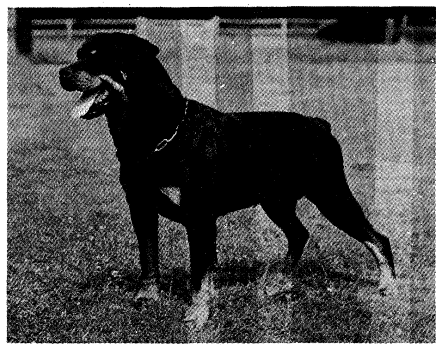
Rotterdam, town (township), Schenectady county, eastern New York, U.S. It lies along the Mohawk River, just northwest of Schenectady. The Jan Mabie House (1671) recalls early Dutch colonial settlement, as does the town's official seal, which is identical with that of Rotterdam, Neth. Rotterdam was formerly part of Schenectady and was separately incorporated as a town in 1821. Rotterdam Junction, a suburban community in the foothills of the Adirondack Mountains, was from 1883 to 1931 an important river and rail juncture for Erie Canal shipments. Although basically residential, Rotterdam has some business enterprises, including an electric plant, a varnish factory, and a large central market warehouse. Pop. (1988 est.) 28,911.

Rotterdam Zoological Garden: *see* Royal Rotterdam Zoological Garden Foundation.

Rottnest Island, Australian island in the Indian Ocean, lying 12 miles (19 km) northwest of Fremantle (at the mouth of the Swan River, near Perth), Western Australia. A coastal limestone fragment, the island measures 6.5 miles by 3.5 miles (10.5 by 5.5 km). It is generally low, with sand dunes and several salt lakes. It was sighted in 1658 by a Dutch party under Samuel Volkerson, and in 1696 a Dutch sea captain, Willem de Vlamingh, gave the island its name, meaning "rat's nest," because the place appeared to be infested with large rats. These, in reality, were quokkas (a kind of wallaby or kangaroo), rare marsupials whose existence is now protected by the island's status as a wildlife sanctuary.

First settled in 1839, Rottnest has served as a pilot station for Fremantle, an Aboriginal penal settlement (to 1850), a juvenile reformatory (1882–1906), and a World War II military base. It is now a resort for the Perth metropolitan area and is accessible by sea and air.

Rottweiler, breed of working dog descended from a cattle dog left by the Roman legions in Rottweil, Ger. The Rottweiler accompanied local butchers on buying expeditions from the European Middle Ages to about 1900, carrying money in a neck pouch to market. It has also served as a guard, a drover's dog, a draft dog, and a police dog.

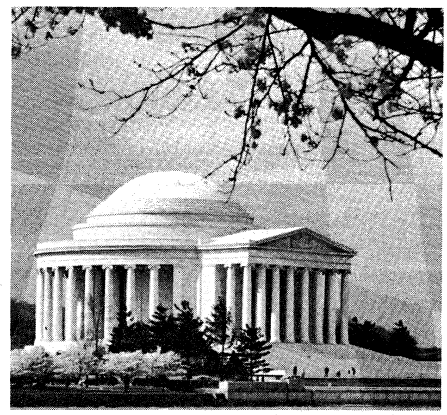


Rottweiler
Sally Anne Thompson—EB Inc.

Characteristically stocky and strongly built, the Rottweiler stands about 22 to 27 inches (56 to 69 cm) and weighs 75 to 90 pounds (34 to 41 kg). It has a short, coarse, black coat, with tan markings on its head, chest, and legs.

Rotuma, island dependency of Fiji in the South Pacific, 440 miles (710 km) north-northwest of Suva, the Fijian capital. Rotuma comprises one large volcanic island—Rotuma Island (17 square miles [44 square km])—and eight islets. Sighted in 1791 by the British naval ship *Pandora* during its search for the *Bounty* mutineers, the main island was formerly called Grenville. The group was annexed by Fiji in 1881. Ahau is the chief village. Copra and woven mats are exported through the small port of Motusa. Rotumans are Polynesians mixed with other ethnic groups. By the early 1980s nearly 5,000 people of Rotuman descent had resettled in other areas of Fiji. Pop. (1986) 2,688.

rotunda, in Classical and Neoclassical architecture, building or room within a building that is circular or oval in plan and covered with a dome. The ancestor of the rotunda was the *tholus* (tholos) of ancient Greece, which was also circular but was usually shaped like a beehive above.



Rotunda, Jefferson Memorial, Washington, D.C., designed by Pope, Eggers, and Higgins, 1939–41
David W. Corson from A. Devaney, New York

An example of a Classical Roman rotunda is the Pantheon erected at Rome about AD 124. The Villa Rotonda (Capra) at Vicenza is an Italian Renaissance example, designed by the influential architect Andrea Palladio. Begun in 1550, the building features a large central hall that is circular and has a low dome. It was later copied by architects of the English Renaissance in such manor houses as Chiswick House, begun in 1725 in London. In the gardens of Chiswick House is a rotunda that serves as a gazebo, or pavilion. The central hall of the Capitol and the rotunda of the Jefferson Memorial in Washington, D.C., are examples of the rotunda in its familiar role as part of a monumental public building.

Sometimes the term rotunda is also used in reference to the dome itself, whether or not the area beneath it is a single oval or circular room. In this sense, the dome of St. Paul's Cathedral in London is a rotunda.

Rouault, Georges(-Henri) (b. May 27, 1871, Paris, Fr.—d. Feb. 13, 1958, Paris), French painter, printmaker, ceramicist, and maker of stained glass who, drawing inspiration from French medieval masters, united religious and secular traditions divorced since the Renaissance.

Rouault was born in a cellar in Paris dur-



"The Workman's Apprentice (Self-Portrait)," in oils by Georges Rouault, 1925; in the Musée National d'Art Moderne, Paris

Giraudon—Art Resource/EB Inc.

ing a bombardment of the city by the forces opposed to the Commune. His father was a cabinetmaker. A grandfather took an interest in art and owned a collection of Honoré Daumier's lithographs; Rouault said later that he "went first to school with Daumier." In 1885 he enrolled in an evening course at the Paris École des Arts Décoratifs. From 1885 to 1890 he was apprenticed in a glazier's workshop; his mature style as a painter was undoubtedly influenced by his work on the restoration of medieval stained-glass windows, including those of Chartres cathedral. In 1891 he entered the École des Beaux-Arts, where he soon became one of the favourite pupils of the Symbolist painter Gustave Moreau, in a class that also included the young Henri Matisse and Albert Marquet. After the death of Moreau in 1898, a small Paris museum was created for his pictures, and Rouault became the curator.

Rouault's early style was academic. But around 1898 he went through a psychological crisis, and, subsequently, partly under the influence of Vincent van Gogh, Paul Gauguin, and Paul Cézanne, he evolved in a direction that made him, by the 1905 Paris Salon d'Automne, a fellow traveller of the Fauves (Wild Beasts), who favoured the arbitrary use of strong colour. Until the beginning of World War I, his most effective medium was watercolour or oil on paper, with dominant blues, dramatic lighting, emphatic forms, and an expressive scribble.

Rouault's artistic evolution was accompanied by a religious one, for he had become, about 1895, an ardent Roman Catholic. He became a friend of the Catholic intellectuals Joris-Karl Huysmans and Léon Bloy. Through another friend, a deputy public prosecutor, he began to frequent, as had Daumier, the Paris law courts, where he had a close view of human apparently fallen from the grace of God. His favourite subjects became prostitutes, tragic clowns, and pitiless judges.

Without completely abandoning watercolour, after 1914 Rouault turned more and more toward the oil medium. His paint layers became thick, rich, and sensuous, his forms simplified and monumental, and his colours and heavy black lines reminiscent of stained-glass windows. His subject matter became more specifically religious, with a greater emphasis on the possibility of redemption than he had put into his pre-1914 work. In the 1930s he produced a particularly splendid series of paintings on the Passion of Christ; typical examples are "Christ Mocked by Soldiers," "The Holy Face," and "Christ and the High Priest." During these years he got into the habit of reworking his earlier pictures; "The Old King," for instance, is dated 1916–36.

Between World Wars I and II, at the instigation of the Paris art dealer Ambroise Vollard, Rouault devoted much time to engravings, illustrating *Les Réincarnations du Père Ubu* by Vollard, *Le Cirque de l'étoile filante* by Rouault himself, *Les Fleurs du mal* by Charles Baudelaire, and *Miserere* (his masterpiece in the genre), with captions by Rouault. Some of this work was left unfinished for a time and published later. In 1929 he designed the sets and costumes for a production by Sergey Diaghilev of Sergey Prokofiev's ballet *The Prodigal Son.* In 1937 he also did the cartoons for a series of tapestries.

During and after World War II, he painted an impressive collection of clowns, most of them virtual self-portraits. He also executed some still lifes with flowers; these are exceptional, for three-quarters of his lifetime output is devoted to the human figure. In 1947 he sued the heirs of Vollard to recover a large number of works left in their possession after the death of the art dealer in 1939. Winning the suit, he established the right of an artist to things never offered for sale, and afterward he publicly burned 315 canvases that he felt were not representative of his best work. During the last 10 years of his life, he renewed his palette, adding greens and yellows, and painted some almost mystical landscapes: a good example is "Christian Nocturne."

Among the major artists of the 20th-century school of Paris, Rouault was an isolated figure in at least two respects: he practiced Expressionism, a style that has never found much favour in France, and he was chiefly a religious painter—one of the most convincing in recent centuries. Both statements, however, need qualification. Rouault was not as fiercely Expressionistic as some of his Scandinavian and German contemporaries; in some ways his work is a late flowering of 19th-century Realism and Romanticism. And he was not an official church artist; his concern with sin and redemption was deeply personal.

(R.McMu.)

MAJOR WORKS. "The Road to Calvary" (1891; Wadsworth Atheneum, Hartford, Conn.); "The Ordeal of Samson" (1893; Los Angeles County Museum of Art); "Duet" (1904; Musée d'Art Moderne de la Ville de Paris); "Head of Christ" (1905; Walter P. Chrysler, Jr. Collection, New York); "Aunt Sallys" (1907; Tate Gallery, London); "Judges" (1908; Statens Museum for Kunst, Copenhagen); "Portrait of Mr. X" (1911; Albright-Knox Art Gallery, Buffalo); "Christ Mocked" (1912; Musée d'Art Moderne de la Ville de Paris); "The Old King" (1916–36; Carnegie Institute, Museum of Art, Pittsburgh); "Three Clowns" (1917; Joseph Pulitzer, Jr. Collection, St. Louis, Mo.); "Crucifixion" (1918; Henry P. McIlhenny Collection, Philadelphia); "Pierrot" (1920; Stedelijk Museum, Amsterdam); "Circus Trio" (1924; Phillips Collection, Washington, D.C.); "The Workman's Apprentice (Self-Portrait)" (1925; Musée National d'Art Moderne, Paris); "Christ Mocked by Soldiers" (1932; Museum of Modern Art, New York City); "The Holy Face" (1933; Musée National d'Art Moderne); "Christ and the High Priest" (1937; Phillips Collection); "Christ and Fishermen" (1937; Musée du Petit Palais, Paris); "Sunset" (1937; Worcester Art Museum, Massachusetts); "The Three Judges" (1937–38; Tate Gallery); "Head of Christ" (1938; Cleveland Museum of Art); "Diplomat" (1938; Musées Royaux des Beaux-Arts de Belgique, Brussels); "Christ Mocked" (1942; Staatsgalerie, Stuttgart, Ger.); "De Profundis" (1946; Musée National d'Art Moderne); "Head of a Clown" (1948; Museum of Fine Arts, Boston); "Christian Nocturne" (1952; Musée National d'Art Moderne); "Decorative Flowers" (1953; private collection, Paris).

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Roubaix, industrial town, Nord *département,* Nord-Pas-de-Calais region, northern France, just northeast of Lille. It is situated on the Canal de Roubaix in the plain of Flanders near the Belgian frontier and is united in the north with Tourcoing. Roubaix obtained its first manufacturing charter in the 15th century. After a long struggle in the second half of the 18th century, it obtained the same privileges as Lille to manufacture all of the textiles that the English made. The population tripled to 25,000 in the first half of the 19th century and reached over 122,000 before World War I. The town was occupied by the Germans in World War I and in World War II. Roubaix and Tourcoing, with their suburbs, have become part of the Lille urban agglomeration. One of the most important manufacturing centres of France, Roubaix specializes in textiles. More than 200 factories are engaged in the production of natural and man-made fibres, of which wool is the most important. The city is an important centre for mail-order sales and has chemical industries. Pop. (1982) 101,488.

Roubiliac, Louis-François, also spelled ROUBILLAC (b. *c.* 1695/1702/1705, Lyons, Fr.—d. Jan. 11, 1762, London), the most important late Baroque sculptor working in 18th-century England.

Roubiliac was apprenticed to a sculptor of ivory and porcelain, Balthasar Permoser, and later became assistant to Nicolas Coustou, a French Baroque sculptor. He moved to London about 1732. His first independent commission was a statue of Handel for Vauxhall Gardens in 1737. A year later he opened his own studio. In 1746 he carved a monument of the Duke of Argyll in Westminster Abbey, one of his greatest works, though his more dramatic "Monument of Lady Elizabeth Nightingale" (1761) in the same building is better known. Besides monuments and full length-portrait statues, Roubiliac executed masterly portrait busts, several of which were modelled in terra-cotta for a Chelsea pottery factory (*c.* 1750)—*e.g.,* the busts of William Hogarth and of Alexander Pope.

Outstanding technically, Roubiliac's likenesses were also admired for their acute ob-



"Monument of Lady Elizabeth Nightingale," white and black marble sculpture by Louis-François Roubiliac, 1761; in the Chapel of St. Nicholas, Westminster Abbey, London

By courtesy of the Warburg Institute, London

servation of the sitter and the perceptive revelation of his character.

Rouen, port city and capital of Seine-Maritime *département,* Haute-Normandie region, northwestern France, northwest of Paris, on the Seine River.

Known to the Romans as Rotomagus, the town first became important in the 3rd century AD, when Christianity was brought there by St. Mellon, who was its first bishop. Invaded by the Normans in 876, it became subject to the English crown after the Norman Conquest of England (1066). In 1204 the French captured the city, and the town prospered until the Hundred Years' War (1337–1453), when, in 1419, it was taken by Henry V of England. In 1430 St. Joan of Arc, the patron saint of France, was imprisoned at Rouen in a tower that still stands and now bears her name. Tried and condemned for heresy, she was burned at the stake by the English in the city on the Place du Vieux-Marché in May 1431. The city was recaptured by the French in 1449 and for the following century it was one of the main cultural centres of France. It suffered during the Wars of Religion (late 16th century), and more than half its population emigrated after 1685, when the revocation of the Edict of Nantes deprived French Protestants of their civil and religious liberties. The port and city then declined until the 19th century, when the textile trade brought it new prosperity. Rouen was occupied by the Germans during the 1870 Franco-Prussian War.

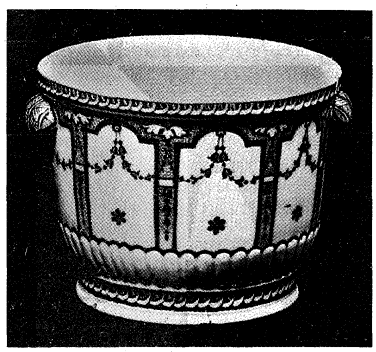
The old city, on the right bank, surrounded by a natural amphitheatre of hills, has so many ancient buildings that it has been called the *ville-musée* (museum-town). Further north, beyond the hills and around the university at Saint-Aignan, residential areas were developing in the 1970s. The left-bank districts were almost completely destroyed in World War II but have been rebuilt and now extend for miles within the great northward loop of the river. Although situated 75 mi (120 km) inland, Rouen received seagoing vessels before World War II and was an outport (seaward terminal for deep-draft vessels) of Paris. Tonnage handled has declined considerably as traffic has utilized the harbour at Le Havre. Industrialization has replaced the port function. Largely rebuilt after World War II, the docks extend 12 mi (18 km) along the Seine, down to the neighbouring township of La Bouille. The proximity of Rouen to Paris and its port have made the city the centre of an expanding industrial zone. A traditional cotton trade centre, it also manufactures clothing; its paper mills provide much of the nation's newsprint. Other industries include chemical works and plants that manufacture mechanical equipment, automobiles, and aircraft parts.



The Gros-Horloge (Great Clock), Rouen, Fr.
Paul Almasy

Despite its variety of architectural styles (from early Gothic to late Flamboyant) and its lack of symmetry, Rouen cathedral is considered one of the finest Gothic churches in France. Damaged during World War II, it has been admirably restored. The immense facade, covered with lacelike stonework, stands between two dissimilar towers, the left dating mostly from the 12th century, and the right from the 15th century. Its Tour de Beurre has a carillon of 55 bells. The central lantern tower (13th–16th century), with a late 19th-century spire, is the highest church tower in France (495 ft [151 m]). The cathedral also has an 11th-century crypt, a 13th-century choir, and Renaissance tombs in the Lady Chapel. The adjoining Archbishop's Palace has a 15th-century facade, behind which stands the mainly 15th-century church of Saint-Maclou, a rich example of Flamboyant Gothic. The church of Saint-Ouen (mainly 12th–15th centuries) has a striking interior and 14th-century windows. Famous secular buildings include the late Gothic Palais de Justice and the 16th-century Hôtel de Bourgtheroulde. The Gros-Horloge, a Renaissance gateway (1527) with an ancient clock, standing next to a 14th-century belfry, is in the centre of the city. The Fine Arts and Ceramics Museum includes a collection of 17th- and 18th-century French paintings and Rouen ceramics. Other museums are devoted to the 17th-century dramatic poet Pierre Corneille and to the 19th-century novelist Gustave Flaubert, who were born there. Pop. (1982) 100,696.

Rouen ware, faience (tin-glazed earthenware) and porcelain wares that made Rouen, Fr., a major pottery centre. In the 16th century



Rouen soft-paste porcelain cachepot, the Poterat factory, *c.* 1695; in the Musée des Beaux-Arts, Rouen, Fr.
By courtesy of the Musee des Beaux-Arts, Rouen, Fr.

faience was used as an element of architectural decoration and in apothecary jars. A Rouen potter, Edme Poterat, who opened a factory in Rouen in 1647, is credited with the invention of France's soft-paste porcelain. He also introduced the radiating festoon style (*style rayonnant*) of decoration, which, though it was new to pottery, was already popular in furniture, bookbinding, and garden design. Rouen ware is prized also for the embroidered style (*lambrequin*), which was predominant during the first quarter of the 18th century.

At Rouen, as at Nevers, Fr., faience was made in the Dutch–Chinese manner, using a camaïeu (monochrome) technique to decorate a fine milky-white background. At first the decoration was executed only in blue; then red and yellow were added to produce polychrome ware. A still costlier and rarer type of this faience, made in about 1725, was of black and blue design on a yellow or brown background; an even rarer one was of red on blue. In the second half of the 18th century another striking type of Rouen faience was the highly original oriental-style ware, the makers of which blended elements of the Chinese *famille rose* and *famille verte* styles with elements from the Japanese Kakiemon style.

Rouen, like Nevers, also produced cheaper and more popular *faïence parlante* type of ware with satiric genre scenes, including the music plates that are sought after as the source of information about the popular songs of the 18th century. Like Nevers, too, Rouen produced large free-standing statuary. Production declined in both cities, however; the faience factories of Rouen had dwindled to only 10 in 1798.

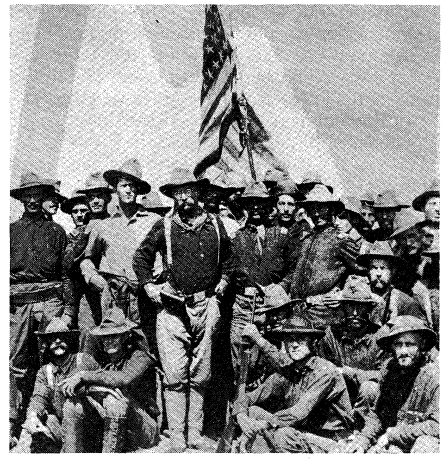
Rouen porcelain has a slightly greenish tinge, though it is translucent and is decorated in a blue camaïeu. Edme Poterat developed the soft-paste porcelain in an effort to imitate delftware; Rouen porcelain was produced under royal privilege granted to his son Louis Poterat from 1673 until 1696, when Louis died without divulging its secret. The products of that period, now very rare, were small vases, cosmetic jars, and condiment containers. Specimens are often confused with the better known Saint-Cloud porcelain. In 1743 Nicolas Levavasseur attempted to revive the production of porcelain in Rouen, but his wares were of poor quality.

Rouergue, ancient province of south central France, corresponding to much of the modern *départements* of Aveyron and Tarn-et-Garonne. It was bounded on the north by Auvergne, on the south and southwest by Languedoc, on the east by Gévaudan and the Cévennes mountains, and on the west by Quercy. It derived its name from the Gallic tribe of Rutheni. Administratively it formed first a *sénéchaussée,* dependent on Languedoc (capital Villefranche), and later it was attached to the military governments of Guyenne and Gascony. It disappeared as a separate entity when *départements* were established in the French Revolution (1790).

Rouge et Noir (card game): *see* Trente et Quarante.

Rouget de Lisle, Claude-Joseph (b. May 10, 1760, Lons-le-Saunier, Fr.—d. June 26, 1836, Choisy-le-Roi), author of "La Marseillaise," the French national anthem. A lowly army officer and only a moderate republican, Rouget de Lisle never wrote anything else of significance. He composed both the words and music of "La Marseillaise" for his comrades in 1792 while stationed at Strasbourg; it was originally called "Chant de guerre de l'armée du Rhin" ("War Song of the Army of the Rhine") and gained its familiar title after being adopted by Provençal volunteers when they were marching from Marseille to Paris during the French Revolution.

Rough Rider, member of 1ST VOLUNTEER CAVALRY, in the Spanish–American War, one



Theodore Roosevelt (centre left with glasses) and the Rough Riders, July 1898
By courtesy of the Library of Congress, Washington, D.C.

of a regiment of U.S. cavalry volunteers recruited by Theodore Roosevelt and composed of cowboys, miners, law-enforcement officials, and college athletes, among others. Their colourful and often unorthodox exploits received extensive publicity in the U.S. press. Col. Leonard Wood resigned as White House physician to command the regiment; Roosevelt, who resigned as assistant secretary of the Navy, was second in command. It was a flamboyant unit that received more publicity than any other unit in that war, especially for its uphill charge in the Battle of Santiago (July 1, 1898). The Rough Riders joined in the capture of Kettle Hill, then charged across a valley to assist in the seizure of San Juan Ridge, the highest point of which is San Juan Hill.

Rouher, Eugène (b. Nov. 30, 1814, Riom, Fr.—d. Feb. 3, 1884, Paris), French statesman who was highly influential as a conservative



Rouher; portrait by an unknown artist, *c.* 1865
H. Roger-Viollet

minister under the Second Empire and as a leader of the Bonapartist party under the Third Republic.

He was elected to the National Assembly in 1848, and his conservative attitudes and fear of disorder led him to support Louis-Napoléon. Appointed minister of justice in 1849, he suppressed left-wing opposition, introduced the bill ending universal suffrage (May 1850), and was responsible for drawing up the constitution of the Second Empire (1852). After three years as vice president of the council of state, he was in 1855 made minister of agriculture, public works, and commerce. A vigorous proponent of private enterprise and free trade, he signed trade treaties with England (1860), Belgium (1861), and Italy (1863). As minister of state (the government's spokesman in the legislature, popularly dubbed the "Vice Emperor") from 1863, he tried by every means to suppress the liberal movement; when it finally succeeded, he was forced to resign (1869) and became president of the Senate. After the fall of the Second Empire (1870), he served as a member of the National Assembly and the Chamber of Deputies (1872–82) and as leader of the Bonapartist party.

Roulers (Belgium): *see* Roeselare.

Roulette (from French: "small wheel"), gambling game in which players bet on which red or black numbered compartment of a revolving wheel a small ball (spun in the opposite direction) will come to rest within. Bets are placed on a table marked to correspond with the compartments of the wheel. It is a gambling game universally played in the gambling casinos of Europe, North and South America, Asia, and Africa. Roulette is a banking game, and all bets are placed against the bank—that is the "house" or proprietor of the game. As a big-time betting game its popularity has been superseded in the United States and the Caribbean Islands by others, notably Craps and Blackjack.

Fanciful stories about the invention of Roulette include its invention by the 17th-century French mathematician Blaise Pascal, by a French monk, and by the Chinese, from whom it was transmitted to France by Dominican monks. Whatever its antecedents and origins, Roulette emerged only in the late 18th century as a glamorous attraction in the casinos of Europe, where it has long been associated with the gaming rooms at Monte-Carlo.

Equipment. The Roulette table is composed of two sections, the wheel itself and the betting layout, better known as the Roulette layout. There are two styles of Roulette tables. One has a single betting layout with the Roulette wheel at one end; the other has two layouts with the wheel in the centre. The wheel spins horizontally.

Heading the layout design, which is printed on green baize, is a space containing the figure 0 (European style), or the figures 0 and 00 (American style). The main portion of the design is composed of 36 consecutively numbered rectangular spaces, coloured red and black alternately, arranged in three columns of 12 spaces each, and beginning with 1 at the top and concluding with 36 at the bottom. Directly below the numbers are three blank spaces (on some layouts these are marked 2 to 1 and are located on the players' side of the table). On either side of these, or along one side of the columns, are rectangular spaces marked 1st 12, 2nd 12, and 3rd 12. On European-style layouts these terms are 12^{p} (*première*), 12^{m} (*milieu*), and 12^{d} (*dernière douzaine*). Six more spaces are marked red (*rouge*), black (*noir*), even (*pair*), odd (*impair*), 1–18 (low, or *manque*), 19–36 (high, or *passe*).

The Roulette wheel consists of a solid wooden disk slightly convex in shape. Around its rim are metal partitions known as separators or frets, and the compartments or pockets between these are called *canoes* by Roulette croupiers. Thirty-six of these compartments, painted alternately red and black, are numbered from 1 to 36. On European-style wheels, a 37th compartment, painted green, carries the sign 0, and on American wheels two green compartments carry the signs 0 and 00. The wheel, its spindle perfectly balanced on a single ball bearing, spins smoothly in an almost frictionless manner.

The standard Roulette table employs five, six, or seven sets of wheel checks (usually called chips). Each set is differently coloured, each consists of 300 chips, and there is one set for each player. The chips usually have a single basic value, although some casinos also sell chips of lesser value. The colour of the chips indicates the player, not the value of the chips. If a player wishes to buy chips of slightly higher value, the croupier places a marker indicating that value on top of the table's stack of chips of the colour corresponding to the chips purchased. Most casinos have high-value chips that can be wagered at any gaming table. Unlike Roulette chips, these have their numbered values printed on them.

Bets. It is possible to place the following bets in Roulette: (1) straight, or single-number (*en plein*), in which the chips are placed squarely on one number of the layout, including 0 (and also 00 on American layouts), so that the chips do not touch any of the lines enclosing the number; a winning single number bet pays 35 to 1; (2) split, or 2-number (*à cheval*), in which the chips are placed on any line separating any 2 numbers; if either wins, payoff odds are 17 to 1; (3) street, or 3-number (*transversale pleine*), in which the chips are placed on the outside line of the layout, betting the 3 numbers opposite the chips; payoff odds on any of the 3 numbers is 11 to 1; (4) square, quarter, corner, or 4-number (*en carre*), in which the chips are placed on the intersection of the lines between any 4 numbers; payoff odds are 8 to 1; (5) line, or 6-number (*transversale six*), in which the chips are placed on the intersection of the side line and a line between two "streets"; payoff odds are 5 to 1; (6) column, or 12-number, in which the chips are placed on one of the three blank spaces (some layouts have three squares, marked 1st, 2nd, and 3rd) at the bottom of the layout, thus betting the 12 numbers above the space; payoff odds are 2 to 1; (7) dozens, or 12-number, in which the chips are placed on one of the spaces of the layout marked 12, betting the numbers 1–12, 13–24, or 25–36; payoff odds are 2 to 1; (8) low-number or high-number, in which the chips are placed on the layout space marked 1–18 (*manque*) or on the space marked 19–36, (*passe*); payoff is even money; (9) black or red, in which the chips are placed on a space of the layout marked black (*noir*), or on a space marked red (*rouge;* some layouts have a large black or red diamond-shaped design instead of the words); payoff is even money; (10) odd-number or even-number, in which the chips are placed on the space of the layout marked odd (*impair*), or on the space marked even (*pair*); payoff is even money.

On layouts with a single zero (European style), the 0 may be included in a 2-number bet with any adjoining number, in a 3-number bet with 1 and 2 or with 2 and 3, and in a 4-number bet with 1, 2, and 3 at the regular odds for these bets; with the American style 0 and 00, a 5-number line bet also is possible, the player placing his chips on the corner intersection of the line separating the 1, 2, 3, from the 0 and 00, with payoff odds of 6 to 1.

The play. The game begins when one of the croupiers (dealers) in attendance calls for the players to make their bets, which they do by placing chips on the spaces of the layout on any number, group, or classification they hope will win.

The croupier starts the wheel spinning in a counter-clockwise direction, then spins a small ivory or plastic ball on to the bowl's back track in the opposite direction. Players may continue to place bets while the wheel and ball are in motion until the ball slows down and is about to drop off the back track.

When the ball falls and comes to rest between any two metal partitions of the wheel, it marks the winning number (or a 0 or 00), the winning colour, and any other permitted bet that pertains to a winning number or symbol. The dealer immediately announces the winning number and its colour and points to the corresponding number on the layout. He first collects all losing bets, not disturbing the chips that are resting on winning spaces. Then he pays off the winner or winners with the correct amount of chips due to each winning bet.

House odds. When using the American-style wheel with the 0 and 00, the advantage for the bank arises when either the 0 or 00 shows. Only bets on the winning symbol (0 or 00) and the line or 5-number bet (combination bet 0, 00, 1, 2, 3) are paid. Thus the bank should win 2 parts in 38 or $5\frac{5}{19}$ percent of all bets. The only exception is the line or 5-number bet where the house percentage is $7\frac{17}{19}$ percent.

Roulette as played elsewhere than in the United States is the same except that the wheel and layout contain only a single zero (0). When the zero appears, all even-money bets, such as Red, Black, Odd, or Even, are "imprisoned." On the next spin of the wheel, if the zero appears again the house collects half of each imprisoned bet; if not, it collects all losing bets and returns the original bets to any winners. The bank's percentage on red, black, odd, or even is $1\frac{13}{17}$ percent, and on all other types of bets it is $2\frac{26}{37}$ percent.

Systems. The oldest and most common betting system is the Martingale or "Doubling-up" system, in which bets are doubled

progressively. This probably dates back to the invention of the Roulette wheel, but every day of the week some gambler somewhere reinvents it, or some variation of it, and believes he has something new. Over the years hundreds of "sure-fire" winning systems have been dreamed up, but regardless of what system is used, in the long run it cannot overcome the house's advantage of the 0, or 0 and 00. This house advantage is the only system that consistently wins in the long run. (J.S.)

round, in music, a polyphonic vocal composition in which three or four voices follow each other around in a canon at the unison or octave. *See* canon; catch.

Round, Henry Joseph (b. June 2, 1881, Kingswinford, Staffordshire, Eng.—d. Aug. 18, 1966, Bognor Regis, Sussex), English electronics engineer whose numerous inventions contributed to the development of radio communications.

Round worked with Marconi's Wireless Telegraph Company, Ltd., from 1902 to 1914, first in the United States, where he improved the tuning components of radio receivers and built early radio direction finders and radio telephones. He was recalled to England to join Marconi's personal research staff, then was sent to enhance the performance of radio transmitters at Clifden, Ire., and in Brazil. Again returning to England, Round experimented with vacuum-tube amplifiers.

During World War I Round installed networks of radio direction finders for military intelligence purposes, first along the Western Front, later in Great Britain. The second of these alerted the Admiralty to the departure of the German fleet from Wilhelmshaven on May 30, 1916; its interception on the following day by the British occasioned the Battle of Jutland.

Rejoining the Marconi company after the war, Round designed and installed several important transmitters. From one, at Ballybunion, Ire., the first radio telephone messages were sent from Europe across the Atlantic; two others were the first public broadcasting stations in England; and another, at Carnarvon, Wales, sent radio signals that were received in Australia. He also devised radio receivers and transmitters for use on ships, systems for recording sound on phonograph records and motion-picture film, and a public-address system for large audiences.

As a consultant to the Admiralty during World War II, Round worked on submarine-detection equipment; later, for the Marconi company, he introduced several devices useful in echo sounding.

Round Table, in Arthurian legend, the table of Arthur, Britain's legendary king, which was first mentioned in Wace of Jersey's *Roman de Brut* (1155). This told of King Arthur's having a round table made so that none of his barons, when seated at it, could claim precedence over the others. The literary importance of the Round Table, especially in romances of the 13th century and afterward, lies in the fact that it served to provide the knights of Arthur's court with a name and a collective personality. The fellowship of the Round Table, in fact, became comparable to, and in many respects the prototype of, the many great orders of chivalry that were founded in Europe during the later Middle Ages. By the late 15th century, when Sir Thomas Malory wrote his *Le Morte Darthur,* the notion of chivalry was inseparable from that of a great military brotherhood established in the household of some great prince.

In Robert de Borron's poem *Joseph d'Arimathie* (*c.* 1200), the Grail, which had been sought by the hero Perceval, was identified as the vessel used by Christ at the Last Supper. Joseph was commanded to make a table in commemoration of the Last Supper and to leave one place vacant, symbolizing the seat of Judas, who had betrayed Christ. This empty place, called the Siege Perilous, could not be occupied without peril except by the destined Grail hero. During the 13th century, when the Grail theme was fully integrated with Arthurian legend in the group of prose romances known as the Vulgate cycle and post-Vulgate romances, it was established that the Round Table—modelled on the Grail Table and, likewise, with an empty place—had been made by the counsellor Merlin for Uther Pendragon, King Arthur's father. It came into the possession of King Leodegran of Carmelide, who gave it to Arthur as part of the dowry of his daughter Guinevere when she married Arthur. Admission to the fellowship of the Round Table was reserved for only the most valiant, while the Siege Perilous was left waiting for the coming of Galahad, the pure knight who achieved the quest of the Grail and who brought the marvels of Arthur's kingdom to a close.

In the city of Winchester there is a great hall—all that remains of a castle begun by William the Conqueror and finished in 1235—where the so-called King Arthur's Round Table can be seen fixed to the wall. Measuring 18 feet (5.5 metres) in diameter, it dates from the 13th century, having been repainted in green and white, the Tudor colours, during the reign of Henry VII.

Round Table Conference (1930–32), in Indian history, a series of meetings called by the British government to consider the future constitution of India. The conference resulted from a review of the working of the Government of India Act, 1919, undertaken in 1927 by the Simon Commission, whose report was published in 1930. The conference, held in London, had three sessions.

The first (Nov. 12, 1930–Jan. 19, 1931) had 73 representatives, from all Indian states and all parties except the Indian National Congress, which was waging a civil disobedience campaign against the government. Its principal achievement was an insistence on parliamentarianism—an acceptance by all, including the princes, of the federal principle—and on dominion status as the goal of constitutional development. The second session (September–December 1931) was attended by Mahatma Gandhi as the Congress representative; it failed to reach agreement, either constitutionally or on communal representation. The third session (Nov. 17–Dec. 24, 1932) was shorter and less important, with neither the Congress nor the British Labour Party attending. The result of these deliberations was the Government of India Act, 1935, establishing provincial autonomy and also a federal system that was never implemented.

Round Table Conference Agreement (1949): *see* Hague Agreement.

rounders, old English game that never became a seriously competitive sport, although it is probably an ancestor of baseball. The earliest reference to rounders was made in *A Little Pretty Pocket-Book* (1744), in which a woodcut also showed the children's sport of baseball. *The Boy's Own Book* (2nd edition, 1828) devoted a chapter to rounders. In 1889 the National Rounders Association of Liverpool and the Scottish Rounders Association were formed. A National Rounders Association was founded in 1943.

Players use a hard ball, weighing 2½ to 3 oz (71 to 85 g) and measuring 7½ in. (19 cm) in circumference, and a round wooden "stick," measuring not more than 6¾ in. around the thickest part, not more than 18 in. in length, and weighing not more than 13 oz. The playing field is marked in the form of an open irregular pentagon measuring 39½ ft (12 m) on three sides and 28 ft on the other two (see diagram). The bowler must deliver the ball below the head but above the knee of the batsman and over the batting square. The batsman must strike at a good ball and attempt to run a rounder (even if he misses the ball or fails to strike at it) in a counterclockwise direction around the first, second, and third posts and so home to the fourth post, though he may stay at any of the first three. Three consecutive bad balls secure half a rounder for the batsman. He is out if the ball is caught on the fly; if the base (post) to which he is running is touched with the ball; or if, while running, he is touched with the ball by a fielder. As in cricket, the ball may be hit in any direction, but if it goes behind the batting square, the batter may run only to first post until the ball has been thrown back past the square. Nine players constitute a side, and two innings with nine outs apiece are played in each match. The usual but not compulsory disposition for a fielding side is the bowler, the backstop (catcher), a base man on each of the four bases, and three deep fielders. There are two umpires. The game is popular in Great Britain among schoolchildren.

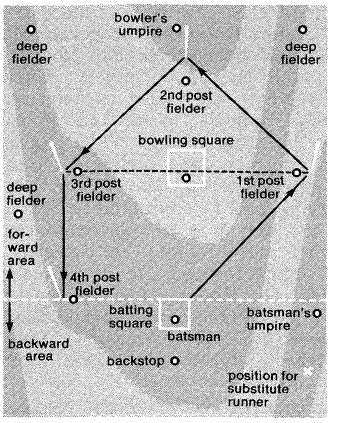


Diagram of rounders playing field showing usual player positions

Roundhead, adherent of the Parliamentary Party during the English Civil War (1642–51) and after. Many Puritans wore their hair closely cropped in obvious contrast to the long ringlets fashionable at the court of Charles I. Roundhead appears to have been first used as a term of derision toward the end of 1641, when debates in Parliament on the Bishops' Exclusion Bill were causing riots at Westminster. John Rushworth, in *Historical Collections of Private Passages of State* (1680–1701), claims that the word was first used on Dec. 27, 1641, by a disbanded army officer, David Hide, who, during a riot, brandished his sword threatening to "cut the Throat of those Roundheaded Dogs that bawled against Bishops." But Richard Baxter (*Reliquiae Baxterianae,* 1696) ascribes the origin of the term to a remark made by Queen Henrietta Maria at the trial (March–April 1641) of Thomas Wentworth, 1st earl of Strafford; referring to the parliamentary leader John Pym, she asked who the roundheaded man was.

rounding, also called LABIALIZATION, in phonetics, the production of a sound with the lips rounded. Vowels, semivowels, and some consonants may be rounded. In English, examples of rounded vowels are *o* in "note," *oo* in "look," and the *u* sound in "rule" and "boot"; *w* in "well" is an example of a rounded semivowel.

Unrounding is the opposite of rounding; in unrounded vowels the lips are slack or may be drawn back, as in pronouncing the *ee* in "meet." Generally speaking, front vowels tend

to be unrounded and back vowels rounded, and this tendency is recognized in the classification of vowels (*see* vowel). However, the French *u* of *tu,* "you," in contrast with the *ou* of *tout,* "all," is a high front rounded vowel; Japanese has high back unrounded vowels.

roundworm (parasitic invertebrate): *see* nematode.

Rourke, Constance Mayfield (b. Nov. 14, 1885, Cleveland—d. March 23, 1941, Grand Rapids, Mich., U.S.), U.S. historian who pioneered in the study of American character and culture.

After earning an A.B. from Vassar College, Poughkeepsie, N.Y., (1907) and studying at the Sorbonne in Paris, Rourke taught English at Vassar. In 1915 she resigned, thereafter working as a research historian and free-lance writer devoted to defining the historical aspects of the American character through the interpretation of popular culture.

She is best known for *American Humor: A Study of the National Character* (1931). Considered a classic work of scholarship, *American Humor* examined both popular and elite culture and argued that American culture reflected a vital and rich tradition distinct from the European experience.

Rourke's works include numerous magazine articles, as well as five monographs on American cultural history. Van Wyck Brooks edited her unpublished manuscripts to bring out *The Roots of American Culture* (1942). A biography by Joan Shelley Rubin, *Constance Rourke and American Culture,* was published in 1980.

Rous, (Francis) Peyton (b. Oct. 5, 1879, Baltimore—d. Feb. 16, 1970, New York City), U.S. pathologist known for his discovery of cancer-inducing viruses. In 1910 he found that sarcomas in hens could be transmitted to fowl of the same inbred stock not only by grafting tumour cells but also by injecting a submicroscopic agent extractable from them; this discovery gave rise to the virus theory of cancer causation. Although his research was derided at the time, subsequent experiments vindicated his thesis, and he received belated recognition in 1966 when he was awarded (with Charles B. Huggins) the Nobel Prize for Physiology or Medicine.

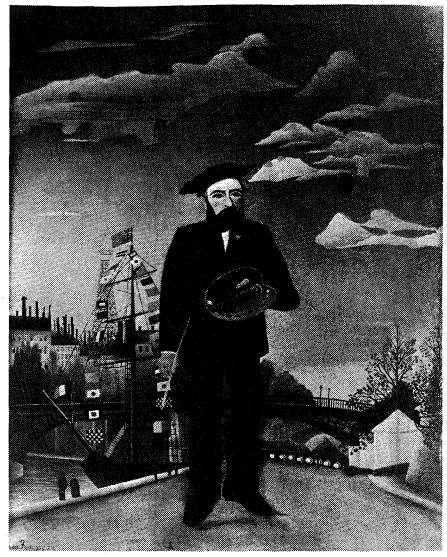
Rous was educated at Johns Hopkins University, Baltimore, and at the University of Michigan. He joined the Rockefeller Institute for Medical Research (now Rockefeller University) in New York City in 1909 and remained there throughout his career. Aside from cancer research, he did investigations of liver and gallbladder physiology, and worked on the development of blood-preserving techniques that made the first blood banks possible.

Roussé (Bulgaria): *see* Ruse.

Rousseau, Henri, byname LE DOUANIER (French: The Customs Officer) (b. May 21, 1844, Laval, Fr.—d. Sept. 2, 1910, Paris), French painter, archetype of the modern naive artist. He expressed himself mainly in richly coloured and meticulously detailed pictures of lush jungles, wild beasts, and exotic figures (*e.g.,* "The Sleeping Gypsy," 1897). After exhibiting with the Fauves in 1905, he became an object of admiration to avant-garde artists.

Early life. Rousseau, the son of a tinsmith, was from a modest background. He was a mediocre student, left the secondary school in Laval without having completed his studies, and soon entered military service, in which he remained for four years.

During his term of service he met soldiers who had survived the French expedition to Mexico (1862–65) in support of Emperor Maximilian, and he listened with fascination to their recollections. Their descriptions of the subtropical country were doubtless the first inspiration for the exotic landscapes that later became one of his major themes. The vividness of Rousseau's portrayals of jungle scenes led to the popular conception, which Rousseau never refuted, that he travelled to Mexico. In fact, he never left France.



"Myself: Portrait-Landscape," self-portrait by Henri Rousseau, oil painting, 1890; in the Museum of Modern Art, Prague

Giraudon—Art Resource/EB Inc.

Civil-service career and early paintings. Released from military service upon the death of his father to support his widowed mother, he settled in 1868 in Paris. The following year he married the daughter of a cabinetmaker, Clémence Boitard. In Paris he began a career as a petty official, eventually becoming, in 1871, a tax collector in the Paris toll office; from this post came the name by which in later years he was well known, *le douanier,* or "customs officer," in spite of the fact that the toll office had no real customs functions. Working as a bureaucrat and busy with family affairs, he still somehow found time to draw and paint. Although no works remain as evidence, he had probably drawn and painted since childhood, and his stated ambition was to be a painter in the style of the academicians of his day. In 1884 he obtained permission to copy paintings at the Louvre. In 1886 he exhibited his first painting, not at the official Salon, which would never have admitted a painter of such naiveté, but at the Salon des Indépendants, an annual exhibition established by young painters to allow themselves and other painters to exhibit and still be free from the narrow official requirements of style and subject matter.

The picture with which Rousseau made his debut, "Carnival Evening," was, in fact, a masterpiece of its kind and an impressive beginning for the artist. This work exhibits an approach to representation that is typical of the naive artist—everything is literally and deliberately drawn; every branch of the trees is traced, the clouds have a curious solidity, and greater attention is paid to the details of costume than to the figures themselves. The design of the painting, however, is effectively poetic, and a striking quality of atmosphere and mood is achieved through the accurate and sensitive observation of the colours of the evening and through the literal treatment of trees and clouds that is ultimately unreal and contributes to an air of mystery.

In spite of this auspicious beginning, Rousseau's work still went largely unnoticed, except for the consistent ridicule of the critics, for the next seven years. During this period he exhibited some 20 paintings at the Salon des Indépendants, but he remained essentially an amateur, dividing his time among painting, work at the toll house, and family life. His wife, who had been ill for some time, died in 1888, and within several years he lost all of his family except for a daughter, whom he sent to live with relatives.

This period of personal hardship was also a period of increased artistic activity. An important event in Rousseau's life at this time was the Universal Exposition, held in Paris in 1889. Being a simple man but one with great imagination, he was profoundly impressed by what he saw there. It is probable that the reconstructions of Senegalese, Tonkinese, and Tahitian landscapes at the exposition provided further inspiration for the exoticism of his later paintings. His enthusiasm for the fair was so great that he wrote a vaudeville play entitled *A Visit to the Exposition of 1889,* which, however, he did not succeed in having produced. In this play, as in other theatrical works he wrote, his naiveté revealed itself even more than in the technical aspects of his painting. Also revealed, however, was an intense desire to express himself artistically; he even attempted to compose music. Still, his only real gift was for painting. Like his contemporaries the Impressionists, he was attracted by landscapes, and at this time he wished to imitate nature. His painting "The Toll-House" (*c.* 1900; Courtauld Institute Galleries, London) shows his place of work; an early photograph of the same location shows that Rousseau conferred on his depiction a profound lyricism while remaining loyal to reality. The most important work of this period in Rousseau's career is his self-portrait "Myself: Portrait-Landscape." Standing in the foreground, palette in hand, Rousseau is surrounded by the Parisian landscape, painted with great accuracy. This is obviously intended as a "portrait of the artist" in the academic tradition; the seriousness of purpose is impressive in spite of the naiveté of execution.

Later paintings and recognition. In 1893 Rousseau retired from the toll house to devote himself entirely to painting. Soon afterward, he met Alfred Jarry, a brilliant young writer, also from Laval, whose nonconformity shocked his contemporaries. He was struck by Rousseau's unusual work and introduced the self-taught artist to the circle of intellectuals associated with the avant-garde review *Le Mercure de France.* It was this review that first published an article praising Rousseau. The article was written in connection with his painting "War," an allegory exhibited at the 1894 Salon des Indépendants, which demonstrated that Rousseau was much more than a minor landscapist. This work also marked the beginning of the recognition of Rousseau as a serious painter. His most important painting of this period was "The Sleeping Gypsy". It portrays a female Gypsy asleep in a moonlit desert with a huge lion standing over her, seemingly transfixed and unwilling to touch her. The landscape is completely bare except for the Gypsy's jug and mandolin. This painting is exceedingly primitive in its technique; the Gypsy lies stiffly on the ground, still clutching her walking staff, and her smiling face is childishly rendered. The stripes of her dress and the hairs of the lion's mane are individually traced in a naive but decorative, almost abstract manner. The painting, however, is wonderfully expressive. The Gypsy's smile, the lion's staring eye, the bare, unearthly landscape, and the whimsical twist at the end of the lion's tail unite opposing feelings of peace and danger, solemn mystery and whimsy, into a powerful expression of magical enchantment. When he exhibited the painting, Rousseau wrote to the mayor of his native Laval asking him to purchase it; he intended it to be a tribute to his native town. The mayor, however,

was merely amused at the idea. Rousseau, by this time, had enormous confidence in his own work and considered himself to be a great painter. Not only was he unaware of his lack of conventional technical skill, but he believed that his work resembled that of the academic painters. He still dreamed of official glory, but his painting was appreciated only by young avant-garde painters such as Robert Delaunay, Picasso, and their common defender, the poet Guillaume Apollinaire, who also became Rousseau's principal supporter.

In 1905 Rousseau was invited to the Salon d'Automne (a semiofficial exhibition created after a schism among the academicians), where his painting "The Hungry Lion" was hung in the same room with the works of some of the most popular painters of the day, who were called Fauves (Wild Beasts): Henri Matisse, André Derain, and Maurice de Vlaminck. The work of these men, with its pure colours and lack of conventional realism, was similar to Rousseau's. At last the critics began to speak of him. Ambroise Vollard, the most important dealer in modern paintings in Paris, bought pictures from him.

Rousseau lived in a humble quarter of Paris, where he gave painting lessons in his home. (His second wife, whom he had married in 1899, died in 1903.) Among avant-garde artists and intellectuals he became a popular figure. In 1908 Picasso organized in his studio a banquet in Rousseau's honour, to which the most sophisticated artists and critics of his day were invited.

During these last years Rousseau painted chiefly exotic landscapes, of which "The Hungry Lion" was the first major example. He excelled in these works, creating with his primitive approach a unique mode in depicting this type of scene. The paintings are characterized by a profusion of exotic plant growth painted with great attention to detail; many varieties of plants, undoubtedly studied at the Paris botanical garden, are distinctly differentiated, with obvious fascination for the different leaf forms. Although crowded together, the plants are deliberately treated, with each leaf painted separately and each branch of leaves constituting a beautiful abstract pattern. In the midst of this vegetal density, colourful birds flit about and mysterious animals stare out at the viewer. There is usually some dramatic incident taking place in the centre, such as a lion attacking its prey, which is in keeping with Rousseau's continued predilection toward the grandiose historical, dramatic narratives of the academic tradition of painting of his time.

Shortly before his death, in 1910, Rousseau painted the most ambitious of these jungle paintings and one of his greatest works, "Yadivigha's Dream." In this impressive fantasy, an enchanting nude rests on a red-plush Victorian sofa in the middle of a dense jungle. Huge flowers wave about her head, two lions and an elephant peer out of the undergrowth, and a darkskinned musician plays a flute behind her. Rousseau's explanation of this scene is that the lady, having fallen asleep on the sofa, dreams that she is transported to this improbable region. The simplicity of Rousseau's conception and of his cast of mind allows a directness of purpose that accounts for the astonishing unconventionality of the subject. The painting, which exhibits all of Rousseau's descriptive and expressive skill, is also a supreme revelation of his powerful and uncommon imagination.

Rousseau's career was remarkable. His work not only inspired a revival of true naive painting in the 20th century but also influenced a branch of modern art. (D.V.)

MAJOR WORKS. "Landscape with Tree Trunks" (1887; Barnes Foundation, Merion, Pa.); "The Present and the Past" (*c.* 1889; Barnes Foundation); "Myself: Portrait-Landscape" (1890; Museum of Modern Art, Prague); "L'Octroi" (*c.* 1890; Courtauld Institute Galleries, London); "The Artillerymen" (*c.* 1893; Solomon R. Guggenheim Museum, New York City); "War" (1894; Louvre, Paris); "The Child Among Rocks" (*c.* 1895; Philadelphia Museum of Art); "The Sleeping Gypsy" (1897; Museum of Modern Art, New York City); "Banks of the Seine" (*c.* 1898; private collection, Paris); "Spring in the Valley of the Bièvre" (*c.* 1904; Metropolitan Museum of Art, New York City); "The Hungry Lion" (1905; private collection, Switzerland); "L'Herbage" (*c.* 1906; Fogg Art Museum, Cambridge, Mass.); "The Repast of the Lion" (1907; Metropolitan Museum of Art); "The Snake-Charmer" (1907; Louvre); "La Bougie Rose" (1907; Phillips Collection, Washington, D.C.); "Football Players" (1908; Solomon R. Guggenheim Museum); "The Rabbit's Feeding" (1908; Barnes Foundation); "The Muse Inspiring the Poet" (1909; State Pushkin Museum of Fine Arts, Moscow); "Promenade au Luxembourg" (1909; State Pushkin Museum of Fine Arts); "The Muse Inspiring the Poet" (1909; Kunstmuseum, Basel, Switz.); "Vase of Flowers" (1909; Albright-Knox Art Gallery, Buffalo); "View of the Île Saint-Louis" (1909; Phillips Collection); "Yadivigha's Dream" (1910; Museum of Modern Art, New York City); "The Cascade" (1910; Art Institute of Chicago); "Landscape" (*c.* 1910; State Pushkin Museum of Fine Arts); "Tropical Forest with Monkeys" (1910; John Hay Whitney Collection, New York City).

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Rousseau, Jean-Baptiste (b. April 6, 1671, Paris—d. March 17, 1741, Brussels), French dramatist and poet who enjoyed great popularity in the witty and decadent Parisian society of his day.

The son of a poor cobbler, Rousseau as a young man showed a talent for satiric verse. He later attempted to produce several of his plays, becoming involved in a series of disputes and exchanges of insults with detractors and critics. In 1712 he was convicted of defamation because of a satirical verse that he claimed (probably truthfully) he had never written. Exiled from France, he sought refuge in Switzerland. Later he wandered about Europe and eventually died in extreme poverty in Brussels after 29 years in exile. His subject matter was usually based on events and personalities of the day, but his forms and his style were classical. His short, cynical epigrams are considered his best work.



Jean-Baptiste Rousseau, engraving by Georg Friedrich Schmidt after a painting by Jacques-André-Joseph Aved

H. Roger-Viollet

Consult the INDEX *first*

Rousseau, Jean-Jacques (b. June 28, 1712, Geneva—d. July 2, 1778, Ermenonville, Fr.), French philosopher, writer, and political theorist whose treatises and novels inspired the leaders of the French Revolution and the Romantic generation.

A brief account of Jean-Jacques Rousseau follows. For a full biography, *see* MACROPAEDIA: Rousseau.

After a Calvinist childhood, Rousseau emigrated to Turin (1728) and became a Roman Catholic. From 1733 until 1740 he lived with Mme de Warens in Chambéry, Fr.; during this period he became a diligent reader and began to write. Rousseau went to Paris in 1742 seeking fame and fortune, but for years had no success. He was invited to read his scheme for musical notation to the Académie des Sciences but nothing came of it; he spent a year, from September 1743 to August 1744, in Venice as secretary to the French ambassador there. He returned to Paris and early in 1745 took up with Thérèse Levasseur, a servant at the hotel where he was staying. He supported her for the rest of his life and had five children by her, who were all sent to a foundling hospital. In disposing of his children in this way, he was doing what was often done at that time. He eventually married Levasseur in 1768 in a civil ceremony.

In the late 1740s and early '50s Rousseau devoted much energy to music. His opera *Le Devin du village* (1752, *The Cunning-Man*) was performed to great acclaim at Fontainebleau in 1752. Rousseau became an ardent champion for the superiority of Italian over French music.

Shortly after returning to Paris, Rousseau met and established a friendship with Denis Diderot, then still a young philosopher going through an intellectual evolution from Skepticism to Materialism; Diderot was to have a profound influence on Rousseau. Indeed, it was Diderot who encouraged him to compete for the prize offered by the Academy of Dijon in 1750 for an essay on the question whether the restoration of the sciences and the arts had tended to purify morals. Rousseau's essay *Discours sur les sciences et les arts* (1750; *Discourse on the Sciences and the Arts*) won first prize and propelled its author to fame. The essay was a bold attack on the arts as instruments of propaganda and sources of greater wealth in the hands of the rich. It provoked a series of violent disputes that continued for three years following its publication.

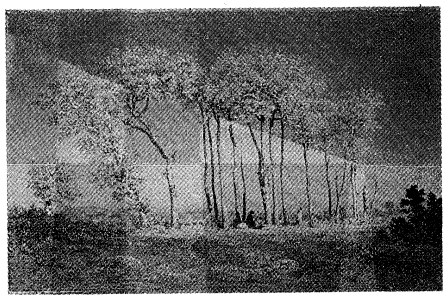
In 1754 Rousseau ventured to reveal his true political thoughts, again in response to a question raised by the Academy of Dijon, concerning the origin of inequality among men. In his *Discours sur l'origine de l'inegalité* (1755; *Discourse on the Origin of Inequality*) Rousseau gave a hypothetical description of man's natural state, proposing that, although unequally gifted by nature in individual endowments, men at one time were in fact equal. But they lived apart from one another. Inequality arose only when men began to form society and to compete with one another. Rousseau did not, however, advocate a return to the state of nature; indeed, he knew that that was impossible. Yet in some of his later writings he suggested ways in which injustices resulting from social inequality could be minimized.

Rousseau visited his native Geneva in 1754, reverted to Protestantism, and renewed his cit-

izenship rights. In 1756 he moved from Paris to Montmorency where he began work on a novel, *Julie: ou, la nouvelle Héloïse* (1761; *Julie: or, The New Eloise*), which became enormously popular. *Émile: ou, de l'éducation* (1762; *Emile: or, On Education*) and *Du Contrat social* (1762; *The Social Contract*) were both condemned by the Parlement of Paris, and Rousseau was forced to seek asylum in Switzerland, all of which provoked Voltaire to write *Le Sentiment des citoyens* (1764; "The Feeling of the Citizens"). After renouncing his citizenship in Geneva, Rousseau moved to England for a year but quarrelled with his benefactor David Hume and returned to France incognito in 1767. To justify himself he began writing his autobiography, *Confessions*, which was published posthumously in 1782.

Rousseau, (Pierre-Étienne-)Théodore (b. April 15, 1812, Paris, Fr.—d. Dec. 22, 1867, Barbizon), French painter who was a leader of the group of landscape painters known collectively as the Barbizon school (*q.v.*). He was an important figure in the development of landscape painting using the direct observation of nature.

The son of a tailor, Rousseau began to paint at the age of 14. In the 1820s he began to paint outdoors directly from nature, a novel procedure at that time. Although his teachers were in the Neoclassical tradition, Rousseau based his style on extensive study of the 17th-century Dutch landscape painters and the work of such English contemporaries



"Under the Birches, Evening," oil on panel by Théodore Rousseau, 1842–44, in the Toledo Museum of Art, Toledo, Ohio

The Toledo Museum of Art, Toledo, Ohio, gift of Arthur J. Secor, 1933

as Richard Parkes Bonington and John Constable. His early landscapes show nature as a wild and undisciplined force and gained the admiration of many of France's leading Romantic painters and writers.

In 1831 Rousseau began to exhibit regularly at the French Salon. But in 1836 his "Descent of the Cattle" (*c.* 1834; Rijksmuseum, The Hague) was rejected by the jury, as were all his entries during the next seven years. But his reputation continued to grow despite the Salon's censure.

Rousseau first visited the Fontainebleau area in 1833 and, in the following decade, finally settled in the village of Barbizon, where he worked with a group of landscape painters, including Jean-François Millet, Jules Dupré, Narcisse-Virgile Diaz, and Charles-François Daubigny. Their artistic goals were similar, and they became known collectively as the Barbizon school. During this period Rousseau produced such tranquil pastorals as "Under the Birches, Evening" (1842–44; Toledo Museum of Art, Toledo, Ohio), reflecting the influence of Constable. After the Revolution of 1848, the Salon was made more liberal, and Rousseau finally received official recognition as a major figure in French landscape painting. His works were well represented in the International Exhibition of 1855, and he became president of the fine-arts jury for the Exposition of 1867. Rousseau's paintings represent in part a reaction against the calmly idealized landscapes of Neoclassicism. His use of small, highly textured brushstrokes presaged that of the Impressionists.

Roussel, Albert(-Charles-Paul-Marie) (b. April 5, 1869, Tourcoing, Fr.—d. Aug. 23, 1937, Royan), French composer who wrote in various styles and whose music is notable for its lyrical fervour, austerity of technique, and harmonic audacity.



Roussel, pen drawing by A. Bilis, 1929; in the Bibliothèque Nationale, Paris

Cauboue—Ziolo

Roussel joined the French navy at the age of 18 and made several journeys to Southeast Asia, the exotic impressions of which he recalled in later orchestral and dramatic works. At 25 he resigned his naval commission and became a pupil of Vincent d'Indy at the Schola Cantorum in Paris. From 1902 to 1914 he taught composition at the Schola Cantorum; his pupils included Erik Satie and Edgard Varèse. In 1909–10 he traveled again to Southeast Asia, and to India. Service at the front with the Red Cross in World War I undermined his health, and he retired to Brittany in 1918, subsequently devoting himself to composition.

Roussel's early works, such as his first symphony, *Le Poème de la forêt* (1904–06; *The Poem of the Forest*), show the influence of the Impressionist style of Claude Debussy as well as that of Roussel's training at the Schola Cantorum, where he came under the tutelage of César Franck. Early compositions inspired by Roussel's knowledge of the East include the three *Évocations* (1912) for solo voices, chorus, and orchestra and the opera-ballet *Padmâvatî* (composed 1914–18; performed 1923). Other notable stage works include the one-act opera *La Naissance de la lyre* (1925; *The Birth of the Lyre*) and the ballets *Le Festin de l'araignée* (1912; *The Spider's Feast*) and *Bacchus et Ariane* (1931), both of which are also played as orchestral suites.

Roussel turned toward a Neoclassical style, using modern techniques in such works as his *Suite in F* (1927) for orchestra and the *Sinfonietta for Strings* (1934). Of his four symphonies, the third, in G minor, is particularly striking, as is his orchestral work *Pour une fête de printemps* (1921; *For a Festival of Spring*). He also wrote chamber music, a small number of piano works, and songs, which include settings of translations from the Chinese, among them "La Réponse d'une épouse sage" ("The Answer of a Wise Wife") and, in English, James Joyce's poem "A Flower Given to My Daughter." Notable among his large-scale choral works is his setting of the English text of Psalm 80, for chorus and orchestra (1928).

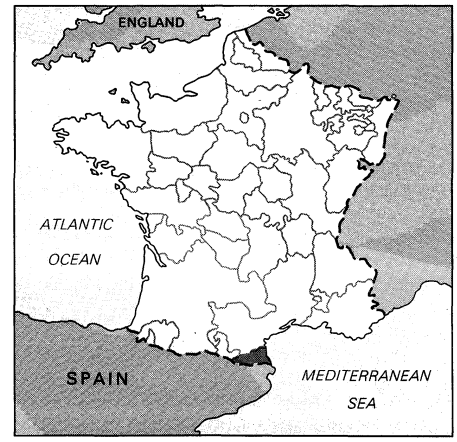
Roussel's mature style, employing both the modal harmonies of Oriental music and the dissonances of the contemporary idiom, is a reaction against French Impressionism as well as against the chromaticism of Franck. Some critics see Roussel as a reviver of the old French formal traditions stemming from Jean-Philippe Rameau, with a venturesome harmonic style traced partly to Igor Stravinsky.

Roussillon, historic and cultural region encompassing the southern French *département* of Pyrénées-Orientales and coextensive with the former province of Roussillon. Its chief city has always been Perpignan.

Ruscino (near Perpignan) was settled by a people with markedly Iberian affinities from the 7th century BC to the latter part of the 3rd, when it came under the control of Gallic peoples. After being conquered by the Romans in the 2nd century BC, the country passed to the Visigoths in AD 462, to the Arabs in about 720, and to Carolingian France in the 750s.

At the final separation, in 865, between Septimania (part of the future Languedoc) to the north and the Spanish March (Frankish Catalonia) to the south, Roussillon was included in the latter. Later in the 9th century, feudalism gave rise to hereditary countships in the area, most of which were held by relatives of the contemporary counts of Barcelona. The latter dynasty acquired direct rights to Roussillon in 1172, and Roussillon thus became part of Aragon, which the counts of Barcelona had also acquired by then.

There was a great flowering of monasticism in Roussillon from the 10th century on, with the result that the area is rich in Romanesque architectural remains. The house of Barcelona-Aragon granted privileges to the towns, and commerce benefited from the integration of Roussillon with neighbouring Catalonia to the south. In the 13th century Roussillon formed the core of the kingdom of Majorca, an amalgamation formed by James I of Aragon and Majorca in the 13th century. The house of Aragon continued to hold Roussillon until the 1640s, when, during the Thirty Years' War, France occupied Spain's lands north of the Pyrenees. The town of Perpignan fell to the



The *gouvernement* of Roussillon in 1789

French in 1642, and in 1659 Spain formally ceded the province to France by the Treaty of the Pyrenees.

Physiographically, the region represents the eastern extremity of the French Pyrenees and the Mediterranean coastal lowlands adjoining them. The population is concentrated in the irrigated plains. Roussillon is overwhelmingly Roman Catholic. Protestants in Perpignan tend to be immigrants, and many Jews living in Roussillon are repatriates from Algeria. There are numerous families of Catalan Gypsies. Catalan is widely spoken, and French is spoken with a heavy Catalan accent. The regional cuisine relies on olive oil. *Ollada,* or *ouillade,* is a beef stew cooked in a heavy pot. *Cargolada* is a dish of escargots. Notable wines come from Banyuls-sur-Mer, Rivesaltes, and Maury.

Roussy–Levy syndrome (medicine): *see* Levy–Roussy syndrome.

router, portable electric power tool used in carpentry and furniture making that consists of an electric motor, a base, two handle knobs, and bits (cutting tools). The motor has a chuck for holding the bits by their straight shanks on one end of its shaft and fits upright (chuck down) in the base. The motor can be raised or lowered relative to the base to adjust the depth of cut made by the bit, which protrudes beyond the base. The bottom of the base, a circular plate with a central opening for the bits, provides a flat, low-friction surface for the router to slide on. Some bits have noncutting pilot pins that extend below the cutting edges and control the sidewise depth of the cut when the router is working on the side of a board. The bits have a straight shank and three or four cutting edges shaped to suit the work being done. The shapes of some of the bits can best be described by considering their silhouettes. For example, to cut a bevelled edge on a table, or a V groove, a silhouette of the rotating cutter would have a V shape; to cut a semicircular groove the silhouette would be a semicircle with the diameter perpendicular to the shank; to cut a beaded (rounded) edge on a table the silhouette would be a rectangle with quarter circles cut from the lower corners. The cutter rotates very rapidly, and the base of the machine is constructed so that the cutter can be guided over the work by the operator, who holds the handle knobs. The router is a versatile power tool that in addition to its usefulness in cabinet work can do many ordinary household jobs, such as cutting fancy edges for shelving, grooves for storm windows and weather stripping, circles and ovals with smooth edges, and round corners on work of all types. The electric router and its bench-mounted analog, the spindle shaper, have largely displaced hand routers, either pushed like a plane (*see also* plane) or pulled like a drawknife, formerly used by woodworkers for cutting grooves and shaping edges.

Rouvier, Maurice (b. April 17, 1842, Aix-en-Provence, Fr.—d. June 7, 1911, Neuilly), French statesman who had some success in balancing the budget during periods of his seven terms as minister of finance and two terms as premier.



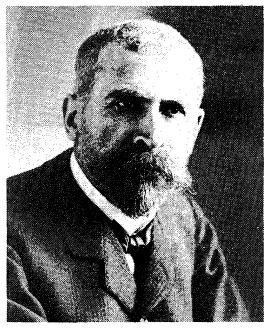
Rouvier, engraving by Fortuné Méaulle after a portrait by Heinrich Meyer

Giraudon—Art Resource/EB Inc.

Having launched the republican journal *L'Égalité* in 1870, Rouvier, a supporter of Léon Gambetta—one of the founding fathers of the Third Republic—served as deputy in the National Assembly from 1871 to 1902. A financial technician, he served on budget commissions, often as chairman, and as minister for commerce and the colonies (1881–82) and for commerce (1884–85). Resisting pressure from rightists to include Gen. Georges Boulanger in his Cabinet, Rouvier became premier (May–November 1887) with the support of moderate republicans. Minister of finance from 1889, he became implicated in the Panama Scandal and, though he apparently did not profit personally, was forced to resign in 1892. He was elected senator in 1902 and served as minister of finance (1902–05) and as premier and minister of finance (1905–06). In June 1905 he took over the Ministry of Foreign Affairs after Théophile Delcassé resigned over the Franco-German crisis in Morocco. Rouvier fell from power (March 1906) over questions arising from the government's decisive measures for the separation of church and state.

Rouvroy, Louis de: *see* Saint-Simon, Louis de Rouvroy, duc de.

Roux, (Pierre-Paul-)Émile (b. Dec. 17, 1853, Confolens, Charente, Fr.—d. Nov. 3, 1933, Paris), French bacteriologist noted for his work on diphtheria. With the Swiss bacteriologist Alexandre Yersin, he was the first



Émile Roux

Harlingue—H. Roger-Viollet

to demonstrate that a toxin is the active agent causing diphtheria. This discovery, together with the subsequent discovery by Emil von Behring that the diphtheria bacillus produces an antitoxin, led directly to development of diphtheria immunization and serum therapy.

Roux taught at the University of Paris (1874–78). He then worked for 10 years in Louis Pasteur's laboratory and was director of the Pasteur Institute (1904–33). With Pasteur, Roux found that inoculation of sheep and cattle with attenuated anthrax bacillus immunized them against subsequent inoculation of virulent forms of the bacillus.

Roux, Jacques (d. Jan. 20, 1794, near Paris), French priest who became the leader of the democratic extremists known as the Enragés (literally "madmen") during the French Revolution.

At the outbreak of the Revolution in 1789 Roux was a vicar of a parish in Paris. Soon he began preaching the ideals of popular democracy to crowds of Parisian sansculottes (wage earners and shopkeepers). In 1791 he was elected to the Paris Commune. France's economy deteriorated rapidly after the country went to war with Austria in April 1792, and in May Roux demanded that hoarders be put to death. He led food riots in Paris in February 1793 and was a leader of the sansculotte crowds that forced the National Convention to expel its moderate Girondin deputies on June 2.

Nevertheless, the Jacobins, who then took charge of the Revolution, were reluctant to institute the stringent economic controls demanded by Roux. On June 24 Roux violently denounced the Convention for its failure to curb hoarders and war profiteers. He was blamed for the soap riots that broke out in Paris the following day, and on July 28 the Jacobin leader Robespierre attacked him as a foreign agent and counterrevolutionary. Shortly thereafter Roux was expelled from the Commune and the Cordeliers Club (Society of the Friends of the Rights of Man and of the Citizen). To win over his adherents, the Convention took action against monopolists and hoarders, and requisitioned food supplies for the populace of Paris (July–August 1793). The Enragés program was taken over by left-wing Jacobins under Jacques Hébert, and on September 5 Roux was arrested. Six months later he committed suicide in Bicêtre prison.

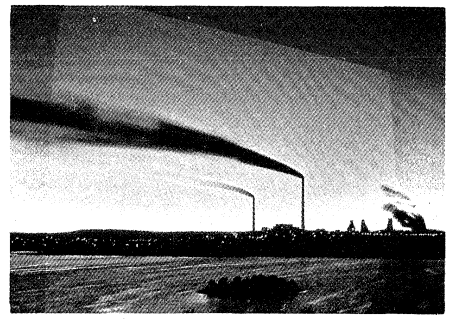
Roux, Wilhelm (b. June 9, 1850, Jena, Saxony—d. Sept. 15, 1924, Halle, Ger.), German zoologist whose attempts to discover how organs and tissues are assigned their structural form and functions at the time of fertilization made him a founder of experimental embryology.

A student of German biologist Ernst Haeckel, Roux studied in Jena, Berlin, and Strasbourg. He was an assistant at the Institute of Hygiene in Leipzig (1879–86) and professor at the universities of Breslau (1886–89), Innsbruck, Austria (1889), and Halle (1895–1921).

Believing that mitotic cell division of the fertilized egg is the mechanism by which future parts of a developing organism are determined, Roux began in the 1880s an experimental program using frog eggs. He destroyed one of the two initial subdivisions (blastomeres) of a fertilized frog egg, obtaining half an embryo from the remaining blastomere. From his results, he concluded that determination of future parts and functions had already occurred in the two-cell stage and that each of the two blastomeres had already received the determinants necessary to form half the embryo. His theory was later negated, however, when German biologist Hans Driesch, working with sea urchin eggs, obtained small but fully developed embryos from both initial blastomeres.

In 1894 Roux founded *Archiv für Entwicklungsmechanik der Organismen,* the first journal of experimental embryology.

Rouyn, city, seat of Nord-Ouest (Northwest) region, western Quebec province, Canada, on Lake Osisko. Originating in the 1920s, when gold and copper ores were first exploited in the area, and named after the sieur de Rouyn,



Copper mines of Rouyn-Noranda from Lake Osisko, Que.

By courtesy of the Department of Tourism, Fish and Game, Que.

a hero of the Battle of Sainte-Foy (1760), the city, 315 mi (507 km) northwest of Montreal city, became the administrative, commercial, and industrial centre for the whole mining region of western Quebec. While copper and gold mining and refining remain the chief economic activities, other industries include lumbering and dairying. Most of the population, about 80 percent, is French-Canadian, the remainder including some 30 different nationalities. The Canadian National Railway, two major highways, and an airport link Rouyn and its twin city of Noranda (*q.v.*) with the rest of the continent. The city is also the site of a college. Inc. village, 1926; town, 1927; city, 1948. Pop. (1981) 17,224.

Rovaniemi, town, capital of Lapin *lääni* (Lappi province), northern Finland, at the junction of the Kemijoki and Ounasjoki (rivers), northeast of Tornio, on the Arctic Circle. Incorporated in 1929, it became the administrative centre of Lappi in 1939, when the government of Lapland was reorganized. Road building between 1920 and 1940 spurred its

development, but the Germans virtually destroyed it during World War II. The new town, designed by the Finnish architect Alvar Aalto, is a striking contrast to the other settlements in northern Finland. Industry has developed in the area, and the town, which is connected by rail to southern Finland and the Soviet Union is the centre for timber and fur trading in the Lapland region. Tours of Lapland begin at Rovaniemi, and it is the centre of an important winter resort area. The Ounasvaara Games, the major winter sports event of northern Scandinavia, are held there in March. Pop. (1983 est.) mun., 31,459.

rove beetle, any member of the widely distributed insect family Staphylinidae (order Coleoptera), containing more than 20,000 species. Rove beetles are usually found around decaying animal and vegetable matter, preying on carrion-feeding insects. Most of them are slender and small (usually less than 3 millimetres, or 1/8 inch); the largest are no more than 24 mm. The short, thick elytra, or wing covers, protect the second, fully developed pair of flying wings. These functional wings can be unfolded rapidly from under the elytra when the beetle is ready for flight. They must be refolded carefully after use, however, often with the aid of both the abdomen and the legs, so as to fit under the elytra. When disturbed, the rove beetle raises the tip of its abdomen and may squirt a foul-smelling mist at its enemies. The wingless larvae resemble the adults.

Some large species are a brightly coloured black and yellow, thus resembling wasps; other rove beetles mimic soldier ants in both appearance and behaviour. *Lomechusa* and *Atemeles* of Europe and *Xenodusa* of North America live in ant or termite hives. They secrete a fluid eaten by the ants and in return are fed by the ants.

Rovenki, city, Voroshilovgrad *oblast* (administrative region), southeastern Ukrainian Soviet Socialist Republic. Rovenki is 37 mi (60 km) south of Voroshilovgrad on the Debaltsevo–Likhovsky rail line. It was incorporated as a city in 1934.

Rovenki is located in a coal-mining area and has an ore-enrichment plant. Food processing, woodworking, and stone products manufacturing are other important industries. The city has a mining *tekhnikum* (semiprofessional training school) and a museum of local history. Pop. (1983 est.) 64,000.

Rovere, Francesco della (pope): *see* Sixtus IV.

Rovere, Giuliano della (pope): *see* Julius II.

Rovereto, town, Trento province, Trentino-Alto Adige region, northern Italy, in the Lagarina valley, on the Leno River near its junction with the Adige, south of Trento on the Brenner–Verona railway. It was ruled by the Castelbarco family from about 1300, then by Venice (1416–1509) and Austria (1509–1918). The 14th-century castle, once a Roman fortress and now a war museum, had a mammoth bell commemorating the fallen of World War I. The bell is now placed on Miravalle Hill, a sacred zone of Rovereto. The newer section of the town has broad avenues (such as the Corso Rosmini, named after the 19th-century priest-philosopher Antonio Rosmini-Serbati, a native of Rovereto) and numerous 18th-century houses. An agricultural market and tourist and industrial centre, Rovereto has mechanical, textile, metal, and chemical industries. There is an important tobacco factory at Sacco (in the suburbs of Rovereto). Pop. (1981 prelim.) mun., 33,042.

Rovigo, city, capital of Rovigo province, Veneto region, northeastern Italy, on the Naviglio (canal) Adigetto, south of Padua. Mentioned as Rodigo in a document of 838, it was ruled by the House of Este until it passed to Venice in 1482 and to Austria after 1797. It was annexed to Italy in 1866. Historical landmarks include the octagonal church of the Beata Vergine del Soccorso (1594), called La Rotonda, with paintings of the Venetian school (14th–18th century); remains of the 10th-century Castello Estense; and several Renaissance palaces, notably the Palazzo Roncale (1555). The art gallery contains paintings by Venetian masters, Hans Holbein the Younger, and Albrecht Dürer. A rail junction and an important agricultural market (grains, sugar beet, flax, and hemp), Rovigo is the commercial centre of the fertile Polesine region between the Po and the lower Adige rivers. Pop. (1983 est.) mun., 52,281.

Rovigo, Anne-Jean-Marie-René Savary, duc de (duke of): *see* Savary, Anne-Jean-Marie-René.

roving, in archery, form of practice or competition dating from at least the 16th century, when it was practiced by the Honourable Artillery Company at Finsbury Fields near London. Archers set up many marks on the field and shot from one to the next in sequence, the object being, as in golf, to use the fewest shots in completing the course. Roving is similar to modern field archery, which, in fact, is sometimes called roving.

Rovno, *oblast* (administrative region), Ukrainian Soviet Socialist Republic, occupying an area of 7,750 sq mi (20,100 sq km) in the northwestern Ukraine. The northern part of the *oblast* is part of the great lowland of Pripet Marshes, the terrain of which is flat, with extensive reed and grass marshes; some of these have been reclaimed for agriculture of rye, flax, and potatoes, and some peat is dug for fuel. Drier areas are mostly forested, mainly by oak, pine, and hornbeam. Timber working is significant, but in general the north is thinly inhabited. The southern part lies on the Volyn-Podolsk Upland, with a steep scarp face overlooking Pripet Marshes. The rolling hills are greatly dissected by river valleys and erosion gullies. Most of the forest-steppe vegetation has been cleared for the cultivation of grains and sugar beets. Communities, apart from Rovno, the administrative centre, are all small centres engaged chiefly in processing local agricultural produce. Pop. (1983 est.) 1,149,000.

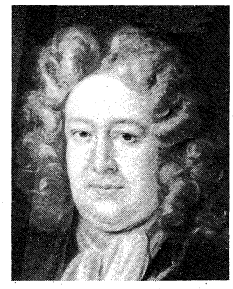
Rovno, city and administrative centre of Rovno *oblast* (region), Ukrainian Soviet Socialist Republic, on the small Ustye River. First mentioned in 1282, Rovno was long a minor Polish settlement. In 1795 it passed to Russia and in 1797 was made a town. Growth began at the end of the 19th century when Rovno became an important rail junction. It reverted to Poland between 1920 and 1939. Its industries, previously of minor significance, developed greatly in the 1960s with the growth of the chemical and machine-building industries. The city, the population of which doubled over the 1960s, has a branch of Kiev University and teacher-training and water-engineering institutes. Pop. (1983 est.) 205,000.

Rovuma, Rio (east Africa): *see* Ruvuma River.

rowboat, boat propelled by oars alone, probably the most common type of boat found around waterfronts and at most fishing camps and docks on inland waters.

A true rowboat or sculling boat has an easy motion through the water and, most important, glides between strokes. Thus the boat's forward motion never ceases; each stroke of the oar keeps the boat underway, and a steady tempo of strokes can be kept up hour after hour. Boats are rowed in one of two ways: either the rower sits facing the stern and pulls with his arms and back, or he faces ahead, letting his weight fall forward on the oars. Sometimes the boat is sculled by one oar over the stern. A special type of rowboat, used solely in competitive racing, is the single-, double-, or eight-oared racing shell, a long frail craft, specially equipped with seats that enable the rower or rowers to put maximum power into each sweep of the long scull or oar.

Rowe, Nicholas (b. June 20, 1674, Little Barford, Bedfordshire, Eng.—d. Dec. 6, 1718, London), English writer who was the first to attempt a critical edition of the works of William Shakespeare. He succeeded Nahum Tate as poet laureate and was also the foremost



Rowe, detail of an oil painting by an unknown artist; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

18th-century English tragic dramatist, doing much to assist the rise of domestic tragedy (in which the protagonists were middle class rather than aristocratic).

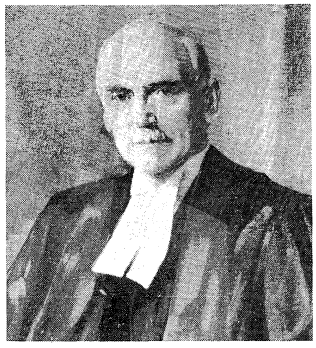
Rowe was called to the bar in 1696 and, an ardent Whig, afterward held several minor government posts. His early plays, *The Ambitious Step-Mother* (1700) and *Tamerlane* (1702), are reminiscent of John Dryden's heroic drama in their pomp and bluster but contain elements that point the way to the spirit of sentiment that characterizes *The Fair Penitent* (1703) and later works. This latter play is of some literary significance; its hero, Lothario, besides giving a new word for an attractive rake to the English language, was apparently the prototype of Lovelace, the hero of Samuel Richardson's novel *Clarissa.* Rowe composed *The Tragedy of Jane Shore* (1714) in imitation of Shakespeare's style, as he did *The Tragedy of the Lady Jane Grey* (1715). His only comedy, *The Biter* (1704), was a failure.

In *The Works of Mr. William Shakespear. Revis'd and Corrected,* 6 vol. (1709; 9 vol., including poems, 1714), Rowe mainly followed the fourth folio edition of 1685, though he claimed to have arrived at the text by comparing "the several editions." He does, however, restore some passages in *Hamlet, Romeo and Juliet, Henry V,* and *King Lear* from early texts. He abandoned the clumsy folio format (a 9 × 12 inch page size), gave lists of characters in the plays, attempted act and scene divisions, and supplied a life of Shakespeare that, although mostly composed of dubious tradition, remained the basis of accounts of Shakespeare until the early 19th century. Rowe's own poetic output included occasional odes and some translations. His version of the Roman poet Lucan's *Pharsalia,* in heroic couplets, published posthumously in 1718, was greatly admired throughout the 18th century.

Rowell, Newton Wesley (b. Nov. 1, 1867, Middlesex County, Ont., Can.—d. Nov. 22, 1941, Toronto), Canadian politician and jurist who served as chief justice of Ontario in 1936–37.

Rowell was called to the bar in 1891 and made king's counsellor in 1902. As a member of the Ontario legislative assembly in 1911, he became leader of the Liberal opposition. He entered the Dominion House of Commons

in 1917 and served in Sir Robert Laird Borden's Unionist government as president of the



Rowell, detail of an oil painting by Wyly Grier, 1939; in the Law Society of Upper Canada collection

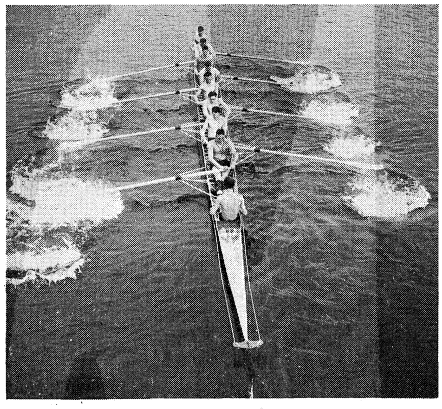
By courtesy of the Law Society of Upper Canada

council. He was chairman of the Cabinet War Committee and a member of the Imperial War Cabinet.

Rowell represented Canada at the International Labour Conference in Washington, D.C., in 1919 and the first assembly of the League of Nations in 1920. Back in Canada, he organized the first federal department of health, then retired from the cabinet in 1920 and from Parliament in 1921. He served as president of the Canadian Bar Association in 1932–34 and became chief justice for Ontario in 1936. In 1937 he served as chairman of the Royal Commission of Dominion Provincial Relations, then retired from all posts in 1938 because of illness.

rowing, propulsion of a boat by means of oars. As a sport, it involves "shells" (usually eight oars) and "sculls" (two or four oars), raced mainly on inland rivers and lakes.

In the sport the term oar refers to a shaft of wood with a rounded handle at one end and a shaped blade. The shaft usually consists of



Crew stroking an eight-oared shell

Ewing Galloway

two halves hollowed out and glued together in order to save weight and increase flexibility. The blade—a thin broadened surface—is either flat or slightly curved at the sides and tip to produce a firm grip of the water. The loom, or middle portion of the oar, rests either in a notch or oarlock (rowlock) or between thole pins on the gunwale (top edge) of the boat in order to serve as a fulcrum of the oar. The loom is protected against wear in this area of contact with a short sleeve of leather or plastic. Oars have fixed leather or adjustable metal or plastic collars, called buttons, to prevent slippage outboard. In sculling, the oars, called sculls, are used in pairs by the oarsmen. There is no length restriction on either oars or sculls, but the former are usually about 3.6 to 3.9 metres (12 to 12.8 feet) long and the latter 2.9 m. Oars in pure recreation and sport fishing rowboats are like sculls. Early shells and scull boats were of wood and heavy. Later, lighter materials and a process called coldmolding resulted in lighter craft and a skin of about 3.1 millimetres (0.8 inch). There are no restrictions on boat size, except for junior events. Shells are 16–18 m long for eights and shorter for fours and pairs. Sculling boats are usually 7.6 m long. Both kinds of boats have an easy motion through the water and glide between strokes.

History. Rowing began as a means of transportation. Galleys, used as war vessels and ships of state, prevailed in Egypt and Rome on the Nile and in the Mediterranean from at least the 25th century BC to the 4th century AD. Rowing was also an important adjunct to sailing for the Romans, Anglo-Saxons, Danes, and Norwegians in various invasions of Great Britain and other military forays. Rowing in England, of both small boats and barges, began on the Thames as early as the 13th century and resulted in a company of watermen who transported passengers up, down, and across the Thames in and near London. Wagering by passengers in different boats by the 16th century led to races, at first impromptu and later organized. By the early 18th century there were more than 40,000 liveried watermen. Doggett's Coat and Badge (*q.v.*), an organized watermen's race, has been held annually since 1715. The watermen were, of course, professionals, and the regattas, programs of racing, held throughout the 18th century were also professional. A similar form of racing by ferrymen in the United States began early in the 19th century.

Rowing in six- and eight-oar boats began as a club and school activity for amateurs about this time in England and somewhat later in the United States. Organized racing began at the universities of Oxford and Cambridge in the 1820s, culminating in 1839 in the Henley Regatta (from 1851 the Henley Royal Regatta, *q.v.*), which has continued to the present. Rowing as sport developed from the 1830s to the 1860s in Australasia and Canada and during the same period became popular throughout Europe and in the United States (Harvard and Yale universities first raced in 1851; the first open regatta for amateurs was held in 1872). Throughout the century professional sculling was a popular sport. Less organized, often impromptu, racing by boats of all kinds, lifesaving, Coast Guard, and dinghies also came into being.

Local and national organizations, amateur and professional, were formed in this period, and in 1892 the Fédération Internationale des Sociétés d'Aviron (*q.v.*; FISA, the International Rowing Federation) was founded. Events in rowing (the use of a single oar grasped in both hands) for crews of eight, four, and two, and in sculling (the use of two oars, one grasped in each hand) were established. In races for eights, fours, and some pairs, there is also a coxswain, who sits at the stern, steers, calls the stroke, and generally directs the strategy of the race. Rowing events in the Olympic Games have been held for men since 1900 and for women since 1976.

The course and equipment. Under FISA rules, all races take place over a 2,000-m straight course on still water, each crew or sculler racing in a separate, buoy-marked lane. Racing shells range in overall length from 18 m for an eight, 13 m for a four, and 10 m for a pair, to 8 m for a single scull. There are no specifications for weight, which varies according to materials used and ranges from 9 kilograms (20 pounds) for a scull to 109 kg or more for a shell for eights. Size, shape, and weights of oars are also not specified, but they are generally about 4 m in length and weigh about 3.6 kg.

Stroke and style of training. The racing stroke begins with the entry of the oar blade into the water (the catch). The stroke under water follows, and then the travel of the blade out of the water (the recovery). Turning the blade horizontally by wrist motion as the oar handle is depressed to raise the blade clear of the water at the beginning of the recovery is called feathering. The extraction of the blade after driving the boat through the water is called the finish. Turning of the blade from horizontal to vertical in preparation for the catch is called squaring.

Early fixed-seat rowing used the English stroke: body swing produced most of the power, the arms being used mainly to transfer the weight of the body to the oar. With the introduction of the sliding seat (1857 in the United States; 1871 in England), leg drive was added. Later style changes introduced by Steve Fairbairn in 1881 emphasized leg drive and arm pull more. The German coach Karl Adam in the 1950s produced good results when he introduced new training methods based on *Fahrtspiel* ("speed play"), originally used for training runners, and on interval training (short sprints alternated with long runs). *See* Sporting Record: *Rowing. See also* Olympic Games.

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Rowland, Henry Augustus (b. Nov. 27, 1848, Honesdale, Pa., U.S.—d. April 16, 1901, Baltimore), U.S. physicist who invented the concave diffraction grating, which replaced prisms and plane gratings in many applications, and revolutionized spectrum analysis—the resolution of a beam of light into components that differ in wavelength. In 1872 Rowland became an instructor of physics at Rensselaer Polytechnic Institute, Troy, N.Y., and four years later was elected to the chair of physics in the newly founded Johns Hopkins University, Baltimore. In 1876, he succeeded in proving that a moving electric charge has the same magnetic action as an electric current. Three years later, with improved thermometric and calorimetric methods, he redetermined the mechanical equivalent of heat; he also redetermined the standard value of electrical resistance, the ohm.

In 1885 Rowland finished constructing a machine capable of engraving as many as 20,000 lines to the inch for diffraction gratings. He then ruled gratings on spherical concave surfaces, thus eliminating the need for additional lenses and mirrors in spectrometers, and used them to develop exact spectrometry. His *Photographic Map of the Normal Solar Spectrum* (1888) was a spectrogram more than 35 feet (11 metres) long, and his table of solar spectrum wavelengths (*Astrophysical Journal*, vol. 1–6, 1895–97) contained tens of thousands of solar lines and was a standard reference for many years. He was the first president of the American Physical Society (1899–1901), and he was elected a foreign member of the Royal Society of London in 1899. The collected *Physical Papers of Henry Augustus Rowland* appeared in 1902.

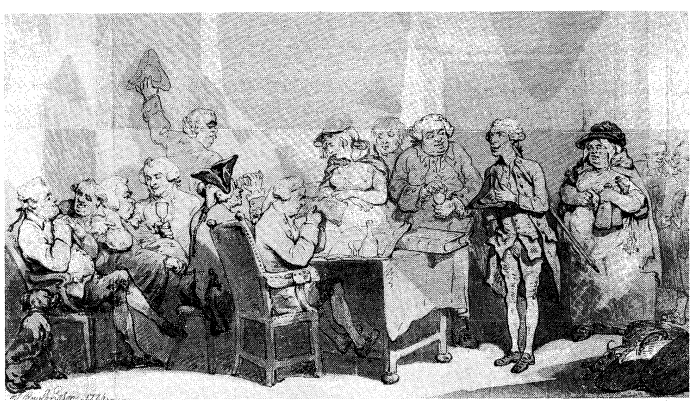
Rowlands, John (African explorer): *see* Stanley, Sir Henry Morton.

Rowlandson, Mary, *née* WHITE (b. *c.* 1635, England—d. *c.* 1678, Wethersfield, Conn.), American colonial author who wrote some of the finest firsthand accounts of 17th-century Indian life and of Puritan–Indian conflicts in early New England.

Mary White Rowlandson was the daughter of John White, an original proprietor of the town of Lancaster, Mass. She married the settlement's first minister, the Reverend Joseph Rowlandson, in about 1656, and the couple had four children. On Feb. 10, 1676, during King Philip's War, Lancaster was attacked and razed by Indians who captured Mary Rowlandson and three of her surviving children. For the next 11 weeks, Rowlandson remained a captive of the Indians, during which time her youngest child died from wounds and exposure. Finally, on May 2, 1676, she was ransomed from her captors for £20, and her two surviving children were released shortly afterward. The next year, the Rowlandson family moved to Wethersfield, Conn., where Joseph had received a call as minister. Following her husband's death in 1678, the Wethersfield town fathers voted her a widow's pension.

Mary Rowlandson wrote graphically about her experiences in captivity in a piece entitled *The Sovereignty and Goodness of God, Together with the Faithfulness of His Promises Displayed: Being a Narrative of the Captivity and Restauration of Mrs. Mary Rowlandson.* Highly popular, it was published in Cambridge, Mass., and London in 1682.

Rowlandson, Thomas (b. July 1756, Old Jewry, London—d. April 22, 1827, London), English painter and caricaturist who, in illustrating the life of 18th-century England, created the comic images of familiar social types of his day, such as the antiquarian, the old maid, the blowsy barmaid, and the Grub Street hack. His characters ranged from the ridiculously pretentious, with their elaborate coiffures, widely frogged uniforms, and enormous bosoms and bottoms, to the merely pathetic, whose trailing handkerchiefs expressed their dejected attitudes.



"The Parish Vestry," wash coloured pen and ink drawing by Thomas Rowlandson, 1784; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London

The son of a tradesman, Rowlandson became a student in the Royal Academy. At the age of 16 he went to study in Paris. After establishing a studio as a portrait painter, he began to draw caricatures to supplement his income, and this soon became his major interest.

His series of drawings "The Schoolmaster's Tour," accompanied by verses of William Combe, was published in the new *Poetical Magazine* (1809–11) launched by the art publisher Rudolph Ackermann, who was Rowlandson's chief employer. The same collaboration of designer, author, and publisher resulted in the popular Dr. Syntax series—*Tour of Dr. Syntax in Search of the Picturesque* (1812), *The Second Tour of Dr. Syntax in Search of Consolation* (1820), and *The Third Tour of Dr. Syntax in Search of a Wife* (1821). They also produced *The English Dance of Death* (1815–16) and *The Dance of Life* (1816–17). Rowlandson illustrated editions of Smollett, Goldsmith, and Sterne.

Rowlandson's designs were usually executed in outline with a reed pen and delicately washed with colour. They were then etched by the artist on copper and afterward aquatinted—usually by a professional engraver, the impressions being finally coloured by hand. Rowlandson compromised his reputation in his later years by producing a mass of inferior drawings. The works of his prime, however, are outstanding in the vitality of their outline and the gusto of their comment on human weaknesses.

Rowlatt Acts (February 1919), legislation passed by the government of India over the unanimous opposition of all nonofficial Indians of the Imperial Legislative Council. They allowed certain political cases to be tried without juries and internment of suspects without trial. Their object was to replace the repressive provisions of the wartime Defence of India Act (1915) by a permanent law. They were based on the report of Justice Rowlatt's committee of 1918.

The Rowlatt Acts were much resented by an aroused Indian public. Mahatma Gandhi organized a protest movement that led directly to the Amritsar massacre (April 1919) and to his Non-cooperation Movement (1920–22). The acts were never actually used.

Rowley, William (b. 1585?, London—d. 1642?), English dramatist and actor who collaborated with several Jacobean dramatists, notably Thomas Middleton.

Rowley became an actor before 1610. He met Middleton about 1614 but was already writing plays for his company in 1612–13. Of some 50 plays known to have been written by Rowley alone or in collaboration, comparatively few are extant. The most important of those by Rowley alone is *All's Lost by Lust* (performed 1619; published 1633), a romantic tragedy with a strong strain of dramatic morality, written in harsh but powerful verse. His other extant plays are comedies and include *A New Wonder, A Woman Never Vext* (*c.* 1610; published 1632), *A Match at Mid-Night* (*c.* 1607; published 1633), and *A Shoo-maker a Gentleman* (*c.* 1608; published 1638). Plays written with Middleton include *The Old Law* (performed *c.* 1615), in which Philip Massinger also collaborated; *A Faire Quarrel* (*c.* 1616) and *The Changeling* (1622), in both of which Rowley wrote the subplot and helped with the plan of the whole; *Wit at Several Weapons* (*c.* 1616), incorrectly attributed to John Fletcher; and *The World Tost at Tennis* (1620).

Other plays in which he collaborated are *Fortune by Land and Sea* (*c.* 1609) with Thomas Heywood; *The Witch of Edmonton* (1621) with Thomas Dekker and John Ford; *The Maid in the Mill* (1623) with Fletcher; and *The Birth of Merlin, or: The Child Hath Found His Father* (1662), the title page of which wrongly attributes part authorship to Shakespeare.

Rowling, Wallace Edward, byname, BILL ROWLING (b. Nov. 15, 1927, Motueka, N.Z.), educator and politician who upon the death of Prime Minister Norman Kirk was elected premier of New Zealand (1974–75).

Rowling was a lecturer in economics when he entered politics; he became a member of Parliament (1962) and president of the Labour Party (1970–72). He was minister of finance (1972) when he was chosen by the party to succeed the late prime minister. His government's effort to retrieve the economy ended with an upset victory by the National Party in 1975.

Rowntree, B(enjamin) Seebohm (b. July 7, 1871, York, Yorkshire, Eng.—d. Oct. 7, 1954, High Wycombe, Buckinghamshire), English sociologist and philanthropist known for his studies of poverty and welfare and for his record as a progressive employer.

After attending the Friends' School at York and studying chemistry at Owens College, Manchester, in 1889 he joined H.I. Rowntree and Company, the family cocoa and chocolate firm. He was instrumental in getting the company to establish a pension plan in 1906, a five-day week in 1919, and an employee profit-sharing plan in 1923.

He was an intimate of Prime Minister David Lloyd George, serving as director of the welfare department of the Ministry of Munitions (1915–18) and as a member of the Reconstruction Committee (1917). Concerned about poverty, Rowntree conducted a survey of working-class homes in York in 1897–98 and published his findings in *Poverty: A Study of Town Life* (1901), which became a classic in empirical sociology. A second survey, conducted in 1936, was published as *Poverty and Progress* (1941). He was also active in labour-management conciliation and in various philanthropies.

His other publications include *Betting and Gambling, a National Evil* (1910); *Unemployment: A Social Study* (1911); *The Human Factor in Business* (1921); *Old People* (1947); *English Life and Leisure: A Social Study* (1951); and *Poverty and the Welfare State* (1951), reporting on a third survey of York.

Rowson, Susanna, *née* HASWELL (b. *c.* 1762, Portsmouth, Hampshire, Eng.—d. March 2, 1824, Boston), English-born U.S. actress, educator, and author of the first American best-seller, *Charlotte Temple.* This novel, a conventional sentimental story of seduction and remorse, was immensely popular after its publication in 1791 and went through over 200 editions.

In 1792 she went on the stage with her husband, William Rowson, a merchant whom she married in 1787 and whose business failed. The Rowsons performed in Scotland and in Philadelphia, Baltimore, and Boston; Susanna Rowson also wrote numerous plays and musicals, promoting the development of the creative arts in the United States. In 1797 she opened the Young Ladies Academy in Boston, one of the first schools for girls above the elementary level in the country.

Among her other works are novels, including *Rebecca, or the Fille de Chambre* (1792); theatrical works, such as *Slaves in Algiers* (1794); and textbooks, such as *A Spelling Dictionary* (1807) and *Biblical Dialogues Between a Father and his Family* (1822).

Roxana, also spelled ROXANE (d. *c.* 310 BC, Amphipolis, Thrace), wife of Alexander the Great. The daughter of the Bactrian chief Oxyartes, she was captured and married by Alexander in 327, during his conquest of Asia. After Alexander's death (323) she had his sec-

ond wife, Stateira (Barsine), killed, and she gave birth at Babylon to a son (Alexander IV), who was accepted by the Macedonian generals as joint king with the idiot Philip III Arrhidaeus (half brother of Alexander the Great). In 319 Roxana joined Alexander's mother, Olympias, in Epirus, but she was captured in 316 in Macedonia by Cassander, who later took the title of king of Macedonia. He imprisoned Roxana at Amphipolis and then executed her and her son.

Roxas, city, northern Panay, Philippines. It lies along the Panay River delta 4 miles (6.5 km) from its mouth on the Sibuyan Sea. The city was formerly called Capiz. Its outport, Port Capiz, accommodates interisland traffic. The northern terminus of the transisland railway from Iloilo, Roxas serves as the entrepôt for a fertile agricultural area, exporting surplus rice to nearby islands. The city also has an airport. The old town of Panay, 3 miles (5 km) southeast, was the second Spanish settlement (1569) in the Philippines. Inc. city, 1951. Pop. (1989 est.) 101,468.

Roxas (y Acuna), Manuel (b. Jan. 1, 1892, Capiz, Phil.—d. April 15, 1948, Clark Field, Pampanga), political leader and first president (1946–48) of the independent Republic of the Philippines.

After studying law at the University of the Philippines, near Manila, Roxas began his political career in 1917 as a member of the municipal council of Capiz (renamed Roxas in 1949). He was governor of the province of Capiz in 1919–21 and was then elected to the Philippine House of Representatives, subsequently serving as Speaker of the House and a member of the Council of State. In 1923 he and Manuel Quezon, the president of the Senate, resigned in protest from the Council of State when the U.S. governor-general (Leonard Wood) began vetoing bills passed by the Philippine legislature. In 1932 Roxas and Sergio Osmeña, the Nacionalista Party leader, led the Philippine Independence Mission to Washington, D.C., where they influenced the passage of the Hare-Hawes-Cutting Act. Roxas was later opposed by Quezon, who held that the act compromised future Philippine independence; the Nacionalista Party was split between them on this issue. In 1934, however, Roxas was a member of the convention that drew up a constitution under the revised Philippine Independence and Commonwealth Act (Tydings-McDuffie Act). Roxas also served as secretary of finance in the Commonwealth government (1938–40).

During World War II Roxas served in the pro-Japanese government of José Laurel by acquiring supplies of rice for the Japanese army. Although a court was established after the war to try collaborators, Roxas was defended by his friend General Douglas MacArthur. Roxas was elected president of the Commonwealth in 1946 as the nominee of the liberal wing of the Nacionalista Party (which became the Liberal Party), and, when independence was declared on July 4, he became the first president of the new republic.

Although Roxas was successful in getting rehabilitation funds from the United States after independence, he was forced to concede military bases (23 of which were leased for 99 years), trade restrictions for Philippine citizens, and special privileges for U.S. property owners and investors. His administration was marred by graft and corruption; moreover, the abuses of the provincial military police contributed to the rise of the left-wing Hukbalahap (Huk) movement in the countryside. His heavy-handed attempts to crush the Huks led to widespread peasant disaffection. Roxas died in office in 1948 and was succeeded by his vice president, Elpidio Quirino.

Roxburgh, also called ROXBURGHSHIRE, former county, southern Scotland; since the reorganization of 1975 it is mostly in Roxburgh (*q.v.*) district, of Borders (*q.v.*) region.

Numerous archaeological remains in the area include hill forts in the dales and later Roman camps, forts, and signal stations, as well as Dere Street, the Roman road running north from England. After the Roman withdrawal the area was occupied by the Britons of Strathclyde, and it was later annexed to Northumbria for four centuries until it was ceded to Scotland in 1018. Roxburgh was constituted a shire by David I, and its ancient town of Roxburgh formed one of the Court of Four Burghs. The town was abandoned when the castle was destroyed and James II of Scotland killed in 1460; it was superseded by Kelso. Other towns in the locality were repeatedly burned during border warfare between the Scots and English, and the abbeys of Jedburgh, Kelso, and Melrose were ruined in 1544–45. Abbotsford, near Melrose, was the last home of the 19th-century novelist Sir Walter Scott, and the surrounding area is known as "the Scott country."

Roxburgh, district, Borders region, southern Scotland. Created by the reorganization of 1975, it includes most of the former county of Roxburgh (*q.v.*) and a small part of the former county of Berwick. Hawick is the seat of the district authority. The district, with an area of 595 square miles (1,540 square km), contains the entire basin of the Teviot River, which flows northeast in its dale (valley) to its confluence with the Tweed at Kelso. Rolling grass moorlands enclose the farmland in the deep valleys. Most of the district's land is under grass. Upland sheep farming is the chief occupation west of Hawick. The lowland crop-livestock farms combine sheep and cattle breeding. The economies of Roxburgh's towns centre on their markets, textile manufactures, and tourist trade. Hawick is especially noted for hosiery and knitwear. Pop. (1987 est.) 35,-133.

Roxbury, southern residential section of Boston, Mass., U.S. Prior to becoming part of the city of Boston in 1868, it was a town (township) of Norfolk county, located between Boston and Dorchester. Early spellings included Rocksbury, Roxburie, and Rocsbury, probably in reference to its rocky site. The town was founded in 1630 by Puritan immigrants who came with Governor John Winthrop.

Roy, (Joseph) Camille (b. Oct. 22, 1870, Berthier-en-Bas, Que., Can.—d. June 24, 1943, Quebec), critic and literary historian, noted as an authority on the development of French-Canadian literature.



Camille Roy

By courtesy of the Universite Laval, Quebec

Ordained a Roman Catholic priest in 1894, Roy received his Ph.D. from Catholic University in Paris (1900). He taught French literature at Laval University in Quebec (1900–26) and then became a professor of Canadian literature. His many significant studies are based on the premise that the purpose of Canadian literature is to preserve the Christian heritage of 18th-century France while remaining untouched by contemporary French influence. These works include *Nos Origines littéraires* (1909; "Our Literary Origins") and the standard text *Manuel d'histoire de la littérature canadienne-française* (1918; 10th ed., 1945; "Handbook of the History of French-Canadian Literature"). He also helped found the Société du Parler Français (Society for Speaking French).

Roy, Gabrielle, married name MRS. MARCEL CARBOTTE (b. March 25, 1909, St. Boniface, Man., Can.—d. July 13, 1983, Quebec), French-Canadian novelist praised for her skill in depicting the hopes and frustrations of the poor.

Roy taught school for a time, studied drama in Europe (1937–39), then returned to Canada and began her writing career. Her studies of



Gabrielle Roy

By courtesy of McClelland & Stewart Ltd.; photograph, Annette & Basil Zarov

poverty-stricken working-class people in the cities include *Bonheur d'occasion* (1945; *The Tin Flute*) and *Alexandre Chenevert, caissier* (1954; *The Cashier*). Some of her novels, such as *La petite poule d'eau* (1950; *Where Nests the Waterhen*) and *Rue Deschambault* (1955; *Street of Riches*), deal with isolated rural life in Manitoba. She also wrote a book of semi-autobiographical stories, *La route d'Altamont* (1966; *The Road Past Altamont*), and a novel based on her experiences as a schoolteacher, *Ces enfants de ma vie* (1977; *Children of My Heart*).

Roy, Manabendra Nath, original name NARENDRANATH BHATTACHARYA (b. Feb. 22?, 1887, Arbelia, India—d. Jan. 25, 1954, Dehra Dūn), leader of India's Communists until independence in 1947.

Roy's interest in social and political issues eventually led to an involvement with various Indian groups engaged in trying to overthrow British colonial rule by acts of terrorism. In 1915 he became involved in a plot by Bengal revolutionaries to smuggle arms into India. The plot failed, and Roy vainly searched for the needed arms among various nations of East and Southeast Asia. In 1916 he reached San Francisco, where he changed his name to Roy.

Moving to Mexico, Roy helped found the Mexican Communist Party soon after the Bolshevik Revolution in Russia. In Moscow he made a favourable impression on Lenin and was put on the executive committee of the Communist International (Comintern). Breaking with the Comintern in 1929 over Joseph Stalin's policies, Roy tried to return secretly to India but was arrested by the British and imprisoned. He was released a few years later and joined the Indian National Congress. Giving higher immediate priority to the defeat of fascism than to Indian independence, Roy opposed the Congress in its reluctance to aid the British in World War II. After India gained independence in 1947, Roy abandoned communism and became a founder of radical humanism, a mixture of socialist and liberal humanitarian ideas.

Roy, Ram Mohun, Ram Mohun also spelled RAMMOHUN, RAMMOHAN, or RAM MOHAN (b. May 22, 1772, Rādhānagar, Bengal, India—d. Sept. 27, 1833, Bristol, Gloucestershire, Eng.), Indian religious, social, and educational reformer who challenged traditional Hindu culture and indicated the lines of progress for Indian society under British rule. He is sometimes called the father of modern India.



Ram Mohun Roy

By courtesy of the Nehru Memorial Museum and Library, New Delhi

He was born in British-ruled Bengal to a prosperous family of the Brahman caste. Little is known of his early life and education, but he seems to have developed unorthodox religious ideas at an early age. As a youth he traveled widely outside Bengal and mastered several languages—Sanskrit, Persian, Arabic, and later Hebrew, Greek, and English, in addition to his native Bengali and Hindi.

Roy supported himself by moneylending, managing his small estates, and speculating in British East India Company bonds. In 1805 he was employed by John Digby, a lower company official. Through Digby he was introduced to Western culture and literature. For the next 10 years Roy drifted in and out of British East India Company service as Digby's assistant.

Roy continued his religious studies throughout this period. In 1803 he composed a tract denouncing India's religious divisions and superstition. As a remedy for these ills, he advocated a monotheistic Hinduism in which reason guides the adherent to ". . . the Absolute Originator who is the first principle of all religions." He sought a philosophical basis for his religious beliefs in the Upanishads and Vedas, translating these ancient Sanskrit treatises into Bengali, Hindi, and English and writing summaries and treatises on them. The central theme of these texts, for Roy, was the worship of the Supreme God, beyond human knowledge, who supports the universe. By translating the sacred Sanskrit Upanishads into modern Bengali, Roy violated a long-standing tradition, but, in appreciation of his translations, the French Société Asiatique in 1824 elected him to an honorary membership.

In 1815 Roy founded the short-lived Atmiya-Sabha (Friendly Society) to propagate his doctrines of monotheistic Hinduism. He became interested in Christianity and learned Hebrew and Greek in order to read the Old and New Testaments. In 1820 he published the ethical teachings of Christ, excerpted from the four Gospels, under the title *Precepts of Jesus, the Guide to Peace and Happiness.*

Social and political activism. In 1823, when the British imposed censorship upon the Calcutta press, Roy, as founder and editor of two of India's earliest weekly newspapers, organized a protest, arguing in favour of freedom of speech and religion as natural rights. This protest marked a turning point in Roy's life, away from preoccupation with religious polemic toward social and political action. In his newspapers, treatises, and books, Roy tirelessly criticized what he saw as the idolatry and superstition of traditional Hinduism. He denounced the caste system and attacked the custom of suttee (ritual burning of widows upon the funeral pyres of their deceased husbands). Roy's actual influence on the British East India Governing Council's prohibition of suttee in 1829 is not clear, but it has been widely accepted that he had the effect of emboldening the government to act decisively on the matter.

In 1822 Roy founded the Anglo-Hindu School and four years later the Vedānta College, in order to teach his Hindu monotheistic doctrines. When the Bengal government proposed a more traditional Sanskrit college, in 1823, Roy protested that classical Indian literature would not prepare the youth of Bengal for the demands of modern life. He proposed, instead, a modern, Western curriculum of study. Roy also led a protest against the outmoded British legal and revenue administration in India.

In August 1828 Roy formed the Brahmo Samaj (*q.v.*; Society of Brahmā), a Hindu reformist sect that utilized Unitarian and other liberal Christian elements in its beliefs. The Brahmo Samaj was to play an important part, later in the century, as a Hindu movement of reform.

In 1829 Roy journeyed to England as the unofficial representative of the titular king of Delhi. The king of Delhi granted him the title raja, though it was unrecognized by the British. Roy was well received in England, especially by Unitarians there and by King William IV. Roy died of a fever while in the care of Unitarian friends at Bristol, Eng., where he was buried.

Roy's importance in modern Indian history rests partly upon the broad scope of his social vision and the striking modernity of his thought. He was a tireless social reformer, yet he also revived interest in the ethical principles of the Vedānta school as a counterpoise to the Western assault on Indian culture. In his textbooks and treatises he contributed to the popularization of the Bengali language, while at the same time he was the first Indian to apply to the Indian environment the fundamental social and political ideas of the French and American revolutions.

Royal Academy of Dramatic Art (RADA), state-subsidized school of acting in London, the oldest school of drama in England. It was established in 1904 by actor-producer Sir Herbert Beerbohm Tree. In 1905 he moved it to a house on Gower Street under the name of the Academy of Dramatic Art and set up a presiding council of other leading actors. Principal of the Academy from 1909 until his death in 1957 was Sir Kenneth Barnes, who assured its success. A royal charter was granted in 1920; from 1924 the Royal Academy of Dramatic Art has received an annual government grant. It set the pattern for subsequent schools of acting.

Royal Air Force, The (RAF), youngest of the three British armed services, charged with the air defense of the United Kingdom and the fulfillment of international defense commitments.

The first air units in Britain's military were formed eight years after the first powered flight took place in 1903. In April 1911 an air battalion of the Royal Engineers was formed, consisting of one balloon and one airplane company. In December 1911 the British Admiralty formed the first naval flying school, at the Royal Aero Club ground at Eastchurch, Kent.

In May 1912 a combined Royal Flying Corps (RFC) was formed with naval and military wings and a Central Flying School at Upavon on Salisbury Plain. The specialized aviation requirements of the navy made it appear, however, that separate organization was desirable, and on July 1, 1914, the naval wing of the RFC became the Royal Naval Air Service (RNAS), the military wing retaining the title Royal Flying Corps.

On the outbreak of World War I in August 1914, the RFC, possessing a total of 179 airplanes, sent four squadrons to France. On April 1, 1918, the RNAS and RFC were absorbed into the Royal Air Force (RAF), which took its place beside the British navy and army as a separate service with its own ministry under a secretary of state for air. The strength of the RAF in November 1918 was nearly 291,000 officers and airmen. It possessed 200 operational squadrons and nearly the same number of training squadrons, with a total of 22,647 aircraft.

To train permanent officers for the flying branch of the RAF, a cadet college was established at Cranwell, Lincolnshire, in 1920. The RAF staff college was opened in 1922 at Andover, Hampshire.

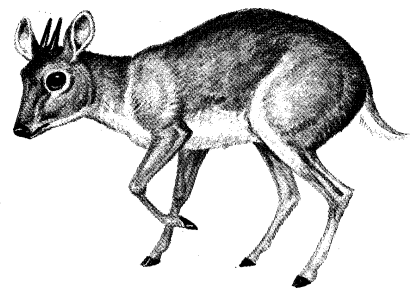
At the outbreak of World War II in September 1939, the first-line strength of the RAF in the United Kingdom was about 2,000 aircraft. The RAF fighter pilots, however, distinguished themselves during the Battle of Britain in the early stages of the war against the numerically superior German Luftwaffe. By the time the war ended, the strength of the RAF was 963,000 personnel. When the war-time forces were demobilized in 1945, however, the total strength of the RAF was reduced to about 150,000, the approximate number retained into the 1980s.

The RAF is composed of three commands: the Strike Command and the Air Support Command in the United Kingdom and the RAF Germany. In 1964 the RAF, with the Admiralty and the War Office, was placed under the Ministry of Defense, and its home and overseas commands are now administered by the Air Force Board.

Royal and Ancient Golf Club of St. Andrews, byname R. AND A., one of the world's oldest and most influential golf organizations; formed in 1754 by 22 "noblemen and gentlemen" at St. Andrews, Fife, Scot., as the Society of St. Andrews Golfers. It adopted its present name in 1834 by permission of the reigning British monarch, William IV. The R. and A. played a major role in the early development of golf. Since 1764 its famed Old Course has been played nine holes out and nine holes back, making the now standard 18-hole round.

In the late 19th century the R. and A. became the sole authority on rules of the game in Great Britain and the Commonwealth. In 1919 it took over management of the British Open and amateur championship tournaments. It sponsors several international competitions, including the Walker Cup and Curtis Cup matches against United States teams. It also maintains close contact with the United States Golf Association and other national federations for purposes of unifying rules of international play.

royal antelope (species *Neotragus pygmaeus*), tiny antelope, family Bovidae (order Artio-



Royal antelope (*Neotragus pygmaeus*)

Painting by Richard Ellis

dactyla), found alone or in pairs in dense West African forests. It is the smallest of antelopes and stands only 25 cm (10 inches) high at the shoulder. It is reddish brown with white underparts; the male is distinguished by short, spikelike horns. Despite its size, the royal antelope is reputedly able to jump about 2.8 m (9 feet) at a bound. A slightly larger relative, Bates's pygmy antelope (*Neotragus batesi*) inhabits dense central African forests.

Royal Ballet, English ballet company and school. It was formed in 1956 under a royal charter of incorporation granted by Queen Elizabeth II to the Sadler's Wells Ballet and its sister organizations, the Sadler's Wells Theatre Ballet and the Sadler's Wells School.

The founders of the Sadler's Wells Ballet were Lilian Baylis and Ninette de Valois. De Valois established a ballet school in London in 1926, the same year that Baylis, the director of the Old Vic Theatre, engaged her to stage incidental dances for operas and plays. When Baylis took over as director of the Sadler's Wells Theatre in London in 1931, she and de Valois organized the Vic-Wells Ballet there. While the company performed at the Old Vic and Sadler's Wells theatres through the 1930s, it was called the Vic-Wells Ballet; later it was known as the Sadler's Wells Ballet.

Alicia Markova became the company's first prima ballerina in 1933. When she left the company in 1935, many of her roles were inherited by the 16-year-old Margot Fonteyn, who later matured into one of the great ballerinas of the century. Robert Helpmann, who had joined the company in 1933, became its principal male dancer. In the 1930s the company premiered several important new ballets choreographed by de Valois and by Frederick Ashton. The dancer and choreographer Leonid Massine was associated with the Sadler's Wells Ballet (as it was now called) in the 1940s and '50s. In 1949 the company made its first triumphant American tour. It was by now a very large organization, with its own school and a sister company, the Sadler's Wells Theatre Ballet, which had been founded in 1946 to undertake foreign and provincial tours.

In 1956 Sadler's Wells received a royal charter and was renamed the Royal Ballet. Its two companies began a gradual amalgamation that was completed in 1959. The Royal Ballet, since its formation in 1956, has featured such choreographers as Sir Frederick Ashton, Kenneth MacMillan, Bronisława Nijinska, and George Balanchine and has toured widely.

Royal Botanic Garden (India): *see* Indian Botanic Garden.

Royal Botanic Garden, botanical garden in Edinburgh, world famous for its beautiful landscaping. The garden, of 62 acres (25 hectares), includes 35,000 kinds of plants and features special collections of rhododendrons, representatives of the heath family, and many Asiatic genera. The herbarium holds about 1.5 million dried specimens. The garden, founded in 1670, is operated by the government.

Royal Botanic Gardens (England): *see* Kew Gardens.

Royal Botanic Gardens and National Herbarium, one of the world's best-designed botanical gardens, located in Melbourne, Australia. Founded in 1845, this state-supported institution occupies a 35-hectare (87-acre) site along the Yarra River, which flows through Melbourne. More than 20,000 species of plants, including a wide array of both native and exotic varieties, are cultivated in the greenhouses and outdoor areas of the gardens. The most important special collections are those featuring palms, rhododendrons, camellias, oaks, cacti, succulents, bromeliads, ferns, and native Australian trees. The Royal Botanic Gardens have become an important centre for taxonomic study because of excellent research facilities, including the National Herbarium begun in 1857 by Ferdinand von Mueller (*q.v.*), a noted botanist who greatly enlarged the gardens' collections during his tenure (1857–73) as director. The herbarium contains approximately 1.5 million reference specimens representing nearly all native Australian species as well as many from other parts of the world.

Royal Canadian Mounted Police (RCMP), formerly (until 1920) NORTH WEST MOUNTED POLICE, byname MOUNTIES, Canada's federal police force. It is also the provincial and criminal police establishment in all provinces except Ontario and Quebec and the only police force in the Yukon and Northwest territories. It is responsible for Canadian internal security as well.

Founded in 1873, it was originally called the North West Mounted Rifles, but the reaction of the United States to the idea of an armed force patrolling the border caused the name to be changed to the North West Mounted Police. The force's first installation was Fort McLeod, in the province of Alberta, and it was the only authority for 300,000 square miles (800,000 square km) of wilderness. The original force of 300 men was sent to deal with traders from the United States who were creating havoc among the Indians by trading cheap whiskey for buffalo hides. With a combination of tact and dogged persistence, the Mounties succeeded in driving these men back across the border and pacifying the Indians. Their just treatment of the Indians resulted in the neutrality of the powerful Blackfoot Confederacy during the Riel Rebellion of 1885.

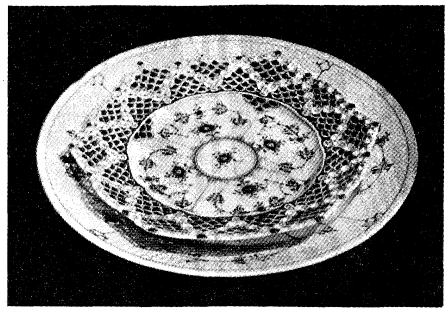
As the only authority in the region, the force assumed a wide variety of duties. Under its surveillance, the western extension of the Canadian Pacific Railway was completed in 1885. Anticipating the gold rush of 1898, the Mounties preceded the first wave of prospectors to the Yukon. As more than 300,000 settlers poured into Canada after the turn of the 20th century, the Mounties were of considerable assistance to those inexperienced in wilderness survival. In 1904 the prefix "Royal" was added to their name, and in 1920, when it became a federal force throughout Canada, the present name was adopted, and the headquarters were moved from Regina to Ottawa.

In the 1930s the marine and air divisions, the dog section, and the first of three crime-detection laboratories were added to the force. Between 1940 and 1942, the RCMP vessel *St. Roch* became the first ship to complete the west-to-east journey through the Northwest Passage and, upon returning east-to-west in 1944, was first to make the trip in both directions.

The facilities of the national police service of the RCMP—crime-detection laboratories and the identification branch of the force—are available to all authorized police forces. The RCMP-sponsored Canadian Police College is attended by selected members of the force and outside forces. The RCMP is a member of the International Criminal Police Organization (Interpol).

Royal Copenhagen porcelain, ware produced by the Royal Porcelain Factory, Copenhagen, from 1775 to the present day. The factory was founded by a chemist, Frantz Heinrich Müller, who was given a 50-year monopoly. Three wavy lines, one above the other, were adopted as a factory mark in 1775. When, in 1779, the king assumed financial responsibility, the factory was styled the Royal Porcelain Factory.

Much elegant ware, particularly decorated in cobalt blue, was produced; a fluted surface (Muschel pattern) was popular, as was painted



Royal Copenhagen fluted surface (Muschel pattern) porcelain plates with (top) a perforated lace border and (bottom) a plain border, from a contemporary service based on original designs dating from 1775
Royal Copenhagen Porcelain

stylized-flower decoration. The factory produced notably modeled figures, both glazed and biscuit (unglazed porcelain). The most famous production, however, was the great "Flora Danica" service (now, but for a few pieces, in Rosenborg Castle, Copenhagen). Begun in 1789 as a gift for Catherine II of Russia, by 1797 it numbered 2,528 items. These include minor objects, such as eggcups, as well as impressive tureens, dishes, and plates. The service was intended as a display of every wild plant in the kingdom. Johann Christoph Bayer painted every item, relying on the illustrations in a book of Danish flora. Underglaze-painted blue ware forms the largest proportion of the immense contemporary output of Royal Copenhagen.

Royal Danish Ballet, ballet troupe founded as the resident company of the Royal Theatre of Copenhagen in 1748. It was developed principally by the ballet masters Pierre Laurent, who established the company's school in 1771; Vincenzo Galeotti (director, 1775–1816), who built its repertoire of dramatic ballets; and August Bournonville, who directed from 1829 to 1877 and for whose classic style the present company is acclaimed.

After a decline in the late 19th and early 20th centuries, the Royal Danish Ballet was revived by Harald Lander, director from 1932 to 1951. The company developed internationally acclaimed soloists—including Erik Bruhn, Henning Kronstam, Peter Martins, and Peter Schaufuss. It performed many contemporary works choreographed by foreign artists including George Balanchine, Sir Frederick Ashton, and Birgit Cullberg. After 1953 the company toured and established an international reputation under Lander's successors, including the dancer Henning Kronstam, appointed artistic director in 1978.

Royal Dutch Airlines: *see* KLM.

Royal Dutch/Shell Group, Dutch KONINKLIJKE NEDERLANDSCHE/SHELL GROEP, one of the world's largest corporate entities in sales, consisting of companies in more than 100 countries, whose shares are owned by NV Koninklijke Nederlandsche Petroleum Maatschappij (Royal Dutch Petroleum Company Ltd.) of The Hague and by the "Shell" Transport and Trading Company, PLC, of London. Below these two parent companies are two holding companies, Shell Petroleum NV and the Shell Petroleum Company Limited, whose shares are owned 60 percent by Royal Dutch and 40 percent by "Shell" Transport and Trading. The holding companies, in turn, hold shares in and administer the subsidiary service companies and operating companies around the world, which engage in oil, petrochemical, and associated industries, from research and exploration to production and marketing. Several companies also deal in metals, nuclear energy, solar energy, coal, and consumer products.

The two parent companies began as rival organizations in the late 19th century. In 1878

in London, Marcus Samuel (1853–1927) took over his father's import-export business (which included the import of Oriental shells—hence the later name) and started a sideline of handling consignments of kerosene. In 1892 he began operating tankers sailing to the Far East and set up oil depots and eventually (1896) oil wells and refineries in Borneo. In 1897 he formed a separate company for his oil interests, the "Shell" Transport and Trading Company, Limited, and in the ensuing decade contracted for petroleum supplies in Sumatra, Texas, Russia, Romania, and elsewhere. (Samuel was knighted in 1898 and would become Viscount Bearsted in 1925.)

Meanwhile, in 1890 a group of Dutch bankers, businessmen, and former colonial administrators formed Koninklijke Nederlandsche Maatschappij tot Exploitatie van Petroleumbronnen in Nederlandsch-Indië (Royal Dutch Company for Exploitation of Oil Wells in the Dutch Indies). This company developed its first pipeline and refinery in Sumatra in 1892, tapping the local oil fields; after 1896, under the leadership of Hendrik W.A. Deterding (1866–1939), it began the construction of tankers and storage facilities and the creation of a sales organization.

In 1903 Royal Dutch and Shell made their first move toward merger by integrating their distributing and sales operations involving Far East sales and East Indies production. In 1907 the more complete merger resulted in the Royal Dutch/Shell Group headed by the two parent companies, with Deterding as general managing director of the Group. (In 1949 Royal Dutch shortened its corporate title to its current name; "Shell" Transport and Trading Company became a public limited company in 1981.)

By 1913 the two companies together, combined with others, had risen to a prominent position among the world's oil companies, acquiring producing concerns in such areas as Romania, Russia, Iraq, Egypt, Venezuela, Mexico, California, and Oklahoma and enlarging sales operations in Europe, Asia, Australia, Africa, and North and South America. The Group's principal American subsidiary is Shell Oil Company, founded in 1922.

Royal Geographical Society (RGS), a British group founded as the Geographical Society of London in 1830. It originated in the Raleigh Travellers' Club (formed in 1827) and was incorporated in 1859 under its present name. Soon after its foundation it absorbed the African Association, founded in 1788.

In the 19th century the society promoted or supported explorations in British Guiana (now Guyana; led by Sir Robert Schomburgk), in Australia and Africa (David Livingstone, Sir Richard Burton, John H. Speke, James A. Grant, and Joseph Thomson), and in the Arctic (Sir John Franklin and Sir George Nares). Activities during the 20th century include Robert F. Scott's first Antarctic expedition, Sir Ernest Shackleton's Imperial Trans-Antarctic Expedition, consecutive Mount Everest expeditions culminating in Sir Edmund Hillary's successful ascent of 1953, the Norwegian-British-Swedish Antarctic expedition (1949–52), Sir Vivian Fuchs's British Commonwealth Trans-Antarctic Expedition (1955–58), and major expeditions to various tropical regions.

The society's objects are to advance geographical knowledge through lectures and publications (*The Geographical Journal* and the *Geographical Magazine*), through its library and public map room, and through instruction in exploratory surveying and the support of exploration and research. It has also arbitrated boundary disputes (*e.g.,* between Peru and Bolivia from 1911 to 1913). The British sovereign annually awards two gold medals for exploration on the council's recommendation.

Royal Greenwich Observatory, astronomical observatory, oldest scientific institution in Great Britain. It was founded for navigational purposes in 1675 by King Charles II of England at Greenwich in southeast London. Its primary contributions have been in practical astronomy—navigation, timekeeping, determination of star positions, and almanac publication. In 1767 the observatory began publishing *The Nautical Almanac,* which was based on the time at the longitude of Greenwich. The almanac's popularity among navigators led in part to the adoption in 1884 of the Greenwich meridian as the Earth's prime meridian and the starting point for the international time zones.

The observatory was transferred from Greenwich to Herstmonceux Castle in Sussex beginning in 1948, in a search for clearer skies; and it was moved to the Institute of Astronomy of the University of Cambridge in 1990 in a perceived need to achieve closer university ties. A number of the instruments from the original observatory have been put on display at the National Maritime Museum.

Royal Leamington Spa, also called LEAMINGTON SPA, town, Warwick district, county of Warwickshire, England. It lies along the River Leam, which is a tributary of the River Avon. The 900-year-old Midland Oak, traditionally marking the centre of England, lies 2 miles (3 km) to the east. The community was a rural settlement until the 1780s, when upper-class members of Georgian society, who arrived there to drink its saline waters, made it a resort town. In 1838 Queen Victoria visited the spa and granted it the right to use the prefix "Royal." The town claims to be the home of lawn tennis, the game having been played there in the 1870s. The Parade (built 1810–30) and Royal Pump Room (built 1814; restored 1953) are examples of Georgian architecture, and the town is laid out spaciously with parks and ornamental gardens. Today Leamington is a residential and resort town, lying within easy reach of the industrial centres of Coventry and the West Midland towns. Pop. (1981 prelim.) 42,953.

royal moth: *see* regal moth.

Royal National Theatre, formerly (1962–88) NATIONAL THEATRE, a complex of British theatre companies, partly state-subsidized, that was formed in 1962 and given a permanent home on the South Bank of the Thames in London in 1976. In 1988 Queen Elizabeth II gave permission for the company to add "Royal" to its name.

Great Britain's lack of a state theatre had become a concern of theatrical professionals by the early 20th century, but successive attempts to raise funds and build a home for such a theatre were stymied by the outbreak of World War I in 1914 and then of World War II in 1939.

After World War II, the South Bank of the Thames was chosen as the site for the prospective home of the proposed national theatre, and in 1949 a parliamentary bill approved the idea of a theatre. In 1951 the building's cornerstone was laid, but no funds were allocated for construction. Then, in 1962, a National Theatre company was finally established, with the actor Laurence Olivier as director beginning in 1963. The Old Vic company provided the nucleus of actors, and the National Theatre took temporary residence at the Old Vic Theatre, opening on Oct. 22, 1963, with a production of *Hamlet.* A mixed repertoire of classic and modern productions directed by such distinguished English and foreign directors as George Devine, Peter Wood, Peter Brook, Franco Zeffirelli, and Jacques Charon rapidly brought the National Theatre to prominence in world drama.

In February 1976 the National Theatre gave its final performance at the Old Vic Theatre and later that year moved to its new home, a three-theatre complex on the South Bank of the Thames. The directorship of the company passed from Olivier (1963–73) to Peter Hall (1973–88) and to Richard Eyre (from 1988).

Royal Navy, The, naval military organization of the United Kingdom, charged with the national defense at sea, protection of shipping, and fulfillment of international military agreements.

Organized seapower was first used in England by Alfred the Great of Wessex, who launched ships to repel a Viking invasion. Naval activity continued to be local, defensive, and temporary until the 13th century, when Normandy was lost to France and trade was extended to Spain and Portugal. Ships were then used to transport soldiers to battles on land; in the Battle of Sluis (1340), however, the English naval force engaged in at-sea fighting.

Henry VIII built a fleet of fighting ships armed with large guns and created a naval administration. Under Elizabeth I the navy developed into England's major defense and became the means by which the British Empire was extended around the globe. The maritime forces were given the name Royal Navy by Charles II, although the military forces had come under control of Parliament during the English Civil Wars (1642–51).

During the 18th century the Royal Navy engaged in a long struggle with the French navy for maritime supremacy, leading Britain to victory over France in four separate wars between 1688 and 1763. It played a key role in Britain's stand against Napoleon, and, after winning the Battle of Trafalgar in 1805, the Royal Navy was never again challenged by the French. This same period saw, in the person of Lord Nelson, perhaps the greatest admiral in history. For the rest of the 19th century, the Royal Navy helped enforce what became known as the Pax Britannica, *i.e.,* the long period of relative peace arising from a balance of power between the major European states that depended ultimately on the use of British maritime supremacy.

The Royal Navy continued to be the world's most powerful navy well into the 20th century. During World War I, its main mission was the protection of shipping from submarine attack. Naval aviation was established by the British during that war, and the Fleet Air Arm was given control of all ship-borne aircraft in 1937. After World War II the Royal Navy was second in size only to the U.S. Navy and continued to be a world leader in maritime, and especially antisubmarine, operations. By the late 20th century the Royal Navy had declined somewhat to third in size among the world's navies, after those of the United States and the Soviet Union.

In 1964 the Board of Admiralty was brought into the Ministry of Defense. After 1967 naval administration was headed by an undersecretary of state for the Navy. Royal Navy organization includes the Commander in Chief, Fleet; the Naval Home Commands; the Fleet Air Arm; and the Royal Marines. Although the Royal Navy has been reduced in size since the 1960s, it was given responsibility for nuclear deterrence in 1969 and maintains a fleet of nuclear-armed submarines.

Royal Oak, city, Oakland county, southeastern Michigan, U.S., a residential northern suburb of Detroit. First settled in 1819, it may have been named for an oak in Scotland under which, according to legend, Charles Edward the Young Pretender hid from his pursuers in 1745. The Detroit Zoological Park is there. The controversial "radio priest" of the 1930s, Charles E. Coughlin, was pastor of the city's Shrine of the Little Flower. Inc. village, 1891; city, 1921. Pop. (1988 est.) 68,125.

Royal Ontario Museum, art collection located in Toronto. The museum is especially known for its collections of Chinese and ancient Egyptian art, American ethnology, and Canadian arts and crafts. There are also exhibits on the life and Earth sciences. The museum, associated with the University of Toronto, stresses research, as well as an educational program for the public.

royal poinciana, also called FLAMBOYANT TREE, or PEACOCK TREE (species *Delonix regia*), strikingly beautiful flowering tree of the pea family (Fabaceae). Though native to Madagascar, it has been widely planted elsewhere in frost-free regions for its scarlet to orange flowers and its shade. It is a rapid grower, attaining 6 to 12 m (20 to 40 feet) in height with pinnately divided (*i.e.,* resembling a feather) leaves 30 to 60 cm (1 to 2 feet) long.

Royal Road: *see* Persian Royal Road.

Royal Rotterdam Zoological Garden Foundation, byname BLIJDORP ZOO, Dutch STICHTING KONINKLIJKE ROTTERDAMSE DIERGAARDE, or DIERGAARDE BLIJDORP, zoological garden in Rotterdam, Neth., that was opened in 1887 by a private zoological society. It was essentially the outgrowth of the private collection of two railway workers who kept exotic animals as a hobby. Because of the need for additional space, the zoo was reconstructed in 1938 at its present 17-hectare (42-acre) site in the Blijdorp district of Rotterdam. The centre of the zoo is the Riviera Hall. The main hall of the building houses a collection of small mammals, birds, and fishes, while the zoo's other sections hold elephants, great apes, and tropical birds, including the world's finest collection of birds-of-paradise. The zoo specializes in South Asian species and has bred more than 500 Bengal, Sumatran, and Siberian tigers—a number unmatched by any other zoo. It also had the first group of orangutan that bred regularly in captivity.

Royal Shakespeare Company, formerly (until 1961) SHAKESPEARE MEMORIAL COMPANY, important English theatrical company, based in Stratford-upon-Avon and in London. The repertory of the Stratford-based part of the company consists of works by William Shakespeare and other Elizabethan and Jacobean playwrights, while the London-based unit performs modern plays and non-Shakespearean classics.

The company was originally attached to the Shakespeare Memorial Theatre in Stratford-upon-Avon, which had been built through the efforts of Charles Edward Flower. This theatre opened in 1879 as the site of an annual festival of Shakespeare's plays, and its resident, seasonal company came to be called the Shakespeare Memorial Company. In 1925 a royal charter was granted to this company, which had by then become one of the most prestigious in Great Britain.

The director Peter Hall reorganized the company in 1961: it was renamed the Royal Shakespeare Company and divided into twin units, one to play at Stratford and the other to be based in London. These changes enabled the company to develop into a professional ensemble working year-round. The Shakespeare Memorial Theatre in Stratford was similarly renamed the Royal Shakespeare Theatre. In 1982 the London unit moved from its home at the Aldwych Theatre to new quarters at the Barbican arts complex. The Royal Shakespeare Company also makes international tours.

Royal Society, in full ROYAL SOCIETY OF LONDON FOR THE PROMOTION OF NATURAL KNOWLEDGE, the oldest scientific society in Great Britain and one of the oldest in Europe, founded in 1660. It began earlier with small, informal groups, who met periodically to discuss scientific subjects. The "Invisible College" of London and Oxford, which first met in 1645, and a number of small academies in England became incorporated in 1662 when the newly restored Charles II granted a charter to the Royal Society of London for the Promotion of Natural Knowledge. Largely composed of Puritan sympathizers and adherents of Francis Bacon, the Royal Society received little more than moral support from the crown, unlike academies on the European continent, which were established by the state and whose members gained an income but lost their independence. The stimulus of free expression provided an impetus to scientific thought and developments in England. By the 18th century, the achievements of the Royal Society were internationally famous. Its publication, *Philosophical Transactions,* begun in 1665, was one of the earliest periodicals in the West. Founders and early members of the Royal Society included the scientist Bishop John Wilkins, the philosopher Joseph Glanvill, the mathematician John Wallis, the inventor and microscopist Robert Hooke, and the architect Christopher Wren, who wrote the preamble to its charter. Isaac Newton was elected to the society in 1671, and Edmond Halley, the astronomer, in 1678. In 1768 the society sponsored the first scientific expedition to the Pacific, under James Cook, and in 1919 it sent an expedition to photograph the solar eclipse of May 29 from Principe Island in the Gulf of Guinea, which verified Albert Einstein's general theory of relativity and helped make Einstein famous.

Five medals (the Copley Medal, two Royal, the Davy, and the Hughes) are awarded by the society every year, the Rumford and the Darwin medals biennially, the Sylvester triennially, and the Buchanan quinquennially. The Copley Medal originated in a bequest by Sir Godfrey Copley (1709) and is the most prestigious scientific award in Great Britain. The Royal Society continues to publish scientific papers in its *Philosophical Transactions,* while abstracts of the papers appear in the *Proceedings.* Members of the society are known as fellows. Candidates for membership in the Royal Society must be recommended by several fellows who personally attest to the candidate's scientific achievement. The society also has a number of foreign members. In the late 20th century, membership in the Royal Society included more than 1,000 fellows and 90 foreign members.

royal tennis (sport): *see* real tennis.

Royal Tunbridge Wells (England): *see* Tunbridge Wells.

Royal Ulster Constabulary (RUC), state police force in Northern Ireland, established in 1922. The RUC had a paramilitary character until 1970, when the force was remodeled along the lines of police forces in Great Britain. In 1970, the security of Northern Ireland became the responsibility of the RUC, the British army, and the Ulster Defence Regiment (UDR). The British government has tried to keep the RUC as the chief peacekeeping force in Northern Ireland, while the army and the UDR play as minor roles as possible. Frequent complaints of RUC mistreatment of suspects and prisoners have led to investigations and some changes in procedures, such as closed-circuit monitoring of interview rooms at the Castlereagh interrogation centre at Belfast.

Royal Victorian Order, British order of knighthood instituted by Queen Victoria in 1896 to reward personal services rendered the monarch. As it is a family order, conferment of this honour is solely at the discretion of the British sovereign.

Unlike other British orders, there is no limit on the number of members. It was Edward VIII, during his brief reign (1936), who admitted women to the order. This was the first British order to consist of more than three classes which, listed in descending order, are knight or dame grand cross (G.C.V.O.), knight or dame commander (K.C.V.O. or D.C.V.O., respectively), commander (C.V.O.), and member (M.V.O.) fourth and fifth class. Conferment of the two highest classes entails admission into knighthood. Foreigners can be admitted as honorary members.

The day of the order is June 20, which marks the date of Queen Victoria's accession to the throne. Since 1938, the Queen's Chapel of the Savoy, London, has been the chapel of the order, where members of the royal family and knights and dames grand cross have affixed their stall plates bearing their coats of arms. The order's badge depicts a Maltese Cross with the motto "Victoria," the initials "V.R.I.," and an imperial crown. Associated with this order is the Royal Victorian Medal, awarded for personal military service to the monarch.

Consult the INDEX *first*

Royal Winnipeg Ballet, preeminent Canadian ballet company that was the first to be designated "royal" (1953). Originating in Winnipeg's Ballet Club, established in 1938 by Gweneth Lloyd and Betty Farrally, the group staged its first production in 1939, becoming a professional company 10 years later. As the sponsor of the first Canadian Ballet Festival (1948), the company gave an important impetus to the regional ballet festival movement. A combination of standard classical ballets and original works, such as *Shadow on the Prairie* (1952) and *Rose Latulippe* (1966), two ballets based on Canadian themes, make up the repertoire.

Royall, Anne Newport, *née* NEWPORT (b. June 11, 1769, New Baltimore, Md. [U.S.]—d. Oct. 1, 1854, Washington, D.C.), traveler and writer generally considered to be the first American newspaperwoman.

She was married in 1797 to Captain William Royall, a gentleman farmer who served in the Revolution and died in 1813. In her 50s, Anne Royall began to journey across the country, and from 1826 to 1831 she published 10 accounts of her travels, which remain valuable sources of social history. An eccentric and acerbic woman, Royall was tried and convicted in Washington, D.C., in 1829 for being a "common scold," the result of her antagonism to a local Presbyterian church. John Eaton, Andrew Jackson's secretary of war, paid her fine.

In 1831 she began to publish *Paul Pry,* a Washington newspaper; it was succeeded by *The Huntress* (1836–54). In those newspapers Royall crusaded against government corruption and incompetence and promoted states' rights, Sunday mail service, and tolerance for Catholics and Masons. John Quincy Adams called her a "virago errant in enchanted armor," and she gained widespread notoriety for her outspoken and often controversial views.

In addition to her travel books, Royall wrote a novel, *The Tennessean* (1827), and a play, *The Cabinet.*

royalty, in law, the payment made to the owners of certain types of rights by those who are permitted by the owners to exercise the rights. The rights concerned are literary, musical, and artistic copyright; patent rights in inventions and designs; and rights in mineral deposits, including oil and natural gas. The term originated from the fact that in Great Britain for centuries gold and silver mines were the property of the crown; such "royal" metals could be mined only if a payment ("royalty") were made to the crown.

It is uncommon for the author of a book to be in a position to exploit it fully himself; he requires the resources of a publishing organization. Similarly, a playwright needs the services of a theatrical management and actors to perform his play and a publisher to produce and sell copies. A musical composer must arrange for the performance of his work, for the sale of copies, and for the making of recordings. An artist, if he wants to make any profit from a picture beyond the price that he obtains for it, must arrange for reproductions to be published in books and as prints. An individual inventor without capital or plant must license others to manufacture his invention. When owners of rights make arrangements for such exploitation by others, the remuneration that they receive in exchange is often in the form of a royalty, usually based on the actual extent of the exploitation.

Mineral deposits have nothing in common with the fruits of intellectual and artistic endeavour, the subject of the other rights mentioned above, except that they are often exploited by persons other than the owners upon payment of royalties.

Royce, Sir (Frederick) Henry, BARONET (b. March 27, 1863, Alwalton, Huntingdonshire, Eng.—d. April 22, 1933, West Wittering, Sussex), English industrialist who was one of the founders of Rolls-Royce Ltd., manufacturer of luxury automobiles and airplane engines.



Sir Henry Royce, 1930
BBC Hulton Picture Library

In 1882 Royce was chief electrical engineer for Liverpool's first electric street-lighting system. Two years later he moved to Manchester and started his own engineering business, which developed into Royce Ltd., manufacturers of electrically driven cranes, dynamos, and motors. In 1904 he built three experimental cars of his own design; their outstanding qualities came to the attention of motor dealer C.S. Rolls, who soon agreed to take Royce's entire output. Their firms merged in 1906 as Rolls-Royce Ltd.; the motor section of the business was moved to Derby in 1908. Royce was made a baronet in 1930 (there was no issue of his marriage, and the baronetcy became extinct upon his death).

Royce, Josiah (b. Nov. 20, 1855, Grass Valley, Calif., U.S.—d. Sept. 14, 1916, Cambridge, Mass.), versatile Idealist philosopher and teacher whose emphasis on individuality and will, rather than intellect, strongly influenced 20th-century philosophy in the United States.

As an engineering student at the University of California, he encountered the teachings of the geologist Joseph LeConte and the poet Edward Rowland Sill, and upon his graduation in 1875 he turned to philosophy. After studies in Germany, he returned to study in the United States under philosophers William James and Charles Sanders Peirce at Johns Hopkins University, Baltimore. He taught English for four years at the University of California before beginning his teaching career at Harvard, where James found him a position. He remained at Harvard for the rest of his career, eventually succeeding George Herbert Palmer as Alford professor (1914).

Considering himself an absolute Idealist and borrowing from the works of Hegel, Royce stressed the unity of human thought with the external world. His doctrines were centred on his view of absolute truth, and he declared that everyone must be in agreement with his assertion that such a truth exists, because even those skeptics who would deny this truth automatically affirm it. To deny absolute truth would be to affirm that some "truthful" statements are possible, and thus the skeptic is caught in a self-contradictory attitude toward the possible existence of "truth."

Royce's Idealism also extended to religion, the basis of which was said to be human loyalty. This "religion of loyalty" was supplemented by an ethical system that showed his emphasis on the human will. In his words, the highest good would be achieved by "the willing and practical and thoroughgoing devotion of a person to a cause." Like the British Idealist F.H. Bradley, whose views resembled his own, Royce enhanced the reputation of European Idealists in his own country. Both men taught a monistic Idealism and helped raise the intellectual standards for philosophical treatment of human problems.

Royce's contributions to psychology, social ethics, literary criticism, history, and metaphysics established him as a thinker of widely diverse talents. Among the numerous books and articles he wrote are *The Religious Aspect of Philosophy* (1885); *The Spirit of Modern Philosophy* (1892); *Studies of Good and Evil* (1898); *The World and the Individual* (Gifford Lectures, vol. I and II, 1900–01); and *The Philosophy of Loyalty* (1908). *The Review of International Philosophy,* 1967, nos. 1 and 2, were dedicated to Royce and contain an extensive bibliography. Two studies of Royce's thought are E. Smith, *Royce's Social Infinite* (1950), and J.H. Cotton, *Royce on the Human Self* (1954).

Royer-Collard, Pierre-Paul (b. June 21, 1763, Sompuis, Fr.—d. Sept. 4, 1845, Châteauvieux), French statesman and philosopher, exponent of Legitimist constitutional monarchy and of the realist "philosophy of perception."

A lawyer since 1787, Royer-Collard supported the French Revolution in its first stages, serving as secretary of the Paris Commune from 1790 to 1792. He retired to Sompuis in 1793, when the moderate Girondins were overthrown. His election by the Marne *département* to the Council of Five Hundred (1797) was annulled by Napoleon's antiroyalist coup of Fructidor 18 (September 4), and he joined the secret royal council, sending reports to the exiled Louis XVIII until 1803. For the next 10 years he devoted himself mainly to philosophy, becoming professor of the history of philosophy at the University of Paris in 1811. To refute the materialism and skepticism of the philosopher Étienne Bonnot de Condillac he developed his "philosophy of perception," basing his system of knowledge through "consciousness" and memory on that of the Scottish philosopher Thomas Reid.

Appointed supervisor of the press and counsellor of state responsible for public education by Louis XVIII under the First and Second Restorations (1814, 1815), Royer-Collard also represented the Marne in the Chamber of Deputies (1815–42). He soon became a critical opponent of the more reactionary ministers, developing a Legitimist theory of constitutional monarchy. This, along with his philosophical program, made him the central focus of the Doctrinaires. Resigning his control of education in 1819 and dismissed from the Council of State in 1820, he became president of the Chamber in 1828. In March 1830 he presented the protest of 221 deputies against Charles X's arbitrary appointment of Prince Jules de Polignac as prime minister. After the July Revolution of 1830 he remained in the Chamber, but as a Bourbon Legitimist he could not sympathize with the new regime of King Louis-Philippe and took no further active part in politics.

Royster, Vermont (Connecticut) (b. April 30, 1914, Raleigh, N.C., U.S.), U.S. journalist and editor of *The Wall Street Journal* and president (1960–71) of its publishing company, Dow Jones & Company. He was famed for his editorials, which, in the words of a Pulitzer Prize citation (1953), revealed "an ability to discern the underlying moral issue, illuminated by a deep faith and confidence in the people of our country." Unlike most Pulitzer Prizes, which honour a particular editorial, this one celebrated the whole body of his work.

Royster's father was a professor of law and classical languages, and Vermont was educated in a Tennessee preparatory school and at the University of North Carolina, where he majored in English literature and graduated in 1935. He edited the school newspaper and was elected to Phi Beta Kappa. In 1936 he joined the staff of the New York City News Bureau as a reporter and later that year moved to *The Wall Street Journal* and was assigned to its Washington (D.C.) bureau.

Royster enlisted in the U.S. Navy in 1941, and as a line officer took part in actions in the Palau Islands, the Philippine Sea, and the Okinawa areas. He returned to the *Journal* after World War II. He became, successively, chief Washington correspondent, editorial writer and columnist, associate editor (1948–51), senior associate editor (1951–58), editor (1958–71), and senior vice president (1960–71) and then (from 1970) director of Dow Jones & Company, publishers of the *Journal.* In 1971 he became a contributing editor and columnist.

Royster served as president of the American Society of Newspaper Editors. He also served as Kenan Professor of Journalism and Public Affairs at the University of North Carolina, and as a member of the Pulitzer selection committee. His publications include the books *Journey Through the Soviet Union* (1962) and *A Pride of Prejudices* (1967).

Royston, Philip Yorke, Viscount: *see* Hardwicke, Philip Yorke, 1st earl of.

Rozanov, Vasily Vasilyevich (b. May 2 [April 20, old style], 1856, Vetluga, Russia—d. Feb. 5, 1919, Moscow), Russian writer known for his unorthodox religious ideas and for the exceptional originality and individuality of his prose works.

Born into a middle-class family, Rozanov studied at the University of Moscow, majoring in history. For a while he taught history and geography, but he had very little interest in teaching. About 1880 he married Apollinaria (Polina) Suslova, former mistress of the novelist Fyodor Dostoyevsky. He attracted attention in 1890 with a critical analysis of the "Legend of the Grand Inquisitor" chapter in *The Brothers Karamazov,* the first study in depth of Dostoyevsky's work.

During the 1880s Rozanov lived in St. Petersburg and wrote many works on religious issues, attacking Christianity for its asceticism and as a religion of sorrow and renunciation. He advocated a naturalistic religion of sex and procreation. As a Slavophile, however, he was not accepted by the modernist literary groups, and his writings are frequently marred by an egregious anti-Semitism.

In 1899 Rozanov began writing for the con-

servative paper *Novoye vremya* ("New Time"); it was as a permanent contributor to this publication, being permitted to write anything he liked but restricted by space, that he developed his characteristic fragmentary style. The abortive revolution of 1905 won his enthusiastic support, and for a time he wrote radical articles for the progressive publication *Russkoye slovo* ("Russian Word"), under the pseudonym V. Vavarin, while continuing to write conservative articles in *Novoye vremya* under his real name. In 1912 he published the work most representative of his mature genius, *Uyedinnye, pochti na pravakh rukopisi* ("Solitary Thoughts, Printed Almost Privately"; *Solitaria*). Described as a collection of maxims and short essays, it is more than that: it evokes the intonations of a living voice, eloquent, rhythmic, and original. Shortly after the start of the Revolution of 1917, Rozanov settled in a monastery near Moscow, where he died in poverty but reconciled with the Orthodox church.

Rozelle, Pete, byname of ALVIN RAY ROZELLE (b. March 1, 1926, Lynwood, Calif., U.S.), commissioner of the American professional National Football League (NFL) from 1960 to 1989, who became one of the most powerful executives in professional sports.

Following his graduation from the University of San Francisco, Rozelle became assistant athletic director there (1950–52). He was publicity director for the NFL Los Angeles Rams (1952–55), was a partner in a San Francisco public-relations company (1955–57), and served as the general manager of the Rams (1957–60).

He was elected commissioner of the NFL in January 1960. As commissioner, Rozelle oversaw the expansion of the NFL from 12 to 14 teams (1960–61) and ultimately to 28, and he negotiated the merger of the NFL with the rival American Football League (AFL), effective in 1970. To offset adverse court decisions related to alleged antitrust-law violations, he led the lobbying for federal legislation in 1961 that permitted the NFL to sell television rights for all NFL games to a single network, a lucrative transaction in which all teams shared equally. As early as 1962 he took strong action against players involved in gambling, and he also influenced NFL efforts to combat alcohol and drug abuse.

Rozelle was elected to the Pro Football Hall of Fame in 1985. He resigned his post as commissioner in 1989.

Różewicz, Tadeusz (b. Oct. 9, 1921, Radomsko, Pol.), innovative Polish poet, playwright, and novelist whose work combines elements of the Polish avant-garde and The Theatre of the Absurd.

Having seen service during World War II in the underground Polish Home Army, Różewicz made use of his experiences in his first two volumes of poems, *Niepokój* (1947; *Faces of Anxiety*) and *Czerwona rękawiczka* (1948; "The Red Glove"). These works were notable for their lack of traditional poetic devices such as metre, stanza, and rhyme. In the 1960s he began to explore the dramatic form, writing such plays as *Kartoteka* (1960; *The Card Index*) and *Świadkowie albo nasza mała stabilizacja* (1962; "The Witnesses, or Our Little Stabilization"; *The Witnesses and Other Plays*). In a later play, *Stara kobieta wysiaduje* (1968; "The Old Woman Broods"), the title character speaks her monologues from her seat on a growing pile of garbage. In addition to his plays and poetry, Różewicz was the author of novels, short stories, and works of nonfiction.

Roztocze, range of hills in east-central Poland. The Roztocze rises from the Lublin uplands and extends southeastward across the border into the Ukraine region of the Soviet Union. Low and rolling, the range is approximately 100 miles (160 km) in length, and its highest peaks are Rogaty Goraj (1,280 feet [390 m]) and Wapielnia (1,263 feet [385 m]). The range provides a number of scenic views and is composed of forested terrain indented with deep gorges and streams overflowing slabs of limestone. A few small villages are located in the mountains.

Rozwi, also spelled ROZVI, former Karanga empire in southern Africa. The empire was probably established by Changamire Dombo I (1684–95), who conquered some of the most fertile and mineral-rich areas and drove the Portuguese from their marketplaces in the Zambezi River valley in the 1690s. The *changamire* was one of the most powerful rulers in 18th-century south-central Africa. The exact relationship of the *changamire* to the Matapa empire and other kingdoms in southern Africa has been the subject of much conjecture but is unknown.

The area of the Rozwi confederacy fluctuated, and its influence extended over much of present-day Zimbabwe and perhaps westward into Botswana and southward into the Transvaal. Its nuclear sites in southwestern Zimbabwe are characterized by distinctive band and panel polychrome pottery and stone buildings. The kingdom disintegrated in the early 19th century.

Ṛṣabhanātha, also spelled RISHABHANĀTHA ("Lord Bull"), the first of the 24 Tīrthaṅkaras, or saviours, of Jainism, a religion of India. His name is attributed to the series of 14 auspicious dreams that were seen by his mother before his birth in which the bull (*ṛṣabha*) appeared first. He is also known as Ādinātha ("Lord First").

Ṛṣabhanātha is one of the most honoured of the Jaina saints, having been the first to preach the Jaina faith. Legends also credit him with having taught men the 72 accomplishments (including writing and arithmetic) and women the 64 crafts (including pottery, carpentry, and weaving). He had 100 sons, each of whom was 500 bow shots tall and the most famous of whom was Bharata, the first chakravartin, or universal ruler. Ṛṣabhanātha instituted marriage, the giving of alms, and the observance of funeral rites.

Ṛṣabhanātha was born in the city of Ayodhyā, which was also famous as the city where the Hindu god Rāma was born, and he attained moksha (release from earthly existence) on Mount Kailāsa, also the home of the Hindu god Śiva. In paintings he is always shown gold in colour (in paintings of the Digambara sect, yellow), and his symbol is the bull. *See also* Tīrthaṅkara.

Ruacana, site of important hydroelectric-power stations and a diversion dam directly above the Ruacana Falls, on the Kunene River at the border between Angola and Namibia. The Ruacana Dam and power stations, together with the Calueque Dam (completed in 1976) 25 miles (40 km) farther upriver in Angola, are designed to provide irrigation water for southern Angola and the Owambo region of northern Namibia as well as to provide electricity for most of Namibia.

The construction of the Ruacana project, based on a 1969 agreement between South Africa and the then Portuguese government of Angola, was begun by South Africa in 1973. In the late 1970s, its completion was repeatedly halted by the government of recently independent Angola, which denied South African engineers access to the north bank of the river. Although the power stations were not operating at full capacity by the 1980s, they did provide most of the hydroelectric demand for Namibia. In the 1980s the transmission of electrical power was intermittently disrupted by members of the South West Africa People's Organization (SWAPO) who were protesting South African influence.

Ruaha National Park, national park, west of Iringa town in south-central Tanzania. The park is located at an elevation of 2,500 to 5,200 feet (750 to 1,900 m) and covers an area of 5,000 square miles (12,950 square km) and was originally part of the Rungwa Game Reserve. Lying in the East African Rift Valley system, the park, established in 1964, consists mostly of rolling plains east of the Great Ruaha River. Vegetation consists of clumps of palms and patches of open grassland; in the north there are scattered baobab trees and scrubby woodland. Wildlife includes lion, leopard, cheetah, elephant, zebra, black rhinoceros, kudu, bushbuck, buffalo, roan and sable antelope, and hartebeest. Crocodiles are found in the rivers.

Ruaidhri UA CONCHUBAIR: *see* Roderic O'Connor.

Ruanda (East African country): *see* Rwanda.

Ruanda language: *see* Rwanda language.

Ruanda-Urundi, twin territory in central East Africa that was administered by Belgium from 1922 to 1962 and which thereafter became the independent states of Rwanda and Burundi (*qq.v.*). After World War I, in 1922, with an adjustment of frontiers, a slice of what had been formerly German East Africa came under Belgian control and, in 1924, became the mandate of Ruanda-Urundi, under League of Nations auspices. After World War II, in 1946, the twin territory was reconstituted as a United Nations trust territory. Throughout its history it was administered under a vice governor-general as an integral part of the Belgian Congo, but with a separate budget.

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Ruapehu, Mount, active volcano and highest peak (9,176 feet [2,797 m]) on North Island, New Zealand, in Tongariro National Park. Mount Ruapehu is situated on the Taupo Plateau, which rises 2,000 to 3,000 feet (about 600 to 900 m) above sea level, Ruapehu last erupted in 1945–46. The volcano is forested below its line of permanent snow cover. Above the line, glaciers flow from the peak. Within the crater lies a lake, which is drained by the Whangaehu River. Ruapehu is the most southerly of the large volcanic cones within the park, the others being Ngauruhoe (7,513 feet [2,290 m]) and Tongariro (6,457 feet [1,968 m]). These mountains form the centre of one of New Zealand's major ski resorts. Ruapehu was first climbed to its highest point by J. Park, C. Dalin, and W.H. Dunnage in 1886.

Ru'ays, ar- (United Arab Emirates): *see* Ruways, ar-.

Rubʿ al-Khali, also spelled AR-RABʿ AL-KHALI, English EMPTY QUARTER, vast desert in the southern Arabian Peninsula, covering about 250,000 square miles (650,000 square km) in a structural basin lying mainly in southeastern Saudi Arabia, with lesser portions in Yemen, Oman, and the United Arab Emirates. It is the largest area of continuous sand in the world. It occupies more than one-quarter of Saudi Arabia. The topography is varied. In the west the elevation is as high as 2,000 feet (610 m) and the sand is fine and soft, while in the east the elevation drops to 600 feet (183 m) with sand dunes, salt flats, and sand sheets. One of the driest regions in the world, it is virtually uninhabited and largely unexplored. However, in 1975 al-Ghawār, one of the world's largest oilfields,

was discovered there. For convenience several town-like names were given to different locations along the field.

rubāʿī, plural RUBĀʿĪYĀT: *see* robāʿī.

rubato (from Italian *rubare,* "to rob"), in music, subtle rhythmic manipulation and nuance in performance. For greater musical expression, the performer may stretch certain beats, measures, or phrases and compact others. The technique is seldom indicated on a musical score but may be utilized according to the performer's discretion. Rubato may affect only the melody (as in jazz) or the entire musical texture.

In the application of rubato, the written note values must not be disregarded, and the performer eventually returns to the strict underlying rhythm from which the rubato deviated. A true "tempo rubato" is found in certain types of orally transmitted music, for example, among the peasants of Hungary and Romania, whose practices, in turn, inspired such composers as Franz Liszt and Béla Bartók.

rubber, elastic substance obtained from the exudations of certain tropical plants (natural rubber) or derived from petroleum and alcohol (synthetic rubber).

A brief treatment of rubber follows. For full treatment, *see* MACROPAEDIA: Industries, Chemical Process.

Rubber was first scientifically described by C.-M. de la Condamine and François Fresneau of France following an expedition to South America in 1736. The English chemist Joseph Priestley gave it the name rubber in 1770 when he found it could be used to rub out pencil marks. Its major commercial success came only after the vulcanization (*q.v.*) process was invented by Charles Goodyear in the early 1840s.

Natural rubber is produced from a wide variety of plants, but predominantly from *Hevea brasiliensis* (family Euphorbiaceae), a tall softwood tree originating in Brazil, where the wild trees are still tapped for their milky liquid (latex) but where efforts to establish plantations have largely failed. Trees transplanted to Indonesia, Sri Lanka, and Malaysia and grown from selected seeds or cuttings produce most of the modern world's natural rubber.

The latex found in the inner bark of *Hevea brasiliensis* is obtained by tapping—cutting or shaving the bark with a sharp knife—and is then coagulated. The oldest technique for coagulation, generally used in South America, is smoking over a fire: the thickened latex is slowly poured over a stick or paddle on which it accumulates to form a ball or cake. Modern plantation rubber is coagulated by the addition of chemicals, such as acetic acid, that cause the rubber to form a sheet on the surface of the liquid, which can then be pressed between rollers to remove excess moisture; the crude latex also may be sprayed into a stream of hot air, which evaporates the liquid, leaving particles of rubber.

Before vulcanization, rubber products were plagued by rubber's tendency to soften in the summer, become stiff and brittle in the winter, and turn sticky when exposed to solvents. After years of experimentation, Charles Goodyear overcame these defects by combining rubber with sulfur and white lead and exposing the mixture to heat. His vulcanization process was improved in the early 1900s by the introduction of organic chemical accelerators and antioxidants, which caused the rubber to cure more rapidly and resist embrittlement upon aging. Reinforcing agents, such as carbon black, were later found effective in increasing strength and durability.

Despite the competition of synthetic rubber, natural rubber continues to hold an important place; its resistance to heat buildup makes it valuable for tires used on racing cars, trucks, buses, and airplanes.

Research on the chemistry of natural rubber led in the 19th century to the isolation of isoprene, which could be reconverted into a rubberlike substance by polymerization. This process by which long chainlike molecules were created attracted continued research in the early 20th century; in World War I, German scientists produced some 2,500 tons (2,300 metric tons) of useful synthetic rubber. In the 1930s and in World War II several polymerizing processes were developed in Germany, the Soviet Union, Britain, and the United States.

Among the most important synthetics are the butadiene-styrene copolymers; the various butadiene copolymers; the chloroprene polymers (neoprene); the polysulfide polymers (Thiokol); the isobutylene polymers (butyl rubbers); the silicone rubbers produced by blending silicones with natural and synthetic rubbers; and plasticized vinyl chloride and vinyl acetate polymers and copolymers.

Some synthetic rubbers closely resemble natural rubber, while others have quite different physical properties. Synthetic rubbers, like natural rubbers, can be toughened by vulcanization and improved and modified for special purposes by reinforcement with other materials. *See also* gutta-percha.

Rubbia, Carlo (b. March 31, 1934, Gorizia, Italy), Italian physicist who in 1984 shared with Simon van der Meer the Nobel Prize for Physics for the discovery of the massive, short-lived subatomic particles W and Z. These particles are the carriers of the so-called weak force involved in the radioactive decay of atomic nuclei; their existence strongly confirms the validity of the Weinberg–Salam theory, proposed in the 1970s, that the weak force and electromagnetism are different manifestations of a single basic kind of physical interaction.

Rubbia was educated at the Normal School of Pisa and the University of Pisa, earning a doctorate from the latter in 1957. He taught there for two years before moving to Columbia University as a research fellow. He joined the faculty of the University of Rome in 1960 and was appointed senior physicist at the European Centre for Nuclear Research (CERN; now the European Organization for Nuclear Research), Geneva, in 1962. In 1970 he was appointed professor of physics at Harvard University and thereafter divided his time between Harvard and CERN.

In 1973 a research group under Rubbia's direction provided one of the experimental clues that led to the formulation of the electroweak theory by observing neutral weak currents (weak interactions in which electrical charge is not transferred between the particles involved). These interactions differ from those previously observed and are direct analogues of electromagnetic interactions. The Weinberg–Salam theory embodied the idea that the weak force can be transmitted by any of three particles called intermediate vector bosons; furthermore, it indicated that these particles (W^+, W^-, and Z^0) should have masses nearly 100 times that of the proton.

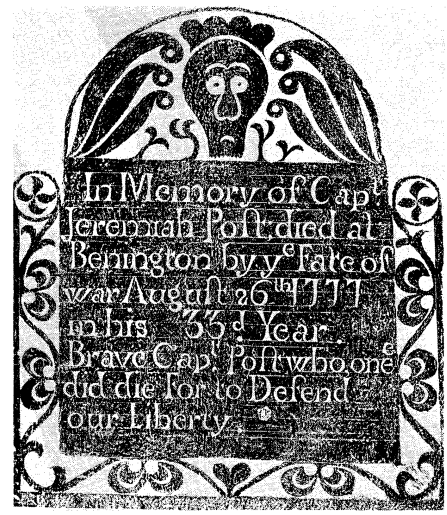
Rubbia then proposed that the large synchrotron at CERN be modified so that beams of accelerated protons and antiprotons could be made to collide head-on, releasing energies great enough for the weak bosons to materialize. In 1983 experiments with the colliding-beam apparatus gave proof that the W and Z particles are indeed produced and have properties that agree with the theoretical predictions.

Further analysis of the results obtained in 1983 led Rubbia to conclude that in some decays of the W^+ particle, the first firm evidence for the sixth quark, called top, had been found. Discovery of this quark confirmed an earlier prediction that three pairs of these particles should exist.

rubbing, one of the most universal and perhaps the oldest of the techniques used in printmaking. Rubbings are made by carefully pressing paper onto a carved or incised surface so that the paper conforms to the features to be copied. The paper is then blacked and the projecting areas of the surface become dark, while indented areas remain white. In East Asia, a special ink is used, and in the West, a mixture of wax and carbon black, called heelball, is rubbed onto the paper. A carefully made rubbing provides an accurate, full-scale facsimile of the surface reproduced.

Rubbings are generally used to reproduce surfaces carved or incised by someone other than the person who makes the rubbing. The end product, therefore, cannot be considered an original print but rather an accurate record of the work of others.

Rubbings probably originated in East Asia, where they served many utilitarian purposes. Japanese fishermen, for example, continue the centuries-old practice of using rubbings to record the size of the various fish that they catch. The earliest known rubbings are Buddhist texts rubbed from wooden blocks in Japan in the 8th century AD. Evidence suggests, however, that rubbing may have been practiced in China as early as the 2nd century AD. There, rubbing (*t'a-pen*) was used to disseminate Confucian texts carved on large stones. These inscriptions and the rubbings made from them were valued both for their information and for their calligraphy. Even after prints began to be made from woodcuts and stone engravings, rubbings remained the most common method of reproducing Confucian texts. In the Sung dynasty (960–1279), antiquarian research became fashionable, and rubbings were used to make copies of ancient relief carvings.



Rubbing from a gravestone by an anonymous cutter called the "Hook and Eye Man," c. 1777; in Oxford, N.H.

By courtesy of Edmund V. Gillon, Jr.

The technique of rubbing began to be practiced in the West at a relatively late date. In the United States, rubbing is most often used to reproduce reliefs carved on gravestones, especially of the colonial period and the early 19th century. In Europe it is almost exclusively applied to monumental brasses, engraved memorial brass sheets mounted into large stone slabs. *See also* frottage.

rubble masonry, also called RUBBLEWORK, the use of undressed, rough stone, generally in the construction of walls. Dry-stone random rubble walls, for which rough stones are piled up without mortar, are the most basic form.

An intermediate method is coursed rubble walling, for which stones are roughly dressed and laid in courses. Snecked rubble features stones of varying sizes with small fillers or snecks between them.

The primary reason for the use of rubble in masonry is the relative difficulty of dressing most types of stone. Rubblework was preferred where the surface either would be faced with ashlar (dressed stone), or otherwise hidden, as in a foundation, or where the builder wanted or was indifferent to the rough effect.

Rubblework bound with mortar was often used as an infilling between dressed wall faces. Used in this way it does not contribute significantly to the wall's strength and may even detract from it if the mortar is poorly prepared, leached out by moisture, or otherwise unsuitable. Nevertheless, many medieval cathedrals were built in this manner. Rubblework in walls was superseded even in ancient times by brick when available and in modern construction by reinforced concrete.

Rubcovsk (Russian S.F.S.R.): *see* Rubtsovsk.

rubella, also called GERMAN MEASLES, epidemic viral disease of mild course; it has a longer incubation period than measles (rubeola) and is seldom followed by complications. Close study of epidemics in Germany in the 19th century gave rise to the popular name of the disease. Rubella is acquired by direct contact with a person who is ill with the disease. Infectivity is much lower than in rubeola. Although the disease may occur in young children, it is more commonly seen in older children and young adults. One attack of rubella apparently confers a lasting immunity, but there is no cross-immunity between rubella and rubeola. Many so-called second attacks of rubeola are actually cases of rubella.

The period of incubation in rubella is 10 to 20 days, commonly 17 or 18 days. Usually, the rash is the first sign noted. Its colour is less intense than that of measles, but it has a similar blotchy appearance. It develops rapidly, often in one day, and fades just as rapidly two days later. There are no Koplik spots, little catarrh, and little conjunctivitis. The fever is seldom high and lasts only two or three days; often there is no fever at all. Enlargement of the lymph glands in the neck, behind the ears, and perhaps elsewhere in the body is characteristic. Complications are rare, although occasionally encephalitis may follow. A day or so of bed rest and a light diet with plenty of fluids is the only treatment required in most cases.

Rubella would be of little concern were it not for the effect this infection has on the unborn child when the disease occurs in the pregnant woman. In 1941 an Australian ophthalmologist, N.M. Gregg, discovered that rubella early in pregnancy may lead to fetal defects, especially of the eyes and heart. During a large epidemic in the United States in 1964 it was demonstrated that infants may be born with active rubella and may manifest any of the following additional abnormalities: growth retardation, encephalitis, glaucoma, liver and spleen enlargement, jaundice, thrombocytopenic purpura, and lesions of the long bones. In fact, rubella has been found capable of causing extensive damage to almost any organ of the infant's body; the virus has been recovered from the bones, lungs, liver, and heart at post-mortem examinations of infants. Women in the early stages of pregnancy should be especially careful to avoid contact with rubella. Two methods of immunization with attenuated live virus vaccines have been recommended: for young children of both sexes, in hope of stamping out the virus from the environment, and for girls at age 11–12, or just before puberty, in hope of building up the number of women of childbearing age immune to rubella.

rubellite, a pink mineral of the tourmaline (*q.v.*) family.

Rubenist, French RUBÉNISTE, any of the artists and critics who championed the sovereignty of colour over design and drawing in the "quarrel" of colour versus drawing that broke out in the French Royal Academy of Painting and Sculpture in Paris in 1671 (*see also* Poussinist). The dispute raged for many years before the Rubenists emerged victorious. The aim of painting, they maintained, is to deceive the eye by creating an imitation of life or of nature and by manipulating colour.

The colourists pointed to the art of Peter Paul Rubens (whence their name) as one in which nature and not the imitation of Classical art predominated. To popularize the point of view of the colourist party, the critic Roger de Piles published a series of theoretical pamphlets setting forth the arguments and counter-arguments. In 1673 his *Dialogue sur le coloris* appeared, and in 1677 he followed it with *Conversations sur la peinture.* The victory for the colourists was signalled in 1699 when de Piles was elected to the Academy (as an amateur), and the triumph became complete in 1717 with the submission and subsequent acceptance of Antoine Watteau's "L'Embarquement pour l'île de Cythère" (1717; Louvre) for his membership in the Academy.

Rubens, Peter Paul (b. June 28, 1577, Siegen, Nassau—d. May 30, 1640, Antwerp), Flemish master painter, the greatest exponent of Baroque painting's sensuous exuberance. Though his masterpieces include numerous portraits and religious works, he is perhaps best known for the pagan vitality of his allegorical scenes (*e.g.,* "Venus and Adonis," *c.* 1635).

Early life. Although Rubens' father, Jan,



Rubens, detail of a self-portrait in oil, *c.* 1639; in the Kunsthistorisches Museum, Vienna

By courtesy of the Kunsthistorisches Museum, Vienna

was born a Roman Catholic, his name had appeared on a list of Calvinists as early as 1566. This accounted for the Rubens family's exile to Germany, where Peter Paul was born. Victims of the hysterical religious persecution following the decapitation in 1568 in Brussels of the freedom-seeking counts of Egmond and Horn, the Rubens family fled the wrath of the Spanish rulers of their native Flanders. Jan Rubens became a diplomatic agent and adviser to the Protestant princess Anna of Saxony (died 1577), second wife of the latitudinarian Catholic William the Silent, who led the resistance to Spanish rule of the Netherlands. An unfortunate pregnancy revealed the intimate extent of the relationship between this princess of the House of Orange-Nassau and Rubens' father. She obtained clemency from her husband for Jan, but he and his family were placed under house arrest at Siegen, a Nassau stronghold in Westphalia. The Rubens children were grounded in the classics by their exiled father, who was a doctor of both civil and canon law. Jan died in 1587, after he had been allowed to leave Siegen and go to the German city of Cologne. Rubens' mother then took her four surviving children to Antwerp, where Jan had been an alderman.

Antwerp training. At the age of 10, Peter Paul was sent with his brother Philip to a Latin school in Antwerp. There the future painter befriended a contemporary, Balthasar Moretus, who was to become head of the leading Flemish publishing house, the Plantin Press. In 1590, shortage of money and the need to provide a dowry for his sister Blandina forced Rubens' mother to break off his formal education and make him a page to the Countess of Lalaing.

Soon tired of courtly life, he was allowed to become a painter. He was sent first to his kinsman Tobias Verhaecht, a minor painter of Mannerist landscapes in the tradition of the more important Antwerp painter Joos de Momper. Having quickly learned the rudiments of his profession, he was apprenticed for four years to an abler master, Adam van Noort, and subsequently to Otto van Veen, one of the most distinguished of the Antwerp Romanists, a group of Flemish artists who had gone to Rome to study the art of antiquity and the Italian Renaissance. Van Veen had been in Italy an active admirer of the proto-Baroque painter from Urbino, Federico Barocci, as well as of the great masters of the Florentine Roman tradition of Renaissance art such as Michelangelo and Raphael.

Italian period. In May 1600, with two years' seniority as a master in the Antwerp Guild of St. Luke, Rubens set out with Deodatus del Monte, his constant travelling companion and first pupil, for the visual and spiritual adventure of Italy. He was offered employment by Vincenzo I Gonzaga, duke of Mantua, which duchy held one of the largest and finest collections outside the Vatican of works by Italian artists. During the eight years that Rubens was to call Vincenzo his lord, he had unmatched opportunities of fulfilling his expressed intention "to study at close quarters the works of the ancient and modern masters. . . ." The Early Renaissance painter Andrea Mantegna and the Mannerist architect and painter Giulio Romano were his admired predecessors in the service of the Gonzaga family.

Rubens was sent to Rome (1601–02) by the Duke to paint copies of pictures and live under the protection of Cardinal Montalto. There, through Flemish connections, he obtained his first public commission to paint three altarpieces for the crypt chapel of St. Helena in Sta. Croce in Gerusalemme. In Rome the Bolognese painter Annibale Carracci and his assistants were at work in the gallery of the Palazzo Farnese. Their bold scale in drawing and working methods decidely influenced the young Rubens. He assimilated Venetian colour, light, and loose application of paint first through the works of Tintoretto, then through those of Veronese, long before he could penetrate the inward meaning of Titian's art.

In 1603 he was entrusted with his first diplomatic mission, to take Philip III and the Spanish court costly presents from Mantua. This mission gave him a first view of the royal collections in Madrid. Two paintings in the groups of copies offered to Philip's favourite, the Duke of Lerma, being rain-sodden beyond repair, were promptly replaced by him with a "Democritus and Heraclitus" (1603; private collection, England) of his own invention. His resource and his tact in dealing with the temperamental regular Mantuan representative to the Spanish court raised him in the Duke's estimation and helped prepare him for future diplomatic missions.

The only major works he executed for Mantua were the three pictures finished by Trinity Sunday 1605 for the Jesuit church of SS. Trinità. In the same year he completed the "Circumcision" for the high altar of the Jesuit church in Genoa. Portraits of court beauties by Rubens were commissioned by the Duke for the Gonzaga Gallery, of which Rubens was curator.

Toward the end of 1605, Rubens obtained leave from the Duke of Mantua to continue his studies in Rome. There he shared a house with his brother Philip, then librarian to Cardinal Ascanio Colonna, a member of one of Rome's most wealthy and powerful families. Daily contact with Philip, a brilliant student of the famed Flemish Humanist and Classical scholar Justus Lipsius (1547–1606), added zest to his personal discovery of the antique world. They combined their interest in the antique by collaborating to produce the book *Electorum Libri II,* which dealt with Roman social life and customs and was published in Antwerp in 1608 by the Plantin Press. Philip wrote the text, and Peter Paul prepared the art.

In the summer of 1607 he was asked to accompany the Gonzaga court to the Italian seaside resort of San Pier d'Arena, where he continued to paint with splendour portraits of the Genoese aristocracy. Chronic arrears in payment of his salary, and an ambition to establish himself as an international, rather than just a Mantuan, artist, motivated him to accept other patronage. He received the backing of the wealthy Genoese banker to the papacy, Monsignor Jacopo Serra, who was instrumental in obtaining for him the coveted commission for the painting over the high altar of the Roman church of S. Maria in Vallicella. He concurrently painted the altarpiece of the "Adoration of the Shepherds" for the Oratorian Order in Fermo. In October 1608 his brother summoned him to their mother's deathbed in Antwerp, but she died before he could reach her.

Return to Antwerp. Soon after his mother's death Rubens was "bound with golden fetters" to the service of the Spanish Habsburg regents of Flanders. The house that he built for himself, the pride of Antwerp, was filled with paintings, statuary, cameos, coins, and jewels from Renaissance and ancient Roman Italy. He built a private pantheon to house his antiquities. His enthusiasm for Italian architecture is best expressed in his publication *Palazzi di Genova.* Printed in Antwerp in 1622, this book of engravings illustrates the great Renaissance palaces of Genoa. He practiced the spirit of the book's preface, which extols Italian design, in the magnificent new church of the Antwerp Jesuits, St. Charles Borromeo, where he was the chief designer, along with the Flemish architect Pieter Huyssens (1577–1637), of the facade, tower, and all architectural detail. Rubens was also the master decorator and provided oil sketches as designs for the ceiling paintings.

Settling permanently in Flanders, he married in October 1609 Isabella, daughter of Jan Brandt, a leading Antwerp Humanist. He became not only the court portraitist but a major religious painter. His Baroque altarpieces of the "Erection of the Cross" for St. Walburga's in Antwerp, "Descent from the Cross" for Antwerp cathedral, and "The Miracle of St. Bavon" for the Cathedral of St. Bavon in the neighbouring city of Ghent established Rubens as the leading painter of Flanders. Because of his prestige, he was allowed to live in Antwerp, rather than in Brussels, where the Flemish court was based. He was also exempt from the regulations of the Antwerp painters' guild and thus was free to engage pupils or collaborators without having them enrolled in this organization. By 1611 he wrote that he had to refuse more than 100 applicants who wished to become his pupils.

Diplomatic career. In the period between 1621 and 1630, Rubens was increasingly used as a diplomat by the Spanish Habsburg rulers. His contact with the leading political and intellectual personalities of Europe, as well as his gracious manner, made him the ideal political agent. Furthermore, as a painter, he could often act as a covert diplomat or observer.

His first important diplomatic functions were in connection with the attempt of Spain and the Spanish Netherlands to renegotiate the Twelve Years' Truce (1609–21) between the Habsburg-controlled area of Flanders and the Dutch Republic to the north. The regent of Flanders, the archduke Albert, a Habsburg of the Austrian line, died in 1621, leaving the renewal of the truce to his widow, the infanta Isabella, the daughter of the Habsburg ruler of Spain, Philip II. Rubens became her adviser and tried unsuccessfully to intercede with the Dutch. War again broke out in the Netherlands between the predominantly Protestant Dutch and the Catholic Flemish, and continued for the rest of Rubens' life.

Early in 1622 Rubens was summoned to Paris by Marie de Médicis, the widow of Henry IV and mother of the reigning king of France, Louis XIII. This Florentine princess, whose wedding by proxy Rubens had attended in Florence in 1600, commissioned him to paint two series of paintings for two long galleries in her newly constructed Luxembourg Palace. One cycle of 21 pictures representing episodes from Marie's life now hang in the Louvre, while the other proposed series of pictures, dealing with the life of Henry IV, was never completed. After six weeks of discussion and arrangements, Rubens returned to Antwerp, where he worked for two years on his most artistically important secular commission.

When Rubens returned to Paris in 1625 to install the Medici pictures, the political atmosphere at court had changed. Formerly friendly to Spain and the Spanish Netherlands, France had signed before 1624 treaties with the Dutch, the Danes, and the English, all hostile to the Habsburgs. This new French alliance was due to the influence of Cardinal Richelieu, the powerful adviser to young Louis XIII. Not without reason, the Cardinal suspected that Rubens was more spy and agent than artist during his second Paris visit. Further suspicions were aroused when Rubens was seen frequenting the company of the Duke of Buckingham, the favourite of Charles I of England, who was in Paris for the marriage by proxy of his master and the youngest daughter of Marie de Médicis and Henry IV, the princess Henrietta Maria. The Duke was an avid art collector. His portrait was drawn by Rubens in Paris. He ordered from him an equestrian portrait, and he bought the painter's famous collection of antiquities, with some paintings. This is often considered more a diplomatic gesture on Rubens' part to stay in Buckingham's graces than an economic necessity. During their acquaintance in France, Rubens tried to persuade the Duke that England should enter into an alliance with the Spanish Netherlands and cease supporting the Dutch. Since Buckingham was currently engaged in promoting a war between England and Spain, he was noncommittal.

The death of Buckingham reopened the way for Rubens to attempt the negotiation of a peace treaty on behalf of the sorely tried Spanish Netherlands. Unfortunately, the minister of Spain, the Conde-Duque de Olivares, persuaded his master, Philip IV, to make a close pact with France to reconquer England for Catholicism. In 1628 Rubens travelled in secret haste to Madrid. During his nine months in Madrid, besides pleading for a peace treaty rather than war with England, Rubens painted royal portraits. He eventually was deemed a suitable envoy by Philip IV and named secretary of the Privy Council of the Spanish Netherlands to give him sufficient status for a special peace mission to England. News awaiting his arrival in Brussels made his mission even more urgent and difficult; on April 24, 1629, England had signed a treaty with France.

Charles I waived the formalities of exchanging ambassadors and sent for Rubens directly, and it is to Rubens personally that the peace treaty of 1630 between England and Spain largely can be attributed. He was knighted and given an honorary degree by Cambridge University. The King commissioned him to decorate the ceiling of the royal Banqueting House (1619–22) designed by the court architect Inigo Jones as a part of Whitehall Palace. Finished in 1634, the nine huge panels allegorize the reign of James I, the father of Charles I.

Late years in Flanders. On his return to Flanders in 1630, Rubens was rewarded by the Archduchess with exemption from further missions. The peace Rubens had worked for nearly 10 years to achieve, however, did not last, and for most of the next 20 years Europe continued to be embroiled in the Thirty Years' War.

Having been a widower for four years, he married in December of 1630 the 16-year-old Hélèna Fourment, whose charms recur frequently among his later figure subjects. He bought the château of Elewijt, in 1635. In his last years, he spent much time there depicting the rural life and scenery outside of Antwerp. His long-established interest in landscape painting, early expressed in drawings of his Roman period, reached its grandest and most emotionally romantic expression in his late works. Rubens' major commission during these last years, however, was to provide for King Philip IV of Spain (the brother of the infante Ferdinand, who had succeeded Archduchess Isabella as regent of Flanders) models for about 120 scenes from the writings of the Roman poet Ovid and other classical authors to decorate the Torre de la Parada, the royal hunting lodge near Madrid. Rubens died at Antwerp in 1640 when gout, which had for months troubled his painting arm, reached his heart.

Achievement. Rubens is one of the most methodically assimilative, and most prodigiously and variously productive of Western artists. His abundant energy fired him to study and emulate the masters both of antiquity and of the 16th century in Rome, Venice, and Parma. His warmth of nature made him responsive to the artistic revolutions being worked by living artists.

Robust powers of comprehension nourished his limitless resource in invention. The larger the scale of the undertaking the more congenial it was to his spirit. The success of his public performance as master of the greatest studio organization in Europe since Raphael's in Rome has obscured for many the personal intensity of his vision as evinced in such works as his oil sketch for "All Saints" (Museum Boymans-van Beuningen, Rotterdam) and in his deeply felt study for the head of St. John in the Antwerp cathedral "Descent from the Cross," as well as in portraits of his family and friends and in his treatment of the mood and grandeur of landscape. He is a central figure to Western art history.

His own deepest love as a painter, consummated by his second visit to Spain, was for the poetry, the control of glowing colour, and the sheer mastery in handling of oil paint that excelled in the art of Titian. In these qualities Rubens himself became supreme, whether with the brilliant play of fine brushes over the white reflecting surface of a small panel, or with masterful gestures often more than

six feet long, sweeping a richly loaded brush across some huge canvas. (Ml.J./Ed.)

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rubeola: *see* measles.

Rubezhnoye, also spelled RUBEZHNOE, or RUBEŽNOJE, city, Voroshilovgrad *oblast* (administrative region), Ukrainian Soviet Socialist Republic, on the Donets River. The settlement dates from the 18th century and was incorporated in 1934. Rubezhnoye has an engineering industry and, with Lisichansk and Severodonetsk, one of the most important chemical centres in the Soviet Union for the production of aniline dyes. The chemical industry dates from World War I, when it arose as a response to the pre-Revolutionary industrialization of the Donets Basin coalfield. There are various technical colleges and a branch of the Kharkov Polytechnic Institute. Pop. (1983 est.) 67,000.

Rubiaceae, the madder family of the Gentianales order of flowering plants, consisting of about 500 genera with more than 6,500 species of herbs, shrubs, and trees, distributed primarily in tropical areas of the world. Members of the family have leaves opposite each other with stipules or in whorls, unbroken leaf margins, and leaflike appendages at the base of the leafstalks. The leaves usually are large and evergreen in tropical species, deciduous in temperate species, and needlelike or scalelike in desert species. The plants may bear a single flower or many small flowers clustered together. The fruit is a berry, a capsule, or a nutlike structure.



Crosswort (*Crucianella*)
G.E. Hyde from the Natural History Photographic Agency—EB Inc.

Economically important products of the family include quinine, derived from bark of *Cinchona* species; coffee, from the seeds of *Coffea* species; ipecac, obtained from the roots of *Cephaëlis* species; and gambier, a substance used in tanning, from *Uncaria gambir.* Some trees provide useful timber. Species cultivated as ornamentals include those of *Gardenia, Ixora, Nertera, Crucianella, Bouvardia,* bluets (*Houstonia*), and buttonbush (*Cephalanthus*).



Bouvardia ternifolia
E.R. Degginger—EB Inc.

Common madder (*Rubia tinctorum*) was formerly cultivated for the red dye obtained from its roots (alizarin); the roots of crosswort (*Cruciata*) also contain a red dye once used in medicines.

Plants in the genus *Myrmecodia* have swollen stems with hollow areas that are inhabited by ants. Ants also inhabit the hollow stem segments in the genera *Nauclea, Duroia,* and *Hydnophytum.* Two familiar genera of low herbaceous plants native to temperate areas are bedstraw, or cleavers (*Galium*), with small flowers and square stems, and partridgeberry (*Mitchella*), with twin four-petalled flowers borne at the end of each stem.

Rubicon, Latin RUBICO, or RUBICON, small stream that separated Cisalpine Gaul from Italy in the era of the Roman Republic. The movement of Julius Caesar's forces over the Rubicon into Italy in 49 BC violated the law (the Lex Cornelia Majestatis) that forbade a general to lead an army out of the province to which he was assigned. His act thus amounted to a declaration of war against the Roman Senate and resulted in the three-year civil war that left Caesar ruler of the Roman world. "Crossing the Rubicon" became a popular phrase describing a step that definitely commits a person to a given course of action.

The modern Rubicone (formerly Fiumicino) is officially identified with the Rubicon that Caesar crossed, but the Pisciatello to the north and the Uso to the south have also been suggested.

rubidium (Rb), chemical element of Group Ia in the periodic table, the alkali metal group, second most reactive metal, very soft with a silvery-white lustre. It was discovered (1861) spectroscopically by Robert Bunsen and Gustav Kirchhoff and named after the two prominent red lines of its spectrum. Rubidium occurs combined in such minerals as lepidolite, pollucite, and carnallite. Small amounts of rubidium are obtained from the mixture of alkali metal carbonates remaining after lithium is extracted from lepidolite. Rubidium ignites spontaneously in air and reacts violently with water to yield a solution of rubidium hydroxide (RbOH) and hydrogen, which bursts into flames; rubidium is therefore kept in dry mineral oil or an atmosphere of hydrogen. It is used in photoelectric cells and as a getter in electron tubes to scavenge the traces of sealed-in gases. Rubidium atomic clocks, or frequency standards, have been constructed, but they are not so precise as cesium atomic clocks. Rubidium has been proposed as a working fluid in plasma propulsion for deep-space probes.

Natural rubidium makes up about 0.03 percent of the Earth's crust; it exists as a mixture of two isotopes: rubidium-85 (72.15 percent) and the radioactive rubidium-87 (27.85 percent); 15 radioactive isotopes have been artificially prepared, from rubidium-79 to rubidium-95. One estimate of the age of the solar system as 4,500,000,000 years is based on the ratio of rubidium-87 to strontium-87 in a stony meteorite. Rubidium easily loses its single valence electron and no others, accounting for its electrovalence of one.

atomic number	37
atomic weight	85.47
melting point	38.9° C (102° F)
boiling point	688° C (1,270° F)
specific gravity	1.53 (20° C)
valence	1
electronic config.	2-8-18-8-1 or (Kr)$5s^1$

rubidium–strontium dating, method of estimating the age of rocks, minerals, and meteorites from measurements of the amount of the stable isotope strontium-87 formed by the decay of the unstable isotope rubidium-87 that was present in the rock at the time of its formation. Rubidium-87 comprises 27.85 percent of the total atomic abundance of rubidium, and of the four isotopes of strontium, only strontium-87 is formed by its decay. The method is applicable to very old rocks because the transformation is very slow: the half-life, or time required for half the initial quantity of rubidium-87 to disappear, is approximately 50,000,000,000 years.

Most minerals that contain rubidium also contain some strontium incorporated at the time the mineral was formed, and so a correction must be made for this initial amount of strontium to obtain the radiogenic increment (*i.e.*, the increase due to decay of rubidium-87).

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Rubini, Giovanni Battista (b. April 7, 1794, Romano, Republic of Venice—d. March 3, 1854, Romano), Italian tenor remembered as the major early exponent of the Romantic style of Vincenzo Bellini and Gaetano Donizetti.

Rubini showed early musical promise and was engaged as violinist and chorister at the Riccardi Theatre in Bergamo, in the Cisalpine Republic, at the age of 12. He made his professional debut in Pietro Generali's *Le lagrime di una vedova* at Pavia in Lombardy, in 1814, then sang for 10 years in Naples, specializing in comic roles. In 1825 he sang the leading roles in Gioacchino Rossini's *La cenerentola, Otello,* and *La donna del lago* in Paris, establishing himself as the leading tenor of his day. His first Bellini role came the next year, when he premiered *Bianca e Gernando* in Naples, and he went on to sing the tenor leads in *Il pirata* (1827), *La sonnambula* (1831), and *I Puritani* (1835). Performing with him in the premiere of the latter were the soprano Giulia Grisi and the baritone Antonio Tamburini. Along with Luigi Lablache, this stellar group was popularly referred to as the "Puritani quartet."

Rubini's Donizetti premieres included *La lettera anonima* (1822), *Elvida* (1826), *Il giovedì grasso* (1827), *Gianni di Calais* (1828), *Il paria* (1829), *Anna Bolena* (1830), and *Marino Faliero* (1835). From 1831 to 1843 he divided the year between the Théâtre-Italien in Paris and His Majesty's Theatre in the Haymarket, London. He toured Germany and Holland with Franz Liszt in 1843 and later that year performed in St. Petersburg, Russia, where

Czar Nicholas I appointed him Director of Singing and Colonel of the Imperial Music. Two years later he retired to his birthplace, where he bought a palazzo, which after his death, became the Rubini museum.

Rubin's test, diagnostic method for determining whether the fallopian tubes (in the human female, the slender hollow structures on each side of the uterus through which the eggs travel from the ovaries to the uterus) are occluded. The test is helpful in explaining certain instances of female infertility. It consists of introducing carbon dioxide into the uterus and through the fallopian tubes. The gas escapes into the abdominal cavity if the tubes are not occluded (positive test), causing referred shoulder pain. The abdominal gas may also be demonstrated by X-ray or fluoroscopy. The insufflation is usually carried out at a gas pressure of less than 120 millimetres of mercury. The manometer reading decreases to 100 or less if the tubes are clear; if between 120 and 130, there is probably partial stricture; if it rises to 200 and above, it is suggestive that the tubes are obstructed.

Rubinstein, Anton Grigoryevich (b. Nov. 28 [Nov. 16, old style], 1829, Vykhvatinets, Podolia province, Russia—d. Nov. 20 [Nov. 8, O.S.], 1894, Peterhof), Russian composer and one of the greatest pianists of the 19th century.

In 1835 Rubinstein's father opened a small factory in Moscow, and there in the same year



Anton Rubinstein
By courtesy of the Royal College of Music, London

his brother Nikolay was born. Both boys were taught piano, first by their mother and then by Aleksandr Villoing. Anton gave his first public recital in Moscow in 1839, and the following year Villoing took him abroad for a three-year concert tour. He appeared in Paris, London, The Netherlands, Germany, and Sweden, attracting the attention of Chopin and Liszt. From 1844 to 1846 he and his brother studied music theory in Berlin. Anton spent two more years abroad alone, mainly in Vienna, studying the piano and composition. On his return to Russia in 1848 he settled in St. Petersburg, where in 1852 his first opera, *Dmitry Donskoy,* was produced; *Fomka durachok* (*Fomka the Fool*) and *Sibirskiye okhotniki* (*The Siberian Hunters*) were introduced at St. Petersburg in 1853. The years 1854–58 were spent abroad.

Under the patronage of the Grand Duchess Elena Pavlovna, Rubinstein in 1859 founded the Russian Music Society and later became conductor of its orchestral concerts; in 1862 he founded and became the director of the Imperial (or St. Petersburg) Conservatory (now Leningrad Conservatory), and in 1866 his brother founded the Moscow Conservatory, where he remained as director until his death in 1881. Anton Rubinstein resigned his conservatory directorship in 1867 but resumed it in 1887 and continued to hold the post until 1891. From 1871 to 1872 he directed the Vienna Philharmonic concerts and the next year toured the United States.

Rubenstein's operas include *Demon* (*The Demon;* St. Petersburg, 1875), *Der Makkabäer* (*The Maccabees;* Berlin, 1875), and *Kupets Kalashnikov* (*The Merchant Kalashnikov;* St. Petersburg, 1880), the first two reflecting his Jewish heritage. He wrote six symphonies, the oratorio *Der Turm zu Babel* (*The Tower of Babel;* Königsberg, 1870), five piano concerti, songs, piano pieces, and numerous chamber works.

In 1889 Rubinstein published an autobiography, translated by A. Delano as *Autobiography of Anton Rubinstein* (1890).

Rubinstein, Artur (b. Jan. 28, 1887, Łodz, Pol., Russian Empire—d. Dec. 20, 1982, Geneva), international virtuoso pianist regarded by many as the 20th century's foremost interpreter of the repertoire.

Rubinstein began study at the age of three and at the age of eight studied at the Warsaw Conservatory. The following year he became a pupil of Heinrich Barth in Berlin. Rubinstein was 6 when he made his first public appearance, and he made his European debut in Berlin at 13. In 1906 he made his U.S. debut with the Philadelphia Orchestra at Carnegie Hall but received a cool reception. During World War I, Rubinstein, who was fluent in eight languages, served as a military interpreter in London and performed there with the violinist Eugène Ysaye. In 1916 he visited Spain and created a sensation by introducing works by Manuel de Falla and Enrique Grandas. Another trip to the United States in 1919 proved to be lacklustre, however.

During the 1920s Rubinstein developed a reputation as a cosmopolitan socialite, but in 1928 he met his future wife, Aniela Mlynarski, and began to seriously analyze his artistry. He renewed his dedication to music, practiced six to nine hours a day, and brought a new discipline to his already brilliant technique. When he returned once again to the United States in 1937 and performed at Carnegie Hall, he was hailed as a genius.

Throughout the rest of his career, Rubinstein retained a high artistic reputation with a huge repertoire that included works by Beethoven, Mozart, Albéniz, Ravel, Stravinsky, and Chopin. As an interpreter of the latter's work, Rubinstein was considered a master. He moved to the United States during World War II and was granted citizenship in 1946. Rubinstein was known as a witty extrovert and irrepressible raconteur, but he was also a serious musician whose stage presence enhanced his playing. He made more than 200 recordings. Rubinstein was awarded the United States Medal of Freedom in 1976.

He wrote a two-volume autobiography, *My Young Years* (1973) and *My Many Years* (1980).

Rubinstein, Helena (b. Dec. 25, 1870, Kraków, Pol., Austria-Hungary—d. April 1, 1965, New York City), cosmetician, business executive, and philanthropist. She founded Helena Rubinstein, Inc., a leading manufacturer and distributor of women's cosmetics.

One of eight daughters of a middle-class Jewish family in Poland, she left in 1902 to visit relatives in Australia. In that year she opened a beauty salon in Melbourne, offering free consultation along with a special cream that she had brought with her from Poland. An immediate success, she took her business to Europe, where she studied under the leading dermatologists of the day, finally opening the Maison de Beauté in London in 1908 and another salon in Paris in 1912. With the outbreak of World War I she immigrated to the United States and opened salons in New York City and other cities.

In 1917 Mme Rubinstein began wholesale distribution of her products, an enterprise that, along with manufacturing, was eventually to become the mainstay of her business. The chemists and researchers whom she employed developed hundreds of new and improved beauty aids, including the first line of medicated skin-care products. In the years after World War II she established manufacturing facilities on five continents.

With a personal fortune estimated at $100,000,000, Mme Rubinstein was prominent in international society and maintained homes in cities around the world. A patron of the arts, she established the Helena Rubinstein Foundation in 1953 to coordinate her philanthropies, including gifts to museums, colleges, and institutions for the needy, particularly women and children.

Rubinstein, Ida (b. 1885, St. Petersburg, Russia—d. Sept. 20, 1960, Vence, Fr.), exceptionally beautiful dancer, actress, and patron of the performing arts.

An orphan of a well-to-do Jewish family, Rubinstein used her sizable inheritance for commissions for the arts. As a young woman she studied mime and recitation and was a great admirer of the American dancer Isadora Duncan. She studied with Michel Fokine, and he choreographed *Salome* for her, a performance that was seen only once, because of the censor's intervention (1909). Although she moved gracefully, Rubinstein's exceptional beauty apparently far outweighed her dancing talent. Nonetheless, Fokine recommended that Sergey Diaghilev use her in the title role of *Cleopatra,* which opened the Ballet Russes' first Paris season in 1909. Other cast members included Anna Pavlova and Vaslav Nijinsky. Rubinstein was chosen also for Zobeide in the 1910 production of *Scheherazade.* The next year, she left Diaghilev's company and formed her own troupe.

Rubinstein's many commissions reflected her good taste and her eye for great art. Among them were Maurice Ravel's *Bolero* (1911) and *La Valse,* both choreographed by Fokine; Claude Debussy's music for the poet Gabriele D'Annunzio's *The Martyrdom of St. Sebastian* (1911), in which she played the title role; *The Fairy's Kiss,* with music by Igor Stravinsky, choreographed by Bronislava Nijinska (1928); and *Persephone,* music by Stravinsky, choreography by Kurt Jooss (1934). In 1924 she danced Léo Staats' *Istar* at the Paris Opéra. During this period she turned to serious drama, appearing in title roles such as *Camille* by Alexandre Dumas *fils.* Rubinstein's troupe was most influential during the season of 1928–29. Although she revived the company in 1931 and again in 1934, she gave it up entirely in 1935, retiring in seclusion on the French Riviera, where she lived until 1960. Among the many famous dancers who appeared with her company were Frederick Ashton, Roman Jasinsky, David Lichine, and Nina Verchinina.

ruble, the basic monetary unit of the U.S.S.R., divided into 100 kopeks. The origins of the ruble as a designation of silver weight can be traced to the 13th century. Peter the Great in 1704 introduced the first regular minting of the ruble in silver. During the 18th century it was debased, and, after the middle of the 19th century, the rapidly depreciating paper money predominated in Russia's circulation. In 1897 a gold ruble was substituted for the silver one as the new standard of a monometallic system. Early in World War I, gold coin disappeared from circulation, and notes became inconvertible. During the period of the Revolution and civil war, an inflation of astronomical dimensions made the ruble virtually worthless. A reform carried out during 1922–23 reestablished an orderly monetary system. The chervonets was introduced as the standard unit and the basis of the state bank's note issue; the chervonets ruble, corresponding to one-tenth of a chervonets, was made a unit of reckoning. The ruble remained a term

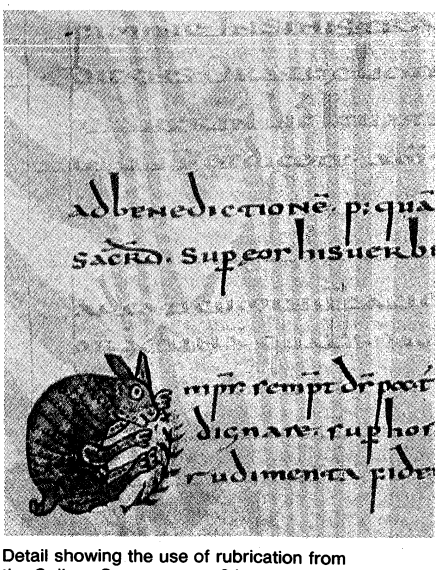
of denomination for treasury notes and silver coin. In the post-War War II reform of 1947 the chervonets was abandoned as the monetary standard and the ruble restored.

Rublyov, Andrey (b. *c.* 1360–70—d. *c.* 1430), one of the greatest medieval Russian painters, whose masterpiece is a magnificent icon of "The Old Testament Trinity," now in the State Tretyakov Gallery, Moscow.

Little is known of his life except that he was the assistant of another great painter called Theophanes the Greek, who came to Russia from Constantinople. Fairly late in life, Rublyov became a monk, first at Trinity-St. Sergius at Zagorsk and then at the Andronikov monastery in Moscow. Russian painters did not sign their works until the 17th century, so paintings can be assigned to him only on the basis of written evidence or of style. Written evidence associates with his name wall paintings at Vladimir and Moscow and the panel, or icon, of "The Old Testament Trinity." By analogy of style a number of other icons can also be attributed to him, the chief of these being panels of St. John the Baptist, St. Paul, St. Peter and the Ascension, done in 1408 for the Cathedral of the Dormition of the Virgin at Vladimir, and others of the Archangel Michael and the Saviour from Zvenigorod, now in the State Tretyakov Gallery.

Rublyov was trained wholly in the Byzantine tradition, in which the spiritual essence of art was regarded as more important than naturalistic representation. The hieratical character of the mid-Byzantine style had, with the 14th century, given way to a more intimate, humanistic approach, but to this Rublyov was able to add an element that was truly Russian, a complete unworldliness, and it is this that distinguishes his work from that of his Byzantine predecessors. Nor was any later Russian painter ever quite able to equal Rublyov either in his handling or in the interpretation of his subject. *See also* Moscow school.

rubrication, in calligraphy and typography, the use of handwriting or type of a different colour on a page, derived from the practice of setting off liturgical directions, headings of statutes, and the like in red. Specifically, it applied to the rules prescribed for the conduct of religious services as set forth in breviaries, prayer books, and missals. Though red is the traditional colour for rubrication (Latin *rubricare,* "to colour red"), the term is now extended to include other colours and different hues of inks either applied by hand or printed. In the manuscript period of bookmaking, the finishing touches of colour were supplied by the rubricator, or rubrisher.

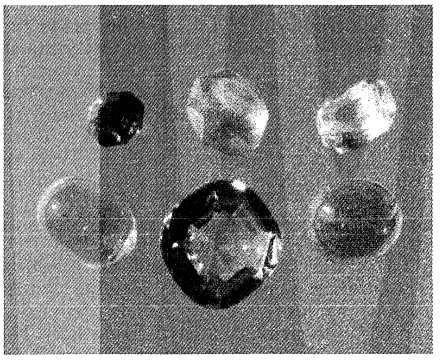


Detail showing the use of rubrication from the *Gellone Sacramentary,* 8th century (Paris, Bibliothèque Nationale, MS. lat. 12048, fol. 40)

By courtesy of the Bibliotheque Nationale, Paris

Rubtsovsk, also spelled RUBCOVSK, city, Altay *kray* (territory), west central Russian Soviet Federated Socialist Republic, on the Aley River and the Turk-Sib Railway. It is the centre of an important region of mining nonferrous ores. The city manufactures agricultural machinery, chiefly diesel tractors and electrical equipment for tractors, as well as flour and other foodstuffs. Pop. (1983 est.) 161,000.

ruby, gemstone composed of transparent red corundum (*q.v.*), which is a mineral form of aluminum oxide, Al_2O_3. Its colour varies from deep cochineal to pale rose red, in some cases with a tinge of purple; the most valued is a pigeon-blood red. The red colour is a consequence of the replacement of a small number of aluminum atoms by chromium atoms (1 in 5,000). High refractivity is characteristic; when cut and polished, ruby is a brilliant stone, but, because it has weak dispersion, it lacks fire. On exposure to high temperature, ruby becomes green but regains its original colour upon cooling. When subjected to radiant discharge, ruby phosphoresces with a vivid red glow.



Faceted and (bottom left and right) cabochon rubies from Sri Lanka

From the collection of Joseph and Helen Guetterman; photograph, John H. Gerard

Ruby is a mineral of very limited distribution. Its best known localities are in Upper Burma, northeast of Mandalay, where the gemstone occurs in bands of crystalline limestone associated with granitic and gneissic rocks. Rubies have been found at several localities in the provinces of Chanthaburi and Trat, Thailand, in gravels with sapphires and spinels; they are generally of dark colour, often inclining to a deep reddish brown. Rubies found in the gem gravels of Sri Lanka are not usually of such good colour as the Burmese stones.

The stone is sometimes called oriental ruby to distinguish it from other red gems. Thus Cape rubies, Australian rubies, and Arizona rubies are fine garnets; Siberian ruby is rubellite, red tourmaline; and balas ruby is ruby spinel. Although the word ruby is used in the English translation of the Old Testament, it is improbable that ruby was known to the ancient Hebrews.

Rubies have been produced artificially with much success. At one time it was the practice to fuse together small fragments of the natural stone. This method gave way to the flame-fusion (Verneuil) process of forming artificial ruby from purified ammonia alum and small amounts of chrome alum. Synthetic ruby containing 2.5 percent chromic oxide has the prized pigeon-blood red colour. Synthetic rubies possess the physical characteristics of natural corundum but may generally be distinguished by microscopic bubbles and striae.

ruby glass, deep-red glass deriving its colour from gold chloride. Originally known in the ancient world, its rediscovery was long sought by European alchemists and glassmakers, who believed it had curative properties. A Hamburg physician, Andreas Cassius, in 1676 reported his discovery of the red colouring properties of a solution of gold chloride, subsequently called purple of Cassius. Ruby glass was produced *c.* 1679 by a Potsdam chemist and glass technologist named Johann Kunckel von Löwenstern, who kept the recipe a secret. The difficulty in producing this colour lay in the fact that the glass at first appears gray and turns red only on reheating. This secret was rediscovered in the glassworks at Ehrenfeld at the end of the 19th century. Meanwhile, Bohemian glassmakers produced a ruby shade using copper, and glassware flashed with a thin ruby-glass casing became a characteristic 19th-century Bohemian product.

ruby silver, either of two silver-containing minerals, proustite and pyrargyrite (*qq.v.*).

ruby spinel, natural or synthetic gem-quality spinel (*q.v.;* magnesium aluminum oxide) that resembles ruby. The two natural gems are generally found together in gem gravels, to the extent that spinel has been called "mother of ruby." Many historic rubies were probably spinels; the Timur Ruby in the British crown jewels is such a stone. Spinel may be distinguished from ruby by its lesser hardness and lighter weight. Pure spinel is colourless; the gem varieties owe their hues to the presence of small proportions of metal ions other than magnesium and aluminum. Ruby spinel is the bloodred variety; balas ruby, the pink; almandine, the purple; and rubicelle, the yellow to orange red. The placer deposits of Sri Lanka, Burma, and Thailand provide most of the gem material.

ruby-tailed wasp: *see* cuckoo wasp.

Rucelinus (French philosopher): *see* Roscelin.

Rucellai, Palazzo, early Renaissance palace in Florence, designed *c.* 1445–70 by Leon Battista Alberti for the Rucellai, a wealthy Tuscan mercantile family. Alberti's overriding concern with balance and proportion is evident in his symmetrical treatment of the palace's facade. The use of the three classical orders to indicate upward progression was inspired by the Colosseum at Rome. The Palazzo Rucellai, in turn, influenced such later buildings as the Palazzo della Cancellerio (later the Papal Chancery, in Rome).

Ruche, La (artists' settlement): *see* Beehive, The.

Ruckers, Hans, THE ELDER (b. *c.* 1555, Mechelen, Burgundy—d. *c.* 1623, Antwerp), most famous of all harpsichord makers and founder of a dynasty of Flemish instrument makers whose harpsichords provided an important model for later north European builders.

Little is known of his life. His earliest known instrument is a double virginal (a rectangular harpsichord with two independent keyboards, set side by side, and two independent sets of strings) dated 1581, now in New York City; his latest extant instrument is dated 1620. Ruckers' sons Hans the Younger (also known as Jean) and Andreas were likewise renowned builders, as was Andreas' son, Andreas the Younger (d. after 1667).

The Ruckers shop built variations of nine basic models of harpsichords and virginals, of which more than 100 are extant in whole or part. So prized were the Ruckers instruments that they were often rebuilt and enlarged, as well as copied, well into the 18th century and again in the 20th. The family business was carried on by the Couchet branch (Jan Couchet was a nephew of Hans II) until nearly 1700.

Rückert, Friedrich, pseudonym FREIMUND RAIMAR (b. May 16, 1788, Schwein-

furt, Saxe-Coburg-Gotha—d. Jan. 31, 1866, Neuses, near Coburg), German prolific poet known for his facility with many different verse forms.

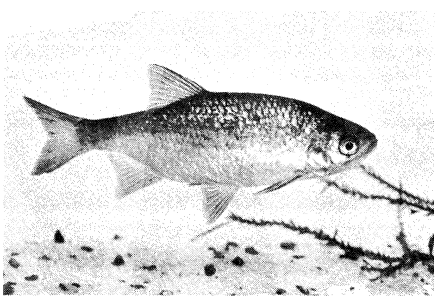
Rückert was self-educated in Oriental languages and, through translations and imitations of Eastern literature, introduced his German readers to Arabic, Persian, Indian, and Chinese mythology and verse. He taught Oriental philology from 1826 at Erlangen and Berlin universities before moving in 1848 to Neuses to devote his life to scholarship and writing. He published several epic poems and historical plays but achieved greater success and repute with his lyric verse, particularly *Liebesfrühling* (1844; "Dawn of Love"), poems written during his courtship of Luise Wiethaus, whom he married in 1821. One of his best known works is a martial poem, *Geharnischte Sonette* (published in *Deutsche Gedichte,* 1814; "Armoured Sonnets"), a stirring exhortation to Prussians to join in the Wars of Liberation (1813–15) from Napoleonic domination; Rückert stayed home during the war at his parents' request. *Kindertodtenlieder* ("Children's Death Songs"), written in 1834 on the death of his two children and published posthumously in 1872, were set to music as a song cycle by Gustav Mahler in 1902.

Ruda Śląska, town, Katowice *województwo* (province), south central Poland, in the heart of the Górny Śląsk (Upper Silesia) coal-mining region. An old industrial town, Ruda Śląska was founded in the Middle Ages as an iron-mining settlement, but it was not incorporated until after World War II. Poland's first coal mine was operated there in 1751. Pop. (1982 est.) 161,600.

Rūdakī, original name ABŪ ʿABDOLLĀH JAʿFAR EBN MOḤAMMAD (b. *c.* 859, Rudak, Khorāsān—d. 940/941, Rudak?), the first poet of note to compose poems in the "New Persian," written in Arabic alphabet, widely regarded as the father of Persian poetry.

A talented singer and instrumentalist, Rūdakī served as a court poet to the Sāmānid ruler Naṣr II (914–943) in Bukhara until he fell out of favour in 937. He ended his life in wretched poverty. Approximately 100,000 couplets are attributed to Rūdakī, but of that enormous output, fewer than 1,000 have survived, and these are scattered among many anthologies and biographical works. His poems are written in a simple style, characterized by optimism and charm and, toward the end of his life, by a touching melancholy. In addition to parts of his divan (collection of poems), one of his most important contributions to literature is his translation from Arabic to New Persian of *Kalīlah wa Dimnah,* a collection of fables of Indian origin. Later retellings of these fables owe much to this lost translation of Rūdakī, which further ensured his fame in Perso-Islāmic literature.

rudd (*Scardinius erythrophthalmus*), stout-bodied freshwater sport fish of the carp family, Cyprinidae, similar to the related roach, but more golden, with yellow-orange eyes, deep red fins, and a sharp-edged belly. The rudd is widely distributed in Europe and Asia Minor and has been introduced into the United States, where it is called American, or pearl, roach. It is a schooling fish that frequents thickly planted, reedy lakes and slow rivers and eats plants, small animals, and insects. Maximum length and weight are about 35–40 centimetres (14–16 inches) and 1–2 kilograms (2–4½ pounds).

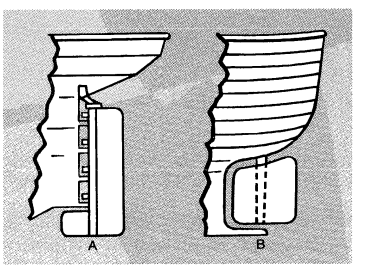


Rudd (*Scardinius erythrophthalmus*)
W.S. Pitt—Eric Hosking

Rudd, Steele, pseudonym of ARTHUR HOEY DAVIS (b. Nov. 14, 1868, Drayton, Queen., Australia—d. Oct. 11, 1935, Brisbane, Queen.), novelist, playwright, and short-story writer whose comic characters are a well-known part of Australia's literary heritage.

Son of a blacksmith, Rudd worked as a horsebreaker, stockman, and drover before going to Brisbane, where he became a clerk and began to write poems and sketches for local journals. His first book was the largely autobiographical *On Our Selection* (1899), followed by a similar volume, *Sandy's Selection* (1904). He later adapted *On Our Selection* into a successful play that was produced in London; six other dramas followed. In more than 20 volumes Rudd depicted farm life in the Darling Downs area of southern Queensland. Though his early work was often realistic and tragic, he later found popular success in creating caricatures of rustic types. Adapted into comic strips, radio programs, and films, his popular work has retained its hold on the Australian public since his death. In 1904 he founded *Steele Rudd's Magazine,* a popular periodical that appeared at irregular intervals over the next 25 years. A champion of Australian writing, he published the work of many unknown writers who later achieved fame.

rudder, part of the steering apparatus of a boat or ship that is fastened outside the hull, usually at the stern. The most common form consists of a nearly flat, smooth surface of wood or metal hinged at its forward edge to the sternpost. It operates on the principle of unequal water pressures. When the rudder is turned so that one side is more exposed to the force of the water flowing past it than the other side, the stern will be thrust away from the side that the rudder is on and the boat will swerve from its original course. In small craft the rudder is operated manually by a handle termed a tiller or helm. In larger vessels, the rudder is turned by hydraulic, steam, or electrical machinery.



(A) Semibalanced rudder; (B) balanced rudder
From F. Riesenberg, *Standard Seamanship for the Merchant Service*

The earliest type of rudder was a paddle or oar used to pry or row the stern of the craft around. The next development was to fasten a steering oar, in a semivertical position, to the vessel's side near the stern. This arrangement was improved by increasing the width of the blade and attaching a tiller to the upper part of the handle. Ancient Greek and Roman vessels frequently used two sets of these steering paddles. Rudders fastened to the vessel's sternpost did not come into general use until after the time of William the Conqueror. In ships having two or more screw propellers, rudders are fitted sometimes directly behind each screw.

Special types of rudders use various shapes to obtain greater effectiveness in manoeuvring. The balanced rudder and the semibalanced rudder (*see* illustration) are shaped so that the force of the water flowing by the rudder will be balanced or partially balanced on either side of its turning axis, thus easing the pressure on the steering mechanism or the helmsman. The lifting rudder is designed with a curvature along its lower edge that will lift the rudder out of danger should it strike an object or the bottom.

ruddy turnstone, shorebird species of the genus *Arenaria. See* turnstone.

Rude, François (b. Jan. 4, 1784, Dijon, Fr.—d. Nov. 3, 1855, Paris), French sculptor, best known for his public monuments such as the "Departure of the Volunteers of 1792," popularly called "La Marseillaise" (1833–36; Arc de Triomphe, Paris). He rejected the formalism of late 18th- and early 19th-century French sculpture in favour of a dynamic, emotional style and for more than 50 years became the paragon for artists working on official commissions.

After the death of his father, whom he had assisted in his metalworking shop, Rude went to Paris determined to perfect himself in the art of sculpture. He won the Prix de Rome in 1812 but could not go to Rome because of the Napoleonic Wars. He was an enthusiastic Bonapartist. The attention of the public was first attracted to Rude by "Mercury Attaching his Winged Sandals" (1828; Louvre, Paris), a work that strictly conformed to the rules of the Neoclassical school of French sculpture. But Rude was obviously uncomfortable within the restrictions of the classical canon and might be called rather a Romantic-Realist. In his "Neapolitan Fisherboy Playing with a Tortoise" (1834; Louvre), the unusual pose and the open mouth both break with tradition. In the statue of Marshal Ney in the Place de l'Observatoire in Paris, the hand with the sword raised above the head and the open mouth again violated Neoclassic principles. The group of volunteers (for the Revolutionary campaign of 1792) on the Arc de Triomphe, although classical in detail, is romantic and impetuous in feeling.

Many critics have felt that Rude's adulation of Napoleon Bonaparte was more powerful than his aesthetic judgment, causing his memorial, "Bonaparte Awakening to Immortality" (1847) at Fixin near Dijon (plaster cast in the Louvre) to be a grandiloquent failure, though others have admired its careful realism. Toward the end of his life, Rude returned to his early, classical style but achieved little of note under this reimposed discipline.

Rudel, Julius (b. March 6, 1921, Vienna), Austrian-born U.S. conductor and opera impresario who was conductor or director of the New York City Opera, 1944–79.

Rudel attended the Vienna Academy of Music and, after immigrating to the United States in 1938, studied at the Mannes School of Music in New York. In 1943 he joined the New York City Opera as a rehearsal pianist and coach. He made his conducting debut in a New York City Opera production of Johann Strauss's *The Gypsy Baron* in 1944, and in the following years he continued to conduct at the New York City Opera. He also directed the Third Street Music School (1945–52) and acted as music director of the New York City Light Opera. From 1957 to 1979, he served as director of the New York City Opera. Rudel instilled the spirit of ensemble opera in the company, which, during those years, offered an adventurous repertory; noteworthy were its premieres of American operas by Carlisle Floyd, Robert Ward, Douglas Moore, and

Hugo Weisgall. Rudel achieved a memorable success with Cole Porter's *Kiss Me, Kate* at the Vienna Volksoper in 1956. He was the first music director of the Kennedy Center for the Performing Arts in Washington, D.C. (1971–74). In 1979 he went on to become music director of the Buffalo Philharmonic Orchestra.

Rüdesheim, in full RÜDESHEIM AM RHEIN, town, Hesse *Land* (state), western Germany, in the Rheingau (region) at the foot of the Taunus Mountains, chief centre of the Rhine wine industry. It was first mentioned in 864, and there are traces of Celtic and Roman activity at the site. The Brömserburg, an early possession of the archbishops of Mainz, was rebuilt as a residence *c.* 1200 and later belonged to the knights of Rüdesheim (who became extinct in 1548); it now houses historical collections and a wine museum. Half-timber houses, narrow streets, and old inns give the town a medieval character; the ruins of the Ehrenfels Castle (*c.* 1210), a frequent residence of the archbishops of Mainz in the 15th century, are nearby. At the top of the Niederwald Height is a monument commemorating the founding of the German Empire in 1871.

Rüdesheim holds a September wine festival; it is also known for its brandy and *Sekt*, a sparkling white wine. Pop. (1989 est.) 9,243.

Rudini, Antonio Starabba, marchese di (marquess of) (b. April 16, 1839, Palermo—d. Aug. 7, 1908, Rome), Italian statesman, premier of Italy (1891–92, 1896–98).

Member of an old aristocratic Sicilian family that opposed the rule of the Bourbon kings of Naples, Rudini joined the revolutionaries of 1860, and, in 1864, following the Piedmontese annexation, he was, at the age of 25, appointed mayor of Palermo. It was a post of danger as well as of importance, in which Rudini successfully resisted the opponents of national unity who for a week besieged him in the town hall. As a reward, he was promoted to prefect with the task of suppressing brigandage in western Sicily. In 1869 he served briefly as minister of the interior before entering parliament, where he in time became leader of the Right. In 1891 he became premier for a year, surprising many by forming a coalition with the Left.

His second term as premier (and minister of the interior) followed a crisis brought on by the defeat of an Italian army at Adowa, Eth., in March 1896. He concluded peace with Ethiopia, and to satisfy the anti-colonial party he ceded Kassala to Great Britain, thus provoking much indignation in Italy. His domestic policy was not sufficiently elastic to avoid serious rioting, which broke out in 1898; nor was he sufficiently forceful in putting down an incipient Socialist revolution. His government fell in June.

Consult the INDEX *first*

Rudnicki, Adolf (b. Feb. 19, 1912, Warsaw), Polish novelist and essayist.

Rudnicki first appeared on the literary scene with works on social problems. In *Szczury* (1932; "Rats") he described the dull and passive lives of people in provincial areas. *Żołnierze* (1933; "Soldiers") is a sombre naturalistic picture of life in an army barracks. The novels *Niekochana* (1936; "Unloved") and *Lato* (1938; "Summertime") encouraged critics to classify him as a psychological novelist.

Mobilized in the Polish Army in 1939, Rudnicki was taken prisoner by the Germans, escaped, and crossed to the Soviet-occupied zone of Poland. In Lwów he contributed to *Nowe Horyzonty* ("New Horizons"), a Communist periodical. When Germany attacked the U.S.S.R. in 1941, Rudnicki returned to Warsaw, where he lived under a false identity. He took part in the Warsaw uprising of 1944, and after the war he settled in Łódź, joining the Marxist group *Kuźnica* ("The Forge"). He undertook to write a huge volume under the title *Żywe i martwe morze* (1952; "The Living and the Dead Sea"), a moving testament to the "nation of Polish Jews" and how they died. After 1953 Rudnicki began publishing weekly notes in literary periodicals, which have been collected into several volumes entitled *Niebieskie kartki* ("Blue Pages").

Rudny, also spelled RUDNYI, or RUDNYJ, city, Kustanay *oblast* (administrative region), Kazakh Soviet Socialist Republic, on the Tobol River. Rudny, meaning "ore" in Russian, was founded in 1955 beside the huge ore-dressing combine, then under construction, which mines and processes the rich Sokolovka and Sarbay iron-ore deposits. A reservoir on the Tobol supplies the city and combine with water. Electrified rail links join Rudny with cities in the Urals. Pop. (1983 est.) 114,000.

Rudolf, name of rulers grouped below by country and indicated by the symbol •.

Foreign-language equivalents:

Czech	Rudolf
French	Rodolphe, or Raoul
German	Rudolf
Hungarian	Rudolf, or Rezso

AUSTRIA

• **Rudolf I:** *see* Rudolf I (Germany/Holy Roman Empire).

• **Rudolf V:** *see* Rudolf II (Germany/Holy Roman Empire).

BOHEMIA

• **Rudolf:** *see* Rudolf II (Germany/Holy Roman Empire).

BURGUNDY

• **Rudolf I** (d. Oct. 25, 912), first king of Juran (Upper) Burgundy (888–912).

The son of Conrad, count of Auxerre of the powerful German Welf (Guelf) family, Rudolf succeeded to the duchy of Burgundy in 885 or 886. In January 888 he was crowned king at the abbey of St. Maurice d'Agaune and quickly extended his rule over much of Lorraine and Alsace. Attacked by Arnulf of Germany, Rudolf was unable to hold his new territory, and in late 888 he relinquished his claims in exchange for Arnulf's recognition of the kingdom of Burgundy.

• **Rudolf II** (d. July 11, 937), king of Burgundy (912–937) who ruled Italy for nearly four years (923–926) during the chaotic period at the end of the Carolingian era.

The son of Rudolf I, founder of the kingdom of Jurane (Upper) Burgundy (*i.e.*, the part of Burgundy north of Provence), and a descendant of the Welf (Guelf) family, Rudolf II was offered the throne of Italy by Italian nobles disaffected with their king, Berengar of Friuli. Crowned at Pavia in 922, Rudolf fought and defeated Berengar the next year near Piacenza. After Berengar's murder (924), Rudolf ruled both Jurane Burgundy and Italy, residing alternately in the two kingdoms. In 926 Italian nobles, dissatisfied with his reign, made overtures to Hugh of Provence, the actual master of Provence, which was only nominally held by the emperor Louis III (the Blind). Rudolf, recognizing the weakness of his position, returned to Burgundy, and Hugh became king of Italy. When Italian leaders proposed to recall Rudolf to the throne, Hugh concluded a treaty (*c.* 931) ceding Provence to Rudolf in return for Rudolf's renunciation of all claims to the kingdom of Italy. All Burgundy was thus united under his rule.

• **Rudolf III,** byname RUDOLF THE SLUGGARD, or THE PIOUS, French RODOLPHE LE FAINEANT, or LE PIEUX (d. Sept. 6, 1032), last of the independent kings of Burgundy (993–1032).

Son and successor of Conrad the Peaceful, Rudolf was unable to control the rising power of the nobility and the increasing encroachments of Otto-William, count of Besançon, and Emperor Henry II of Germany. In 1016 he was forced to name Henry as his successor, and after Henry's death (1024) the new German king, Conrad II, demanded the same agreement. When Rudolf died without legitimate heirs, Conrad claimed the kingdom and united it with Germany.

FRANCE

• **Rudolf** (d. Jan. 14/15, 936, Auxerre, Fr.), duke of Burgundy (921–936) and later king of France (923–936), who, after a stormy career typical of the general political instability that characterized the age, succeeded in consolidating his authority shortly before he died.

Rudolf was the son-in-law of Robert I, briefly king of France, with whom in 922 he led a rebellion that ousted Charles III the Simple, the Carolingian ruler of France. When Robert was killed in battle the following year, Rudolf was elected king and was crowned at Soissons. His reign was little more than an unending series of battles. He was at first not recognized by many of the magnates; in addition, he had to face the attacks of the Northmen and even of the Hungarians. In 925 he lost Lorraine to Henry I of Germany and in 928 was obliged to cede Laon to Herbert, count of Vermandois, who had earlier been a principal supporter but now exploited his possession of the person of Charles the Simple to blackmail the King.

Rudolf's position improved significantly, however, after the death of Charles in 929 removed a rallying point for the opposition; soon, only Herbert held out against him. The King had just forced his foe's capitulation when he fell ill and died.

GERMANY/HOLY ROMAN EMPIRE

• **Rudolf,** also called RUDOLF OF RHEINFELDEN, or RUDOLF OF SWABIA, German RUDOLF VON RHEINFELDEN, or RUDOLF VON SCHWABEN (d. Oct. 15, 1080, Merseburg, Ger.), German anti-king, opponent of Henry IV.

Rudolf was granted the duchy of Swabia in 1057 by the dowager empress Agnes of Poitou, regent for her infant son Henry IV. She also appointed him administrator of the Kingdom of Burgundy and gave him her daughter Matilda in marriage (1059). Rudolf at first supported Henry IV and was, in fact, largely responsible for Henry's victory over the Saxons at the Unstrut River in 1075. The next year, however, when Pope Gregory VII excommunicated Henry and absolved his subjects from their oaths of allegiance, Rudolf turned against the King. Promising to respect the elective character of the monarchy and to renounce any royal right to the investiture of prelates, he was elected king by an assembly of dissident princes in March 1077 and two months later was crowned at Mainz. The townspeople of Mainz, however, who sympathized with Henry, rioted, and Rudolf was compelled to flee and make his way to Saxony, where he was supported by the majority of the lay and ecclesiastical nobles. After invading Rudolf's duchy of Swabia, Henry, at the end of May 1077, held a diet at Ulm that deprived Rudolf of his duchy on a charge of treason.

Rudolf's effective power was thereafter confined to Saxony. He fought Henry at the indecisive battle at Mellrichstadt (1078) and, more successfully, at Flarchheim (1080). Recognized at last as king by Pope Gregory, early

in 1080, Rudolf on October 15 of that year won a victory over Henry at the Elster River but, in the process, received a mortal wound in the battle.

• **Rudolf I,** also called RUDOLF OF HABSBURG (b. May 1, 1218, Limburg-im-Breisgau, Ger.—d. July 15, 1291, Speyer), first German king of the Habsburg dynasty.

A son of Albert IV, count of Habsburg, Rudolf on the occasion of his father's death (*c.* 1239) inherited lands in upper Alsace, the Aargau, and Breisgau. A partisan of the Hohenstaufen emperor Frederick II and his son Conrad IV, he increased his territories largely at the expense of his uncle, Count Hartmann of Kyburg, and his cousin, Count Hartmann the Younger, who supported the papal cause against the Hohenstaufens. Rudolf's first marriage (*c.* 1245), to Gertrude of Zollern-Hohenberg-Haigerloch, also added considerable property to his domains. In 1254 he assisted the Knights of the Teutonic Order by participating in a crusade in Prussia.



Rudolf I, detail from his tomb sculpture; in the cathedral of Speyer, Ger.

By courtesy of the Bildarchiv Preussischer Kulturbesitz BPK, Berlin

Rudolf's election as German king at Frankfurt was hastened by the desire of the electors to exclude an increasingly powerful rival candidate of non-German birth, Otakar II of Bohemia. Crowned at Aachen on Oct. 24, 1273, Rudolf was recognized by Pope Gregory X in September 1274 on the condition that he would renounce all imperial rights in Rome, in the papal territories, and in Italy and to lead a new crusade. In 1275 the Pope managed to persuade Alfonso X of Castile (whom some of the German electors had chosen king in April 1257) to abandon his claim to the German crown.

Meanwhile Otakar II of Bohemia had been gaining control of Austria, Styria, Carinthia, and Carniola. When in 1274 Otakar refused to appear before an imperial diet to show cause for his actions, Rudolf placed him under the ban of the empire and led an army into Austria, where he defeated Otakar in 1276. In 1278 Otakar, attempting to reconquer the territories he had lost to Rudolf, invaded Austria; he was again defeated and killed at the Battle of Dürnkrut (August 26).

In 1282 Rudolf received permission from the German princes to grant to his sons the territories recovered from Otakar, and in December of that year he granted Austria and Styria to his sons Albert and Rudolf, thus constituting the territorial nucleus of the future Habsburg power.

Rudolf combatted the expansionist policy of France on his western frontier by marrying (his first wife having died in 1281) Isabella, daughter of Hugh IV, duke of Burgundy, and by compelling Otto IV, Count Palatine of Franche-Comté, to pay homage (1289). French influence at the papal court, however, prevented Rudolf from being crowned emperor by the Pope.

Rudolf made great efforts, in concert with the territorial princes, to enforce the public peace (*Landfriede*) in Germany, and in 1274 he reasserted the right of the monarchy to impose taxation on the cities. He was, however, unsuccessful in his efforts, between 1287 and 1291, to secure the election of his elder son Albert as German king or king of the Romans. The German electors were determined that the crown should not become a hereditary possession of the House of Habsburg, and thus the electors' freedom of action remained intact at the time of Rudolf's death.

• **Rudolf II** (b. July 18, 1552, Vienna—d. Jan. 20, 1612, Prague), Holy Roman emperor from 1576 to 1612; his ill health and unpopularity prevented him from restraining the religious dissensions that eventually led to the Thirty Years' War (1618–48).

The eldest surviving son of the emperor Maximilian II and Maria, who was the daughter of the emperor Charles V, Rudolf was crowned king of Hungary in 1572 (as Rudolf) and of Bohemia in 1575 (as Rudolf II). He succeeded his father as emperor and as archduke of Austria (as Rudolf V) on Oct. 12, 1576.

Subject to fits of severe depression, Rudolf soon retired to Prague, where he lived in seclusion, dabbling in the arts and sciences. During the first 20 years of his rule disputes between Roman Catholic and Protestant factions crippled the political institutions of the empire. In Austria Rudolf reversed Maximilian II's tolerant religious policy and sought to limit the political privileges of the Protestant Estates (the nobles and representatives of the towns).

The Emperor's mental instability grew worse after 1598, and in 1605 the Habsburg archdukes, long dissatisfied with his political incompetence, compelled him to entrust the conduct of Hungarian affairs to his brother Matthias. In 1606 they recognized Matthias as their head and as their candidate for Rudolf's succession. Two years later Rudolf was forced to cede Hungary, Austria, and Moravia to Matthias and to promise him the succession in Bohemia. When mutinous imperial troops under the archduke Leopold ravaged Bohemia with Rudolf's support in 1611, the Bohemian Estates sought help from Matthias, whose army virtually held Rudolf prisoner in Prague until he yielded Bohemia to Matthias in May. Although Rudolf prevented Matthias' preliminary election as king of the Romans (successor-designate to the empire), Matthias gained the imperial throne five months after Rudolf's death.



Rudolf II, oil painting by Johann von Aachen; in the Kunsthistorisches Museum, Vienna

By courtesy of the Kunsthistorisches Museum, Vienna

HUNGARY

• **Rudolf:** *see* Rudolf II (Germany/Holy Roman Empire).

ITALY

• **Rudolf:** *see* Rudolf II (Burgundy).

Rudolf, ARCHDUKE AND CROWN PRINCE OF AUSTRIA, German RUDOLF, ERZHERZOG UND KRONPRINZ VON ÖSTERREICH (b. Aug. 21, 1858, Schloss Laxenburg, near Vienna—d. Jan. 30, 1889, Schloss Mayerling, near Vienna), heir to the Austro-Hungarian throne whose reformist and liberal ideas were stifled by his conservative father and who finally committed suicide.

The only son of the emperor Francis Joseph and the empress Elizabeth, Rudolf received an extensive education and travelled widely. Politically, his anxiety to overcome the problem of the various nationalities of the Habsburg monarchy and his antipathy toward Russian imperialism were combined with liberal and anticlerical views, which alienated him from his father and from the prime minister, Eduard, Graf von Taaffe. The Emperor excluded him from the business of government and arranged his marriage (May 10, 1881) to Stephanie, daughter of Leopold II of the Belgians. She bore only one child, Elizabeth Marie, who, being female, was excluded from the imperial succession.



Rudolf, archduke and crown prince of Austria, 1888

By courtesy of the Bild-Archiv, Osterreichische Nationalbibliothek, Vienna

Rudolf in October 1881 came under the influence of a journalist, Moritz Szeps, to whose radical paper, the *Neues Wiener Tagblatt,* he contributed anonymous articles. He also published two books on his travels and sponsored a monumental survey of Austria-Hungary, *Österreich-Ungarn in Wort und Bild* ("Austria-Hungary in Word and Picture"). At the same time he entertained schemes for having himself crowned king of Hungary and for resuscitating a Kingdom of Poland. Frustrated in his designs and unhappy in his marriage, he fell into despondency. The baroness Maria Vetsera, a girl of 17 with whom he had begun relations in October, 1887, accepted his offer of a suicide pact. In the morning of Jan. 30, 1889, he and Maria were found shot dead in the hunting lodge at Mayerling. Maladroit attempts by the Emperor and his advisers to disguise the facts provoked many rumours; enemies of the Habsburg court added false interpretations; and romantic writers battened on the stories. Apart from mental derangement, the most plausible explanation of Rudolf's act is that he believed that his dealings with the Hungarian opposition were about to be exposed.

His position as heir to the throne was assumed by his cousin Francis Ferdinand (assassinated at Sarajevo in 1914).

BIBLIOGRAPHY. Karoly Lonyay, *Rudolph: The Tragedy of Mayerling* (1949), a heavily documented study, makes use of secret state papers. Richard Barkeley, *The Road to Mayerling: Life and Death of Crown Prince Rudolph of Austria* (1958), is a popular treatment.

Rudolf OF HABSBURG: *see* Rudolf I *under* Rudolf (Germany/Holy Roman Empire).

Rudolf OF RHEINFELDEN: *see* Rudolf *under* Rudolf (Germany/Holy Roman Empire).

Rudolf OF SWABIA: *see* Rudolf *under* Rudolf (Germany/Holy Roman Empire).

Rudolf VON EMS (b. *c.* 1200, Hohenems, Swabia [now in Austria]—d. *c.* 1254, Italy), prolific and versatile Middle High German poet. Between about 1220 and 1254 he wrote five epic poems, totaling more than 93,000 lines. His castle at Hohenems, near Lake Constance, still stands.

Though the influence of earlier masters of the courtly epic is evident in his work—his style is modeled on Gottfried von Strassburg, while his moral outlook derives from Hartmann von Aue—Rudolf's poems show considerable originality in subject matter. His earliest preserved poem, *Der guote Gerhart* ("Gerhard the Good"), is the story of a Cologne merchant who, despite his unaristocratic calling, has all the courtly qualities of an Arthurian knight. His charity and humility result in his being offered the crown of England, which he rejects. The charm and realism of this poem were not equaled in Rudolf's other works: *Barlaam und Josaphat,* a Christian version of the legend of Buddha; and the three historical epics, *Alexander, Willehalm von Orlens,* and *Weltchronik,* an ambitious, uncompleted world chronicle that ends with the death of Solomon. The popularity of Rudolf's writings can be gauged by the fact that there are more than 80 extant manuscripts and manuscript fragments of the *Weltchronik* alone.

Rudolf, Lake, also called LAKE TURKANA, fourth largest of the eastern African lakes, in northern Kenya, with its northern end stretching into Ethiopia. The lake lies in the eastern arm of eastern Africa's Rift Valley. The lake covers an area of 2,473 square miles (6,405 square km) and lies at 1,230 feet (375 m) above sea level. Together with Lake Baringo (south), Lake Rudolf once formed a larger body of water drained by the Sobat River into the Nile River. Earth movements during the Pleistocene epoch (1,600,000 to 10,000 years ago), however, created a smaller lake of independent inland drainage. Volcanic outcrops give rise to rocky shores in the east and south, while the lake's western and northern shores are lower and consist of sand dunes, sandspits, and mud flats. The three main islands in the lake—North, Central, and South—are volcanic.

Lake Rudolf is 154 miles (248 km) long and only 10–20 miles (16–32 km) wide and is relatively shallow, with a greatest recorded depth of 240 feet (73 m). The lake's level and hence its area tend to fluctuate. The lake's only perennial tributary is the Omo River, which flows from Ethiopia. Having no outlet, the lake's waters are brackish. Sudden storms in the area are frequent, rendering navigation on the lake treacherous.

Lake Rudolf is a rich reservoir of fish. Nile perch, tigerfish, bichir, and various species of *Tilapia* abound. Crocodiles and hippopotamuses are common. Birds include flamingos, cormorants, and kingfishers. Some sorghum (millet) is cultivated along the lakeshores, but the peoples of the neighbouring desert scrub are largely nomadic pastoralists.

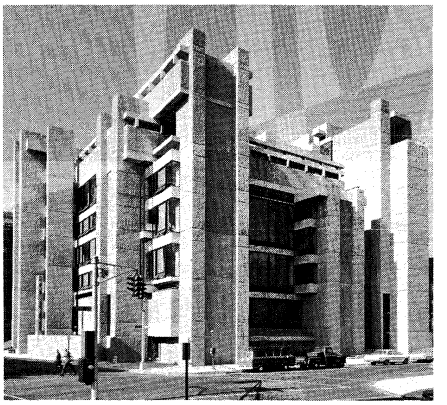
Count Samuel Teleki and Lieutenant Ludwig von Höhnel visited the lake in 1888 and named it after the Crown Prince of Austria. In Kenya it is called Lake Turkana.

Rudolph (personal name): *see under* Rudolf.

Rudolph, Paul (Marvin) (b. Oct. 23, 1918, Elkton, Ky., U.S.), one of the most prominent American architects to emerge in the period after World War II. His buildings are notable for creative and unpredictable designs that appeal strongly to the senses.

Rudolph received a bachelor's degree in architecture from Alabama Polytechnic Institute in 1940 and received a master's degree at Harvard University, where he studied under Walter Gropius. During World War II he served (1943–46) with the U.S. Navy as a supervisor of ship construction at the Brooklyn Naval Yard.

In the late 1940s and early 1950s Rudolph practiced architecture in Sarasota, Fla., first as a designer of private residences for the firm of Twitchell and Rudolph and later working independently. His early designs used the glass walls and austere geometry of the International Style but attracted attention by their ingenious construction and attractive lines. Rudolph came to believe that a building's form should develop from and be integrated with its interior uses and structure, and this led him to break up a building's masses into distinctly articulated units that are interesting from both the outside and the inside. His early orchestrations of different units were regular and rather symmetrical, as in the Mary Cooper Jewett Arts Center for Wellesley College (1955–58).



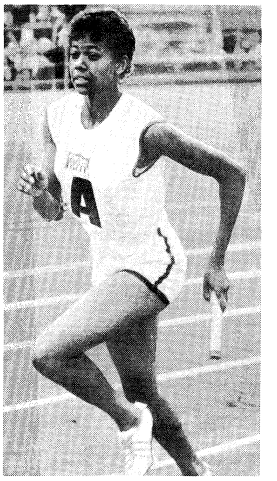
School of Art and Architecture, Yale University, New Haven, Conn., designed by Paul Rudolph, completed 1963

© Ezra Stoller (ESTO)

From 1958 to 1965 Rudolph was chairman of the department of architecture at Yale University. His School of Art and Architecture at Yale University (1958–63), with its complex massing of interlocking forms and its variety of surface textures, is typical of the increasing freedom, imagination, and virtuosity of his mature building approach. Rudolph's Boston Government Service Center (1963) and the Endo Laboratories in Garden City, N.Y. (1962–64), continue a trend toward complex, irregularly silhouetted, and dynamic structures that contain dissimilar but harmoniously combined masses, shapes, and surfaces.

In 1965 Rudolph left Yale to practice in New York City. His practice grew in size and volume and embraced master plans for urban communities as well as designs for campuses and educational buildings, office buildings, and residential projects. Other important works by Rudolph include the IBM Complex at East Fishkill, N.Y. (1962; with Walter Kiddle), and the Burroughs Wellcome Corporate Headquarters, Research Triangle Park, at Durham, N.C. (1969).

Rudolph, Wilma (Glodean) (b. June 23, 1940, St. Bethlehem, Tenn., U.S.), U.S. sprinter, the first American woman to win three track-and-field gold medals in the Olympic Games.



Wilma Rudolph, 1961

AP/Wide World Photos

Rudolph was sickly as a child and did not walk without a special shoe until she was 11 years old. Her determination to compete, however, made her a star basketball player and sprinter at Clarksville (Tennessee) High School. She attended Tennessee State University (Nashville) from 1957 to 1961. When she was 16, the team of which she was a member won the bronze medal in the 4 × 100-metre relay race in the 1956 Olympic Games at Melbourne. In 1960, before the Olympic Games at Rome, she set a world record of 22.9 sec for the 200-metre race, and in the games themselves she won gold medals in the 100-metre dash (world record: 11.3 sec), the 200-metre dash, and as a member of the 4 × 100-metre relay team, which set a world record of 44.4 sec (lowered by another U.S. team she anchored in 1961 to 44.3 sec). She was Amateur Athletic Union 100-yard-dash champion (1959–62).

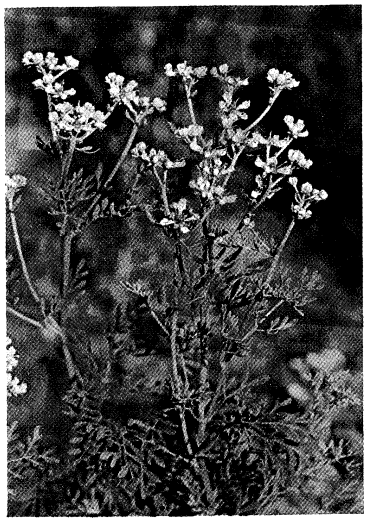
After retiring as a runner, Rudolph was an assistant director for a youth foundation in Chicago during the 1960s to develop girls' track-and-field teams, and thereafter she promoted running nationally.

Rudolphine Tables, Latin TABULAE RUDOLPHINAE, planetary tables and star catalog published in 1627 by Johannes Kepler, based principally on the observations of Tycho Brahe. The best of the pretelescopic catalogs, it is accurate to a few minutes of arc and contains positions for 1,005 stars (increased by Kepler from Tycho's 777) and tables and directions for locating the planets. It is the first catalog to include corrective factors for atmospheric refraction, and logarithmic tables. It was named for Rudolf II, Holy Roman emperor and patron of Kepler and Tycho.

Rudolphi's rorqual: *see* sei whale.

Rudra (Sanskrit: Howler), relatively minor Vedic god and one of the names of Śiva, a major god of later Hinduism. Śiva is considered to have evolved from Rudra, and the two share a fierce, unpredictable, destructive nature. In the Vedas, Rudra is known as the divine archer, who shoots arrows of death and disease and who has to be implored not to slay or injure in his wrath. As a healer and a source of 1,000 remedies, he has also a beneficent aspect. He is also the father of the storm gods, the Rudras, sometimes called Maruts.

rue, any plant of the genus *Ruta,* of the family Rutaceae, comprising 40 species of perennial shrubs and herbs native to Eurasia and the Canary Islands. Common rue (*R. graveolens*) is cultivated as a small garden shrub



Common rue (*Ruta graveolens*)
Shunji Watari—EB Inc.

for its evergreen leaves and dull-yellow flower clusters. The gland-studded, translucent leaves have been used for centuries as a spice and in medicines.

Meadow rue is a plant of the genus *Thalictrum* of the buttercup family (Ranunculaceae).

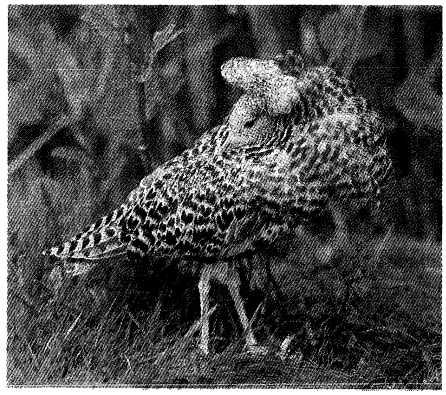
Rueda, Lope de (b. *c.* 1510, Seville—d. 1565, Córdoba), outstanding figure of the early Spanish theatre who did much to popularize it and prepared the way for Lope de Vega.

A gold-beater by trade, Rueda was probably attracted to the stage by touring Italian actors; he organized a travelling theatre company and as its *autor,* or author-manager, took his troupe throughout Spain. He became popular and played before all kinds of audiences, from Philip II to crowds of rural townfolk. His work was seen by Cervantes, who praised him both as an actor and as a writer of verse. His most important contributions to early Spanish drama are the *pasos,* comic representations drawn from the events of daily life and intended to be used as humorous relief between the acts of longer works or even incorporated into them as amusing interludes. Written in prose, they brought to the stage a natural language spoken by conventional figures such as the simpleton and the master. His longer works, the *comedias Medora, Armelina, Eufemia,* and *Los engañados* and the dialogues *Camila, Tymbira,* and *Prendas de amor,* derive directly from Italian comedy.

Rueil-Malmaison, city, Hauts-de-Seine *département,* Paris region. It is a western residential and industrial suburb of Paris, 5.3 mi (8.5 km) by road from the city limits of the capital. Originally called Rotoialum, or Roialum, it was a pleasure resort of the Merovingian kings, a Frankish dynasty (6th–8th century). In 1346, Rueil was burned by the Black Prince, son of Edward III of England. In 1622 Christophe Perrot, a counsellor of the Parlement de Paris, built himself a château at the site called Malmaison (House of Misfortune). It was purchased in 1799 and enlarged by Joséphine Bonaparte, first wife of Napoleon, and later empress of the French; Napoleon stayed there between campaigns and spent a short while there after his defeat in 1815. It is now a museum. The empress Joséphine and her daughter, Queen Hortense, are buried in the 16th-century church of Rueil, restored by Napoleon III in the 19th century. Industries in the suburb include the manufacture of auto parts, photographic film, and pharmaceuticals. It is also a centre for engraving and distilling. Pop. (1982) 63,310.

ruff, in zoology, Old World bird (*Philomachus pugnax*), of the sandpiper subfamily Calidritinae (family Scolopacidae) remarkable for its courtship plumage and behaviour. The name ruff applies to the species or may be applied to the male only. In spring the 30-centimetre (12-inch) male acquires a double crest ("cape") and a collar ("ruff"); these may contain reddish, brown, black, and white feathers in proportions that vary with the individual (the most extreme case of polymorphism known among birds). The female, called the reeve, is only about 25 centimetres (10 inches) long and is plain grayish brown, as is the male in winter. In the breeding season males gather on a traditional display area (lek), usually a bare hill, and, while the reeves watch, display close together by making short rushes with cape and ruff erect and wings drooping. When a reeve strolls into their midst the males collapse, quivering, with bills stuck into the ground. Then the female chooses one of the males. She builds a nest, incubates the eggs, and raises the chicks alone. The sexes keep apart, even in flocks (further evidence of the extreme dimorphism of the species).

The ruff breeds in river meadows and coastal marshes from northern Europe to Siberia. It



Male ruff (*Philomachus pugnax*) displaying
© Bruce Coleman—Bruce Coleman Inc.

is decreasing in population because of cultivation. It winters on broad mud flats from the North Sea to southern Africa and parts of southern Asia, and it has been recorded with increasing frequency in North America.

ruff, in dresswear, crimped or pleated collar or frill, usually wide and full, worn in Europe, especially from the mid-16th century into the 17th century, by both men and women. The beginnings of the ruff can be seen in the early years of the 16th century, when men allowed the top of the shirt to be exposed. A drawstring through the top, when pulled tight, created an incipient ruff. The ruff increased in size, becoming a symbol of the aristocracy. Women wanted to show their status in society and also wished to expose the bosom, so the ruff developed as a half circle—open in front and rising in back.



Woman wearing a ruff, detail of "Portrait of a Lady of the Vavasour Family," oil on wood by Bartholomäus Bruyn, the Younger, *c.* 1570; in the Art Gallery of Ontario, Toronto
By courtesy of the Art Gallery of Ontario, Toronto

The ruff was at first worn with a supporting wire frame and was later starched. Usually, it was white. By the end of the 16th century, the ruff was generally replaced by other types of collars. Once again, in the early 19th century, a modified ruff became fashionable for women's daytime wear.

ruffed grouse, North American game bird sometimes called a partridge. *See* grouse.

Ruffin, Edmund (b. Jan. 5, 1794, Prince George County, Va., U.S.—d. June 18, 1865, Amelia County, Va.), the father of soil chemistry in the United States, who showed how to restore fertility to depleted Southeast plantations. He was also a leading secessionist for decades prior to the U.S. Civil War.

Born into Virginia's planter class, Ruffin was largely educated at home. In 1813 he took over management of his recently deceased father's tobacco plantation. Like other tidewater farmlands, it had declined greatly in productivity owing to single-crop agriculture, overuse, and poor farming methods. Though lacking any background in scientific agriculture, Ruffin set about investigating the causes and cures of soil depletion. He found that Southern soils had become so acid that they could not retain fertilizers.

In 1818 Ruffin presented a paper—later (1821) expanded into an article for *American Farmer* and eventually into a highly influential book, *An Essay on Calcareous Manures* (1832)—in which he explained how applications of calcareous earths (marl) reduced soil acidity. Even more persuasive were Ruffin's enhanced yields of corn and wheat on lands fertilized, plowed, planted, rotated, and drained according to his instructions.

From 1833 to 1842 Ruffin published and largely wrote an agricultural journal, the *Farmer's Register.* He became the president of the Virginia State Agricultural Society in 1852. Throughout the 1820s, 1830s, and 1840s, he wrote numerous articles and pamphlets and gave many speeches on the benefits of scientific agriculture in the South.

As the sectional conflict intensified during the 1850s, however, Ruffin turned his attention more and more to defending slavery, largely on racial grounds. In 1857 he published *The Political Economy of Slavery,* in which he contrasted favourably Southern chattel servitude with Northern free labour. His *Anticipations of the Future* in 1860 called for secession and predicted a happy and prosperous independent South.

Ruffin fired one of the first shots at Fort Sumter in 1861. During the Civil War he grew increasingly despondent as his long-cherished dreams were crushed by Union military might. Two months after Appomattox, Ruffin wrote a note in which he said, "I cannot survive my country's liberty," and then killed himself.

Ruffini, Paolo (b. Sept. 22, 1765, Valentano, Papal States—d. May 9, 1822, Modena, Duchy of Modena), Italian mathematician and physician who made studies of equations that anticipated the algebraic theory of groups. He is regarded as the first to make a significant attempt to show that there is no algebraic solution of the general quintic equation (an equation with the variable in one term raised to the fifth power).

Appointed professor of mathematics at the University of Modena in 1787 and professor of clinical medicine and applied mathematics

in 1799, Ruffini left for seven years to teach applied mathematics at the military school at Modena (later the Italian Military Academy). He refused to take a civil oath while at Modena, for which the Cisalpine government dismissed him for one year. In 1814 he became rector of the University of Modena.

Ruffini finished his proposed proof of the general quintic equation in 1799, but his demonstration was severely criticized for lack of rigour. It remained for the noted Norwegian mathematician Niels Henrik Abel to devise an improved proof in 1824, which also fell somewhat short of completeness. Ruffini's contribution to the understanding of groups was fundamental to the brilliant work on group theory that followed—namely, that of Evariste Galois and Augustin-Louis Cauchy, both of France.

Ruffini ending, sensory nerve ending lacking any definite capsule and thought to assist in the sensation of pressure. It is named for the 19th–20th-century Italian anatomist Angelo Ruffini, who first described it. Ruffini endings are found in ligaments, joints, and subcutaneous tissue. *See also* Meissner corpuscle; pacinian corpuscle.

Ruffo, Fabrizio (b. Sept. 16, 1744, San Lucido, Calabria, Kingdom of Naples—d. Dec. 13, 1827, Naples), Roman Catholic cardinal and politician who was royal vicar of the Neapolitan kingdom (1799) and led a royalist-popular counterrevolution against the French under Napoleon.

The son of Litterio Ruffo, duke of Baranello, Ruffo was placed by Pope Pius VI among the *chierici di camera*—the clerks who formed the papal civil and financial service. He was later promoted to be treasurer general, a post that carried with it the ministry of war. In 1791 he was removed from the treasurership but was created cardinal on September 29 though he was not in orders. He never became a priest.

Ruffo went to Naples, and when in December 1798 the French troops advanced on Naples, he accompanied the royal family to Palermo. He was chosen to head a royalist movement in Calabria, where his family exercised large feudal powers. He was named vicar-general on Jan. 25, 1799. On February 8, he landed at La Cortona with a small following and began to raise the so-called "Army of the Faith" in association with Fra Diavolo.

Ruffo had no difficulty in upsetting the republican government established by the French and by June had advanced to Naples. But he lost favour with King Ferdinand IV by showing a tendency to spare the republicans. He resigned his vicar-generalship, and during the second French conquest and the reigns of Joseph Bonaparte and Joachim Murat he lived quietly in Naples. During the revolutionary troubles of 1822 he was consulted by the King and was even in office for a very short time as a "loyalist" minister.

Rufiji River, river, the largest in Tanzania, East Africa, draining most of the southern part of the country and navigable for about 60 mi (100 km). Formed by the confluence of the Kilombero and the Luwegu rivers, it flows for about 175 mi northeast and east to enter the Indian Ocean, opposite Mafia Island. The river has major potential for irrigation and hydroelectric power development. Its principal tributary is the Great Ruaha.

Rufinus, in full FLAVIUS RUFINUS (d. Nov. 27, 395, Constantinople), minister of the Eastern Roman emperor Arcadius (ruled 383–408) and rival of Stilicho, the general who was the effective ruler of the Western Empire. The conflict between Rufinus and Stilicho was one of the factors leading to the official partition of the empire into Eastern and Western halves.

Rufinus was a native of Gaul who had risen to the rank of praetorian prefect of Illyricum. Shortly before he died early in 395, the emperor Theodosius I (the effective ruler of the whole empire) appointed Rufinus guardian of his son Arcadius and Stilicho guardian of his other son, Honorius, who had been made nominal ruler of the West.

At once the two regents became enemies. Stilicho had the military advantage, for he had under his command Eastern troops that had been brought to the West by Theodosius to crush a usurper. Rufinus sought to strengthen his political position by marrying his only daughter to Arcadius, but the marriage was prevented by the chamberlain, Eutropius. When Stilicho landed in Greece to suppress an uprising of the Visigoths, he sent troops to Constantinople in apparent (or pretended) compliance with an order from Arcadius (prompted by Rufinus). The army, under the command of Gainas, reached the city in late November 395 and unexpectedly murdered Rufinus. There is extant a posthumous attack on Rufinus by the poet Claudianus, a supporter of Stilicho.

Rufinus, Tyrannius (b. *c.* 345, Concordia, near Aquileia, Italy—d. 410/411, Sicily, possibly at Messina), Roman priest, writer, theologian, and translator of Greek theological works into Latin at a time when knowledge of Greek was declining in the West.

After study at Rome, where he met Jerome (later a saint and one of the doctors of the Western Church), Rufinus entered a monastery at Aquileia. Jerome often visited the monastery, and the two became close friends.

About 373 Rufinus began to study the writings of Origen (*q.v.*), one of the Greek doctors of the church. In the early 390s Rufinus and Jerome became involved in a controversy over Origen's teachings, by this time suspected by orthodox theologians of injecting heretical elements into theology. In 393 both men were charged with Origenist leanings, but Rufinus refused to make formal abjuration of the alleged errors, while Jerome readily did so. The discord between the men continued during the next year, abated by 397, and then flared soon afterward into a bitter quarrel when Rufinus published in Rome a translation of Origen's *De principiis* ("On First Principles") and wrote a preface representing Jerome to be an admirer of Origen. Thereafter, Rufinus was subjected to merciless abuse from Jerome. Rufinus' orthodoxy was questioned, and he was obliged to write an *Apologia* to Pope Anastasius, who had summoned him to Rome.

For the remainder of his life Rufinus devoted himself to literary pursuits, translating numerous biblical commentaries and homilies by Origen, an *Apologia* for Origen by the learned teacher and martyr Pamphilus, sermons by Saints Basil and Gregory of Nazianzus, and the history of the early church by the scholar Eusebius; none of these works survive in complete texts. Whenever he suspected that works that he was in the process of translating had been altered by unorthodox theologians, Rufinus did not hesitate to shorten or paraphrase the original text. His own writings include a commentary on the Apostles' Creed that exemplified contemporary catechetical instruction and provided the earliest continuous Latin text of the creed.

Rufisque, town and minor port, east of Dakar at the southeastern end of the Cape Verde Peninsula (Presqu'île du Cap Vert), Senegal. Its proximity to Dakar, the national capital, has spurred the development of some light industry, including textile, oil, lime, footwear, and cement works. There are natural gas deposits nearby. Rufisque is a busy transport hub on the Dakar–Niger and Dakar–Saint-Louis railways. Pop. (1976 prelim.) 49,800.

Rufus, Lucius Verginius: *see* Verginius Rufus, Lucius.

Rufus, Marcus Caelius: *see* Caelius Rufus, Marcus.

Rufus, Publius Sulpicius: *see* Sulpicius Rufus, Publius.

Rufus, Servius Sulpicius: *see* Sulpicius Rufus, Servius.

rug and carpet, decorative textiles, usually intended as floor coverings and normally made of a thick material. Until the 19th century, rugs and carpets were handmade and were often of such high artistic quality that they were usually considered works of art. In the 20th century the word rug is often used to describe a partial and movable floor covering, often of relatively small size, while the word carpet denotes wall-to-wall covering that is fastened to the floor.

A brief treatment of rugs and carpets follows. For full treatment, *see* MACROPAEDIA: Decorative Arts and Furnishings; Industries, Manufacturing.

The design of rugs and carpets is frequently considered as an aspect of interior design, although before the 17th century they were made almost exclusively as objects of beauty, luxury, and utility in their own right and not conceived as part of an overall scheme or pattern. Their design and execution reached its highest artistic quality in Persia in the 15th and 16th centuries.

Carpets were first made in central and western Asia as coverings for earthen floors and were the only form of decorative art generally practiced by nomadic peoples. Carpets—unlike furniture, pottery, or metalworks—could be easily transported and were as useful in tents and simple dwellings as they were in palaces and religious buildings. Carpets served as blankets, saddle covers, storage bags, flexible tent doorways, and tomb covers. The prayer rug was designed to be carried everywhere and was therefore correspondingly small and portable and usually decorated with religious imagery.

Oriental carpets imported into Europe in the 16th and 17th centuries were considered as valuable objects of decorative art, too precious to be put on the floor, and they were frequently hung on walls, over balconies, or used to cover furniture. Dutch paintings of 17th century interiors often show Oriental carpets used as chest or table covers.

The two distinct techniques of Oriental carpet weaving are the knotted pile carpet and the woven flat carpet, or *kilim*. The material used is usually wool, though some of the finest Persian carpets are woven of silk. Cotton, linen, and hemp are the traditional materials for the carpet foundation, which is composed of horizontal, or weft, yarns, and vertical, or warp, yarns. The different pile carpet yarns, traditionally coloured with natural dyes such as madder and indigo, are knotted individually by hand around warp yarns so that the unknotted ends form a pile above the foundation. These pile ends are later sheared to an even height. The quality of the carpet is determined by the intricacy and beauty of the design and by the density and skill of the knotting. Some Indian carpets have more than 2,400 knots per square inch. Several different types of knot were used, depending on the geographical origin of the carpet, the most important of these being the Turkish, or Ghiordes, knot and the Persian, or Sehna, knot. *Kilims* are made in a manner similar to tapestries and do not, therefore, have any pile.

The overall design of a carpet is usually divided between a central area, called the field, and one or more borders that act as a sort of frame. The field may be decorated with an all-over design or with various panels or medallions. The designs of the finest carpets

are usually intricate yet always balanced and harmonious.

The motifs used are often symbolic and may be geometric, stylized, or naturalistic. In the finest Persian carpets a stylized scrolling vine design, or arabesque, was common. Naturalistic plant forms, such as flowers and fruit trees, symbolize eternal life and rebirth. Small birds and motifs connected with the hunt were also favoured. Designs of great elegance and intricacy inspired by illuminated manuscripts were also highly regarded. European carpets tended toward less stylized flat designs in favour of designs that imitated painting, creating a pictorial effect with light and shadow.

The carpets of western Turkistan, sometimes wrongly called Bokhara, were made in great quantity, especially in the last century, by nomadic tribes, and large numbers have been exported to the west. Most of these carpets are dark red in colour with geometrical designs covering the field and arranged symmetrically in rows.

Important European carpet manufacturies were established in France, where Savonnerie and Aubusson carpets were made in the 17th and 18th centuries, and in England at Axminster. Mechanization transformed carpet making in the 19th and 20th centuries. The power loom made its appearance in 1839, and the high-speed tufting method originated in the United States in the 1920s. In the tufting process, a prewoven backing fabric moves through a high-speed machine as a bank of giant needles inserts individual tufts into the material. Yarn from spools on large creels is airblown through plastic or copper tubes to the needles. On the face side of the carpet, the yarn is caught by a hook that forms the loop. For cut pile, a small knife beside each hook slits the loop.

A layer of latex over the back of the carpet locks the fibres in place. A second woven backing may be added to increase stability and strength. Through electronic control of the yarn feed and the needle action, the height of the pile may be varied, creating textured patterns. The three basic types of power looms are the velvet, the Wilton, and the Axminster.

Rugby, district (borough), county of Warwickshire, England, with an area of 137 sq mi (356 sq km). Rugby was not of great importance until the coming of the railways in the 19th century. It then became a railway junction and attracted a wide range of industry, including especially the production of electrical equipment. Rugby School, a famous public (*i.e.,* fee-paying) school, was founded for boys in 1567 by Laurence Sheriff, a local resident, and was endowed with sundry estates including Sheriff's own house. The school flourished under the headship of Thomas Arnold between 1828 and 1842 and became, under his rule, a model of the British public school for following generations. It was the scene of *Tom Brown's School Days* (1857) by Thomas Hughes and the founding place of Rugby football. Pop. (1981 prelim.) town, 59,564; (1983 est.) district, 86,700.

rugby, football game played with an oval ball by teams with 13 (in professional matches) or 15 (amateur) members on each side. It is similar to association football (soccer) and U.S. football, but play is continuous and substitution is not allowed. The ball may be kicked, carried, or thrown between players, but it may not be passed forward; lateral passing, tackling, and scrum are featured. The object of rugby is to score goals or tries (touchdowns), either by carrying or kicking the ball behind an opponent's goal line.

A brief treatment of rugby follows. For full treatment, *see* MACROPAEDIA: Sports, Major Team and Individual.

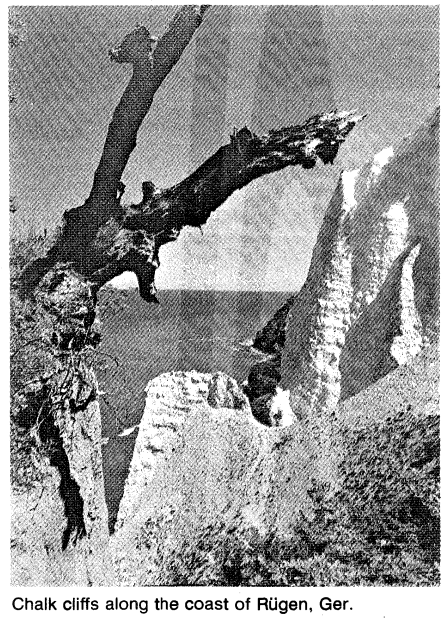
According to tradition, rugby originated in England in 1823, when a football player at the Rugby School in Rugby, Warwickshire, ran with the ball instead of kicking it. This new style of football was excluded from the Football Association that was set up in 1863, but it continued to gain popularity through the schools. In 1871 the Rugby Football Union, which now regulates the amateur sport in England, was organized to standardize rules, and the game caught on quickly throughout the British Isles and in Commonwealth countries. In 1934 the Fédération Internationale de Rugby Amateur (FIRA) was formed as the governing body for international amateur competition.

Professional rugby was organized in 1895, when 22 clubs from northern England broke away from the Rugby Union and formed a new organization that, from 1922, was called the Rugby Football League. Rugby League is mainly professional, whereas Rugby Union is entirely amateur. The rules of the two games vary slightly, but they are played on similar fields. Rugby League is played mainly in northern England, Australia, New Zealand, and France. The World Cup tournament is the high point of professional competition.

Rugby Football League, governing body of Rugby League football (professional rugby) in England, founded in 1895. Originally called the Northern Rugby Football Union (popularly Northern Union), it was formed when 22 clubs from Yorkshire, Lancashire, and Cheshire left the Rugby Football Union over the question of compensation for loss of wages sustained by players while participating in games. Later, league play spread to Australia, New Zealand, France, and other countries. The present name was adopted in 1922. The league publishes an annual handbook, and its headquarters are in Leeds, West Yorkshire. *See* Sporting Record: *Football.*

Rugby Football Union, governing body of Rugby Union football (amateur rugby) in England, formed in 1871 to draw up rules for the game first played at Rugby School in 1823. Similar unions were organized during the next few years in Ireland, Wales, Scotland, New Zealand, Australia, France, Canada, South Africa, and the U.S. Among the Union's chief activities are conferences, organizing international matches, and educating and training players and officials. Publications include handbooks and guides for coaches. Headquarters are at Twickenham, Middlesex. *See* Sporting Record: *Football.*

Rügen, largest island of Germany, in the Baltic Sea opposite Stralsund and separated from the German mainland by the Strelasund (Strela Sound) and Bodden Strait. It is administered as part of Mecklenburg-West Pomerania *Land* (state). Its length from north to south is 32 mi (51 km), its maximum breadth 25 mi, and its area 358 sq mi (926 sq km). The coastline is irregular, as Rügen originally consisted of several separate islands that, in geologically recent times, have been joined by strips of land. The general name is applied locally only to the roughly triangular main trunk of the island, while the larger peninsulas of Jasmund and Wittow (north) and Mönchgut (southeast) are considered to be as distinct from Rügen as the various adjacent smaller islands, notably Ummanz and Hiddensee, which are also included under the name for statistical purposes. The west coast is generally low, while on the eastern shore chalk cliffs rise to 400 ft (122 m) at the Stubbenkammer promontory. The highest point is the Piekberg (528 ft) in Jasmund.



Chalk cliffs along the coast of Rügen, Ger.
W. Krammisch—Bruce Coleman Inc./EB Inc.

Rügen is rich in prehistoric artifacts. There are Upper Paleolithic remains, traces of the Neolithic Beaker folk, and the Bronze Age Hügelgraber Culture (distinguished by burial tumuli). The Germanic Rugieri tribe was displaced by the Slavic Wends (*c.* 500 BC), whose fortress on the northern promontory of Arkona was destroyed by the Danish king Waldemar I when he conquered and Christianized the island in 1168. Rügen was thereafter ruled by native princes under Danish supremacy until 1218 and passed to Pomerania (Pomorze) in 1325, to Sweden in 1648, and to Prussia in 1815.

The fertile morainic soil supports sugar beets, oats, rye, and potatoes. Cattle and sheep are reared on the drier ground. The chief industry is herring fishing, and chalk pits in Jasmund are commercially exploited. Tourism is also important at such resorts as Lohme, Binz, Sellin, Göhren, and Lauterbach-Putbus. The principal towns are Bergen (the administrative centre) and Sassnitz, the base of the deep-sea fishery and the terminus of the ferry to Trelleborg, Swed. Rügen is connected to the mainland by a 1.5-mi road and rail embankment, the Rügendamm, over the Strelasund, opened in 1936. Pop., including adjoining islands (1989 est.), 86,999.

Ruggiero (Italian personal name): *see under* Roger.

Ruggles, Carl (b. March 11, 1876, Marion, Mass., U.S.—d. Oct. 24, 1971, Bennington, Vt.), important New England composer, whose works, small in number, are characterized by highly dissonant, nonmetric melodies, wide dynamic range, and rich colouring.

Ruggles played the violin for Pres. Grover Cleveland at the age of nine; though a close friend of such innovative and influential composers as Charles Ives and Edgard Varèse, he was largely self-taught, save for some music study at Harvard. For five years following 1912, he conducted an orchestra that he founded at Winona, Minn. He was active in composers' organizations in New York (1923–33) and taught composition in Florida (1937). A patron made it possible for Ruggles to devote most of his energy to composition and painting. Because Ruggles destroyed his early compositions, he is known only through a few remaining works. He was elected to the National Institute of Arts and Letters in 1954, and a Ruggles Festival was held at Bowdoin College, Maine, in 1966.

Among the works released by Ruggles, *The Sun-Treader* (for orchestra, 1927–32) is the longest and most important. It is highly dissonant and complex, rhapsodic and imaginative, characteristics typical of Ruggles' other works. Fond of mystical poetry, Ruggles sought sublime, impressionistic effects; this practice led

some critics to attack his compositions as being vague and unclear. Ruggles worked over his compositions so that some exist in several different versions. His works include *Toys* (1919, voice and piano), *Men and Angels* (1920, 1939, brass), *Men and Mountains* (first performed, 1924, 1936, orchestra), and other works for orchestra and piano, and the hymn *Exaltation* (1958).

Ruggles-Brise, Sir Evelyn (John) (b. Dec. 6, 1857, Finchingfield, Essex, Eng.—d. Aug. 18, 1935, Peaslake, Surrey), prison reformer who was instrumental in the founding and development of England's Borstal system for the treatment of young offenders.

Appointed prison commissioner in 1895, he had the duty of applying the recommendations of the Gladstone Committee. The committee held that offenders between 16 and 21 years of age should not be subjected to the harsh punitive treatment that was administered to older, less tractable prisoners and should be given education and industrial training at a "penal reformatory" under the supervision of a qualified staff.

Ruggles-Brise visited the United States in 1897 to study the state reformatory system; upon his return to England he collected a group of young prisoners at the prison in Borstal, Kent, and in 1902 began to implement a program of reform. In 1908 Parliament established the system that permitted magistrates to prescribe "Borstal detention" as a separate sentence for young offenders. Ruggles-Brise was knighted in 1902.

Rugi, Germanic tribe that migrated from southwest Norway to Pomerania around AD 100 and from there to the Danube River valley. They were allies of Attila until his death (453) and then settled in what is now Austria. They then joined with the Ostrogothic army of Theodoric in its campaign to take over Italy in 488–493. The Rugi, who converted to Arianism by 482, suffered a crushing defeat in Vienna at the hands of Odoacer, king of Italy, in 487. The remaining Rugi followed Theodoric for revenge, although they maintained their independence even within the Ostrogothic state, keeping their own administrators and avoiding intermarriage with the Goths. They disappeared with the fall of the Ostrogothic state.

Ruguru (people): *see* Luguru.

Ruhengeri, *préfecture*, northern Rwanda, Central Africa, bordering Zaire and Uganda (north) and the *préfectures* of Kigali and Gitarama (south), Byumba (east), and Gisenyi (west). Ruhengeri's relief varies considerably; elevation ranges from 4,900 ft (1,500 m) in the central region to more than 8,200 ft in the northwest, where part of the Virunga chain of volcanic mountains is located. Crops or pasture occupy most of Ruhengeri's area of 680 sq mi (1,760 sq km). The alluvial valleys and rich volcanic soils of the *préfecture* yield large crops of potatoes, bananas, sorghum, coffee (*arabica*), and tea. Ruhengeri's industrial activities include pyrethrum (a natural insecticide) processing and flour milling. A hydroelectric plant operates at Ntaruka on Lakes Bulera (Burera) and Luhondo (Ruhondo), producing 30,000,000 kW-hr of electricity annually. Roads connect Ruhengeri with the city of Kigali, the towns of Gisenyi and Gitarama, and with the neighbouring country of Uganda. The *préfecture*'s administrative centre is Ruhengeri town, which is the site of a modern hospital, an airstrip, and an insecticide (pyrethrum) factory. Pop. (1978 prelim.) 528,649.

Ruhmkorff, Heinrich Daniel (b. Jan. 15, 1803, Hannover, Hanover—d. Dec. 20, 1877, Paris), German mechanic who invented the Ruhmkorff coil, a type of induction coil that could produce sparks more than 1 foot (30 centimetres) in length.

After apprenticeship to a German mechanic, Ruhmkorff worked in England with Joseph Brahmah, inventor of the hydraulic press. In 1855 he opened his own shop in Paris, which became widely known for the production of high-quality electrical apparatus. There he built a number of improved induction coils, including one in 1851 that was awarded a 50,000-franc prize in 1858 by Emperor Napoleon III as the most imporant discovery in the application of electricity. Ruhmkorff's coils, which produced high-voltage current within a secondary armature winding, were used for the operation of Geissler and Crookes tubes as well as for detonating devices. Ruhmkorff's doubly wound induction coil later evolved into the alternating-current transformer.

Ruhr, river and major industrial region along its course, North Rhine-Westphalia *Land* (state), western Germany. The river, an important tributary of the lower Rhine, rises on the north side of Winterberg and flows 146 mi (235 km) west past Witten (the head of navigation), Essen, and Mülheim to enter the Rhine at Duisburg. The Ruhr functions chiefly as a supplier of water and is dammed in many places to form lakes and reservoirs. Nearby canals carry the bulk of the water traffic. Its chief affluents are the Möhne (right) and Lenne (left).

The river has given its name to one of the world's largest single industrial regions. Although the Ruhrgebiet, or Ruhr, is not strictly an administrative or political entity, it is geographically defined as extending from the left bank of the Rhine east to Hamm and from the Ruhr River north to the Lippe; a wider definition would include the Rhine River cities of Krefeld and Düsseldorf and the urban belt extending eastward from Düsseldorf through Wuppertal to Hagen. This is Germany's most densely populated region. The Ruhr coalfield (extending west of the Rhine and north of the Lippe) is one of the world's largest, producing the bulk of Germany's bituminous coal. Steel production and diversified chemical manufacturing constitute the other basic industries of the region, which is served by an extensive inland-waterway system and one of Europe's densest railway networks.

Although settlement in the area dates back to the Paleolithic period and coal mining to before the Middle Ages, the Ruhr's industrial importance dates from the early 19th century, when the Krupp and Thyssen firms started large-scale coal mining and steel production.

Before 1918 much of the iron ore used in steel production came from German-occupied Lorraine. The return of Alsace-Lorraine to France after World War I drastically reduced Germany's home supply of ore; most of the required amount has since been imported. Although compensation from the German government allowed the erection of new ironworks and steelworks in the Ruhr and the modernization of the coking and coal-mining industries after World War I, the area's recovery was hampered by the required "reparations in kind," deliveries of coal and coke to France. Deficiencies in deliveries led to French occupation of Düsseldorf, Duisburg, and Ruhrort in 1921 and of the entire region by French-Belgian forces in January 1923. German passive resistance paralyzed the economic life of the Ruhr and was the deciding factor in the collapse of the German currency. The dispute was settled with the adoption of the Dawes Plan for reparations in 1924 (recommended by a committee presided over by American financier Charles G. Dawes). The occupation ended in 1925.

Although the role of Ruhr industrialists in bringing Hitler to power and in furthering German rearmament has probably been exaggerated, the region's resources and heavy industries necessarily played a vital role in Germany's preparations for World War II. Consequently the Ruhr was a primary target for Allied bombing, and about 75 percent of the area was destroyed; more than one-third of the coal mines discontinued operations or suffered heavy damage.

The postwar disposition of the Ruhr and the status of ownership and operation of the mines and industries caused major disagreements among the Allies. Initial proposals to prevent future German military strength and contain German aggression, through the dismantling of industrial equipment and breaking up of large concentrations of economic power, proved unrealistic in the changed political situation after 1947. A short phase of dismantling was followed by modernization and controlled rebuilding. The International Authority for the Ruhr, set up in 1949, was later replaced by the European Coal and Steel Community (ECSC) in 1952. The attainment of sovereignty by the Federal Republic of Germany (West Germany) in 1954 ended all Allied control over German industry; the only remaining restrictions on Ruhr industries were exercised by the ECSC and later by the European Economic Community.

The creation of North Rhine-Westphalia *Land* (1946) removed the former provincial border between the Rhineland and Westphalia and allowed a closer integration of operations in the Ruhr. This and the expanding West German economy since the 1950s led to increased production and expansion in the Ruhr and to investment abroad by Ruhr industrialists.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Ruhrkohle AG, German company that was created in order to consolidate all coal-mining activities in the Ruhr region. Headquarters are in Essen.

Ruhrkohle, created in 1969, provides more than one-tenth of Germany's total coal production. Although coal is one of the country's major mineral resources, the coal industry suffered a severe decline in the 1960s owing to uneconomical mining methods and the shift of consumer demand to oil and gas. After a 1968 law provided for the closing of unprofitable pits, all major coal companies combined in the giant holding company, Ruhrkohle, to facilitate the slowing down of coal output and diversification of the coal-producing industry. Ruhrkohle is an integrated operation, engaged in the mining, processing, and refining of coal and other minerals related to energy production.

Since the major market for coal is steel producers, the coal industry is particularly sensitive to fluctuations in durable goods production and was thus seriously affected by the worldwide recessions that occurred in the 1970s and '80s. Ruhrkohle also serves the utility industry and has a long-term supply agreement with the German state power authorities.

Rui Zong (Chinese emperor): *see* Jui-tsung.

Ruisdael, Jacob (Isaakszoon) van, Ruisdael also spelled RUYSDAEL (b. 1628/29, Haarlem, Neth.—buried March 14, 1682, Amsterdam), Baroque artist, often considered the greatest Dutch landscape painter.

He was probably the pupil of his father, the frame maker and artist Isaak de Goyer, who later called himself Ruysdael. None of Isaak's paintings have been identified with certainty, and it is impossible to determine the nature and extent of his influence on Ruisdael. The influence of Cornelis Vroom, another Haarlem landscapist, is often noticeable in his early



"Wheatfields," oil on canvas by Jacob van Ruisdael, *c.* 1670; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York City, bequest of Benjamin Altman, 1913

works of the 1640s. The earliest dated pictures are of 1646. Two years later Ruisdael became a member of the Guild of St. Luke in Haarlem. From 1650 to 1653 he traveled extensively in the Netherlands and the neighbouring parts of western Germany. In about 1655 he settled in Amsterdam, of which he became a free citizen in 1659. Meindert Hobbema was his most famous pupil and follower.

Ruisdael's early work, such as the "Dunes" (*c.* 1647; Louvre), reflects his obsession with trees. Earlier Dutch artists use trees merely as decorative compositional devices, but Ruisdael makes them the subject of his paintings and imbues them with forceful personalities. His draftsmanship is meticulously precise and is enriched by thick impasto, which adds depth and character to the foliage and trunks of his trees. After 1650 the monumentality of his landscapes increases. In his view of "Bentheim Castle" (1653; National Gallery of Ireland, Dublin), the forms become more massive, the colours more vibrant, and the composition more concentrated. The latter quality is even more evident in his famous "Jewish Cemetery" (*c.* 1660; Gemäldegalerie Alte Meister, Dresden), which is one of his most masterly compositions. All motifs of secondary importance serve as accessories to the main motif, three ruined tombs. The painting symbolizes the transience of temporal things.

After 1656 Ruisdael's compositions became more spacious and his palette became brighter. His paintings of waterfalls and his "Marsh in the Woods" (*c.* 1665; Hermitage, Leningrad), recall his earlier interest in forest scenes. But more often his late works, such as the "Windmill at Wijk bij Duurstede" (*c.* 1665; Rijksmuseum, Amsterdam), "Wheatfields" (*c.* 1670; Metropolitan Museum of Art, New York City), and his numerous views of Haarlem display panoramas of the flat Dutch countryside. The horizon is invariably low and distant and dominated by a vast, clouded sky. Sometimes the small figures in his pictures were added by other artists, such as Adriaen van de Velde, Johannes Lingelbach, Philips Wouwerman, and Claes Berchem. He also produced several delicately finished etchings, one of the most famous of which is "The Cornfield" (Petit-Palais, Paris).

Ruiz, José Martínez: *see* Azorín.

Ruiz, Juan, also called ARCHPRIEST OF HITA, Spanish EL ARCIPRESTE DE HITA (b. *c.* 1283, Alcalá, Spain—d. *c.* 1350), poet and cleric whose masterpiece, the *Libro de buen amor* (1330; expanded in 1343; *The Book of Good Love*) is perhaps the most important long poem in the literature of medieval Spain.

Almost nothing is known of Ruiz's life apart from the information he gives in the *Libro:* he was educated at Toledo and by 1330 had finished writing the *Libro* while serving as archpriest in the village of Hita, near Alcalá. He also apparently earned some fame from the popular songs he composed.

The *Libro de buen amor* is a long poem composed mainly in the form known as *cuaderna vía,* although verses in many other metrical forms are found scattered throughout the work. The *Libro* contains 12 narrative poems, each describing a different love affair. The work's title refers to the distinction the author makes between *buen amor* (*i.e.,* love of God) and *loco amor* (*i.e.,* carnal love). But while the author frequently indulges in sententious passages praising spiritual love, his narratives describe in great detail a male hero's attempts to obtain carnal love through his wooings and unsuccessful seductions of various women. The work also contains a parody of a sermon along with other anticlerical satires, several love songs, and a song in praise of small women. Besides its realistic and high-spirited descriptions of attempted amorous conquests, the book is remarkable for its satirical glimpses of Spanish medieval life. It contains vigorous descriptions of basic character types from the lower classes, including one of the first major comic personages in Spanish literature, the old panderess Trotaconventos. The author shows a mastery of popular speech and offers folk sayings and proverbs along with bits of obscure but impressive learning.

Ruiz derived his material from a wide range of literary and other sources, including the Bible, Spanish ecclesiastical treatises, Ovid and other ancient authors, the medieval goliard poets, the fabliaux, various Arabic writings, and popular poetry and songs, impressing upon all these the cheerful cast of mind of a worldly, ribald, curiously learned priest.

Ruiz, Mount, Spanish NEVADO DEL RUIZ, volcano in the Cordillera Central of the Andes, west-central Colombia, noted for its two eruptions on Nov. 13, 1985, which were among the most destructive in recorded history. Located about 80 miles (130 km) west of Bogotá, it is the northernmost of some two dozen active volcanoes scattered along the Cordillera Central and reaches an elevation of 17,716 feet (5,400 m). Although eruptions of Mount Ruiz have not been frequent, geological evidence suggests that a major eruption in 1595 damaged an area extending from central Colombia north to the southern border of Panama. An eruption in 1845 caused mud slides and flooding in which 1,000 people were killed.

The 1985 disaster was preceded by a buildup of highly viscous magma within the volcano's neck. Two explosions occurred on the northeast side of the mountain, and magma, blasting outward, melted the mountain's cap of ice and snow. A mixture of mud, ash, and water with a crest of 15 to 50 feet (4.5 to 15 m) raced down the volcano's eastern slope through the Azufrado and Lagunilla river channels. Torrents of mud almost totally buried the town of Armero on the Lagunilla River, 30 miles (48 km) from the volcano, killing an estimated 25,000 people. Mud also swelled the nearby Gualí River to overflowing, and on the western side of the mountain another mud slide killed about 1,000 people in the town of Chinchiná on the Claro River.

Ruiz de Alarcón (y Mendoza), Juan (b. *c.* 1581, Taxco, Mex.—d. Aug. 4, 1639, Madrid), Mexican-born Spanish dramatist of the colonial era who was the principal dramatist of early 17th-century Spain after Lope de Vega and Tirso de Molina.

Born into a prosperous family in Mexico, Ruiz de Alarcón went to Spain in 1600 to study at the University of Salamanca, from which he graduated in about 1602. After studying further at the University of Mexico, he settled permanently in Spain in about 1611 and held several government posts, being appointed to the Council for the Indies in 1626. He wrote plays for his own enjoyment rather than for financial reward.

Less prolific than his contemporaries, Ruiz de Alarcón wrote about 25 plays, most of which were published in two separate volumes in 1628 and 1634, respectively. His plays are notable for their superb plot construction, psychological subtlety, and ethical teachings. Most of his comedies of life in Madrid centre on a defect in a person's character: *La verdad sospechosa* ("The Suspicious Truth") is a study of inveterate lying; *Las paredes oyen* ("The Walls Have Ears") concerns slander; *La prueba de las promesas* ("The Proof of the Promises") is an attack on ingratitude; *Mudarse por mejorarse* ("To Change Oneself to Improve Oneself") inveighs against the fickleness of lovers. A skinny hunchback, Ruiz de Alarcón and his deformities were mercilessly ridiculed by rival dramatists, especially Lope de Vega.

Rukeyser, Muriel (b. Dec. 15, 1913, New York City—d. Feb. 12, 1980, New York City), American poet who depicted social and political problems.

While at college, Rukeyser contributed poems of a personal nature to *Poetry* magazine. She later gained perspective on larger issues when she attended the Scottsboro trials and witnessed the opening events of the Spanish Civil War; she broadened the scope of her poetry accordingly. *U.S. 1* (1938) describes the oppressed poor along the industrial Atlantic seaboard. This work includes "The Book of the Dead," which tells of miners dying of silicosis in West Virginia; the piece is considered one of Rukeyser's best works. *The Collected Poems of Muriel Rukeyser* appeared in 1978. Her use of fragmented, emotional imagery is sometimes thought lavish, but her poetry is praised for its power and acuity.

Rukeyser's book *Willard Gibbs: American Genius* (1942), a biography of the mathematician and physicist, was a well-received portrayal of an imaginative, inquiring mind.

rukh (legendary bird): *see* roc.

Rukwa, Lake, lake, southwestern Tanzania, Eastern Africa. It is part of an inland drainage system in the Rukwa Trough, which probably at one time belonged to the East African Rift Valley system of which Lake Nyasa is a part. The lake covers an area of about 1,000 square miles (2,600 square km) and lies midway between Lake Tanganyika and Lake Nyasa, at an elevation of about 2,600 feet (800 m); it has an average depth of 10 feet (3 m). The British explorer John Hanning Speke heard it described as an impassable swamp, and in 1850 Joseph Thompson, a noted Scottish geologist and explorer, saw the lake from a distance. It has a drainage basin with an area of 31,000 square miles (80,000 square km) in Tanzania. There is no outlet from the lake, and at times it is completely dry. In 1929 it shrank to a length of about 30 miles (50 km), but 10 years later it expanded to about 80 miles (130 km) with a width of 25 miles (40 km). The lake's fluctuations in size are caused by the varying inflow of streams. Its water is brackish, and there are salt pans near its southwestern end. Crocodile and hippopotamus inhabit the lake, and fish abound. It lies over the epicentre of an earthquake-prone zone.

rules of ———: *see under* substantive word (*e.g.,* road at sea, rules of the), except as below.

rules of order: *see* parliamentary procedure.

Rulfo, Juan (Perez) (b. May 16, 1918, Sayula, Mex.—d. Jan. 7, 1986, Mexico City), Mexican writer who was important in the development of the "magic realism" school of Latin-American fiction.

As a child growing up in the rural countryside, he witnessed the horrors of the later

Cristero uprisings of 1926–29. His family of prosperous landowners lost a considerable fortune. When they moved to Mexico City, Rulfo worked for a rubber company and as a film script writer. Many of the short stories that were later published in *El llano en llamas* (1953; *The Burning Plain,* 1967) first appeared in the review *Pan;* they depict the violence of the rural environment and the moral stagnation of its people. In them Rulfo first used narrative techniques that later would be incorporated into the Latin-American new novel, such as the use of interior monologue, stream of consciousness, flashbacks, and shifting points of view. *Pedro Páramo* (1955; Eng. trans., 1959) treats of the physical and moral disintegration of a laconic *cacique* (boss) and is set in a mythical hell on earth inhabited by dead individuals who are constantly haunted by their past transgressions.

From 1933 Rulfo lived in Mexico City. He became director of the editorial department of the National Institute for Indigenous Studies and advised young writers at the Centro Mexicano de Escritores (Centre for Mexican Authors).

Rulhière, Claude-Carloman de (b. June 12, 1734, Bondy, Fr.—d. Jan. 30, 1791, Bondy), French writer and historian of Russia and Poland whose histories favoured a return to Franco-Prussian friendship and alliance at the expense of Russia.

The son of a nobleman and government official, Rulhière joined the military after his graduation from the college of Louis-le-Grand, serving as aide-de-camp to marshal Louis-François-Armand, duc de Richelieu, at Bordeaux from 1758 to 1759. Made secretary of the French envoy to Russia, he accompanied him to St. Petersburg, witnessing, in 1762, the dethronement and death of Peter III and the accession of Catherine II. In 1768 he was charged with writing a history of Poland for the young Louis XVI and the same year completed the first chapter of his *Histoire de la révolution de Russie en 1762,* based on his detailed personal records. On the appearance of the second chapter in 1773, he was apparently harassed by Russians in Paris who wanted to suppress the manuscript, which he had intended for private circulation. After travelling in Germany, Austria, and perhaps Poland in 1776, he returned to the writing of his *Histoire de l'anarchie de Pologne,* 4 vol. (1807), based on personal interviews and correspondence. Although his history of Poland is no longer regarded highly, it is important as one of the few valuable sources not destroyed in the Revolution. A well-known literary figure and author of several poetic works apart from his historical books, he was elected to the Académie Française in 1787.

rum, distilled liquor made from sugarcane products, usually produced as a by-product of sugar manufacture. It includes both the light-bodied rums, typified by those of Cuba and Puerto Rico, and the heavier and fuller-flavoured rums of Jamaica.

Rums originated in the West Indies and are first mentioned in records from Barbados in about 1650. They were called "kill-devil" or "rumbullion" and by 1667 were simply called rum. Rum figured in the slave trade of the American colonies: slaves were brought from Africa and traded to the West Indies for molasses; the molasses was made into rum in New England; and the rum was then traded to Africa for more slaves. British sailors received regular rations of rum from the 18th century until 1970. Rum, the major liquor distilled during the early history of the United States, was sometimes mixed with molasses and called blackstrap or mixed with cider to produce a beverage called stonewall.

Most rums are made from molasses, the residue remaining after sugar has been crystallized from sugarcane juice, containing as much as 5 percent sugar. Some countries import molasses for use in rum production. Where sugar industries are undeveloped, rum is often made with sugarcane juice. A low-quality spirit, called tafia, is made from impure molasses or other sugarcane residue, but it is not considered a true rum and is seldom exported.

The sugar necessary for fermentation is already present in the raw material, and rum retains more of the original raw-material taste than most other spirits. The characteristic flavour of specific rums is determined by the type of yeast employed for fermentation, the distillation method, aging conditions, and blending.

The heavy, dark, and full-bodied rums are the oldest type and have strong molasses flavour. They are primarily produced in Jamaica, Barbados, and Demerara in Guyana. Such rums are usually produced from molasses enriched with the skimmings, or dunder, remaining in the boilers used for sugar production. This liquid attracts yeast spores from the air, resulting in spontaneous, or natural, fermentation. The resulting slow fermentation period allows full development of flavour substances. The rum is distilled twice in simple pot stills, producing a distillate of clear colour that turns to a golden hue as the distillate takes up substances from the oak of the wooden puncheons used for storage during the aging period. Colour is deepened by the addition of caramel after aging. The Jamaican rums are always blended and are aged for at least five to seven years. They are usually marketed with an alcohol content of 43–49 percent by volume (86–98 U.S. proof). New England rum, made in the United States for over 300 years, has strong flavour and high alcohol content. Batavia arak is a pungent rum produced on the Indonesian island of Java.

The production of dry, light-bodied rums began in the late 19th century. This type, produced mainly in Puerto Rico and the Virgin Islands, employs cultured yeast in fermentation, and distillation is accomplished in modern, continuous-operation patent stills. The rums are usually blended and are aged from one to four years. Those rums marketed as white-label types are pale in colour and mild in flavour; a gold-label rum has a more amber colour and more pronounced and sweeter flavour, resulting from longer aging and the addition of caramel.

Straight rum is a popular drink in rum-producing countries. Elsewhere, rum is usually consumed in mixed drinks, with light rums preferred for such cocktails as the daiquiri and dark rums used in such tall drinks as the rum Collins. Rum is frequently used as a flavouring in dessert sauces and other dishes. It is also used to flavour tobacco.

Rum (card game): *see* Rummy games.

Rum Rebellion (Jan. 26, 1808), in Australian history, an uprising in which Gov. William Bligh of New South Wales (1806–08), who had earlier been the victim of the famous "Bounty" mutiny, was deposed by the officers of the New South Wales Corps. Bligh's stifling of the colony's rum traffic gave the rebellion its name, though other issues were also involved. Bligh had alienated the corps by accusing its officers and rank and file of corruption and ineptitude, and he had actively sought its recall. The immediate incident that led to the rebellion was Bligh's arrest of John Macarthur, a former corps officer and one of the colony's leading entrepreneurs, for a violation of port regulations. Macarthur had long been in conflict with Bligh over the disposition of grazing land for Macarthur's sheep and Macarthur's attempted manipulation of commodities prices. His arrest early in January 1808 seemed to augur ill for the colony's more prosperous settlers, including the corps officers. It appears likely that Macarthur convinced Maj. George Johnston of the corps to depose Bligh. The corps invaded Government House on Jan. 26, 1808, placed Bligh under arrest, and took over the administration of the colony until the arrival of Gov. Lachlan Macquarie in December 1809. In 1810 the corps was recalled to England and Bligh vindicated; Johnston was dismissed from service in 1811, and Macarthur could not return to New South Wales, for fear of facing charges, until 1817.

Rumania, Rumanian: *see under* Romania, Romanian.

Rumantsch language: *see* Romansh language.

rumba, also spelled RHUMBA, ballroom dance of Afro-Cuban folk-dance origin that became internationally popular in the early 20th century. Best known for the dancers' subtle side to side hip movements with the torso erect, the rumba is danced with a basic pattern of



Rumba danced by Carole Lombard and George Raft in the motion picture *Rumba,* 1935

By courtesy of MCA, Inc.; photograph, Culver Pictures

two quick side steps and a slow forward step. Three steps are executed to each bar. The music, in $\frac{4}{4}$ time, has an insistent syncopation.

The ballroom version is based on the Cuban *son,* itself a less vigorous form of the uninhibited Cuban rumba danced in taverns and similar places. The word rumba occasionally refers generically to other Cuban dances with similar rhythms.

Rumbek, town, capital of al-Buḥayrah *mudīrīyah* (province), Southern Region, southern Sudan, about 138 mi (222 km) northwest of Bor. Located at an elevation of 1,388 ft (423 m), it serves as an agricultural centre for the surrounding areas producing cassava *durra* (sorghum), pulses, and cereals; livestock is also raised. Cottage industries include leather tanning, and sawmills and woodworking. A road connects it with Tonj and it has a domestic airport. Rumbek is the headquarters of the Rumbek Rural Council, and of Lakes district. Pop. (1973) 17,748.

Rumelia, Turkish RUMELI, the former Ottoman possessions in the Balkans. The name means "land of the Romans"—*i.e.,* Byzantines. The Turks first began to make conquests in the Balkans in the mid-14th century. The land was divided into fiefs of various size that were administered by cavalry officers; local notables who converted to Islām also shared in the administration. The administrative configuration of Rumelia changed frequently until 1864, when the unit of administrative

division became defined as the province, or *vilayet,* which was in turn divided into *sancak* (subprovinces). The Danube *vilayet* was formed first, in 1864, followed by those of Janina (Ioannina) and Salonika (Thessaloníki, in Greece) in 1867. Under the Treaty of Berlin (1878), the Danube *vilayet* formed the independent state of Bulgaria under Ottoman suzerainty; southern Bulgaria formed the autonomous province of Eastern Rumelia with its capital at Philippopoli (Plovdiv); and western Rumelia was divided into the Edirne, Salonika, and Monastir *ils* (provinces). In 1885 Bulgaria annexed Eastern Rumelia, and by the Treaty of Bucharest (1913) Monastir was ceded to Serbia and Salonika to Greece; only Edirne remained under Ottoman rule.

In the 15th and 16th centuries Rumelia functioned as a reservoir of the *devşirme* (levy of Christian boys), who held the highest posts in the Ottoman army and government. Rumelia was also a centre of Ottoman Islāmic culture, which flourished in the religious schools (*medreses*) and mosques in Üsküb, Istip (Stip), Prizren, Pristina, Monastir, and Edirne. Islāmic mystic brotherhoods found large followings in Bulgaria, Albania, and Bosnia-Hercegovina.

Rumford, town, Oxford county, western Maine, U.S. The town is in the Oxford hills, where the Ellis, Swift, and Concord rivers enter the Androscoggin River to form spectacular falls, 75 miles (120 km) north-northwest of Portland. First settled in the 1770s, it was chartered in 1800 as New Penacook Plantation and was renamed for Count Rumford (Sir Benjamin Thompson), one of the proprietors. It was organized as a town in 1892. Industrial activity is limited almost exclusively to papermaking, and the Oxford Paper Company's mill (1899), one of the world's largest, is powered by the falls. The area is noted for winter sports, and Lake Webb, Mount Blue State Park, and the Andover Earth (satellite communications) station are nearby. Pop. (1986 est.) 7,510.

Rumford, Sir Benjamin Thompson, Graf von (Count of): *see* Thompson, Sir Benjamin.

Rumiantsev, Nikolay Petrovich: *see* Rumyantsev, Nikolay Petrovich.

Rumiantsev, Pyotr Aleksandrovich: *see* Rumyantsev, Pyotr Aleksandrovich.

ruminant, any mammal of the suborder Ruminantia (order Artiodactyla), which includes the pronghorns, giraffes, okapis, deer, chevrotains, cattle, antelopes, sheep, and goats. Most ruminants have four-chambered stomachs and a two-toed foot. The upper incisors are reduced or sometimes absent. Camels and chevrotains, however, have a three-chambered stomach. Ruminants eat quickly, storing masses of vegetation in the first chamber of the stomach, the rumen, where it softens. They later regurgitate this material, called cud, and chew it again to further break down its cellulose content, which is difficult to digest. The chewed cud goes directly to the other chambers of the stomach (the reticulum, omasum, and abomasum), where it is further digested with the aid of various essential microorganisms that live in the stomach.

Rummy, any of a family of card games whose many variants make it one of the best-known and most widely played card games. The basic principle of all Rummy (rum, rhum, romme) games is to form sets of three or four cards of the same rank (as four eights, three sixes), or sequences of three or more cards of the same suit (♢ 6–5–4–3, etc.). Some variants allow only one or the other of these combinations. In Canasta (*q.v.*), for example, sequences are not permitted.

Many 17th-century card games included the principle of building such structures, or melds, before or during a period of play. The ancient Chinese game of mah-jongg, played with tiles long before the invention of playing cards and based on forming matching groups of three and four, is a venerable ancestor of Rummy. The earliest modern form of Rummy, however, became popular in Mexico in the latter half of the 19th century as Conquian, from the Spanish *con quien,* "with whom," a mysterious misnomer since it was a two-hand rather than a partnership game.

Conquian, known as Cooncan as it spread to Texas and the southern United States early in the 20th century, used the Spanish pack of 40 cards—the regular 52-card pack with 10s, 9s, and 8s removed. The modern game of Panguingue, or Pan, uses eight such packs shuffled together to make it possible for the game to be played by as many as 15 players, although the usual game is for six or seven.

In the United States, Cooncan soon developed into Rum. The names Rummy and Rum are of uncertain origin, the latter descended from the former. A later variant, however, introduced as a two-hand game in 1909 in New York by Elwood Baker, was named Gin Rummy (*q.v.*) deliberately. Another Rummy variant, Canasta, originated in Uruguay in the late 1940s, and in the early 1950s it temporarily eclipsed Contract Bridge in popularity in the United States. The regular game has long been a favourite in firehouses.

Principles and procedures. There are no official rules for the basic game of Rummy, but the following procedures are generally observed.

From two to six may play, using a standard deck of 52 cards, with or without jokers. Cards rank: K (high), Q, J, 10, 9, etc., to A, low. In some variants, but not generally in the basic game, A-K-Q is allowed as a sequence. In two-hand play, 10 cards are dealt to each, face down, one at a time. For three or four players, a hand is seven cards; for five or six players, six cards; they are dealt clockwise, beginning with the player on the dealer's left. The remainder of the pack, the stock, is placed face down; the top card of the stock is faced to begin the talon, or discard pile. Each player in his turn may take the top card of the discard pile or draw the top card of the stock; he may then place face up on the table any legal meld of three cards or more or add (lay off) one or more cards from his hand that match his own or any other player's exposed melds, no more than one card on each. He ends his turn by discarding one card face up on the discard pile. Practice varies on the turn when a player goes out. With six cards dealt, no discard need be made. A player goes out when he has melded all the cards in his hand or disposed of cards on other players' melds. The joker may be used as any needed card.

The melds, as previously noted, may be sets of three or four cards of the same rank or sequences of three or more cards in the same suit or additions of such cards to melds previously tabled. Melding an entire hand at one turn is called going rummy and counts double.

A running score is kept: face cards count 10 each; aces 1 or 11 as previously agreed; jokers, if used, count 15. The game ends when any player reaches the predetermined goal (as 100 points) or after an agreed number of deals. When rum is played as a gambling game, the payoff may be in terms of points, multiplied by an amount agreed on, *e.g.,* a penny a point; or the winner of each hand may win an agreed-on sum, and the winner of the game is set in terms of number of hands, *e.g.,* a dime and a quarter, respectively. In either case, there is one winner.

The winner of each deal collects from each of the other players the index value of the cards each still holds in his hand, even if such cards are matched up.

When stock is exhausted, play ends and the hand with the lowest unmatched count wins. In some games, each player is permitted an additional turn to take or refuse the top card of the talon.

Among the most widely played Rummy games is 500 Rum, also called Pinochle Rummy, and its variants, including Michigan Rum, Oklahoma, Persian Rummy, and Canasta and its many derivatives, Samba, Bolivia, and others. In all of these the object, unlike regular Rummy, is to score the most points.

Rumoi, city, northwestern Hokkaido, Japan. It lies at the mouth of the Rumoi River, facing the Sea of Japan. The city's natural port was a fishing centre until the disappearance of herring along its coast after World War II, although cod and Alaska pollack continued to be caught on a small scale. Rumoi is now engaged in the shipping of timber and coal from its hinterland. It is also the seat of the Rumoi subprefectural government. Pop. (1985) 35,-542.

Rumor, Mariano (b. June 16, 1915, Vicenza, Italy—d. Jan. 22, 1990, Vicenza), a leader of Italy's Christian Democrat Party, premier in several governments from 1968 to 1974.

After graduation from the University of Padua, Rumor became a teacher. During World War II he served as an officer in the artillery, and in 1943 he joined the partisans to fight against the Fascist and German forces. In 1945 he became a member of the Christian Democrat Party and a year later was chosen by the district of Verona as a deputy to the assembly charged with forming the new republican constitution. He entered Parliament in 1948.

After serving as under secretary for agriculture in the governments of Alcide De Gasperi and Giuseppe Pella, in 1954 he was elected deputy secretary of his party. During 1959–63 he was minister for agriculture under the successive governments of Antonio Segni, Fernando Tambroni, and Amintore Fanfani, and his name was linked with the so-called "green plan" to develop agriculture in Italy. For five months in 1963–64 he was minister for home affairs under Giovanni Leone, during the difficult times of the Alto Adige (South Tirol) terrorism and the Vaiont Dam disaster, in which more than 1,500 persons were killed. Made secretary-general and then political secretary of the party, he became premier for the first time in 1968, supported initially by the Christian Democrats alone, then by the parties of the centre-left coalition. Rumor was Italy's premier in five different governments between 1968 and 1974. He had to cope with economic crises and with the labour unrest and political extremism that were on the rise in Italy at the time. He served as foreign minister from 1974 to 1976.

Rump Parliament, in the period of the English Commonwealth, name given to the phase of the Long Parliament (*q.v.*) following the expulsion of 121 members unacceptable to the rebel army in 1648.

Rumyantsev, Nikolay Petrovich, Graf (Count), Rumyantsev also spelled RUMIANTSEV (b. April 14 [April 3, Old Style], 1754—d. Jan. 15 [Jan. 3], 1826, St. Petersburg, Russia), Russian statesman and diplomat who was also a bibliophile and a patron of historiography and voyages of exploration. The Rumyantsev Museum, St. Petersburg, founded to house his collection of books, rare manuscripts, and maps, became the heart of the present Lenin Library, one of the world's largest such collections.

Rumyantsev was the son of the field marshal Pyotr Aleksandrovich Rumyantsev. Under Emperor Paul I, Nikolay became a senator; under Alexander I, he was director of water communications (1801–09), minister of com-

merce (1802–11), and president of the state council (from 1810). In diplomatic affairs he served Russia as envoy to the elector of the Rhenish Palatinate (1781–95) and to the German Diet (appointed 1799). As foreign minister (appointed 1808), he worked for closer relations with France; he was so dismayed by Napoleon I's invasion of Russia (1812) that he suffered an apoplectic stroke and lost his hearing. Subsequently, his influence in the government declined, and he retired in 1814. The Rumyantsev Museum was founded in 1831, five years after his death.

Rumyantsev, Pyotr Aleksandrovich, GRAF (Count) ZADUNAYSKY, Rumyantsev also spelled RUMIANTSEV (b. Jan. 15 [Jan. 4, Old Style], 1725, Moscow, Russia—d. Dec. 19 [Dec. 8], 1796, Tashan), Russian army officer who distinguished himself in the Seven Years' War (1756–63) against Prussia and in the Russo-Turkish War (1768–74). As governor-general of the Ukraine (from November 1764), he was responsible for integrating the region more closely into Russia.

In the Seven Years' War Rumyantsev helped to defeat the Prussians in the battles of Gross-Jägersdorf (Aug. 30, 1757) and Kundersdorf (Aug. 12, 1759) and captured the port city and



Pyotr Aleksandrovich Rumyantsev, engraving, after a portrait by D.G. Levitsky
Novosti Press Agency

fortress of Kolberg (Kolobrzeg) in Pomerania (Dec. 16, 1761). In the Russo-Turkish War he scored decisive victories over much stronger enemy forces on the Larga and Kagula rivers in Moldavia (1770), crossed the Danube into Bulgaria, and won the battle of Kozludzha (Suvorovo; June 20 [June 9], 1774), forcing the Turks to sue for peace. He was promoted field marshal and created count in July 1775.

runabout (vehicle): *see* bike wagon.

Runcorn, new town, Halton district, county of Cheshire, England. It lies on the southern shore of the River Mersey, 15 miles (24 km) upstream from the port of Liverpool. The main industry is the production of chemicals. In 1964 Runcorn was designated by British planners as a new town to cater to the needs of the overspill population of nearby metropolitan areas, particularly Liverpool and Manchester. Railway and road bridges connect the town with Widnes. Pop. (1981) 64,412.

Runcorn, Stanley Keith (b. Nov. 19, 1922, Southport, Lancashire, Eng.), British geophysicist who was the first to discover evidence of periodic reversals of the Earth's magnetic field (geomagnetic polar reversals).

Runcorn was director of the school of physics at the University of Durham between 1956 and 1963 and served in the same capacity at the University of Newcastle upon Tyne, Northumberland, from 1963. Runcorn's work included studies of geomagnetic secular variation, polar migration and resultant climatic change, paleomagnetic evidence of continental drift, and theories of the geomagnetic-field origin, as well as research on planetary interiors.

Rundi, the peoples of the Republic of Burundi, who speak Rundi, a Bantu language. The Rundi are divided into two main ethnic groups: the Hutu (*q.v.*), the shorter and darker-skinned group, who form a subordinate majority of farmers; and the Tutsi (*q.v.*), an aristocratic minority of taller, lighter-skinned pastoralists. A small third group, the pygmy Twa (*q.v.*), are hunters and potters. *See also* Rwanda.

Where the same name may denote a person, place, or thing, the articles will be found in that order

Rundstedt, (Karl Rudolf) Gerd von (b. Dec. 12, 1875, Aschersleben, near Magdeburg, Prussia [Germany]—d. Feb. 24, 1953, Hannover, W.Ger.), German field marshal who was one of Adolf Hitler's ablest leaders during World War II, holding commands on both the Eastern and Western fronts and playing a major role in defeating France in 1940 and in opposing the 1944 Allied offensive in the West.

An officer in the army from 1893, Rundstedt rose during World War I to become chief of staff of an army corps and assisted in the reorganization of the Turkish general staff. He remained in the army after the war and was active in Germany's secret rearmament both before and after Hitler came to power. Retiring in 1938 as senior field commander, he returned to active duty to command an army group in the Polish campaign at the outbreak of World War II. Later, on the Western Front, he took part in the implementation of the plan that defeated France in 1940; as head of Army Group B he led the breakthrough that sealed France's fate. He was, however, partly to blame for the order to halt the German armour, allowing the British to escape from Dunkirk. During the invasion of the Soviet Union, beginning in June 1941, he commanded the German southern wing, which penetrated farthest before winter. When Soviet counteroffensives forced a retreat, Hitler dismissed the aged field marshal.

Returning to duty in July 1942, Rundstedt became commander in chief, west, and fortified France against an expected Allied invasion. Unable to defeat the Anglo-American invasion forces in 1944, he was replaced in July but returned in September to direct the Ardennes offensive (Battle of the Bulge) that disrupted the military timetable of the Western Allies for several months. Though the scion of an aristocratic Prussian family and highly disdainful of Hitler and Nazism, he refused to participate in the plots and assassination attempts against the Führer in which many of his fellow officers were involved. Relieved for the third time in March 1945, he



Rundstedt
Ullstein, Berlin

was captured by U.S. troops in May 1945 but was released because of ill health.

Even Rundstedt's opponents recognized his considerable military talents; General Dwight D. Eisenhower called him the ablest of the German generals of World War II.

Rundu, town, extreme northeastern Namibia. It lies on the south bank of the Okavango River, which forms the border between Angola to the north and Namibia to the south. Rundu is the main settlement in the Kavango region, which comprises northeastern Namibia and is named for the local Kavango people. Rundu is a service centre for the surrounding area and has a hospital. Cattle are raised in the surrounding area. In the 1980s the town's population was swollen by refugees fleeing from the civil war in Angola. Rundu is connected by road with Grootfontein, 150 miles (240 km) southwest. Pop. (1988 est.) 15,000.

Runeberg, Johan Ludvig (b. Feb. 5, 1804, Jakobstad, Swedish Finland—d. May 6, 1877, Borgå, Russian Finland [now Porvoo, Fin.]), Finnish poet, generally considered that country's greatest, whose works expressed the patriotic spirit of his countrymen and, because they were written in Swedish, also exercised great influence on Swedish literature.



Runeberg, detail of an engraving by Émile Lassalle
Studio Littre

At Åbo (Turku) University, Runeberg was inspired by Romantic nationalism. In the heart of the Finnish countryside, he came to know and love Finland's landscape and people and heard firsthand some of the stories of the heroic past that were to be the themes of his best work. He returned to the university, which had moved to Helsinki, in 1830 and became clerk to the council and (1831) lecturer in Latin language and literature. In the same year, he received a gold medal from the Swedish academy for his verse romance of Finnish life, *Grafven i Perho* ("The Grave at Perho"). In 1837 he moved to Borgå (Porvoo), where he was lecturer in classics until 1857 and rector of that college in 1847–50. For the last 13 years of his life he was partly paralyzed and unable to write.

Runeberg's first book of poems, in 1830, showed freshness, vigour, and sympathy with the Finnish peasant. His two epic poems, *Elgskyttarne* (1832, "The Moose Hunters") and *Hanna* (1836), won him a place in Swedish literature second only to Esaias Tegnér. In 1844 he published *Kung Fjalar,* a cycle of unrhymed verse romances derived from old Scandinavian legends. His *Fänrik Ståls Sägner* (2 series, 1848 and 1860; *Tales of Ensign Stal*), patriotic poems describing the war of independence (1808) as experienced by an old soldier, made a tremendous impression, and the first of them, "Vårt land" ("Our Country"), became the Finnish national anthem.

Runeberg's work shows the influence of classical literature and of J.W. von Goethe in its highmindedness and purity of form. His originality consists in his power to combine this classicism with Romantic feeling and the realism that distinguishes his understanding of peasant life and character.

Runge, Friedlieb Ferdinand (b. Feb. 8, 1795, Hamburg [Germany]—d. March 25, 1867, Oranienburg, Prussia [Germany]), German chemist considered to be the originator of the widely used analytic technique of paper chromatography.

Runge was successively a professor at Breslau, instructor in Berlin, and director of a chemical factory in Oranienburg. He discovered several components of coal-tar oil, including carbolic acid (phenol), pyrrole, rosolic acid (aurin), and aniline, but did not analyze any of these compounds. He noted the ability of belladonna to induce long-lasting dilation of the pupil of the eye (mydriasis), and he developed a process for obtaining sugar from beet juice.

Rungu (people): *see* Tabwa.

runic alphabet, also called FUTHARK, writing system of uncertain origin used by Germanic peoples of northern Europe, Britain, Scandinavia, and Iceland from about the 3rd century to the 16th or 17th century AD. Runic writing appeared rather late in the history of writing and is clearly derived from one of the alphabets of the Mediterranean area. Because of its angular letter forms, however, and because early runic inscriptions were written from right to left like the earliest alphabets, runic writing seems to belong to a more ancient system. Scholars have attempted to derive it from the Greek or Latin alphabets, either capitals or cursive forms, at any period from the 6th century BC to the 5th century AD. A likely theory is that the runic alphabet was developed by the Goths, a Germanic people, from the Etruscan alphabet of northern Italy and was perhaps also influenced by the Latin alphabet in the 1st or 2nd century BC. Two inscriptions, the Negau and the Maria Saalerberg inscriptions, written in Etruscan script in a Germanic language and dating from the 2nd and 1st centuries BC, respectively, give credence to the theory of Etruscan origins for runic.

There are at least three main varieties of runic script: Early, or Common Germanic (Teutonic), used in northern Europe before about 800 AD; Anglo-Saxon, or Anglian, used in Britain from the 5th or 6th century to about the 12th century AD; and Nordic, or Scandinavian, used from the 8th to about the 12th or 13th century AD in Scandinavia and Iceland. After the 12th century, runes were still used occasionally for charms and memorial inscriptions until the 16th or 17th century, chiefly in Scandinavia. The Common Germanic script had 24 letters, divided into three groups, called *ættir,* of 8 letters each. The sounds of the first six letters were *f, u, th, a, r,* and *k,* respectively, giving the alphabet its name: futhark. The Anglo-Saxon script added letters to the futhark to represent sounds of Old English that did not occur in the languages that had used the Common Teutonic script. Anglo-Saxon had 28 letters, and after about 900 AD it had 33. There were also some slight differences in letter shape. The Scandinavian languages were even richer in sounds than Old English; but, instead of adding letters to the futhark to represent the new sounds, the users of the Nordic script compounded the letter values, using the same letter to stand for more than one sound—*e.g.,* one letter for *k* and *g,* one letter for *a, æ,* and *o.* This eventually resulted in the reduction of the futhark to 16 letters.

Other varieties of runes included the Hälsinge Runes (*q.v.*), the Manx Runes, and the *stungnar runir,* or "dotted runes," all of which were variants of the Nordic script. More than 4,000 runic inscriptions and several runic manuscripts are extant. Approximately 2,500 of these come from Sweden, the remainder being from Norway, Denmark and Schleswig, Britain, Iceland, various islands off the coast of Britain and Scandinavia, and other countries of Europe, including France, Germany, and the Soviet Union.

Runjit Singh (Sikh maharaja): *see* Ranjit Singh.

running, footracing over a variety of distances and courses, among the most popular sports in nearly all times and places. Modern competitive running ranges from the sprints (dashes), with their emphasis on continuous high speed, to the grueling long-distance and marathon races, requiring great endurance. *See also* athletics; cross-country; hurdling; long-distance running; marathon; middle-distance running; relay race; sprint; steeplechase. For results and records of various running events, *see* Sporting Record: *Track-and-field sports.* For walk racing, *see* walking. *See also* Olympic Games. Running is also a popular noncompetitive recreation that can produce important physiological benefits. *See* jogging.

running-dog pattern, in classical architecture, decorative motif consisting of a repeated stylized convoluted form, something like the profile of a breaking wave. This pattern, which may be raised above, incised into, or painted upon a surface, frequently appears on a frieze, the middle element of an entablature, between the architrave below and the cornice above.

The pattern is sometimes referred to as the Vitruvian scroll, after Vitruvius, a Roman architectural historian of the 1st century BC. Because of its shape, it is also known as the wave ornament, or wave scroll, and a molding upon which it appears is called a wave molding. The area between the wave forms, or curls, may also be decorated with other stylized forms; and the pattern may be reversed, with the waves breaking upside-down. It is most common in the Composite order of architectural decoration, which combines elements of the Corinthian and Ionic orders in buildings of the classical, Renaissance, and Renaissance-revival periods.

Often delineated in sharply contrasting black on white, the running-dog pattern was also sometimes used in decorating furniture and smaller household articles.

Runnymede, district (borough) in the northwestern part of the county of Surrey, England. Runnymede lies to the west of London on the River Thames. It is in large part rural in character and includes a considerable portion of Windsor Great Park as well as the riverside



American Bar Association Memorial commemorating the signing of Magna Carta at Runnymede, Surrey
Jean Moss

Runnymede meadows, 1 mile (1.6 km) northwest of Egham; these meadows are celebrated as the place where King John granted Magna Carta on June 15, 1215. The Runnymede meadows are now owned by the National Trust and are open to the public. Situated on Coopers Hill, overlooking the river, are memorials commemorating Magna Carta and the British Commonwealth airmen who died in World War II; at the foot of the hill, by the river, there is a memorial to U.S. president John F. Kennedy, unveiled in 1965. The area of Runnymede district is 30 square miles (78 square km). Pop. (1986 est.) 71,300.

runoff, in hydrology, quantity of water discharged in surface streams. Runoff includes not only the waters that travel over the land surface and through channels to reach a stream but also interflow, the water that infiltrates the soil surface and travels by means of gravity toward a stream channel (always above the main groundwater level) and eventually empties into the channel. Runoff also includes groundwater that is discharged into a stream; streamflow that is composed entirely of groundwater is termed base flow, or fair-weather runoff, and it occurs where a stream channel intersects the water table.

Distribution of runoff

continents and islands	river runoff		
	layer* (mm)	volume (cu km)	percentage of total
Europe	299	2,920	7.05
Asia	259	10,560	25.4
North America	296	5,950	14.3
South America	534	9,420	22.7
Africa	148	4,360	10.5
Australia	42	320	0.8
Antarctica	80	1,060	2.6
Islands		6,930	16.7
total	281	41,500	100.0

*Refers to the depth to which each particular land area would be covered by the water volume involved (*e.g.,* the area of Europe would be covered to a depth of 299 mm [11.6 inches] by a water volume of 2,920 cubic km [700 cubic miles]).

The total runoff is equal to the total precipitation less the losses caused by evapotranspiration (loss to the atmosphere from soil surfaces and plant leaves), storage (as in temporary ponds), and other such abstractions.

Runyon, (Alfred) Damon (b. Oct. 4, 1884, Manhattan, Kan., U.S.—d. Dec. 10, 1946, New York, N.Y.), American journalist and short-story writer, best known for his book *Guys and Dolls,* written in the regional slang that became his trademark.

At age 14 Runyon enlisted in the U.S. Army and was sent to the Philippines in the Spanish-American War. After the war he wrote for Western newspapers for 10 years. Although Runyon gained a reputation as a political and feature reporter, his passion for sports was paramount. In 1911 he moved to New York City, where he became a reporter for the *New York American.* He covered the New York baseball clubs for many years, as well as various other sports topics, and along the way he developed his style of focusing on human interest rather than strictly reporting facts. He began writing stories about a racy section of Broadway, and these were collected in *Guys and Dolls* (1931). This book is representative of Runyon's style in its use of an exaggerated version of local idiom to portray a particular class of characters—gamblers, promoters, fight managers, race-track bookies, and other habitués of the street. Employing an unusual and colourful style, he produced such characters as Joe the Joker, Apple Annie, and Regret the Horseplayer, who became familiar to thousands of his readers.

In the 1930s, Runyon began writing columns, and his popular feature "As I See It" was syndicated to all the Hearst newspapers. At the peak of his popularity, in the 1930s, Runyon was one of the most productive and highly paid writers in New York.

Ruo River, Portuguese RIO RUO, largest tributary of the Shire River of southern Malaŵi and Mozambique. Rising on the slopes of the Mulanje Mountains, it flows south to Mulanje town, where it veers southwest, forming 80 mi (130 km) of the Malaŵi–Mozambique border before entering the Shire at Chiromo. The catchment area of about 1,900 sq mi (4,900 sq km) drains the southern portion of the eastern Shire Highlands, with periodic heavy discharge causing severe flooding.

rūpa-loka, also called RŪPA-DHĀTU, in Buddhist thought, the world, or realm, of form. *See* arūpa-loka.

Rupat Island, Bahasa Indonesia PULAU RUPAT, Rupat also spelled ROEPAT, island in the Strait of Malacca, Riau *propinsi* (province), Indonesia. It lies just off the eastern coast of Sumatra across a 3-mi- (5-km-) wide channel, opposite Melaka, Malaysia. The island is very low and swampy and circular in shape, with a diameter of about 30 mi. The climate is hot and humid, and rainfall is heavy throughout most of the year. Rupat island is sparsely inhabited, and unmanageable seasonal floods make cultivation virtually impossible. As a result, exploration of the interior has been difficult, and human habitation is confined to the low, dry coastland. The only major settlement is Batupanjang on the southwestern coast.

rupee, the monetary unit of Muslim India from the 16th century and the modern monetary unit of India, Pakistan, and Sri Lanka. The modern unit is divided into 100 paisa in India and Pakistan and into 100 cents in Sri Lanka. The name derived from the Sanskrit *rūpya* ("silver").

In the late 16th century in central and northern India the Mughals established the silver rupee, divided into 16 annas. In 1671 the British East India Company minted coins copied from local types, using the rupee as the basic unit of account. The value of the rupee varied, however, from region to region, depending on the minter, and not until 1835 was the rupee made uniform by law.

After independence, India retained the rupee and adopted the monetary decimal system in 1955. Pakistan began creating its independent money in 1948, adopting the decimal system in 1961. Ceylon (now Sri Lanka) adopted a decimal system in 1872, based on the Indian rupee, and adopted an autonomous monetary system in 1929 and an independent system in 1949.

Rupelian Stage, major division of middle Oligocene rocks and time (the Oligocene Epoch began about 38,000,000 years ago and lasted about 12,000,000 years). The Rupelian Stage, which follows the Lattorfian Stage and precedes the Chattian Stage, was named for exposures studied along the Rupel, a tributary of the Scheldt River in Belgium. The Rupelian was a time of transgressing seas. In Belgium the Rupelian consists largely of clays economically important for their use in the cement industry. In France the Rupelian is known as the Stampian Stage. Rupelian rocks in Great Britain include the Upper Hamstead Beds. The Rupelian Stage is characterized by a distinctive molluscan fossil assemblage. Belgium and northern Germany share many molluscan species assigned to the Rupelian Stage.

Rupert, also called RUPERT KLEM, or CLEM, byname RUPERT OF THE PALATINATE, German RUPRECHT KLEM, or CLEM, or RUPRECHT VON DER PFALZ (b. May 5, 1352, Amberg, Rhenish Palatinate—d. May 18, 1410, near Oppenheim, Rhenish Palatinate), German king from 1400 and, as Rupert III, elector Palatine of the Rhine from 1398.

A member of the Wittelsbach dynasty, he was chosen king by the German ecclesiastical electors on Aug. 22, 1400, to succeed Wenceslas, who had been deposed the day before by the German princes. After being crowned at Cologne on Jan. 6, 1401, Rupert went to Italy, hoping to be crowned again by Pope Boniface IX. In alliance with the city of Florence he attacked Gian Galeazzo Visconti, duke of Milan (who had given financial support to Wenceslas in the 1390s), but was defeated outside Brescia on Oct. 14, 1401, and returned to Germany. On Oct. 1, 1403, Rupert finally was recognized as German king by Boniface, who mistakenly expected that Rupert would give him effective aid against the schismatic Avignonese popes. Actually, the King devoted most of his energies to combatting the adherents of Wenceslas in Germany.

Rupert, PRINCE, byname RUPERT OF THE RHINE, or RUPERT OF THE PALATINATE, German PRINZ RUPERT, or RUPRECHT (b. Dec. 17, 1619, Prague—d. Nov. 29, 1682, London), the most talented Royalist commander of the English Civil War (1642–51). His tactical genius and daring as a cavalry officer brought him many victories early in the war, but his forces eventually were overcome by the more highly disciplined Parliamentary army.



Rupert, detail of a painting from the studio of Sir Peter Lely, *c.* 1670; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Rupert's father was Frederick V, elector Palatine and king of Bohemia (as Frederick I); and his mother, Elizabeth Stuart, was a daughter of King James I of England. In 1620, two years after the outbreak of the Thirty Years' War, the family was driven from Bohemia to the United Provinces, where Rupert grew up. The high-spirited youth became a favourite of his uncle, King Charles I, when he visited the English court in 1636. Rupert fought against the imperial forces in the Thirty Years' War in 1638, but he was captured at Vlothe on the Weser River and held captive in Austria for three years.

Soon after his release Rupert went to England. He joined Charles I shortly before the outbreak of the Civil War in August 1642. At the age of 23 he received command of the cavalry, and during the Royalist offensive of 1643 and early 1644 he led his swift-moving troops in a series of brilliant successes. He took Bristol in July 1643, relieved Newark, Nottinghamshire, in February 1644, and seized most of Lancashire in June. On July 2, however, he was severely defeated by Oliver Cromwell at Marston Moor, Yorkshire. Despite this setback, the Prince, who had been made duke of Cumberland and earl of Holderness in January 1644, was appointed commander in chief of the King's armies in November 1644. The promotion only sharpened the hostility between Rupert and several of the King's counsellors, particularly Lord Digby (afterward 2nd earl of Bristol). These dissensions continually frustrated Rupert's attempts to organize a coordinated campaign. He captured Leicester in May 1645 but was badly beaten at Naseby, Northamptonshire, on June 14. When he surrendered Bristol to the Parliamentarians in September, Charles abruptly dismissed him from his command. In July 1646, following the King's surrender to the Scots, Rupert was banished by Parliament from England.

Rupert took charge of the small Royalist fleet in 1648 and began to prey on English shipping. He was chased by the Parliamentary admiral Robert Blake from Kinsale, County Cork, to Lisbon and on into the Mediterranean Sea. Driven from the Mediterranean, Rupert resumed his piratical activities in the Azores and the West Indies (1651–52). In 1653 he returned with only one ship and a few prizes to France, where Charles II, the son and successor of Charles I, had his court in exile. After quarrelling with Charles, Rupert went into retirement in Germany. Nevertheless, after Charles gained the English throne in the Restoration of 1660, the Prince was made a privy councillor and given naval commands in the second and third Dutch Wars (1665–67 and 1672–74). During the years before his death, Rupert dabbled in scientific experiments and introduced the art of mezzotint printmaking into England.

Rupert House (Canada): *see* Fort-Rupert.

Rupert River, French RIVIÈRE DE RUPERT, river in Saguenay–Lac-Saint-Jean and Nouveau-Québec regions, western Quebec province, Canada, rising from Mistassini Lake in the central part of the province and flowing generally westward for 380 mi (610 km) through a series of lakes to Ruperts Bay, at the south end of James Bay. It was discovered by Henry Hudson, who wintered at its mouth (1610–11), and was named after Prince Rupert, first governor of the Hudson's Bay Company. The company's first trading post, Fort-Rupert (formerly Rupert House), was established at the river's mouth in 1668; other posts formerly found along the river include Nemiscau and Mistassini Post.

Rupert's Land, also called PRINCE RUPERT'S LAND, historic region in northern and western Canada. The name was applied to the territory comprising the drainage basin of Hudson Bay, granted by King Charles II in 1670 to the Hudson's Bay Company. Prince Rupert, cousin of Charles, was the first governor of the company, whence the name. Rupert's Land ceased to exist as a territorial entity in 1869, when the land became part of the Dominion of Canada, but the name still is used as that of an ecclesiastical province of the Anglican Church of Canada.

Rūpnagar (India): *see* Ropar.

Rūpnārāyan River, river in West Bengal state, northeastern India, rising as the Dhaleśwarī (Dhalkisor) in the Choṭa Nāgpur plateau foothills northeast of Purūlia town. It follows a tortuous southeasterly course through the southwestern corner of Burdwān district; continuing southwestward through Bānkura district, where it is known as the Dwārkeswar, it is joined by the Silai on the Midnapore district border, where it takes the name Rūpnārāyan. Dividing Midnapore from Hooghly and Howrah districts, it then joins the Hooghly after a 150-mi (240-km) course. The Rūpnārāyan originally formed a western exit of the Ganges and is important for its irrigation potentiality. It is tidal through its entire course and constitutes a principal danger to navigation of the Hooghly because it forces that river to deposit silt upon dangerous shoals.

Rupp, Adolph (Frederick), byname THE BARON OF BLUEGRASS COUNTRY (b. Sept. 2, 1901, Halstead, Kan., U.S.—d. Dec. 10, 1977, Lexington, Ky.), U.S. collegiate basketball coach who was the most successful of all time. His teams won 879 games and had an .821 winning percentage.

Rupp grew up on a Kansas farm and was hardly aware of basketball until he went to college. He was a member of the University

of Kansas (Lawrence) Big Eight Conference championship team of 1923. After coaching five years at Iowa and Illinois high schools, in 1930 Rupp became coach at the University of Kentucky (Lexington), where he remained until retirement in 1972. During his career, Kentucky won 24 Southeastern Conference titles and four National Collegiate Athletic Association (NCAA) championships (1948–49, 1951, 1958), and his teams appeared in the championships 20 times. He was also co-coach of the U.S. Olympic team that won the gold medal in the 1948 games.

Rupp was outspoken and a strict disciplinarian; he taught set offenses and aggressive man-to-man defenses that cut off opponents from the lanes to the basket. He was named coach of the year four times, conducted 11 overseas clinics, and coached 24 All-Americans and 26 players who became professionals. In addition, he served on the NCAA rules committee from 1961. After his retirement as coach he served as president of the professional Memphis Tams in the American Basketball Association. Rupp was elected to the Basketball Hall of Fame in 1968. Throughout his life in Kentucky he engaged in cattle breeding and tobacco farming.

Rüppell, (Wilhelm Peter) Eduard (Simon) (b. Nov. 20, 1794, Frankfurt am Main [Germany]—d. Dec. 10, 1884, Frankfurt am Main), German naturalist and explorer of northeastern Africa who is remembered as much for the zoological and ethnographical collections he brought back to Europe as for his explorations.

Rüppell first went to Africa in 1817 and ascended the Nile River to its first set of cataracts (at Aswān, Egypt). Returning to Germany he completed his scientific training and then began his first expedition (1822–27), crossing the Sudan from the Nubian Desert south to Kordofan in the central Sudan. On his second (1830–34), he crossed Ethiopia from east to west, by way of the ruins of Adwa, to Lake Tana, which he mapped for the first time. On his return he stayed at the then capital of Ethiopia, Gonder, where he put his collections in order and amassed an anthology of ancient Ethiopian manuscripts.

rural electrification, project implemented in the United States in the second quarter of the 20th century by the Rural Electrification Administration (REA), a federal agency established in 1935, under the New Deal, in an effort to raise the standard of rural living and to slow the extensive migration of rural Americans to urban centres; more than 98 percent of the United States' farms were equipped with electric power under the program.

The REA provided low-interest loans to farm cooperatives for the construction and operation of power plants and power lines in rural areas. Rural electrification brought city conveniences, such as electric lighting and radio, to areas of low population density and allowed for the automation of a number of farm operations.

Although rural electrification did contribute to bridging the gap between urban and rural life, it did not succeed in checking the movement of farm workers to cities; the application of technical innovations, in fact, acted to increase productivity per man-hour and to replace hand labour with automation and mechanization.

Rural Free Delivery (RFD), service begun in the United States in 1896 to deliver mail directly to farm families. Before RFD, rural inhabitants had to pick up mail themselves at sometimes distant post offices or pay private express companies for delivery. Free mail delivery began in cities in 1863, but it took more than 20 years of agitating by the National Grange for the service to be extended.

Thomas E. Watson, a congressman from Georgia, pushed through legislation for an RFD system in 1893. Local shopkeepers, fearing competition from mail-order merchandisers, sought to delay establishment of the service, and not until October 1896 did the first five riders go out on delivery routes in rural West Virginia. After that, however, the service expanded quickly.

In 1898 officials of the Post Office announced that any group of farmers could have free delivery merely by sending a petition—along with a description of their community and roads—to their congressman. The flood of petitions was overwhelming, and by 1905 the Post Office was serving 32,000 RFD routes.

In 1913 the RFD system was supplemented by Parcel Post. The mail-order houses boomed as a consequence; but, more important, rural families were no longer isolated from contemporary thought and fashion in 20th-century America.

rural society, society in which there is a low ratio of inhabitants to open land and in which the most important economic activities are the production of foodstuffs, fibres, and raw materials. Such areas are difficult to define with greater precision, for, although in non-industrialized nations the transition from city to countryside is usually abrupt, it is gradual in industrialized societies, making it difficult to pinpoint the boundaries of rural places. A second, related problem is that governments do not use the same statistical criteria for rural and urban populations; in Japan, for instance, any cluster of fewer than 30,000 people is considered rural, whereas in Albania a group of more than 400 inhabitants is regarded as an urban population.

In the past, rural societies were typified by their adherence to farming as a way of life. Such cultures were not goal- or achievement-oriented; their members sought subsistence, not surplus. Marked by a high regard for intimacy and traditional values, farming communities were often regulated by kinship customs and ritual, and, in particular, the ownership and care of productive land was strictly guarded by tradition. Collectively, these characteristics are often designated by the term gemeinschaft, an expression introduced by the German sociologist Ferdinand Tönnies. Tönnies described the contrasting nature of urban life with the term gesellschaft, a state characterized by impersonal bureaucracy, rationalized specialization, and mechanization. Gesellschaft is typically associated with modern industry, where people are employees who perform specific, goal-oriented functions in a rational and efficient, as opposed to a traditional and organic, manner. The two terms are sometimes translated as "community" and "society." Rural inhabitants work with people they know well and are accustomed to relationships of great intimacy and small scale, whereas urban dwellers know each other in narrow, segmented ways that have little to do with family or friendship. According to Tönnies and subsequent sociologists, all societies are characterized by mixtures of gemeinschaft and gesellschaft; the United States, where even agriculture is almost completely mechanized, is closer to the gesellschaft end of the spectrum, whereas rural India, which is still heavily guided by tradition, is an example of gemeinschaft.

Historically, farming societies have had higher birthrates than urban societies; their populations have also tended to be younger, to live in larger families, and to include slightly greater percentages of males. These phenomena were related: it was to a farmer's advantage to have many offspring, especially males, who could work in the fields as children and then would support their parents as they grew older. Generally, however, as the children became older, there was not enough productive land for all of them to support their own families, and some would migrate to the cities. In this way, cities have historically absorbed the excess population of the countryside, thus tending to become filled with comparatively older people living in smaller families. With the advent of improved health care in this century, infant mortality rates fell, and the increased number of surviving offspring has swelled the number of migrants to the cities.

In the industrialized nations the countryside has sometimes been virtually depopulated, to the point that, for example, in 1970 only 6.7 percent of the employed persons in the United States were in the fields of agriculture, fisheries, and forestry. The result has been a global acceleration of the process of urbanization, which has in turn created vast slums in many urban centres. To halt or reverse this process, agricultural-development specialists have suggested methods of increasing productivity without moving large numbers of farmworkers off the land. Among their recommendations are improvements in soil technology and changes in irrigation, seed stocks, and drainage; they counsel against further large-scale mechanization. The habit of the developed nations to apply their own practices of agriculture to situations where they might not be ultimately beneficial has been yielding to the belief that appropriate technologies must be developed for each area.

Consult the INDEX *first*

Rurales, federal corps of rural police established on May 6, 1861, by the Mexican president Benito Juárez to combat the banditry that threatened travel and commerce throughout Mexico. Such a force had been planned four years earlier but could not be established during the War of Reform. In 1869, after the overthrow of the empire of Maximilian, it was reconstituted under the Ministry of the Interior (Ministro de Gobernación) and charged with patrolling the highways and railways, assisting the army, guarding special shipments of goods and bullion, and policing local elections. Under President Porfirio Díaz (governed 1876–1911), its powers were considerably enlarged to include escorting prisoners, guarding public buildings, intimidating political opponents, and acting as a kind of praetorian guard for the dictatorship. It acquired a considerable reputation (rather exaggerated) for oppression and efficiency. By the end of Díaz' reign, the Rurales numbered about 2,700 men. After the revolution, in 1914, the Rurales were disbanded.

In 1929 a new force, the Cuerpos de Defensas Rurales (Rural Defense Corps) was created out of a number of volunteer forces that had developed during the 1920s for local self-protection. This corps still exists as an army reserve, its members receiving no pay but being subject to call in national emergencies. There were 120,000 such Rurales in 1975.

Rurik, also spelled RORIK, or HROREKR, Russian RYURIK (d. *c.* AD 879), the semilegendary founder of the Rurik dynasty of Kievan Rus.

Rurik was a Viking, or Varangian, prince. His story is told in the *Russian Primary Chronicle* (compiled at the beginning of the 12th century) but is not accepted at face value by modern historians. According to the chronicle, the people of Novgorod, tired of political strife, invited the Varangians about AD 862 to establish an orderly and just government there. Hence, Rurik came with his two brothers and a large retinue (*druzhina*) and became ruler of the city and region of Novgorod.

Some historians think that Rurik came from the Scandinavian peninsula or from Jutland (now in Denmark) and seized the town of Ladoga, on Lake Ladoga. After establishing a stronghold there (*c.* 855), he may have gone southward along the Volkhov and captured Novgorod. Another possibility is that Rurik and his army were mercenaries, hired to guard the Volkhov–Dnepr waterway, who turned against their employers.

Rurik's kinsman Oleg founded the grand principality of Kiev. Oleg's successor, Igor, believed to be Rurik's son, is considered the real founder of the Russian princely house.

Rurik DYNASTY, princes of Kievan Rus and, later, Muscovy who, according to tradition, were descendants of the Varangian prince Rurik, who had been invited by the people of Novgorod to rule that city (*c.* 862); the Rurik princes maintained their control over Kievan Rus and, later, Muscovy until 1598.

Rurik's successor Oleg (d. 912) conquered Kiev (*c.* 882) and established control of the trade route extending from Novgorod, along the Dnepr River, to the Black Sea. Igor (allegedly Rurik's son; reigned 912–945) and his successors—his wife, St. Olga (regent 945–969), and their son Svyatoslav (reigned 945–972)—further extended their territories; Svyatoslav's son Vladimir I (St. Vladimir; reigned *c.* 980–1015) consolidated the dynasty's rule.

Vladimir compiled the first Kievan Rus law code and introduced Christianity into the country. He also organized the Kievan Rus lands into a cohesive confederation by distributing the major cities among his sons; the eldest was to be grand prince of Kiev, and the brothers were to succeed each other, moving up the hierarchy of cities toward Kiev, filling vacancies left by the advancement or death of an elder brother. The youngest brother was to be succeeded as grand prince by his eldest nephew whose father had been a grand prince. This succession pattern was generally followed through the reigns of Svyatopolk (1015–19); Yaroslav the Wise (1019–54); his sons Izyaslav (1054–68; 1069–73; and 1077–78), Svyatoslav (1073–76), and Vsevolod (1078–93); and Svyatopolk II (son of Izyaslav; reigned 1093–1113).

The successions were accomplished, however, amid continual civil wars. In addition to the princes' unwillingness to adhere to the pattern and readiness to seize their positions by force instead, the system was upset whenever a city rejected the prince designated to rule it. It was also undermined by the tendency of the princes to settle in regions they ruled rather than move from city to city to become the prince of Kiev.

In 1097 all the princes of Kievan Rus met at Lyubech (northwest of Chernigov) and decided to divide their lands into patrimonial estates. The succession for grand prince, however, continued to be based on the generation pattern; thus, Vladimir Monomakh succeeded his cousin Svyatopolk II as grand prince of Kiev. During his reign (1113–25) Vladimir tried to restore unity to the lands of Kievan Rus; and his sons (Mstislav, reigned 1125–32; Yaropolk, 1132–39; Vyacheslav, 1139; and Yury Dolgoruky, 1149–57) succeeded him eventually, though not without some troubles in the 1140s.

Nevertheless, distinct branches of the dynasty established their own rule in the major centres of the country outside Kiev—Halicz, Novgorod, and Suzdal. The princes of these regions vied with each other for control of Kiev; but when Andrew Bogolyubsky of Suzdal finally conquered and sacked the city (1169), he returned to Vladimir (a city in the Suzdal principality) and transferred the seat of the grand prince to Vladimir. Andrew Bogolyubsky's brother Vsevolod III succeeded him as grand prince of Vladimir (reigned 1176–1212); Vsevolod was followed by his sons Yury (1212–38), Yaroslav (1238–46), and Svyatoslav (1246–47) and his grandson Andrew (1247–52).

Alexander Nevsky (1252–63) succeeded his brother Andrew; and Alexander's brothers and sons succeeded him. Furthering the tendency toward fragmentation, however, none moved to Vladimir but remained in their regional seats and secured their local princely houses. Thus, Alexander's brother Yaroslav (grand prince of Vladimir, 1264–71) founded the house of Tver, and Alexander's son Daniel founded the house of Moscow.

After the Mongol invasion (1240) the Russian princes were obliged to seek a patent from the Mongol khan in order to rule as grand prince. Rivalry for the patent, as well as for leadership in the grand principality of Vladimir, developed among the princely houses, particularly those of Tver and Moscow. Gradually, the princes of Moscow became dominant, forming the grand principality of Moscow (Muscovy), which they ruled until their male line died out in 1598.

Rus, also spelled ROS, ancient people who gave their name to the land of Russia. Their origin and identity are much in dispute. Traditional Western scholars believe them to be Scandinavian Vikings, an offshoot of the Varangians, who moved southward from the Baltic coast and founded the first consolidated state among the eastern Slavs, centring on Kiev. Soviet scholars, along with some Westerners, consider the Rus to be a southeastern Slavic tribe that founded a tribal league; the Kievan state, they affirm, was the creation of Slavs and was attacked and held only briefly by Varangians.

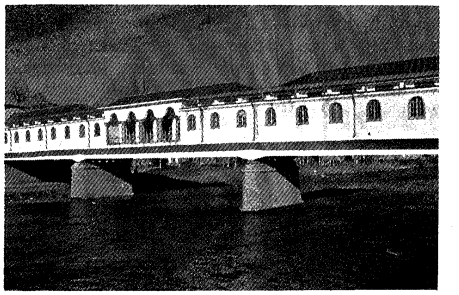
The Viking, or "Normanist," theory was initiated in the 18th century by such German historian-philologists as Gottlieb Siegfried Bayer (1694–1738) and August Ludwig von Schlözer (1735–1809); Bayer was an early member of the St. Petersburg Academy of Sciences. These two relied on *The Primary Russian Chronicle,* an account written in the 12th century and covering the period 852 to 1110; it says that the Rus, a Norman people, were first asked to come to Novgorod by the local population to put an end to their feuds; the Rus later extended their rule to Kiev, making it their keystone of defense. This theory was advanced in the 19th century by the Danish philologist Vilhelm Thomsen (1842–1927) and the German-Russian historian-philologist Ernst Eduard Kunik (1814–99). It was noted that early Arabian writers had represented the seat of Rus as an island covered with woods and marshes; excavations of 9th- and 10th-century tumuli confirmed the presence of Norse warriors in such a region around Lake Ilmen, near the ancient town of Novgorod, and Lake Ladoga, where the Neva River has its origin. These Baltic regions seemed to indicate the origin of the Rus.

Soviet scholars have rejected *The Primary Russian Chronicle* as unreliable and have insisted that the eastern Slavs, before the entry of the Varangians, had evolved a sophisticated feudal state comparable to the Carolingian empire in the West. The Rus were simply a southern Slavic tribe living on the Ros River.

rusalka, plural RUSALKI, in Slavic mythology, lake-dwelling soul of a child who died unbaptized or of a virgin who was drowned (whether accidentally or purposely). Slavs of different areas have assigned different personalities to the *rusalki.* Around the Danube River, where they are called *vile* (singular *vila*), *rusalki* are beautiful, charming girls, dressed always in light robes of mist, singing sweet, bewitching songs to the passersby. The *rusalki* of northern Russia are ugly, unkempt, wicked, invariably naked, and always eager to ambush humans. All *rusalki* love to entice men—the *vile* to enchant them and the northern *rusalki* to torture them.

During *rusalki* week, at the beginning of the summer, the nymphs are supposed to emerge from the water and climb into weeping willow and birch trees until night, when they dance in rings in the moonlight. Any person joining them must dance until he dies. After that week, grass grows thicker where they trod.

Ruse, also spelled RUSSE, or ROUSSÉ, city of northern Bulgaria, on the Danube River near the mouth of the Rusenski Lom. Bulgaria's principal river port and a transportation hub

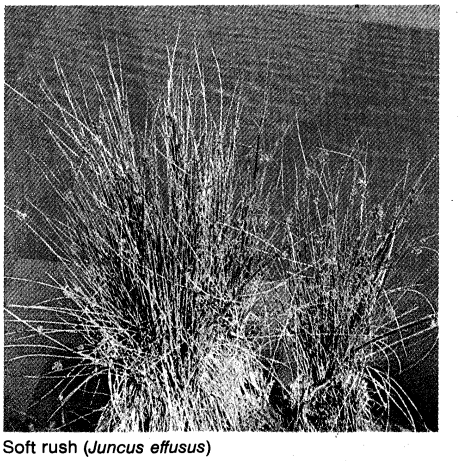


Bridge over the Danube at Ruse, Bulg.
Harrison Forman

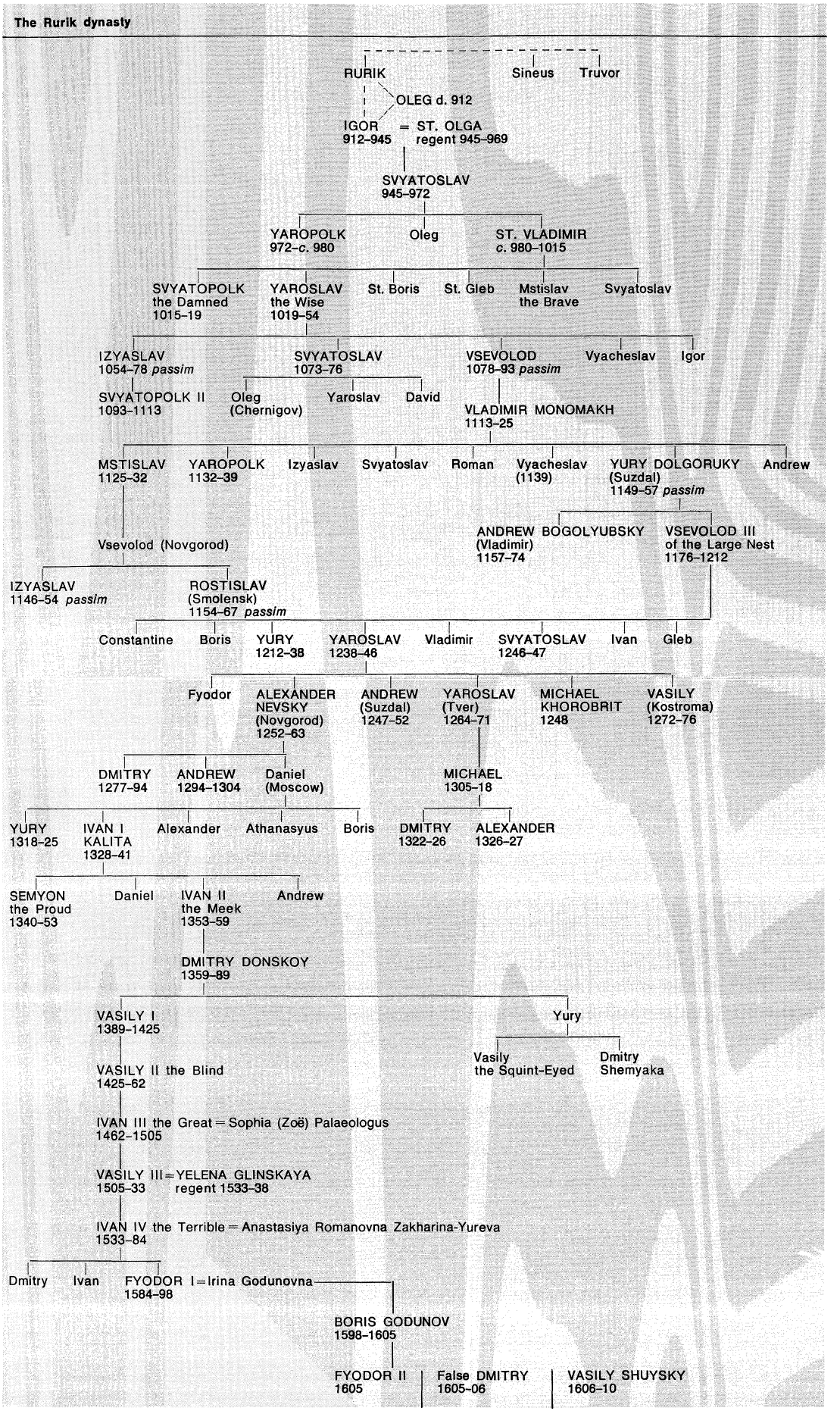
for road and rail, Ruse has regular shipping services on the Danube and an airport. Upstream is the Friendship Bridge, built in 1954, carrying road and rail traffic across the river to Giurgiu, in Romania. Ruse is an industrial town, with an oil refinery, railway car and locomotive works, textile mills, and plants for food processing and the production of agricultural machinery, leather goods, ceramics, and other consumer goods. The harbour is cut in the Danube alluvial plain at the foot of low bluffs.

The town, which began as a fortified Roman harbour called Sexantaprista ("Sixty Ships") in the 1st century BC, was destroyed by barbarians in the 7th century. The Ottomans built a new town, Roustchouk, which subsequently bore the names Cherven and Roussé. Under the Turks it became a vital military base with a fortress and was an established trade centre. The building of the Ruse–Varna railway in 1866, the first in the Ottoman Empire, further stimulated growth. After numerous attacks by the Russians, the city was captured in 1877 and ceded to Bulgaria. Today, Ruse has an agricultural institute, an opera house, a state symphony orchestra, a museum, and an art gallery. Nearby is a state livestock farm. The neighbouring village of Ivanovo has a monk's settlement hewn out of the vertical cliffs overlooking the Rusenski Lom. Pop. (1987 est.) 186,428.

rush, any of several flowering plants distinguished by cylindrical stalks or hollow,

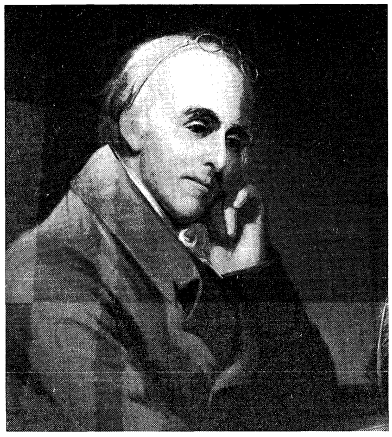


Soft rush (*Juncus effusus*)
A to Z Botanical Collection—EB Inc.


The Rurik dynasty
RURIK
Sineus
Truvor
OLEG d. 912
IGOR 912–945
= ST. OLGA regent 945–969
SVYATOSLAV 945–972
YAROPOLK 972–c. 980
Oleg
ST. VLADIMIR c. 980–1015
SVYATOPOLK the Damned 1015–19
YAROSLAV the Wise 1019–54
St. Boris
St. Gleb
Mstislav the Brave
Svyatoslav
IZYASLAV 1054–78 passim
SVYATOSLAV 1073–76
VSEVOLOD 1078–93 passim
Vyacheslav
Igor
SVYATOPOLK II 1093–1113
Oleg (Chernigov)
Yaroslav
David
VLADIMIR MONOMAKH 1113–25
MSTISLAV 1125–32
YAROPOLK 1132–39
Izyaslav
Svyatoslav
Roman
Vyacheslav (1139)
YURY DOLGORUKY (Suzdal) 1149–57 passim
Andrew
ANDREW BOGOLYUBSKY (Vladimir) 1157–74
VSEVOLOD III of the Large Nest 1176–1212
Vsevolod (Novgorod)
IZYASLAV 1146–54 passim
ROSTISLAV (Smolensk) 1154–67 passim
Constantine
Boris
YURY 1212–38
YAROSLAV 1238–46
Vladimir
SVYATOSLAV 1246–47
Ivan
Gleb
Fyodor
ALEXANDER NEVSKY (Novgorod) 1252–63
ANDREW (Suzdal) 1247–52
YAROSLAV (Tver) 1264–71
MICHAEL KHOROBRIT 1248
VASILY (Kostroma) 1272–76
DMITRY 1277–94
ANDREW 1294–1304
Daniel (Moscow)
MICHAEL 1305–18
YURY 1318–25
IVAN I KALITA 1328–41
Alexander
Athanasyus
Boris
DMITRY 1322–26
ALEXANDER 1326–27
SEMYON the Proud 1340–53
Daniel
IVAN II the Meek 1353–59
Andrew
DMITRY DONSKOY 1359–89
VASILY I 1389–1425
Yury
Vasily the Squint-Eyed
Dmitry Shemyaka
VASILY II the Blind 1425–62
IVAN III the Great = Sophia (Zoë) Palaeologus 1462–1505
VASILY III = YELENA GLINSKAYA 1505–33 regent 1533–38
IVAN IV the Terrible = Anastasiya Romanovna Zakharina-Yureva 1533–84
Dmitry
Ivan
FYODOR I = Irina Godunovna 1584–98
BORIS GODUNOV 1598–1605
FYODOR II 1605
False DMITRY 1605–06
VASILY SHUYSKY 1606–10

stemlike leaves. They are found in temperate regions and particularly in moist or shady locations. The rush family (Juncaceae) includes *Juncus,* the common rushes, and *Luzula,* the woodrushes. Common rushes are used in many parts of the world for weaving into chair bottoms, mats, and basketwork, and the pith serves as wicks in open oil lamps and for tallow candles (rushlights). *J. effusus,* called soft rush, is used to make the tatami mats of Japan. The bulrush, also called reed mace and cattail, is *Typha angustifolia,* belonging to the family Typhaceae; its stems and leaves are used in North India for ropes, mats, and baskets. The horsetail genus (*Equisetum*) is called scouring rush, or Dutch rush, because the plants' silica-laden stalks are used for scouring metal and other hard surfaces. Flowering rush is *Butomus umbellatus* (family Butomaceae). The sweet rush, or sweet flag, is *Acorus calamus* (family Araceae).

Rush, Benjamin (b. Jan. 4, 1746 [Dec. 24, 1745, Old Style], Byberry, near Philadelphia—d. April 19, 1813, Philadelphia), American physician and political leader, a member of the Continental Congress and a signer of the



Benjamin Rush, oil painting by Charles Willson Peale, after a painting by Thomas Sully; in the Independence National Historical Park, Philadelphia

By courtesy of the Independence National Historical Park Collection, Philadelphia

Declaration of Independence. His encouragement of clinical research and instruction was frequently offset by his insistence upon bloodletting, purging, and other debilitating therapeutic measures.

Rush was born into a pious Presbyterian family. He was sent to a private academy and on to the College of New Jersey at Princeton, from which he was graduated in 1760. After a medical apprenticeship of six years, he sailed for Europe. He took a medical degree at the University of Edinburgh in 1768 and then worked in London hospitals and briefly visited Paris.

Returning home to begin medical practice in 1769, he was appointed professor of chemistry in the College of Philadelphia, and in the following year he published his *Syllabus of a Course of Lectures on Chemistry,* the first American textbook in this field. Despite war and political upheavals, Rush's practice grew to substantial proportions, partly owing to his literary output. The standard checklist of early American medical imprints lists 65 publications under his name, not counting scores of communications to newspapers and magazines. Another source of Rush's professional prestige was the large number of his private apprentices and students from all over the country. He taught some 3,000 students during his tenure as professor of, successively, chemistry, the theory and practice of medicine, and the institutes of medicine and clinical medicine in the College of Philadelphia and the University of Pennsylvania. After 1790 his lectures were among the leading cultural attractions of the city.

As a physician, Rush was a theorist, and a dogmatic one, rather than a scientific pathologist. Striving for a simple, unitary explanation of disease, he conjectured that all diseases are really one—a fever brought on by overstimulation of the blood vessels—and hence subject to a simple remedy—"depletion" by bloodletting and purges. The worse the fever, he believed, the more "heroic" the treatment it called for; in the epidemics of yellow fever that afflicted Philadelphia in the 1790s his cures were more dreaded by some than the disease.

In psychiatry Rush's contributions were more enduring. For many years he laboured among the insane patients at the Pennsylvania Hospital, advocating humane treatment for them on the ground that mental disorders were as subject to healing arts as physical ones; indeed, he held that insanity often proceeded from physical causes, an idea that was a long step forward from the old notion that lunatics are possessed by devils. His *Medical Inquiries and Observations upon the Diseases of the Mind,* published in 1812, was the first and for many years the only American treatise on early psychiatry.

Rush was an early and active American patriot. As a member of the radical provincial conference in June 1776, he drafted a resolution urging independence and was soon elected to the Continental Congress, signing the Declaration of Independence with other members on August 2. For a year he served in the field as surgeon general and physician general of the Middle Department of the Continental Army, but early in 1778 he resigned because he considered the military hospitals mismanaged by his superior, who was supported by General Washington. Rush went on to question Washington's military judgment, a step that he was to regret and one that clouded his reputation until recent times. He resumed the practice and teaching of medicine and in 1797, by appointment of Pres. John Adams, took on the duties of treasurer of the U.S. Mint. He held this office until his death.

(L.H.Bu.)

BIBLIOGRAPHY. The standard biography is N.G. Goodman, *Benjamin Rush: Physician and Citizen, 1746–1813* (1934); exhaustive, but covering Rush's life only up to 1790, is D.F. Hawke, *Benjamin Rush, Revolutionary Gadfly* (1971). Both contain reference notes and bibliographies. Rush's separately published works are listed in Robert B. Austin, *Early American Medical Imprints: A Guide to Works Published in the United States, 1668–1820* (1961), which must be supplemented by Rush's nonmedical writings, particularly his *Essays: Literary, Moral & Philosophical* (1798), containing many of his educational and reform proposals. Rush's lively and invaluable *Autobiography* has been admirably edited, with related materials, by George W. Corner (1948); and his *Letters,* touching on every aspect of his life, were edited by L.H. Butterfield, 2 vol. (1951).

Rush, Richard (b. Aug. 29, 1780, Philadelphia—d. July 30, 1859, Philadelphia), American statesman who in 1817 negotiated the Rush–Bagot Agreement with Great Britain, providing for disarmament on the Great Lakes after the War of 1812.

The son of the noted physician Benjamin Rush, Richard graduated from Princeton in 1797 and was admitted to the bar in Philadelphia in 1800. He served as attorney general of Pennsylvania (1811), attorney general of the United States (1814–17), and secretary of the treasury (1825–29). In 1828 he was the candidate for vice president on the unsuccessful ticket headed by his mentor, John Quincy Adams.

The Rush–Bagot Agreement was concluded by Rush, who then (March–September 1817) was acting U.S. secretary of state, and Charles Bagot, the British minister in Washington, D.C. As minister to Great Britain (1817–25), Rush, aided by Albert Gallatin, the U.S. minister to France, negotiated another agreement in 1818 that fixed the 49th parallel as the boundary between Canada and the United States, from the Lake of the Woods—which lies in Ontario, Manitoba, and Minnesota—to the Rocky Mountains. It permitted for 10 years the settlement of U.S. citizens and British subjects in the Oregon Territory without prejudicing the claim of either government to that region. In addition to the U.S.–Canadian negotiations, Rush participated in conferences concerning Latin America with George Canning, British foreign minister and later prime minister, that led to the enunciation of the Monroe Doctrine (1823).

In 1836, as the U.S. agent in London, Rush received the bequest (£104,960) by which James Smithson founded the Smithsonian Institution in Washington, D.C. Rush considered his role in founding the museum his most important public service.

Rush, William (b. July 4, 1756, Philadelphia—d. Jan. 17, 1833, Philadelphia), American sculptor and wood-carver, considered the first native sculptor of significance.

Rush was trained as a maker of ornamental ship carvings and figureheads. During the Revolution he served in the American army, and shortly after the close of the war he set up a shop in Philadelphia. He was one of the founders of the Pennsylvania Academy of Fine Arts (1805) and served for many years as a member of the Philadelphia city council.

A number of his wood carvings are preserved in various Philadelphia institutions, among the most interesting of which are his vigorous self-portrait (Philadelphia Academy of Fine Arts), the "Water Nymph and Bittern" (Fairmount Park), the allegorical figures "Comedy" and "Tragedy" (Edwin Forrest Home), and a statue of George Washington (Independence Hall). Few, if any, of his ship carvings and figureheads survive.

Rush–Bagot Agreement (1817), exchange of notes between Richard Rush, acting U.S. secretary of state, and Charles Bagot, British minister to the United States, that provided for the limitation of naval forces on the Great Lakes in the wake of the War of 1812. Each country was allowed no more than one vessel on Lake Champlain, one on Lake Ontario, and two on the upper lakes. Each vessel was restricted to a maximum weight of 100 tons and one 18-pound cannon. The agreement was ratified unanimously by the Senate in 1818. With some modifications, it has remained in force to the present day and has formed the basis of peaceful border relations between the United States and Canada.

Rushcliffe, district (borough), county of Nottinghamshire, central England, occupying an area of 158 square miles (410 square km) immediately southeast of the city of Nottingham. Rushcliffe district is a rural agricultural area of open, rolling uplands (wolds) and flat plains. The wolds in the south rise to between 200 and 300 feet (60 and 90 m) in elevation and are an extension of higher areas in the adjacent county of Leicestershire. The valley of the River Trent forms most of the district's northern boundary, and the Vale of Belvoir is in the northeast. Both of these wide, flat plains extend far beyond the district's boundaries.

Wheat, barley, oats, and sugar beets are generally grown at higher elevations in the district. Dairy cattle are raised, and some beef cattle and sheep are fattened in valley pastures.

West Bridgford, a light industrial centre directly across the River Trent from the city of Nottingham, is both the county and district

seat. A modern coal mine is in operation at Cotgrave in the centre of the district, and a large thermal power station is located at Ratcliffe-on-Soar in the southwest.

The Trent Bridge Cricket Ground at West Bridgford, one of the better-known cricket grounds in Great Britain, is a venue for test (international) matches. The Perpendicular Gothic broach steeple of the All Saints Church at Bingham, in the Trent Valley northeast of West Bridgford, is noteworthy for its breadth and for its many buttresses. Pop. (1986 est.) 96,900.

Rushmoor, district (borough), county of Hampshire, southern England, occupying an area of 14 square miles (36 square km) in the extreme northeastern corner of the county. It is situated at the southern edge of the Thames River basin, and its rural areas are sandy heathland. The chalk uplands of the North Downs border the district on the south, and the Basingstoke Canal bisects it east–west. The district is a major centre of the United Kingdom's military establishment. A military camp, established at the town of Aldershot in 1854–55, is the largest permanent military base in the country. Adjacent Farnborough, the district seat, and lying to the north of the canal is the site of the Royal Aircraft Establishment, which since 1906 has been the United Kingdom's chief centre for scientific research and experimental development in aeronautics. Farnborough Hill, a gabled, turreted house built in 1862, was inhabited from 1881 until her death in 1920 by Eugénie, the exiled empress of France (1853–1870). Both Aldershot and Farnborough were expanded and redeveloped during the 1960s and 1970s. Industrial manufactures include paper products, cables, and synthetic rubber. In 1908 an American aviator, S.F. Cody, made the first powered flight in Great Britain at Farnborough. Pop. (1986 est.) 79,100.

Rushmore, Mount (South Dakota, U.S.): *see* Mount Rushmore National Memorial.

Rushworth, John (b. *c.* 1612, Northumberland?, Eng.—d. May 12, 1690, Southwark, near London), English historian whose *Historical Collections of Private Passages of State* (7 vol., 1659–1701; 8 vol., 1721), covering 1618–49, remains a valuable source of information on events leading up to and during the English Civil Wars.

He studied law, perhaps at the University of Oxford (from which he received an M.A. in 1649), and in 1638 was made solicitor to the town of Berwick-upon-Tweed. He was enrolled at Lincoln's Inn in 1640 and called to the bar in 1647. Rushworth was always more interested in politics than in law, and during the intermission of parliaments (1629–40) he attended and made shorthand notes of all important political and judicial proceedings heard before the Star Chamber, the court of honour, and the king and council. In 1640–42 he was assistant clerk to the House of Commons, and after the outbreak of war he acted as a messenger between Parliament and its committees at Oxford and York. He himself published a number of the newssheets that preceded the establishment of regular newspapers—*e.g.,* the daily *London Post* (1644–45; 1646–47), the *Kingdomes Weekly Post* (1643–1644)—and also the parliamentary pamphlets opposed to the Royalist *Mercurius Aulicus.*

As secretary (1645–50) to Sir Thomas Fairfax, general of the New Model Army, Rushworth had considerable importance; and thereafter he was employed by the council of state and Parliament. At the Restoration, Rushworth made peace with Charles II and, although called to give information on the activities of the regicides, was not himself implicated. In 1667 he became secretary to the lord keeper and, later, agent to the colony of Massachusetts. Despite his many emoluments and an inherited estate, he fell into poverty and spent his last years in a lodging in the King's Bench prison, Southwark, where he died.

Rushworth's *Historical Collections* was compiled from his own notes and from printed material, with the avowed intention of making it possible for a true history to be written of events that, in pamphlets and newssheets dating from the period before the control of the press, were liable to misrepresentation. It is most useful for its eyewitness accounts of the Earl of Strafford's trial, the Battle of Naseby, and the parliamentary campaigns of 1644–45 and for its transmission of contemporary comment.

Rusk, (David) Dean (b. Feb. 9, 1909, Cherokee County, Ga., U.S.), U.S. secretary of state during the John F. Kennedy and Lyndon Johnson administrations who became a target of antiwar hostility as he consistently defended U.S. participation in the Vietnam War.

After graduating from Davidson College in 1931, Rusk earned his master's degree at St. John's College, Oxford, as a Rhodes Scholar. From 1934 to 1940 he taught political science at Mills College in Oakland, Calif., becoming dean of the faculty in 1938.

During World War II, Rusk served General Joseph W. Stilwell as deputy chief of staff for the China–Burma–India theatre. After the war he held positions in both the state and war departments. In March 1950 he became assistant secretary of state for Far Eastern affairs, a position in which he was involved in U.S. prosecution of the Korean War. Rusk supported the war, but he disagreed with General Douglas MacArthur's advocacy of expanding the fighting into China.

Rusk was president of the Rockefeller Foundation from 1952 to 1960. In 1961 he became secretary of state under President Kennedy. Within a year he faced crises in Cuba, Indochina, and Berlin. Rusk's characteristically cool and reticent personality, however, contributed to the State Department's reduced role in national policy-making.

Rusk was retained as secretary of state in the Johnson administration following Kennedy's assassination. From 1964 to 1968 he consistently defended U.S. objectives in Vietnam, making himself a target of growing antiwar sentiment in the country. His long-time opposition to recognition of Communist China confirmed his image as an inflexible stalwart of the Cold War.

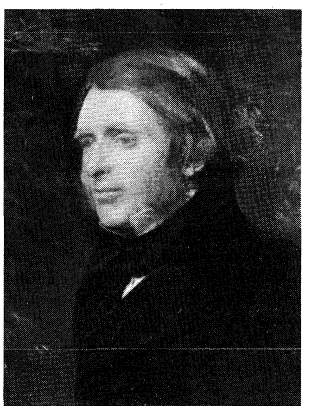
Rusk retired after leaving office in January 1969, but he subsequently accepted a professorship in international law at the University of Georgia.

Ruska, Ernst (August Friedrich) (b. Dec. 25, 1906, Heidelberg, Ger.—d. May 27, 1988, West Berlin), German electrical engineer who invented the electron microscope. He was awarded half of the Nobel Prize for Physics in 1986 (the other half was divided between Heinrich Rohrer and Gerd Binnig).

Ruska studied at the Technical University of Munich during 1925–27 and then enrolled at the Technical University in Berlin. Around this time he began the studies that led to his invention of the electron microscope. The extent to which an optical microscope could resolve the detail of a highly magnified object was limited by the wavelengths of the light beams used to view the object. Since it had been established in the 1920s that electrons have the properties of waves about 100,000 times shorter than those of light, Ruska posited that if electrons could be focused on an object the same way light is, at extremely high magnifications the electrons would yield greater detail (*i.e.,* have a greater resolving power) than would conventional light microscopes. In 1931 he built the first electron lens, an electromagnet that could focus a beam of electrons just as a lens focuses a beam of light. By using several such lenses in a series, he invented the first electron microscope in 1933. In this instrument, electrons were passed through a very thin slice of the object under study and were then deflected onto photographic film or onto a fluorescent screen, producing an image that could be greatly magnified.

Ruska joined Siemens-Reiniger-Werke AG as a research engineer in 1937, and in 1939 the company brought out its first commercial electron microscope, which was based on his inventions. Ruska did research at Siemens until 1955 and then served as director of the Institute for Electron Microscopy of the Fritz Haber Institute from 1955 to 1972. He was also a longtime professor at the Technical University of West Berlin.

Ruskin, John (b. Feb. 8, 1819, London—d. Jan. 20, 1900, Coniston, Lancashire, Eng.), English writer, critic, and artist who championed the Gothic Revival movement in architecture and the decorative arts and had a large influence upon public taste in art in Victorian England. He also did much to inspire the opposition to a laissez-faire philosophy.



Ruskin, detail of an oil painting by Sir John Everett Millais, 1853–54; in a private collection

By courtesy of the Royal Academy of Arts, London

Youth. John Ruskin's parents recognized a dangerous precocity and an unstable genius in their child and sheltered him from contact with reality. His father, John James Ruskin, was a successful wine merchant. The Ruskins moved to Herne Hill, on the southern outskirts of London, when Ruskin was four, and to nearby Denmark Hill, near Dulwich, when he was 20. His natural appetite for pictures found satisfaction in the Dulwich College Picture Gallery, and the pictures exhibited there remained the basis of his thoughts on art.

The Dulwich gallery, constant reading of the Bible with his mother and of the 18th-century classics with his father, and his father's encouragement of his facile talents in writing and drawing were the most valuable part of his education. His father's interest in art secured him drawing lessons from the watercolourist Copley Fielding. When he was 14 the family began a series of tours in Europe. In the Alps he found the beauty and sublimity that his imagination needed, and he justified his love of the Alps by amateur geologizing and botanizing.

When he was 17 Ruskin fell in love with Adèle Domecq, the daughter of his father's Spanish partner. The frustration of this affair seems to have been the effective cause of a permanent failure to attain emotional maturity. In 1836 Ruskin went up to Christ Church, Oxford, where his studies were desultory and his social life was hampered by his mother's presence in lodgings nearby. Nonetheless, he had gotten away from the suburbs and made friends who were permanently to enrich his

life. He won the Newdigate prize for poetry in 1839 and, because of a generous allowance from his father, was able to begin to collect pictures by J.M.W. Turner.

First visit to Italy. Ruskin's time at Oxford was interrupted suddenly in the spring of 1840, when he suffered a hemorrhage, which the doctors considered to be of consumptive origin. They advised that he should winter abroad, and the family departed for Italy. Ruskin made many sketches in the course of the long, leisurely journey, but in Rome he began to have a clearer idea of the difference between amateur and professional work. They went on to Naples, where he had another attack, but on the return journey, by Venice through Switzerland, he regained energy and hope. He found himself able to see natural beauty in all its gamut—from great mountains to minute plants—with a new vividness, and he devoted himself to describing it with artistry.

Ruskin returned to Oxford in the autumn and was graduated in the spring of 1842. The Ruskins spent the summer at Chamonix-Mont-Blanc in the French Alps. There John began to plan a book in defense of Turner, whose late style had been exemplified in the pictures that he exhibited in the Royal Academy that year and that had been laughed at by the critics. Returning to a new house on Denmark Hill, he began to work seriously at the National Gallery and at Dulwich and to write the first draft of what was to become the first volume of *Modern Painters.* He set out to examine the "truth to Nature" of the accepted masters of landscape painting, always with the glorification of Turner in mind; and in his description of landscape in Italy and in the Alps he gave rein to his own capacity for word painting. The book appeared in May 1843, when Ruskin was just 24. It had a considerable success, though Turner himself showed nothing but embarrassment.

Second visit to Italy. In April 1845 Ruskin set out on a journey that was to mark a new stage in his development. Together with a valet and an elderly mountaineer guide and without his parents, he set forth to explore northern Italy and found in its medieval architecture and sculpture a romantic beauty he had not known before. The sketches he made were the best he ever achieved, and the things he saw were forever imprinted on his memory; for once, he was really happy.

When he returned to Denmark Hill it was to complete a second volume of *Modern Painters* in less congenial surroundings. It appeared in April 1846. A subsequent journey to Italy with his parents, to show them the beauties he had lately discovered, was an anticlimax and led to an attack of nervous depression. On their return he began to think of marriage and, with hesitant encouragement from his parents, became engaged to Euphemia Chalmers (Effie) Gray, the pretty daughter of Scottish friends of the family, whom he married in April 1848. He was completely self-centred and gifted; she was rather demanding and a born social climber. It is not surprising that the marriage (never consummated) was not a success.

After a few months in London, where Effie was determinedly social, in August they visited northern France, for Ruskin had it in mind to write a book on Gothic architecture. By April *The Seven Lamps of Architecture* was finished. It took the fruits of the labours of a generation of medievalists and gave them a generalized basis and a moral flavour; and it was extremely well written. In the autumn of 1849 the young Ruskins went to Venice for the winter. Ruskin wished to apply the general principles of *The Seven Lamps of Architecture* to Venetian architecture and to relate its rise and fall to the working of spiritual forces. He worked hard; the first volume of *The Stones of Venice* duly appeared in 1851. In the course of that year Ruskin was induced to champion the Pre-Raphaelite Brotherhood, a group of young English artists founded in reaction against contemporary academic painting, less because he admired them than because he thought the critics unfair to them. He befriended the painter and poet Dante Gabriel Rossetti, who disliked him; established a lasting and happy friendship with the artist Edward Burne-Jones; and cultivated the company of John Everett Millais, with the result that the artist and Effie fell in love. As soon as Millais had been elected a member of the Royal Academy, with an assured future, Effie left Ruskin. In July 1854 she secured an annulment, and a few months later she married Millais.

Return to Denmark Hill. Ruskin was back in the old narrow circle of Denmark Hill. His only escape was to rather futile teaching at the Working Men's College and in sitting at the feet of the historian and essayist Thomas Carlyle, who had him waste a good deal of time on causes irrelevant to his real interests. The third and fourth volumes of *Modern Painters* were written on an increasingly authoritarian note. His chief interest was in the construction of the Oxford Museum of Natural History, under the aegis of an old Oxford friend Henry Acland and according to his own principles of Gothic beauty. He offered to undertake the sorting and arrangement of the mass of drawings that Turner had left to the National Gallery, and, from February 1857 for about a year, this was his chief occupation.

In 1858, again alone but for a valet and the old guide, he spent six weeks in Turin, Italy, and recaptured the magic of the mature Renaissance in the paintings of Paolo Veronese. The fifth volume of *Modern Painters* (1860), written in the winter of 1858–59, is largely influenced by these interests. The volume is extremely disconnected; and, indeed, Ruskin's mind was gradually declining. He fell in love with a hysterical young Irish girl of good family, Rose La Touche, who, when he first knew her, was a child of 10; when she was 16 he declared himself to the parents, who were horrified. Soon after, Rose fell mentally and physically ill, and the affair dragged sadly and hectically on until her death in 1875. During these years, Ruskin became a habitué of Miss Bell's girls' school at Winnington, Cheshire, where the company of the children provided a refuge; some of his later books—notably *The Ethics of the Dust* (1866)—were developed from talks he gave to the pupils. *The Cornhill Magazine* began to publish a series of his essays on the nature of wealth, but they roused so much opposition among its readers that, after the fourth essay, William Makepeace Thackeray, the distinguished novelist who was its editor, discontinued them. Ruskin published them as a book under the title *Unto This Last* (1862).

He was near a breakdown and retired for a time to Mornex, near Geneva. He returned in time for his father's last illness and death in March 1864 and continued to live with his aging mother at Denmark Hill. His father bequeathed Ruskin £120,000, various properties, and a fine collection of pictures; but he had neither peace of mind nor strength of purpose left.

Last years. In 1869 Ruskin was elected the first Slade professor of fine art at Oxford University, and he had a great personal success as a lecturer. He gave the university a collection of prints, photographs, and drawings for undergraduates to study, and he set up a drawing school for them. He had a need to address himself to those of another intellectual class than himself and, thus, wrote two series of letters to workingmen, *Time and Tide* (1867) and a much longer set, *Fors Clavigera* (1871–84). The last was the organ of the Company of St. George, which he founded in 1871 and endowed with a capital of £10,000. It was intended to carry out his economic doctrines; every "companion" was to give it a 10th of his income, and for many years Ruskin did. Its activities were often ill-judged and were usually unfortunate; a museum of art at Sheffield was the most successful. Bouts of illness interrupted work at Oxford; after his mother's death, in 1871, Ruskin sold the house at Denmark Hill and bought Brantwood, an ugly residence beautifully situated on Coniston Water in the Lake District, where he spent much of his time, with a married cousin to keep house for him. He began to be obsessed with the idea of the "Storm-Cloud and Plague-Wind" that were everywhere defiling natural beauty, and finally in 1878 he suffered some months of acute mania. Early in 1879 he resigned his professorship.

Ruskin's intellectual life was over. He showed improvement in 1880–81 and even resumed work at Oxford, but the years that followed were checkered by attacks of mania. It was in these years, however, that he wrote the most charming of his works, the autobiography called *Praeterita* (1885–89). It offered escape from the present, and, since he had kept a diary for much of his life, he had materials to work on. It was never finished; after a sixth attack of madness, in the summer of 1889, he was incapable for the last months of his life of writing anything but his signature.

Assessment. It is usual to think of Ruskin as a typical public figure of Victorian England, the keeper of the artistic conscience of his country who upheld the preeminence of the Gothic style and demanded its employment in building and decoration. Nevertheless, acceptance of Ruskin as a prophet in art was not immediate. Though the substantive part of his pure art criticism was written before he was 35, he was considered to be something of an amateur, a rich dilettante, until after he was 50. By this time, the Gothic Revival movement, with roots in the late 18th century, had already become established as a leading current style, independently of his championship of it. By the last quarter of the 19th century, Ruskin's opinions on art were regarded as almost infallible; but from the 1860s onward he himself had lost interest in art criticism for its own sake, and his creative ideas were active in political and social economy. His puritanical conscience never let him rest easy in the enjoyment of his unearned wealth: he tried at first to justify his enjoyment of beauty by theorizing about it, and later, when this no longer satisfied him, he turned to economic and social questions.

Ruskin lived an inwardly difficult, lonely life, often pursued and struck at by madness. His interests were wide, embracing art, natural science, political science, and economic and social studies. Yet the variety of interest was also symptomatic of a want of concentration that increased with time and caused him, from one hour to the next, to abandon one kind of study for another. His art criticism, too, for all its influence and its breadth, is unsystematic and established on his personal responses; here his apparent limitations are partly those of his time, when art criticism and art history—to which his own writings gave a major impetus—were still only lightly cultivated fields: he had little knowledge or appreciation of any art outside that of Renaissance Italy and of England, and he had no sympathy with the Impressionist movement of his own day.

Yet Ruskin was a man of true originality. His literary style, though it has echoes of the King James Version of the Bible and Dr. Samuel Johnson, is unmistakably his own; although his ideas might owe something to the Greek philosopher Plato and more still to the Bible, he shaped them in his own way. He was a completely honest and curiously innocent man. As a rich man's son, he was free to work at what he liked and generally wrote

easily of what interested him. This amateur quality gives a characteristic sparkle and zest to his treatment of all his many themes. His originality and his intellectual self-indulgence were inextricably mixed with his psychological weakness. But, in spite of these disabilities (and sometimes because of them), he was able to perceive beauty with an infectious intensity and to express his perception in memorable prose, sometimes made even more cogent by accompanying drawings and sketches, for he was a good amateur draftsman.

What, then, are Ruskin's essential ideas on art and society, and how can they be summarized? It must be remembered first that Ruskin was a follower of the poet William Wordsworth in his love of nature. Ruskin founded his aesthetic principles upon truth to nature in landscape painting and tried to prove his point by contrasting, in *Modern Painters,* the sensitive accuracy in this respect of J.M.W. Turner, the great landscape painter of the first part of the 19th century in England, with the conventional generalizations of Claude Lorrain, the great landscapist of 17th-century France. He went on to find the same truthfulness, but now united with religious feeling, in Gothic architecture. He looked with care at the natural forms of its decoration, carved with delicate reserve by a host of anonymous craftsmen. The gesticulation of the Baroque and its ornaments, such as urns, scrolls, and obelisks—forms not found in nature—seemed artificial and false to him and so, in his view, constituted bad art. His conception of good art as a storehouse of natural truth, which also was its source, led to his ideal view of the workman as a dedicated individual who needed to find fulfillment through doing work with a valid purpose. Social justice required the provision of conditions that would allow all to share with the creative artist the opportunity for work of this kind, but such conditions were not generally to be found. Thus, he was led from criticism and exposition of art to a concern with social welfare. Yet one comes back to the fact that he is remembered best in the world of art. (J.Ev./Ed.)

MAJOR WORKS. *Writings on art. Modern Painters,* 5 vol. (1843–60, epilogue 1888); *The Seven Lamps of Architecture* (1849); *The Stones of Venice,* 3 vol. (1851–53).

Writings on social and political economy. Unto This Last (1862), four articles first published in *The Cornhill Magazine,* 1860; *Time and Tide* (1867), letters in newspapers of the same year; *Fors Clavigera,* monthly publication, occasionally interrupted, of letters to workmen, 1–96 (1871–84); *Munera Pulveris* (1872), four articles in *Fraser's Magazine,* 1862–63.

Other works. The Two Paths (1859) and *A Joy for Ever* (1880), both compiled from lectures given in 1856–59; *Sesame and Lilies* (1865) and *The Crown of Wild Olive* (1866), miscellaneous lectures; *The Ethics of the Dust* (1866); *Praeterita,* parts 1–28 (1885–89), an incomplete autobiography.

BIBLIOGRAPHY. Ruskin's *Works* were edited by E.T. Cook and A. Wedderburn, 39 vol. (1903–12). The *Diaries* were edited by Joan Evans and J.H. Whitehouse, 3 vol. (1956–59). There are separate editions of *Letters* to various people, of which *Ruskin's Letters from Venice, 1851–1852,* ed. by J.L. Bradley (1955), may be noted. Joan Abse, *John Ruskin: The Passionate Moralist* (1980), is a biography for the general reader; Robert Hewison, *John Ruskin* (1976), is a sympathetic study claiming for Ruskin a unity of thought denied him by most critics. Other good biographies are E.T. Cook, *The Life of John Ruskin,* 2 vol. (1911, reprinted 1968), a classic that now seems overdiscreet; Derrick Leon, *Ruskin, the Great Victorian* (1949); Peter Quennell, *John Ruskin: The Portrait of a Prophet* (1949); John D. Rosenberg, *The Darkening Glass: A Portrait of Ruskin's* Genius (1961).

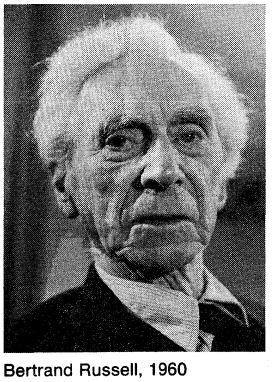
Ruspinum (Tunisia): *see* Munastīr, al-.

Russe (Bulgaria): *see* Ruse.

Russell, community, northeastern North Island, New Zealand, on the southeastern shore of the Bay of Islands. Under its original name of Okiato, the town was chosen (1840) by Lieut. Gov. William Hobson to be the first capital of New Zealand. It was subsequently renamed in honour of Lord John Russell, then secretary of state for the colonies. In 1841 the capital was transferred to Auckland, and shortly afterward Russell was destroyed by fire. By 1846 the town had been relocated to the village site of Kororareka. Russell is now a resort centre, linked to Auckland (165 mi [265 km] south) by road. Its deepwater harbour accommodates game, commercial fishing, and oyster fleets. Pop. (1983 est.) 990.

Russell FAMILY, a famous English Whig family, the senior line of which has held the title of duke of Bedford since 1694. Originating in Dorset, the family first became prominent under the Tudor sovereigns, John Russell (d. 1555) being created earl of Bedford for his part in suppressing a rebellion in 1549 against the Protestant innovations of Edward VI's reign. The family was connected with the Parliamentary party in the English Civil War. Its first notable Whig member was Lord William Russell (son of the 1st Duke of Bedford), a supporter of attempts to exclude the future king James II from the throne; he was executed for treason in 1683. Perhaps the most notable member of the family was Lord John Russell (afterward 1st Earl Russell), a proponent of schemes for parliamentary reform and twice prime minister in the mid-19th century. In the 20th century the family's most famous member was Lord John Russell's grandson, the philosopher Bertrand Russell (3rd Earl Russell).

Russell, Bertrand, in full BERTRAND ARTHUR WILLIAM RUSSELL, 3RD EARL RUSSELL OF KINGSTON RUSSELL, VISCOUNT AMBERLEY (b. May 18, 1872, Trelleck, Monmouthshire, Eng.—d. Feb. 2, 1970, near Penrhyndeudraeth, Merioneth, Wales), English logician and philosopher, best known for his work



Bertrand Russell, 1960

By courtesy of the British Broadcasting Corporation, London

in mathematical logic and for his social and political campaigns, including his advocacy of both pacifism and nuclear disarmament. He received the Nobel Prize for Literature in 1950.

Early years. Russell was the second son of Viscount Amberley and his wife, Katherine, daughter of the 2nd Baron Stanley of Alderley. Lord Amberley was the third son of Lord John Russell, who was twice prime minister and became the 1st Earl Russell.

Katherine Amberley died of diphtheria in 1874, and Amberley himself died 18 months later. The Amberleys had very advanced views and had intended to place Bertrand and his brother Frank (then aged 10) under the guardianship of friends who were atheists. But the children's grandparents had no difficulty, given the feeling of the time, in upsetting the will and getting the two boys made wards in Chancery, so that they were brought up by their Russell grandmother, a strict yet politically liberal-minded Puritan with a rigid personal conscience and exacting standards. Bertrand Russell was educated privately, had little contact with other children, and developed an intense inner life, full of idealistic feeling and metaphysical profundities (partly a product, he later theorized, of sublimated sexual desires), all imbued with a passionate desire for certainty in knowledge. At the age of 11 he had already begun to have religious doubts, and, eventually, the skeptical cast of his intelligence prevailed over his upbringing. He came to disagree with his family on everything except politics, but he was also able to accept the disillusionment of finding that logical certainty was unattainable in empirical matters and to accept as well the stunning disappointment (when introduced by his brother at the age of 11 to the delightful certainties of mathematics) of being told that the axioms of geometry could not be proved but had to be taken on trust.

This situation set the pattern of Russell's philosophical career. He was determined not to be beguiled by human pretensions to knowledge or by unbacked assumptions either about the foundations of knowledge or about what may be said to exist. Henceforth, one of his primary aims was to inquire, with skeptical and parsimonious intent, "how much we can be said to know and with what degree of certainty or doubtfulness."

He entered Trinity College, Cambridge, in 1890, was at once recognized as intellectually outstanding, and soon became a member of the exclusive society known to outsiders as "The Apostles." He was winner of first-class honours in the Mathematical Tripos (honours examination) in 1893 and then turned to philosophy, becoming for several years an Idealist under the influence of the Cambridge metaphysician J.M.E. McTaggart, and taking a first-class degree in moral sciences in 1894.

In the same year, against the wishes of his family, he married Alys Pearsall Smith, the sister of Logan Pearsall Smith (the author of *Trivia*) and a Quaker from Philadelphia with advanced views. In the next two years he lectured in the United States on non-Euclidian geometry, travelled in Germany to study economics, was introduced to Marxism by the Social Democrats there, and, as a result, was appointed first lecturer at the London School of Economics and Political Science. His first published book—written from the orthodox liberal point of view—was *German Social Democracy* (1896). He remained a liberal until he joined the Labour Party in 1914. He also won a fellowship at Trinity with a dissertation entitled "An Essay on the Foundations of Geometry."

First philosophical works. In 1898, with Trinity Fellow G.E. Moore leading the way, he rebelled against Idealism and became, broadly, an Empiricist, a Positivist, and what philosophers would call a physical Realist (though in everyday matters he was what the layman would call a Materialist) for the rest of his philosophical career.

His career may be said to have involved three main aims, with an underlying premise that the scientific view of the world is largely the correct view. The most fundamental and pervasive aim was the one already mentioned: that of paring down to a minimum and to their simplest expression the pretensions of human knowledge. This aim manifested itself in such books as *An Inquiry into Meaning and Truth* (1940) and his last major work *Human Knowledge, Its Scope and Limits* (1948), which was intended to be a definitive survey. The second aim involved the linking of

logic and mathematics, as in his first major work, *The Principles of Mathematics* (1903), with the object of showing that mathematics can be deduced from a very small number of logical principles. The third aim was analytic: assuming that it is possible to infer something about the world from the language in which it is (correctly) described, Russell analyzed that language down to its minimum requirements—its atomic facts—in order to avoid unnecessarily postulating the existence of the objects denoted by descriptive phrases (such as "The present king of France"). This aim manifested itself in the so-called theory of descriptions, in the philosophy of Logical Atomism, and in such books as *The Analysis of Matter* (1927) and *The Analysis of Mind* (1921), the main thesis of which holds that mind and matter are different "structurings" of the same "neutral" elements.

After an interlude of work on Leibniz (*A Critical Exposition of the Philosophy of Leibniz* [1900]), Russell embarked upon his major work on logic and mathematics, starting with the first draft of *The Principles of Mathematics* (1903) and culminating more than a decade later in the publication of the three volumes of *Principia Mathematica* (1910, 1912, and 1913), written in collaboration with his friend and former tutor, the philosopher and mathematician Alfred North Whitehead. This work, together with Russell's ancillary work on logic, was immensely influential among logicians for many years, even though the two authors agreed that they had not completely fulfilled their purpose of deriving mathematics from self-evident logical principles.

At the beginning of this decade of work—the hardest in Russell's whole life—he underwent what he called a "mystic illumination," which in five minutes transformed him into a pacifist (and a pro-Boer in England's war against the Boers of South Africa) and overwhelmed him with "semi-mystical feelings about beauty." It was in 1903 that he suddenly fell out of love with his wife Alys, though the couple did not divorce until 1921, Russell in 1910 having met Lady Ottoline Morrell, a prominent literary hostess, with whom he developed a long-lasting relationship.

In 1902 there appeared the popular and, as he later felt, overwritten essay "The Free Man's Worship." In 1907 he stood unsuccessfully for Parliament, campaigning for women's suffrage and free trade. In 1908 he was elected a fellow of the Royal Society.

Later political and philosophical works. During World War I his activities as a pacifist resulted in his being fined £100 in 1916, being dismissed from his lectureship at Trinity College, and being imprisoned for six months in 1918. While in prison he wrote his *Introduction to Mathematical Philosophy* (1919) and started reading for his work *The Analysis of Mind* (1921).

In 1919 Russell met Dora Black, with whom he visited China in 1920 and whom he married as his second wife in 1921. Russell visited the Soviet Union in 1920 and, the same year, published *The Practice and Theory of Bolshevism,* which was markedly critical of the regime, stressing its totalitarian nature and predicting and condemning many of the aspects of what was later to be called Stalinism.

Since the publication of *Principia Mathematica,* Russell's philosophical work had been mainly analytic and as such was one of the inspirations for the Analytic movement in philosophy, with which, however, Russell himself eventually lost sympathy. In working out his philosophy of Logical Atomism, he was influenced to some extent by his pupil Ludwig Wittgenstein, whom he had first met in 1911, and in particular by the basic doctrine of Wittgenstein's *Tractatus Logico-Philosophicus* (1922), which held that a proposition is a picture of the facts that it asserts and must have in a sense the same structure. Russell continued throughout his life to stress the importance of structure and indeed used the notion of similarity of structure in *Human Knowledge, Its Scope and Limits* (1948) as a criterion in inferring causal relationships. But he disagreed with Wittgenstein's later and influential *Philosophical Investigations* (1953).

During the 1920s much of his work was written for the layman; some of it was vulgarization in the respectable sense, as in *The ABC of Atoms* (1923) and *The ABC of Relativity* (1925); the rest ranged from *What I Believe* (1925) to *Marriage and Morals* (1929), *The Scientific Outlook* (1931), and *Education and the Social Order* (1932). All of these highly influential books were written with barbed wit from a politically, morally, and intellectually left-wing radical and anti-obscurantist point of view. He also wrote, at the expert's level, on ethics—mainly from a Utilitarian standpoint—and on political, social, and educational philosophy.

In 1927 he and his wife Dora started an experimental school at Telegraph House, near Petersfield, which was carried on by Dora after their divorce (in 1935) until the outbreak of war in 1939 and the permissiveness of which, though advanced for those days, was somewhat exaggerated by public gossip.

On his brother's death in 1931, Russell succeeded to the title as 3rd earl. In 1934 he published *Freedom and Organization, 1814–1914* and, in 1937, *The Amberley Papers,* both written with the help of a research assistant, Patricia Spence, whom he married in 1936.

As a pacifist, he supported British policy at Munich in 1938, though after war broke out he acknowledged that Hitler had to be defeated as "a necessary prelude to anything good." After lectureships in the United States during 1938 and 1939, his appointment to a professorship at City College in New York was annulled by the courts, one of the grounds being that he was an advocate of sexual immorality. (See the appendix to his *Why I Am Not a Christian,* 1927, edited by Paul Edwards.) Russell was temporarily saved from poverty by a five-year contract to lecture at the Barnes Foundation in Pennsylvania, but this was cancelled in 1943. He used his lectures as a basis for his *History of Western Philosophy* (1945), which became an immediate best-seller both in Britain and in the United States and was his main source of revenue for many years. In the meantime, on his return to Britain in 1944, Russell had been appointed lecturer and fellow of Trinity College.

The next 15 years saw him attain rapidly increasing fame and respectability, initiated by appearances on the British Broadcasting Corporation (BBC) "Brains Trust" programs and consolidated by the delivery in 1949 of the first BBC Reith Lectures and by the receipt in 1949 of the Order of Merit and, in 1950, of the Nobel Prize for Literature.

Political activism. When *Human Knowledge, Its Scope and Limits* was published in 1948, it received a respectful but lukewarm reception, partly because the theory of knowledge was at that time out of fashion and partly because, since World War II, there had been in any case a turning away from Russell's ideas. This reception was a sharp disappointment to Russell, but he was in any case unsympathetic to the then current linguistic movement in philosophy; and (except for the writing of *My Philosophical Development* [1959] and a few reviews) he began to divert his attention from philosophy to international politics. As a result, from about 1952, when he was divorced from Patricia Spence and married Edith Finch, an American, he became progressively less respectable in the eyes of established authority and more influential in the eyes of the young and left-wing throughout the world. (During the late 1960s he would receive more than 1,000 messages and cards at Christmas, many of them from the Far East.) In 1954 he made his famous "Man's Peril" broadcast on the BBC, condemning the Bikini H-bomb tests; this led to the Russell–Einstein statement of protest by Nobel scientists, to the Pugwash Conferences of scientists from both East and West (Russell was elected president of the first conference in 1957), and, eventually, to the Campaign for Nuclear Disarmament, launched in 1958, again with Russell as president. He resigned, however, in 1960 and formed the more militant Committee of 100 with the overt aim of inciting mass civil disobedience, and he himself with Lady Russell led mass sit-downs in 1961 that brought them a two-month prison sentence, which was reduced to seven days, however, on health grounds.

In 1962, at the age of 90, his energy and strength of purpose were still such that, during the Cuban crisis and the Sino-Indian border conflict, he intervened with heads of state and with U Thant, secretary general of the United Nations. After the publication of the Warren Report, he chaired the Who Killed Kennedy Committee. In the meantime, in order to systematize his work for peace, he had established, in 1963, the Bertrand Russell Peace Foundation and the Atlantic Trust. During the remainder of the '60s, he vehemently attacked U.S. policies in Vietnam. With the help of the French Existentialist Jean-Paul Sartre, the Yugoslav historian Vladimir Dedijer, the Polish author Isaac Deutsher, and others, he convened the International War Crimes Tribunal.

The last three years of the '60s saw the publication in three volumes of one of Russell's finest works—witty, candid, absorbing, and beautifully written—his own *Autobiography.*

Assessment. Bertrand Russell had one of the most widely varied and persistently influential intellects of the 20th century. During most of his active life, a span of three generations, Russell had at any time more than 40 books in print ranging over philosophy, mathematics, science, ethics, sociology, education, history, religion, politics, and polemic. The extent of his influence resulted partly from his amazing efficiency in applying his intellect (he normally wrote at the rate of 3,000 largely unaltered words a day), his memory, and his aristocratic independence, and partly from his deep humanitarian feeling that was the mainspring of his actions. This feeling expressed itself consistently at the frontier of social change through what he himself would have called a liberal anarchistic, left-wing, and skeptical atheist temperament. (R.C.-W.)

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tics (1954); *Common Sense and Nuclear Warfare* (1959); *Political Ideals* (1963).

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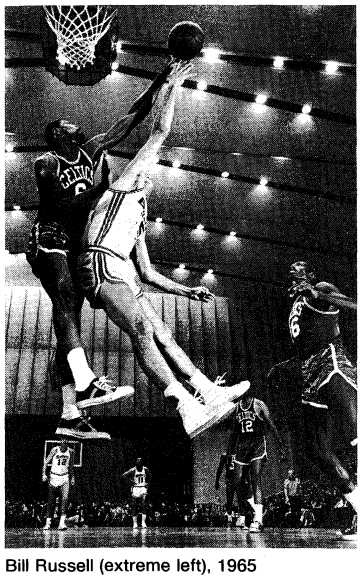
Other works. In Praise of Idleness, and Other Essays (1935); *The Amberley Papers* (1937), an edition of his parents' diaries and letters; *Satan in the Suburbs, and Other Stories* (1953), consisting of five imaginative short stories. The Russell Archives are at McMaster University in Hamilton, Ont.

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A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Russell, Bill, byname of WILLIAM FELTON RUSSELL (b. Feb. 12, 1934, Monroe, La., U.S.), U.S. basketball player regarded in his day as the greatest defensive centre in the history of the game. He set standards by which other exceptionally tall players were judged (his height was 6 feet 10 inches). On April 18, 1966, he became the first black coach of a major professional sports team (the Boston Celtics) in the United States.

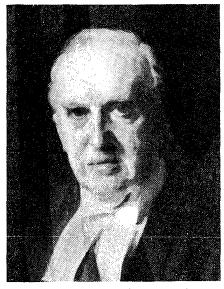
Reared in Oakland, Calif., Russell led the University of San Francisco to National Collegiate Athletic Association (NCAA) championships in two consecutive seasons (1954–55 and 1955–56). After playing on the U.S. team that won the 1956 Olympic basketball championship at Melbourne, he joined the Boston Celtics of the National Basketball Association (NBA). With Russell at centre, the Celtics won 11 NBA championships in 13 seasons. He coached the last two of those championship teams but retired as coach in 1969.



Bill Russell (extreme left), 1965
AP/Wide World Photos

On five occasions Russell was voted the most valuable player in the NBA. In 1967 the Associated Press named him one of the five members of its All-America collegiate team for the preceding 20 years; later the AP selected him the outstanding professional basketball player of the 1960s. He was coach and general manager of the Seattle SuperSonics (1973–77). His autobiography, *Second Wind: The Memoirs of an Opinionated Man*, was published in 1979. After retirement from basketball, Russell was a network sports announcer, wrote a syndicated column, and did television news commentary.

Russell (of Killowen), Charles Russell, Baron (b. Nov. 10, 1832, Newry, County Down, Ire.—d. Aug. 10, 1900, London), lord



Charles Russell, detail of an oil painting from the studio of John Singer Sargent; in the National Portrait Gallery, London
By courtesy of the National Portrait Gallery, London

chief justice of England from June 1894 until his death. A formidable courtroom advocate, he became widely admired as a strong but moderate judge.

Russell practiced law in Ireland from 1854 and in England (usually at Liverpool) from 1859. In 1872 he was appointed a queen's counsel. A Liberal Party member of the House of Commons from 1880 to 1894, he served as attorney general under Prime Minister William Ewart Gladstone in 1886 and again in 1892–94. Although he was sympathetic to Irish nationalism, he urged the establishment of an Irish Parliament subordinate to England's, rather than the granting of Home Rule, which would have given the Irish wider power. In 1888–90 he gained fame as principal defense counsel before the Parnell Commission by discrediting much testimony against the Irish nationalist leader Charles Stewart Parnell, especially that based on a letter forged by a journalist, Richard Pigott.

Created a lord of appeal in May 1894, Russell then was appointed lord chief justice of England on the death of John Duke, Baron Coleridge (June 14, 1894). His reputation as a great judge was secured by his conduct of the trial of L.S. Jameson and other British subjects who had abortively invaded the Boer state of the Transvaal (December 1895–January 1896). In 1899 he participated in the successful arbitration of the Venezuela–British Guiana boundary dispute that had threatened to lead to war between Great Britain and the United States.

Russell, Charles Taze, byname PASTOR RUSSELL (b. Feb. 16, 1852, Pittsburgh—d. Oct. 31, 1916, Pampa, Texas, U.S.), founder of the International Bible Students Association, forerunner of the Jehovah's Witnesses (*q.v.*).

By the time he was 20, Russell had left both Presbyterianism and Congregationalism because he could not reconcile the idea of an eternal hell with God's mercy. He had drifted into skepticism when a chance encounter with some Adventists introduced him to the idea that the Bible could be used to predict God's plan of salvation, especially as the plan related to the end of the world.

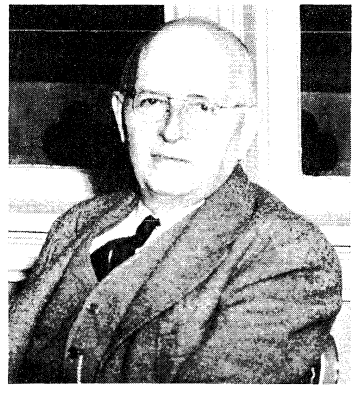
With the help of tutors, Russell managed to master the use of Hebrew and Greek dictionaries to study the Bible. The scriptures fascinated him far more than did his haberdashery in Pittsburgh, and he left the business world to form his first Bible classes in 1872. Basing his judgment on complex biblical calculations, from 1877 he preached that Christ's "invisible return" had occurred in 1874 and that the end of the Gentile times would come in 1914, followed by war between capitalism and Communism or Socialism, after which God's Kingdom by Christ would rule the Earth. Russell (who was never ordained) dedicated his life and his fortune to preaching Christ's millennial reign. In 1879 he started a Bible journal, later called *The Watchtower*, and in 1884 he founded the Watch Tower Bible and Tract Society, which became a flourishing publishing business. His own books and booklets (notably seven volumes of *Studies in the Scriptures*) reached a circulation of 16,000,000 copies in 35 languages, and 2,000 newspapers published his weekly sermons.

Russell's movement survived the embarrassment caused by the apparent failure of his apocalyptic prediction, as well as the problems caused by his separation from his wife and numerous lawsuits.

Russell, Francis: *see* Bedford, Francis Russell, 5th duke of.

Russell, George William: *see* Æ.

Russell, Henry Norris (b. Oct. 25, 1877, Oyster Bay, N.Y., U.S.—d. Feb. 18, 1957, Princeton, N.J.), astronomer and astrophysicist who showed the relationship between a star's brightness and its spectral type, in what



Henry Norris Russell
By courtesy of Princeton University

is usually called the Hertzsprung–Russell diagram, and who also devised a means of computing the distances of binary stars. He exerted considerable influence on the development of 20th-century astronomy, both in the United States and abroad.

Russell was the son of a Presbyterian minister. In 1882, at the age of five, Russell was shown by his parents a rare phenomenon, the transit of Venus across the Sun's disk, and his interest in astronomy began. He was educated at home until the age of 12 and then went to Princeton, first to the preparatory school and later to the university, from which he was graduated in 1897 with the highest distinction ever earned to that date by an undergraduate. Russell then entered the university's astronomy department to work under Charles Augustus Young, whom he found to be "a great teacher as well as a great astronomer." He devised a new way of determining the orbits of binary stars around each other and made some planetary studies, obtaining his Ph.D. in 1900.

Russell then left Princeton to work at the

university observatories at Cambridge with Arthur Robert Hinks in determining stellar distances by photography, a technique then in its infancy. Maintaining his interest in binary stars, he published another method of determining orbits, this time for pairs of stars that could not be directly observed as such but that from an analysis of their light by spectroscope were known to be separate orbiting bodies, now called spectroscopic binaries. In 1905 Russell returned to Princeton as an instructor in astronomy, becoming an assistant professor three years later, when he also married. In 1911 he became professor and director of the university observatory, and from 1921 he held the additional appointment of research associate of the Mount Wilson Observatory. In 1927 his Princeton classmates of 1897 honoured him by endowing the C.A. Young Research Professorship, to which he was appointed.

At Princeton Russell continued his lifelong study of binaries, devising a means of calculating masses from their orbital behaviour and a method of using both orbits and masses for computing distances. He pioneered the study of eclipsing variables—that is, binary stars that appear to move in front of each other as they orbit, thus undergoing periodic eclipses and so displaying characteristic variation in brightness. It is a mark of his lifelong interest that his last scientific paper was on binaries, in this case those in the two small galaxies that are closest to our own and are known as the Magellanic Clouds.

In his early works on stellar distances, Russell concluded that there were two main classes of stars, one much brighter than the other. The Danish astronomer Ejnar Hertzsprung, sharing this view, found the two classes to have similar spectra. By plotting luminosity and spectra in a diagram, Russell showed a definite relationship between true brightness and type of spectrum. He announced his results in December 1913, and the important Hertzsprung–Russell diagram was published the next year. This graphical demonstration of relationships stimulated Russell to work out his theory of stellar evolution by emphasizing the changes of spectrum, mass, and luminosity that stars undergo in time. In 1929 he summarized his views in his article "Stellar Evolution" in the 14th edition of the *Encyclopædia Britannica,* suggesting that stars begin as huge cool red bodies and then undergo a continual shrinkage. At first this contraction causes a rise in temperature accompanied by a change in colour from red to yellow, white, and blue; but finally they shrink to become small cool red bodies. The theory was widely accepted, but, in the light of later evidence, it was eventually replaced.

Russell performed extensive research on spectrum analysis, by which he applied laboratory techniques to the study of stellar conditions. This research led him to postulate the composition of stars—the Russell mixture, widely accepted by other astrophysicists—which took account of the great predominance of hydrogen. During World War I, Russell worked on aircraft navigation, but otherwise his professional life was concerned with astronomy, both at Princeton and as consultant to a number of American observatories. His broad interests led him to the wider philosophical problems of cosmic evolution. His *Solar System and Its Origin* (1935) proved to be a pioneering guide for later research. He took seriously the teaching of astronomy. With two colleagues he helped prepare a textbook, *Astronomy* (1927), volume 2 of which, with its extensive coverage of astrophysics and stellar astronomy, changed the whole emphasis of the way the subject was taught. He was also a successful popularizer of science and regularly published articles of high quality on the general progress of astronomy.

Holding to a mechanistic view of nature, Russell did not believe in life after death, but he thought science was really an ally of morals and religion. He discussed his views in a series of lectures, published as *Fate and Freedom* (1927). His interests ranged from archaeology to botany, from ancient history to boating and travelling. Many honours came to him from universities and academies, both at home and abroad, and he was, as a contemporary said of him, the "dean of American astronomers."

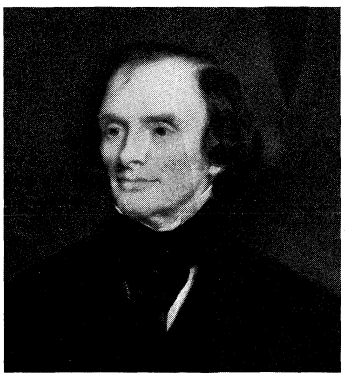
(C.A.R.)

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Russell, John (b. March 29, 1745, Guildford, Surrey, Eng.—d. April 20, 1806, Hull, Yorkshire), pastel artist, amateur astronomer, and literary scholar, whose brilliantly coloured chalk portraits were highly appreciated in 18th-century England. For a decade his works were priced equal to those of Sir Joshua Reynolds.

An evangelistic Methodist, he preached at his sitters while he drew them. Although his militant religious views aroused antagonism in some quarters, he was retained as painter to George III. He also wrote several aesthetic and technical treatises on literature and painting. For 50 years he kept a diary on his religious exercises, and he laboured for 20 years with telescope and engraving tools on a lunar map.

Russell (of Kingston Russell), John Russell, 1st Earl, VISCOUNT AMBERLEY OF AMBERLEY AND OF ARDSALLA, also called (until 1861) LORD JOHN RUSSELL (b. Aug. 18, 1792, London—d. May 28, 1878, Pembroke Lodge, Richmond Park, Surrey, Eng.), prime minister of Great Britain (1846–52, 1865–66) who was an aristocratic liberal known chiefly as leader of the fight for passage of the Reform Bill of 1832.



John Russell, the 1st Earl Russell, detail of a painting by F. Grant, 1853; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Russell was the third son of John Russell, 6th duke of Bedford. (As the younger son of a peer, he was known for most of his life as Lord John Russell; he himself was created earl in 1861.) He thus came of a family that had long demonstrated its public spirit. The depth of his liberalism probably owed much to an untypical education. Poor health forbade the rigours of an English public school, and later, his father, who was critical of Oxford and Cambridge, sent him to the University of Edinburgh, where he drank deeply of Scottish philosophy.

In 1813 he became a member of Parliament and four years later made his first important speech—characteristically, an attack on the government's suspension of the Habeas Corpus Act. In December 1819 Russell took up the cause of parliamentary reform, making it in the early 1820s not only his own cause but also that of the Whig Party. When the Whigs came to power in 1830, he joined the small ministerial committee that was to draft a reform bill, and on March 31, 1831, he presented it to the House of Commons. Overnight, he had won a national reputation.

In the 1830s and '40s, Russell remained the chief promoter of liberal reform in the Whig Party—although never again, perhaps, was this role so glorious as in the protracted but successful conflict over the passing of the first Reform Bill. As paymaster general under Charles Grey, 2nd Earl Grey, during roughly the first half of the 1830s, Russell championed the cause of religious freedom for both English Dissenters and Irish Catholics. Indeed, he pursued these aims so zealously that, in seeking to divert some of the wealth of the established Church of Ireland (which was Protestant) to the Roman Catholics (who formed the bulk of the population), he frightened such leading Whigs as Lord Stanley (later earl of Derby) out of the party. In the second half of the 1830s, as home secretary under Lord Melbourne, Russell, among other things, democratized the government of large towns (with the exception of London). He also reduced the number of criminal offenses liable to capital punishment and began the system of state inspection and support of public education.

Even out of office from 1841 to 1846, when he stood in opposition to Sir Robert Peel, Russell left his mark. In 1845, in advance of his party, he came out in favour of total free trade, a crucial step in forcing Peel to follow him. As a result Peel split his party, the Whigs came to power, and Russell became prime minister.

This administration (1846–52) demonstrated that, although Russell's penchant for advanced ideas was as strong as ever, his ability to implement them was now seriously reduced. He was able to establish the 10-hour day in factory labour (1847) and to found a national board of public health (1848). But, largely because of party disunity and weak leadership, he was unable to end the civil disabilities of the Jews, extend the franchise to the workers in the cities, or to guarantee security of tenure to the Irish farmers.

In the remaining years of his public career, Russell's difficulties increased. Party disunity continued and brought down his second administration (1865–66) when he made his last attempt to extend the franchise. But more significant, in the 1850s the national temper had changed. An age of reform had given way to a mood of self-complacency, even of belligerence. This was already evident in the Ecclesiastical Titles Act of 1851, which Russell's government had passed and which in effect was England's defiance of the papacy.

This mood deepened, transformed, on the one hand, into an appetite for foreign war and, on the other, into boredom with social and political reform. In such an atmosphere Russell was inevitably overshadowed by the forceful and popular Lord Palmerston, who seized the forefront of the national stage in the Crimean War (1854–56). Indeed, for four years, from 1855 to 1859, Russell retired from public life and devoted more and more of his time to literature. Private life had always beckoned to him, as had the life of a litterateur. Among the English prime ministers, few wrote so copiously—biography, history, poetry—as Russell. He accepted an earldom in 1861, and he died at Pembroke Lodge, Richmond Park, in 1878.

(D.Sp.)

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Russell, John Scott (b. May 8, 1808, Glasgow—d. June 8, 1882, Ventnor, Isle of Wight, Eng.), British civil engineer best known for researches in ship design. He designed the first seagoing battleship built entirely of iron.

A graduate of the University of Glasgow (at age 16), he became professor of natural philosophy in 1832 at the University of Edinburgh, where he first began his research into the nature of water waves and their effects on hulls. His subsequent employment at Scottish shipbuilding works produced new hull designs based on his researches. Moving to London (1844), he became a shipbuilder on the Thames, designing or codesigning many ships, including the "Great Eastern" (1856) and HMS "Warrior" (1860), the world's first wholly ironclad battleship. He wrote several books, including *On the Nature, Properties, and Applications of Steam, and on Steam Navigation* (1841) and *The Modern System of Naval Architecture,* 3 vols. (1864–65).

Russell, Ken (b. July 3, 1927, Southampton, Hampshire, Eng.), British motion-picture director whose use of shock and sensationalism earned him both praise and reprehension from critics.

The son of a shoe-store owner, Russell became a cadet at the Nautical College at Pangbourne and subsequently joined the British Merchant Navy. After training as an electrician in the Royal Air Force for two years, he tried his hand at various genres of the arts, including acting, ballet, and photography. One of his early efforts in filmmaking drew the attention of the British Broadcasting Corporation (BBC), and Russell was offered a job as a director of documentary films. He continued his work there as director of BBC television's "Monitor" and "Sunday Night Film" programs for a decade.

The two feature films *French Dressing* (1963) and *Billion Dollar Brain* (1967) that Russell completed while working for the BBC were both successful, but it was *Women in Love* (1969), his third feature, that established his reputation as a major film director. The visual beauty of the film and its tasteful handling of erotic scenes won the approval of public and critics alike. His next film, *The Music Lovers* (1970), portrayed the anguished life of Tchaikovsky in a flamboyant, sensational style that infuriated audiences. *The Devils* (1971), based on the Aldous Huxley novel *The Devils of Loudon,* aroused even more vehement criticism with its story of mass sexual hysteria in a convent. Russell then made *The Boy Friend* (1971) and *Savage Messiah* (1972) before he again achieved a commercial success with *Tommy* (1975), a film based on a rock opera. His later films included *Lisztomania* (1975), *Valentino* (1977), and *Altered States* (1979).

Russell, Lillian, original name HELEN LOUISE LEONARD (b. Dec. 4, 1861, Clinton, Iowa, U.S.—d. June 6, 1922, Pittsburgh), American singer and actress in light comedies who represented the feminine ideal of her generation. She was as famous for her flamboyant personal life as for her beauty and voice.

She made her debut in 1879 as a member of the chorus in Gilbert and Sullivan's *HMS Pinafore.* She received her stage name in 1880 from the entertainer and manager Tony Pastor, and she appeared frequently in his Broadway variety theatre. She achieved

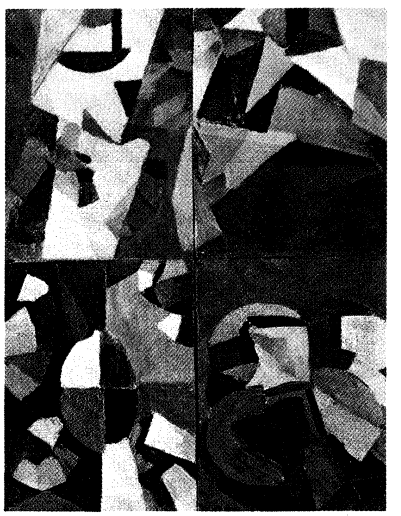


Lillian Russell
EB Inc.

stardom in Edmond Audran's *Grand Mogul* (1881). She also won acclaim for her role in Jacques Offenbach's *Grande-Duchesse de Gérolstein* (1890). From 1899 to 1904 she appeared in England and the United States with the burlesque company of Joe Weber and Lew Fields. After her fourth marriage, in 1912, she wrote a syndicated newspaper column on health, beauty, and love; she also lectured on these topics before vaudeville audiences.

Russell, Morgan (b. 1886, New York City—d. May 29, 1953, near Philadelphia), American painter who called his works "synchromies" to describe his reliance on colour for spatial and emotional depth. In 1913–14 he and Stanton Macdonald-Wright established Synchromism (*q.v.*) as an avant-garde movement, issuing manifestos and exhibiting together in Munich, Paris, and New York City.

After studying under Robert Henri in New York City, Russell moved to Paris (1906) and lived there for 40 years. He was among the



"Four Part Synchromy, Number 7," oil on canvas by Morgan Russell, 1914–15; in the Whitney Museum of American Art, New York City
Collection of the Whitney Museum of American Art, New York City, gift of the artist in memory of Gertrude V. Whitney

first American painters to pursue scientific colour theory for artistic expression.

Russell, Pee Wee, byname of CHARLES ELLSWORTH RUSSELL (b. March 27, 1906, Maple Wood, Mo., U.S.—d. Feb. 15, 1969, Alexandria, Va.), American jazz clarinetist and, late in his life, a painter.

Reluctantly trained in violin as a child, Russell also tried piano and drums before settling on the clarinet, on which he became a distinctive stylist. Russell had a quirky, chance-taking style, employing unusual sonorities, and he never played a solo the same way twice. Making his professional debut in St. Louis in the early 1920s, Russell spent 1923 in Juarez, Mex., with Herbert Berger's hotel band. Moving to Houston, Texas, he joined Peck Kelly's ensemble and met trombonist Jack Teagarden. After returning to St. Louis, he joined bands that included the jazz pioneers Frank Trumbauer and Bix Beiderbecke. In 1927 he moved to New York City and made his first recordings with Red Nichols' Five Pennies. Throughout the 1930s he performed and recorded extensively, notably with Coleman Hawkins and Eddie Condon. In the 1940s, Russell performed regularly at Nick's in New York City's Greenwich Village.

Following a near-fatal collapse from pancreatitis in San Francisco in 1950, Russell made a remarkable transition to performing in modern settings with Thelonious Monk, Duke Ellington, and others, though he continued to work frequently with Condon playing Dixieland music. Russell was a transitional figure on clarinet, enlarging its traditional vocabulary and becoming its first post-Swing Era modernist.

Russell, William Russell, Lord (b. Sept. 29, 1639—d. July 21, 1683, London), English Whig politician executed for allegedly plotting



Lord Russell, detail of a painting by an unknown artist; in the collection of the Earl of Bradford
By courtesy of the Earl of Bradford; photograph, Courtauld Institute of Art, London

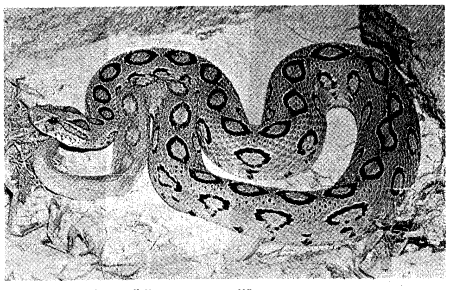
to murder King Charles II and his Roman Catholic brother James, duke of York. Because the charges against Russell were never conclusively proved, he was lauded as a martyr by the Whigs, who claimed that he was put to death in retaliation for his efforts to exclude James from succession to the throne.

The son of the 5th Earl (later 1st Duke) of Bedford, William acquired the courtesy title of Lord Russell in 1678. He sat in the House of Commons in all the Parliaments held during Charles's reign. About 1673 he joined the opposition to Charles's pro-French policies. Titus Oates's fabricated allegations (1678) of a "popish plot" to seize power convinced Russell of an imminent Catholic threat to English Protestantism. By 1680, Russell, a close associate of the Duke of Monmouth, was leading the fight in the Commons to exclude James from the succession. But Charles defeated the exclusion movement by dissolving Parliament (March 1681), and Russell then withdrew from public life.

Nevertheless, he continued to associate with Whig dissidents, some of whom by then had resolved to use violence to keep James from the throne. Hence, in June 1683, informers accused Russell of participating in the Rye House Plot to murder James and Charles. In July he was found guilty of treason and beheaded.

Russell Cave National Monument, portion of a cavern in northeastern Alabama, U.S., 4 miles (6 km) northwest of Bridgeport, just south of the Alabama–Tennessee border. Discovered about 1953, the cave (about 210 feet [64 m] long, 107 feet wide, and 26 feet high) is a portion of a cavern about 3 miles (5 km) long. It contains an almost continuous archaeological record of human habitation dating back to at least 7000 BC. The cave and site area (310 acres [125 hectares]) were presented to the National Park Service by the National Geographic Society in 1958 and were created a national monument in 1961.

Russell's viper, also called DABOIA, or TIC POLONGA (*Vipera russelli*), abundant, highly



Russell's viper (*Vipera russelli*)
© 1971 Z. Leszcynski—Animals Animals

venomous, terrestrial snake of the family Viperidae. It is found from India to Taiwan and Java, most often in open country. It is a major cause of snakebite deaths within its range. The viper grows to a maximum of about 1.5 m (5 feet) and is marked with three rows of reddish brown spots outlined in black and again in white.

Russellville, city, seat (1888) of Pope county, west-central Arkansas, U.S. It lies near the Dardanelle Dam and Lake on the Arkansas River. Founded in 1842, it developed after the arrival of the Little Rock and Fort Smith Railroad in the 1870s. Agriculture and light manufacturing are the city's economic mainstays. Sequoyah, the Indian after whom the giant California redwood tree was named, worked on the Cherokee alphabet at nearby Dwight Mission. Mount Nebo State Park and the Ozark National Forest (headquartered at Russellville) are across the river to the southwest. Arkansas Technical University (formerly Arkansas Polytechnic College, founded in 1922) is in the city. Inc. town, 1870; city, 1927. Pop. (1988 est.) 20,185.

Russellville, city, seat of Logan county, southern Kentucky, U.S. It lies along the Mud River's headwaters, 30 miles (48 km) southwest of Bowling Green. Settled in the 1780s as Big Boiling Spring, it had several names, including Logan County Courthouse, until finally renamed (1798) for General William Russell of Virginia. It was the scene of a conference (1861) at which an act of secession declared Kentucky a Confederate state; Kentucky's General Assembly, however, did not recognize the act. At nearby Harrison's Mills, Andrew Jackson mortally wounded Charles Dickinson in a duel (1806). Russellville's basic farm economy (tobacco, dairy produce, corn [maize]) is supplemented by light manufacturing. South Union (a restored Shaker colony), Lake Malone State Park, and Jefferson Davis Monument State Shrine are nearby. Inc. 1810. Pop. (1986 est.) 8,090.

Rüsselsheim, city, Hesse *Land* (state), in west-central Germany. It is situated on the left bank of the Main River between Mainz and Frankfurt am Main. Founded by the Frankish prince Ruzilo as Rusilesheim ("Ruzilo's home"), it belonged to the counts of Katzenelnbogen from 1300, was chartered in 1437, passed to the landgraves of Hesse in 1479, and fell to the Hesse-Darmstadt line in 1567. The town hall dates from 1604, and there are a museum and a technical school in the city. The Opel automobile plant is the principal industry. Pop. (1989 est.) 58,426.

Russia: *see* Russian Soviet Federated Socialist Republic; Union of Soviet Socialist Republics.

Russia Company (English merchants): *see* Muscovy Company.

Russian-American Company, Russian ROSSIYSKO-AMERIKANSKAYA KOMPANIYA, Russian trading monopoly that established colonies in Russian America (primarily in California and Alaska) during the 19th century. The Northeastern Company, headed by the merchants Grigory I. Shelikov and Ivan I. Golikov, was organized in 1781 to establish colonies on the North American coast and carry on the fur trade. After Shelikov's death (1795), the group merged with three others to form the United American Company. To confront foreign activity more effectively, the Russian emperor Paul I approved the formation of a monopoly, and all other companies were absorbed into United American. With the support of Shelikov's son-in-law, the nobleman Nikolay P. Rezanov, the organization was granted a 20-year charter in 1799 and was renamed the Russian-American Company. The emperor gave them exclusive trading rights in North America north of latitude 55° and made them responsible for the administration of Russian settlements there. Aleksandr A. Baranov directed company operations in America from Kikhtak (now Kodiak Island) from 1791 on before establishing Novo-Arkhangelsk (New Archangel, now Sitka) as the new headquarters in 1804. In 1812 a company outpost was settled at Fort Ross in present-day California. Agreements with the United States, Spain, and Great Britain (*c.* 1824) confirmed the company's control of North American territory north of 54°40′; but, after commercial and political rivalries with Great Britain increased and revenues from the colonies decreased, Russia decided to sell its holdings in America and refused to renew the company's charter, which expired in 1862.

Russian Association of Proletarian Writers: *see* RAPP.

Russian Blue, breed of domestic cat noted for the quality of its short, plushlike coat. Characteristically a quiet and gentle cat, the Russian Blue is a solidly coloured, blue-gray cat with round, green eyes and soft, silky fur that resembles sealskin in texture. A fine-boned cat with long, slim legs and a slender body, it has a relatively long, tapering tail and a wedge-shaped head. The ears are large, broad at the base, and pointed at the tips.

Russian Catholic Church, an Eastern Catholic church of the Byzantine rite, in communion with Rome since the early 20th century. A small number of Orthodox Russians, influenced by Vladimir Solovyov, a philosopher and theologian, converted to Catholicism (*c.* 1900), retaining their rite. Just before the Russian Revolution of 1917, they received their own exarch, Leonid Fyodorov; in 1921, however, Fyodorov was imprisoned, and the exarchy was dispersed under the communists.

About 2,500 Russian Catholics escaped Russia's new communist regime and settled in western Europe. There is one Russian Catholic bishop residing in Rome and a Russian studies institute, Istina, run by Dominicans, at Boulogne-Billancourt, Fr.

Russian chant, monophonic, or unison, chant of the liturgy of the Russian Orthodox Church. Musical manuscripts from the 11th to the 13th century suggest that, at first, chanting in Russia almost certainly followed Byzantine melodies, which were adapted to the accentual patterns of the Old Church Slavonic language. Russian manuscripts of this period are the only surviving sources of a highly ornate type of Byzantine chant called kontakion and contain a complex Byzantine musical notation that by then had disappeared in Byzantium. Russian sources may thus be crucial documents for the reconstruction of one branch of Byzantine music and notation.

From the 14th century the musical notation in Russian manuscripts began to change its meaning and form. It is usually presumed—but is not fully proved—that native Russian elements, specifically folk tunes, began to enter Russian church music at this time. The first lists of signs used as musical notation in Russia were compiled in the late 15th century. The lists show that by then most technical terms were Russian and that Greek terms had begun to disappear. By the 16th century, Russian chant apparently had no more links with its Byzantine prototypes, and melodies became different in their outlines.

In the 17th century, music of Western origin began to be emulated by Russian musicians. German influence became prominent in the 19th century, when various composers emulated the Protestant chorale in Russian church music. As a reaction to this trend, early scholars studying the history of Russian church music began to investigate the nearly forgotten traditional melodies still used in some monasteries resisting the introduction of polyphonic music. The restoration of Russian chant gained momentum in the early years of the 20th century and is best exemplified in the works of Aleksandr Kastalsky and Pavel Chesnokov, who, although writing for multivoiced choirs, utilized supposedly traditional melodies and harmonized them in the style of Russian folk music.

Russian Civil War (1918–20), conflict in which the Red Army successfully defended the newly formed Bolshevik government against various Russian and interventionist anti-Bolshevik armies.

The Treaty of Brest-Litovsk, whereby Russia yielded large portions of its territory to Germany, caused a breach between the Bolsheviks (Communists) and the Left Socialist Revolutionaries, who thereupon left the coalition. (*See* Brest-Litovsk, treaties of.) In the next months there was a marked drawing together of two main groups of Russian opponents of Vladimir I. Lenin: (1) the non-Bolshevik left, who had been finally alienated from Lenin by his dissolution of the Constituent Assembly and (2) the rightist whites, whose main asset was the Volunteer Army in the Kuban steppes. This army, which had survived great hardships in the winter of 1917–18 and which came under the command of General Anton I. Denikin (April 1918), was now a fine fighting force, though small in numbers.

At the same time the Western Allies, desperately pressed by the new German offensive in northern France in the spring of 1918, were eager to create another front in the east by reviving at least a part of the Russian army. In March 1918 a small British force was landed at Murmansk with the consent of the local soviet. On April 5 Japanese forces landed at Vladivostok, without any approval.

A further factor was the Czechoslovak Legion, composed of Czech and Slovak deserters from the Austro-Hungarian army, whom

previous Russian governments had allowed to form their own units. In March 1918 the Communist government agreed to let these units leave Russia by the Far East, but in May violent incidents took place during the evacuation, and on May 29 Leon Trotsky, commissar for war, ordered them to surrender their arms. They refused, defeated attempts of the local soviets to disarm them, and took control of the Trans-Siberian Railway. In the vacuum created by this action, two anti-Bolshevik authorities appeared: the West Siberian Commissariat, of predominantly liberal complexion, based at Omsk; and the Committee of Members of the Constituent Assembly, composed of Socialist Revolutionaries, based at Samara.

These events caused the Moscow government to crack down heavily on non-Bolshevik Socialists. The Menshevik and Socialist Revolutionary deputies were expelled from the central and local soviets and prevented from engaging in any organized political activity. Eventually, in September, the government proclaimed a campaign of "Red terror," including shooting hostages and giving increased powers to the Cheka (political police) of summary arrest, trial, and execution of suspects.

Among the early victims of the civil war, which may be considered to have begun in earnest in June 1918, were the former imperial family. Nicholas II, his wife, and his children had been moved in August 1917 to Tobolsk and in the spring of 1918 to Yekaterinburg (Sverdlovsk). With the development of anti-Bolshevik forces in Siberia, the local soviet feared that Nicholas might be liberated. In the night of July 16–17, 1918, all the members of the family were taken to the cellar of their prison house and shot.

In the late summer the Communists' hastily reorganized armed forces, the Red Army, recovered most of eastern European Russia. At Omsk, which became the centre of the anti-Communists, a new army was hastily trained under the command of Adm. Aleksandr V. Kolchak, with the assistance of British and U.S. military missions. Meanwhile the British forces at Murmansk were at war with the Communists. In August further British forces landed at Archangel, and the Japanese forces in the Far Eastern territories of Russia had been greatly reinforced.

In Omsk relations between the Socialist Revolutionaries and Kolchak steadily deteriorated. Kolchak and his officers disliked the left-wing views of the politicians and found it difficult to distinguish between Socialist Revolutionaries and Communists, lumping together all "Reds" as enemies. The conflict came to a head when, on Nov. 18, 1918, Kolchak set up his own dictatorship. From this time onward, anti-Communist forces in the East were controlled by the extreme right, and many Russians of socialist views were driven to the conclusion that, if the struggle was now to be one between the Revolution and a restoration of the old regime, then the Communists were the lesser of the two evils. Kolchak's coup d'etat, moreover, coincided with the collapse of Germany and the end of the European war.

At the beginning of 1919 Red Army forces invaded the Ukraine. The remnants of the forces of the Socialist Revolutionaries, headed by Simon Petlyura, retreated westward, where they joined forces with Ukrainian nationalist forces from formerly Austrian Galicia. For the next months the mixed Petlyurist–Galician forces held parts of the Ukraine; other areas were in the hands of anarchist bands led by Nestor Makhno; and the main cities were held by the Communists, ruling not directly from Moscow but through a puppet Ukrainian "government" in Kharkov. The defeat of Germany had also opened the Black Sea to the Allies, and in mid-December 1918 some mixed forces under French command were landed at Odessa and Sevastopol, and in the next months at Kherson and Nikolayev.

The Allied governments now had to decide on their policy in the confused Russian situation. The original purpose of intervention, to revive an Eastern front against Germany, was now meaningless. Russian exiles argued that, since the pre-Bolshevik governments of Russia had remained loyal to the Allies, the Allies were bound to help them. To this moral argument was added the political argument that the Communist regime in Moscow was a menace to the whole of Europe, with its subversive propaganda and its determination to spread revolution.

At the beginning of 1919 the French and Italian governments favoured strong support (in the form of munitions and supplies rather than in men) to the Whites (as the anti-Communist forces now came to be called), while the British and U.S. governments were more cautious and even hoped to reconcile the warring Russian parties. In January the Allies, on U.S. initiative, proposed to all Russian belligerents to hold armistice talks on the island of Prinkipo in the Sea of Marmara. The Communists accepted, but the Whites refused. In March the U.S. diplomat William C. Bullitt went to Moscow and returned with peace proposals from the Communists, which were not accepted by the Allies. After this the Allies ceased trying to come to terms with the Communists and gave increased assistance to Kolchak and Denikin.

Direct intervention by Allied military forces was, however, on a very small scale, involving a total of perhaps 200,000 soldiers. The French in the Ukraine were bewildered by the confused struggle between Russian Communists, Russian Whites, and Ukrainian nationalists, and they withdrew their forces during March and April 1919, having hardly fired a shot. The British in the Archangel and Murmansk areas did some fighting, but the northern front was of only minor importance to the civil war as a whole. The last British forces were withdrawn from Archangel and from Murmansk in the early fall of 1919. The only "interventionists" who represented a real danger were the Japanese, who established themselves systematically in the Far Eastern provinces.

In the first half of 1919 the main fighting was in the east. Kolchak advanced in the Urals and had attained his greatest success by April. On April 28 the Red Army's counteroffensive began. Ufa fell in June, and Kolchak's armies retreated through Siberia, harassed by partisans. By the end of summer the retreat had become a rout. Kolchak set up an administration in November at Irkutsk, but it was overthrown in December by Socialist Revolutionaries. He himself was handed over to the Communists in January 1920 and shot on February 7.

Meanwhile, in the late summer of 1919, Denikin had made a last effort in European Russia. By the end of August most of the Ukraine was in White hands. The Communists had been driven out, and the Ukrainian nationalists were divided in their attitude to Denikin, Petlyura being hostile to him, but the Galicians preferring him to the Poles, whom they considered their main enemy. In September the White forces moved northward from the Ukraine and from the lower Volga toward Moscow. On October 13 they took Orel. At the same time General Nikolay N. Yudenich advanced from Estonia to the outskirts of Petrograd. But both cities were saved by Red Army counterattacks. Yudenich retreated into Estonia, and Denikin, his communications greatly overextended, was driven back from Orel in an increasingly disorderly march, which ended with the evacuation of the remnants of his army, in March 1920, from Novorossiysk.

In 1920 there was still an organized White force in the Crimea, under Gen. Pyotr N. Wrangel, who struck northward at the Red Army and, for a time, occupied part of the Ukraine and Kuban. The Red Army eventually battered Wrangel's forces, whose rearguards held out long enough to ensure the evacuation of 150,000 soldiers and civilians by sea from the Crimea. This ended the civil war in November 1920.

The Communist victory was at the same time a defeat for the various nationalist movements of the non-Russian peoples. The hopes of the Tatars and Bashkirs, between the Kazan area and the southern Urals, were ruined in the course of the civil war. The Communists proclaimed the right of self-determination but in practice imposed the dictatorship of the Russian Communist Party on them. In Tashkent the Muslim population remained mistrustful of any Russian authorities, and for some years guerrilla bands of nationalists, known as Basmachi, harassed the Communist authorities.

The defeat of Turkey in World War I had led to the revival of the three separate Transcaucasian republics—Azerbaijan, Armenia, and Georgia. The Moscow government did not intend to respect Transcaucasian independence for long. In April 1920 the Azerbaijan government surrendered to the double threat of invasion by the Red Army and rebellion in Baku. In December 1920 the formerly Russian portion of Armenia was incorporated into Soviet Russia, and the Moscow government recognized the rest of Armenia as part of Turkey. From February to April 1921 the Red Army invaded and conquered Georgia.

For the territory around Lake Baikal and east of it, from the spring of 1920 the fiction of a Far Eastern Republic, independent of Soviet Russia, was maintained. This government was in practice fully controlled from Moscow. The Japanese delegates at the Washington Conference of Pacific States of 1921–autumn of 1922 promised the U.S. government that they would withdraw all their troops from Russian territory. This they did at the end of October. The Far Eastern Republic had now served its purpose, and its assembly in November formally voted it out of existence and united it to Soviet Russia.

The political system that emerged victorious from the civil war bore the name Russian Soviet Federated Socialist Republic. In fact the soviets were of small importance. All power belonged to the Communist Party, members of which occupied all the posts in the Soviet of People's Commissars and the key posts at all lower levels of the machinery of government. The party itself was governed by its Central Committee, which Lenin dominated.

Second only to Lenin was Trotsky, who as commissar for war not only had supreme command of the armed forces but was also largely responsible for organizing supplies and for the mobilization of manpower. By 1919 the Red Army had become much better than the armies of its White opponents. The victory of the Communists in the civil war is indeed mainly due to this simple fact of military superiority, reinforced by the fact that, holding the central core of European Russia throughout the war, they could plan operations and move men more easily than their enemies, whose bases were on the periphery and cut off from one another.

To make the best use of the Britannica, consult the INDEX *first*

Russian Formalism (literary criticism): *see* Formalism.

Russian language, Russian RUSSKI YAZYK, principal state and cultural language of the U.S.S.R.; Russian is an East Slavic language

(thus belonging to the Indo-European language family). It is also used as a second language in non-Russian areas of the U.S.S.R. and is taught extensively in the countries within the Soviet sphere of influence, especially in those with other Slavic native languages in Eastern Europe.

Russian dialects are divided into the Northern group (stretching from Leningrad all across Siberia), the Southern group (in most of central and southern Russia), and the Central group (between Northern and Southern). Modern literary Russian is based on the dialect of Moscow. The city was originally within the Northern dialect zone, but when the mutual influences between the north and the south created a new central dialect type, Moscow found itself in the Central group. The dialect of which has mainly the consonant system of the Northern dialect and the vowel system of the Southern dialect.

Russian and the other East Slavic languages (Ukrainian, Belorussian) did not diverge noticeably from one another until the period from the late 13th until the 16th century. The term Old Russian is generally applied to the common East Slavic language in use before that time.

Russian has been strongly influenced by Church Slavonic and, since the 18th-century Westernizing policies of Tsar Peter I the Great, by the languages of western Europe, from which the language has borrowed many words. The works of the 19th-century poet Aleksandr Pushkin had a very great influence on the subsequent development of the language; his style, by combining the colloquial and Church Slavonic styles, put an end to the considerable controversy that had developed as to which style of the language was best for literary uses.

The modern language generally uses six case forms (nominative, accusative, instrumental, dative, genitive, locative) in the singular and plural of nouns and adjectives and expresses both a perfective aspect (completed action) and an imperfective aspect (process or incomplete action) in verbs. In its sound system Russian has numerous sibilant consonants and consonant clusters as well as a series of palatalized consonants contrasting with a series of unpalatalized (plain) consonants. (Palatalized consonants are those produced with simultaneous movement of the blade of the tongue toward or to the hard palate; they sound as if they have an accompanying *y* glide and are often called soft consonants.) The reduced vowels *ĭ* and *ŭ* of the ancestral Slavic language were lost in Russian in weak position during the early historical period.

Russian literature, the body of written works produced in the Russian language, beginning with the coming of Christianity to Kievan Rus toward the end of the 10th century AD. The first distinctively Russian work of this Old Russian, or Kievan, period was Bishop Ilarion's *Discourse on Law and Grace* (mid-11th century), though the first secular work of significance, despite its religious tone, was Prince Vladimir Monomakh's *Instruction* (1117).

A brief treatment of Russian literature follows. For full treatment *see* MACROPAEDIA: Russian Literature.

The first work of Russian medieval literature to lay claim to greatness was "The Lay of Igor's Host" (c. 1185–87; Eng. trans., *The Song of Igor's Campaign*), but because it only came to light at the end of the 18th century and no works of comparable power from the 12th century are extant, there have been persistent scholarly disputes over its authenticity. By the mid-13th century the Mongol invasion had subdued Kievan Rus, and it was not until the rise of Moscow in the 15th and 16th centuries that signs of a renewal of a national Russian literature could be discerned. Much of the "literature" of this period is of interest primarily to scholars, particularly historians. The first major work of genuine human interest in Russian literature is the autobiography written by the archpriest Avvakum Petrovich toward the end of the 17th century. It was not until a century later, however, that an indigenous literature began to emerge with the odes of Mikhail Lomonosov and Gavrila Derzhavin and the documentary prose of Aleksandr Radishchev and Nikolay Karamzin, who was also famous for his sentimental tale *Poor Liza* (1792).

Despite censorship and official disapproval Russia acquired a literature of world importance in the 19th century. The golden age of Russian literature emerged with the works of Aleksandr Pushkin. The versatility, musicality, simplicity, and originality of his "novel in verse" *Yevgeny Onegin* (1833) and his incomparable lyric poetry were to prove of enduring value in inspiring subsequent developments, although his contribution to prose literature was less influential than that of his immediate successor Mikhail Lermontov with his novel *A Hero of Our Time* (1839–40). After 1840 prose, especially the novel, became the most common medium of expression. The first major prose writer was Nikolay Gogol, whose superb comic gifts were matched by an extraordinarily fecund prose-poetic manner in such masterpieces as the stage comedy *The Government Inspector* (1836) and the novel *Dead Souls* (1842). The first major novelist, Ivan Turgenev, became famous through his *Sportsman's Sketches* (1852) depicting the plight of the serfs, but his reputation now rests mainly on his short novels chronicling the rise of the intelligentsia (*Rudin,* 1856; *On the Eve,* 1860; and *Fathers and Sons,* 1862). Fyodor Dostoyevsky and Leo Tolstoy are now acknowledged as the greatest Russian novelists. Although Dostoyevsky began writing in the 1840s, exile to Siberia delayed his career. He did not produce his outstanding psychological novels until the late 1860s—*Crime and Punishment* (1866), *The Idiot* (1868–69), *The Devils* (1871–72), and his unfinished masterpiece *The Brothers Karamazov* (1879–80). Tolstoy's reputation as a novelist is founded on *War and Peace* (1865–69), his epic historical novel about the Napoleonic invasion of Russia, and *Anna Karenina* (1875–77), his tragic study of passion and suicide. Other noteworthy novelists were Ivan Goncharov and Mikhail Saltykov. At the end of the century the tragicomic short stories and penetrating, innovative plays of Anton Chekhov emphasized futility, while Maksim Gorky, who sympathized with the working classes, proclaimed the need for revolutionary change and later became a hero of the Communists.

The 20th century opened with a revival of poetry, dominated by Aleksandr Blok, while the 1917 Revolution initiated a period of intense, if short-lived, literary vigour marked by the poetry of Vladimir Mayakovsky, Osip Mandelstam and Boris Pasternak. The latter is best known in the West, however, for his novel *Doctor Zhivago* (1957). Prose also flourished, but with the introduction of Socialist Realism as the official doctrine for Soviet literature in 1932 the standard of writing generally declined. Among the few outstanding works was *And Quiet Flows the Don* (1934) and its sequel by Mikhail Sholokhov. The brief literary "thaw" that followed Stalin's death in 1953 gave way to renewed repression and the appearance of a dissident literature. Aleksandr Solzhenitsyn, awarded the Nobel Prize for Literature in 1970, became the leading dissident writer, all his major novels having been prohibited in the Soviet Union. On the whole it can be said that the most vigorous and original Russian literary works to have appeared since 1917 have been produced by writers and poets either uncommitted to, or actively persecuted by, the Soviet regime. But Soviet Russian literature remains exceedingly abundant, catering generally to the political and social needs of the majority while occasionally producing works of exceptional interest.

Russian Museum, Russian RUSSKY MUZEY, in Leningrad, museum opened in 1898 as the central museum of Russian art and life, housed in the buildings of the former Mikhail Palace of 1819–25 designed by Karl Ivanovich Rossi. The buildings were converted to a museum, in 1896–97, and the museum was expanded considerably after the Russian Revolution, when many private collections were confiscated and added to the Russian Museum. The central building houses art from the 10th century to the revolution, including a comprehensive collection of painting and sculpture from the 18th and 19th centuries and an excellent collection of early Russian art with fine icons dating from the 12th to the 14th centuries. In addition there are examples of late 19th- and early 20th-century paintings, portraits, and applied arts and the Ethnographical Museum of the Peoples of the U.S.S.R.

Russian olive (small tree): *see* oleaster.

Russian Orthodox Church, largest autocephalous, or ecclesiastically independent, Eastern Orthodox church in the world; its membership is estimated at between 25,000,000 and 50,000,000.

Christianity, introduced in Russia by Greek missionaries from Byzantium, became the religion of the Kievan state in 988 under Prince St. Vladimir. From 1037 to 1448 the church was ruled by metropolitans appointed from Constantinople, but after the Greek metropolitan of Kiev signed the Union of Florence (1439), a short-lived reunion of the Orthodox and Roman Catholic churches, the Russian Church became autocephalous. In 1589, Job, the metropolitan of Moscow, was elevated to the position of patriarch and received the fifth rank in honour after the patriarchs of Constantinople, Alexandria, Antioch, and Jerusalem.

Meanwhile, in the Ukraine, a separate metropolitanate "of Kiev and all Russia," nominally in the jurisdiction of the patriarchate of Constantinople, existed between 1458 and 1687 in territories under the control of Poland. In 1596 a large section of the Ukrainian clergy and laity joined the Roman communion in Brest-Litovsk, though most of them returned to Orthodoxy after the metropolitanate of Kiev was reunited with the patriarchate of Moscow, in 1687, and after the partitions of Poland in the 19th and the 20th centuries.

In 1721 Tsar Peter the Great suppressed the patriarchate of Moscow and replaced it with a Holy Governing Synod tightly controlled by the state. The patriarchate was not restored until the Russian Revolution in October 1917. Between 1918 and 1939 the Orthodox Church was violently persecuted by the Communist regime. It was further weakened in 1922, when the Renovated Church (*q.v.*), a reform movement supported by the Soviet government, seceded from Patriarch Tikhon's church, restored a Holy Synod to power, and brought division among clergy and faithful.

After Tikhon's death (1925) the government forbade patriarchal elections to be held. In 1927, in order to secure the survival of the church, Metropolitan Sergius formally expressed his "loyalty" to the Soviet government and henceforth refrained from criticizing the state in any way. This attitude of "loyalty," however, provoked more divisions in the church itself: inside Russia, a number of faithful opposed Sergius, and abroad, the Russian metropolitans of America and western Europe severed their relations with Moscow.

Then, in 1943, benefiting from the sudden reversal of Joseph Stalin's policies toward religion, Russian Orthodoxy underwent a remarkable resurrection; a new patriarch was elected, theological schools were opened, and thousands of churches began to function. Between 1945 and 1959 the official organization of the church was greatly expanded, although individual members of the clergy were occasionally arrested and exiled. The number of open churches reached 25,000. A new and widespread persecution of the church was subsequently instituted under the leadership of Nikita Khrushchev and Leonid Brezhnev. Then, beginning in the late 1980s, under Mikhail Gorbachev, the new political and social freedoms resulted in many church buildings being returned to the church, to be restored by local parishioners.

Since World War II the patriarchate of Moscow has received wide recognition from other Orthodox churches, whose leaders exchange regular visits with its patriarch. In 1948 a conference of Orthodox leaders, gathered in Moscow to celebrate the 500th anniversary of the Russian church's autocephaly, adopted a violently anti-Western stand, condemning both the Vatican and the World Council of Churches for cooperation with "American imperialism." After Stalin's death this attitude changed sufficiently to allow the entry of the patriarchate into the World Council of Churches (1961) and the development of friendly relations with Roman Catholics after the second Vatican Council.

The Russian Revolution of 1917 had severed large sections of the Russian church—dioceses in America, Japan, and Manchuria, as well as refugees in Europe—from regular contacts with the mother church. A group of bishops who had left their sees in Russia gathered in Sremski-Karlovci, Yugos., and adopted a clearly political monarchist stand. The group further claimed to speak as a synod for the entire "free" Russian church. This group, which to this day includes a sizable portion of the Russian emigration, was formally dissolved by Patriarch Tikhon in 1922, who then appointed metropolitans Platon and Evlogy as ruling bishops in America and Europe, respectively. Both of these metropolitans continued intermittently to entertain relations with the synod in Karlovci, but neither of them accepted it as a canonical authority. In 1931 both Platon and Evlogy received from Metropolitan Sergius of Moscow a request to pledge "loyalty" to the Soviet government. They both refused the request: Platon proclaimed his "temporary autonomy" in America, while Evlogy was accepted by the ecumenical patriarch of Constantinople.

After World War II the patriarchate of Moscow made unsuccessful attempts to regain control over these groups. In 1970 it finally recognized an autocephalous Orthodox Church in America, thereby renouncing its former canonical claims in the United States and Canada; it also acknowledged an autonomous church established in Japan that same year.

Russian Orthodox Greek Catholic Church of America: *see* Orthodox Church in America.

Russian Plain, also called EAST EUROPEAN PLAIN, Russian RUSSKAYA RAVNINA, or VOSTOCHNO-YEVROPEYSKAYA RAVNINA, plain and series of broad river basins in the western Soviet Union. Comprising most of eastern Europe and all of the European part of the Soviet Union, the Russian Plain extends over nearly 1,500,000 square miles (4,000,000 square km) and averages about 560 feet (170 m) in height. The plain is subdivided into a number of distinct regions including the Valday Hills, the Central Russian Uplands, the Volga Uplands, and the Dnepr, Black, and Caspian Sea lowlands.

Russian Primary Chronicle, also called CHRONICLE OF NESTOR, or KIEV CHRONICLE, Russian POVEST VREMENNYKH LET, ("Tale of Bygone Years"), medieval Kievan Rus historical work that gives a detailed account of the early history of the eastern Slavs to the second decade of the 12th century. The chronicle, compiled in Kiev about 1112, was based on materials taken from Byzantine chronicles, west and south Slavonic literary sources, official documents, and oral sagas; the earliest extant manuscript of it is dated 1377.

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Russian Revolution of 1905, uprising that was instrumental in convincing Tsar Nicholas II to attempt the transformation of the Russian government from an autocracy into a constitutional monarchy. For several years before 1905 and especially after the humiliating Russo-Japanese War (1904–05), diverse social groups demonstrated their discontent with the Russian social and political system. Their protests ranged from liberal rhetoric to strikes and included student riots and terrorist assassinations. These efforts, coordinated by the Union of Liberation, culminated in the massacre of peaceful demonstrators in the square before the Winter Palace, St. Petersburg, on Bloody Sunday (*q.v.;* Jan. 22 [Jan. 9, Old Style], 1905).

In the capital and other major industrial centres, general strikes followed. Nicholas responded in February by announcing his intention to establish an elected assembly to advise the government. But his proposal did not satisfy the striking workers, the peasants (whose uprisings were spreading), or even the liberals of the *zemstva* (local government organs) and of the professions, who by April were demanding that a constituent assembly be convened.

The revolt spread to non-Russian parts of the empire, particularly to Poland, Finland, the Baltic provinces, and Georgia, where it was reinforced by nationalist movements. (In some areas the rebellion was met by violent opposition from the antirevolutionary Black Hundreds [*q.v.*], who attacked the socialists and staged pogroms against the Jews.) The armed forces joined in the revolt as well: army units situated along the Trans-Siberian Railroad line rioted, and in June the crew of the battleship *Potemkin* mutinied in the harbour at Odessa.

The government decree on August 6 announcing election procedures for the advisory assembly stimulated even more protest, which increased through September. The rebellion reached its peak in October-November. A railroad strike, begun on October 7, swiftly developed into a general strike in most of the large cities.

The first workers' council, or soviet, acting as a strike committee, was formed at Ivanovo-Vosnesensk; another, the St. Petersburg soviet, was formed on October 13. It initially directed the general strike; but, as Social Democrats, especially Mensheviks, joined, it assumed the character of a revolutionary government. Similar soviets were organized in Moscow, Odessa, and other cities.

The magnitude of the strike finally convinced Nicholas to act. On the advice of Sergey Yulyevich Witte, he issued the October Manifesto (*q.v.;* Oct. 30 [Oct. 17], 1905), which promised a constitution and the establishment of an elected legislature (Duma). He also made Witte president of the new Council of Ministers (*i.e.,* prime minister).

These concessions did not meet the radical opposition's demands for an assembly or a republic. The revolutionaries refused to yield; even the liberals declined to participate in Witte's government. But some moderates were satisfied, and many workers, interpreting the October Manifesto as a victory, returned to their jobs. This was enough to break the opposition's coalition and to weaken the St. Petersburg soviet.

At the end of November the government arrested the soviet's chairman, the Menshevik G.S. Khrustalev-Nosar, and on December 3 occupied its building and arrested Leon Trotsky and others. But in Moscow a new general strike was called; barricades were erected and there was fighting in the streets before the revolution was put down. In Finland order was restored by removing some unpopular legislation, but special military expeditions were sent to Poland, the Baltic provinces, and Georgia, where the suppression of the rebellions was particularly bloody. By the beginning of 1906 the government had regained control of the Trans-Siberian railroad and of the army, and the revolution was essentially over.

The uprising failed to replace the autocracy with a democratic republic or even to convoke a constituent assembly, and most of the revolutionary leaders were placed under arrest. It did, however, force the imperial regime to institute extensive reforms, the most important of which were the Fundamental Laws (1906), which functioned as a constitution, and the creation of the Duma, which fostered the development of legal political activity and parties.

Russian Revolution of 1917, two revolutions, the first of which, in March (February, Old Style), overthrew the imperial government and the second of which, in November (October), placed the Bolsheviks in power.

By 1917 the bond between the tsar and most of the Russian people had been broken. Governmental corruption and inefficiency were obvious to everyone. Reactionary policies, including the occasional dissolution of the Duma (parliament), the chief fruit of the 1905 revolution, spread dissatisfaction even to moderate elements. The Russian Empire's many ethnic minorities grew increasingly restive under Russian domination.

But it was inefficient prosecution of World War I that finally provided the challenge the old regime could not meet. Ill-equipped and poorly led, Russian armies suffered catastrophic losses. The war made revolution inevitable in two ways: it showed Russia was no longer a military match for the nations of central and western Europe, and it hopelessly disrupted the economy.

Riots over the scarcity of food broke out in the capital, Petrograd, on March 12, and when most of the Petrograd garrison joined the revolt, Tsar Nicholas II was forced to abdicate (March 15). When his brother, Grand Duke Michael, refused the throne, more than 300 years of rule by the Romanov dynasty came to an end.

A committee of the Duma appointed a Provisional Government to succeed the autocracy, but it faced a rival in the Petrograd Soviet of Workers' and Soldiers' Deputies. The 2,500 delegates to this soviet were chosen from factories and military units in and around Petrograd.

The Soviet soon proved that it had greater authority than the Provisional Government, which sought to continue Russia's participation in the European war. On March 14 the Soviet issued its famous Order No. 1, which directed the military to obey only the orders of the Soviet and not those of the Provisional Government. The Provisional Government was unable to countermand the order. All that now prevented the Petersburg Soviet from openly declaring itself the real government of

Russia was fear of provoking a conservative coup.

Between March and October the Provisional Government was reorganized four times. The first government was composed entirely of liberal ministers, with the exception of the Socialist Revolutionary Aleksandr F. Kerensky. The subsequent governments were coalitions. None of them, however, was able to cope adequately with the major problems afflicting the country: peasant land seizures, nationalist independence movements in non-Russian areas, and the collapse of army morale at the front.

Meanwhile, soviets on the Petrograd model, in far closer contact with the sentiments of the people than the Provisional Government was, had been organized in cities and major towns and in the Army. In these soviets, "defeatist" sentiment, favouring Russian withdrawal from the war on almost any terms, was growing. One reason was that radical socialists increasingly dominated the soviet movement. At the First All-Russian Congress of Soviets, convened on June 16, the Socialist Revolutionaries were the largest single bloc, followed by the Mensheviks and Bolsheviks.

Kerensky became head of the Provisional Government in July and put down a coup attempted by Army commander in chief Lavr Georgiyevich Kornilov (*q.v.*); but he was increasingly unable to halt Russia's slide into political, economic, and military chaos, and his party suffered a major split as the left wing broke from the Socialist Revolutionary Party. But while the Provisional Government's power waned, that of the soviets was increasing, as was the Bolsheviks' influence within them. By September the Bolsheviks and their allies, the Left Socialist Revolutionaries, had overtaken the Socialist Revolutionaries and Mensheviks and held majorities in both the Petrograd and Moscow soviets.

By autumn the Bolshevik program of "peace, land, and bread" had won the party considerable support among the hungry urban workers and the soldiers, who were already deserting in large numbers. Although a previous coup attempt (the July Days; *q.v.*) had failed, the time now seemed ripe. On November 7 the Bolsheviks and Left Socialist Revolutionaries staged a nearly bloodless coup, occupying government buildings, telegraph stations, and other strategic points. Kerensky's attempt to organize resistance proved futile, and he fled the country. The Second All-Russian Congress of Soviets, which convened in Petrograd simultaneously with the coup, approved the formation of a new government composed mainly of Bolshevik commissars.

Russian Social-Democratic Workers' Party, Russian ROSSIYSKAYA SOTSIAL-DEMOKRATICHESKAYA RABOCHAYA PARTIYA, Marxist revolutionary party ancestral to the Communist Party of the Soviet Union. Founded in 1898 in Minsk, the Social-Democratic Party held that Russia could achieve socialism only after developing a bourgeois society with an urban proletariat. It rejected the populist idea that the peasant commune, or *mir,* could be the basis of a socialist society that could bypass the capitalist stage.

Most of the leaders elected at the founding congress were soon arrested. The second congress, in Brussels and London in July–August 1903, was dominated by the argument between the Bolsheviks, led by Lenin, and the Mensheviks, led by Martov, over Lenin's proposals for a party of disciplined professional revolutionaries. Georgy Plekhanov, one of the founders of Russian Marxism, took a generally middle positon. This argument dominated the internal life of the party. Party members played a major role in the unsuccessful revolution of 1905. One Social-Democratic leader, Leon Trotsky, was elected president of the St. Petersburg Soviet. In the turmoil of 1917 the Bolsheviks broke definitively with their Menshevik rivals and, after the Bolshevik Revolution in 1917, changed their name to the Russian Communist Party (Bolshevik). Their rivals, the Mensheviks, were finally suppressed after the end of the Russian Civil War.

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Russian Soviet Federated Socialist Republic, also called RUSSIA, Russian ROSSIYSKAYA SOVETSKAYA FEDERATIVNAYA SOTSIALISTICHESKAYA RESPUBLIKA, or ROSSIYA, Academiya Nauk romanization ROSSIJSKAJA SOVETSKAJA FEDERATIVNAJA SOCIALISTIČESKAJA RESPUBLIKA, or ROSSIJA, union republic, preeminent among the 15 that comprise the Soviet Union.

The following article summarizes the administrative history, geography, demographic patterns, economy, and culture of the modern Russian S.F.S.R; for additional treatment of its geography and history, *see* MACROPAEDIA: Union of Soviet Socialist Republics.

The Russian S.F.S.R.'s maritime border meets the Baltic Sea and the Arctic and Pacific oceans. Land borders touch Norway, Finland, and Poland on the northwest and west, and the People's Republic of China, the Mongolian People's Republic, and North Korea on the south. They also touch eight other constituent Soviet republics: to the west Estonia, Latvia, Lithuania, and Belorussia; to the south the Ukraine, Georgia, Azerbaijan, and Kazakhstan. The Russian S.F.S.R. extends halfway across the Northern Hemisphere, covering much of eastern and northeastern Europe and all of northern Asia. It displays an enormous variety of landforms and environments, which can be divided into nine physical regions.

The Kola-Karelian region in the northwest has deposits of nickel, copper, iron, mica, apatite, nepheline, raw materials for the construction industry, and peat. Animal life in the tundra includes arctic fox, northern reindeer, and snowy owl; in the taiga and forest zones elk, wolverine, brown bear, lynx, hare, and fox are found.

The East European (Russian) Plain is a triangle in the north that is nearly devoid of exploitable natural resources. The soil is thin podzol, and much of it is covered with forest. Fauna of the tundra include those found in Kola-Karelia plus the willow ptarmigan. In the steppes there are rodents, suslik (red-cheeked ground squirrel), jerboa, and marmot.

In the Caucasus region fields, vineyards, and orchards are numerous in the foothills. The foothills and the Caucasus Mountains are a resort area; chamois, the West Dagestanian bison or tur, red deer, bear, fox, and eagle are found in the mountains.

The Ural Mountains region's favourable climate and topography, valuable deposits of iron, copper, nickel, asbestos, gemstone, and construction stone, and proximity to areas of dense population have caused it to become highly industrialized.

The Western Siberian Plain has large oil and natural gas deposits that are stimulating extensive development. Animal life is sparse; it includes hedgehog, striped hamster, and suslik.

Central Siberia is a vast territory of permafrost. Pine forests cover about 60 percent of the Central Siberian terrain; in the north there are Arctic deserts and mountain and plain tundras; in the south there are small strips of steppe. The climate is sharply continental (subject to extremes), with bitter winters. The region contains Lake Baikal, the deepest lake in the world. The region also has the Shushenskoye hydroelectric station, one of the world's largest.

The Baikal area, which lies to the west of the lake, also has a harshly continental climate, with hot, dry summers and severe and almost snowless winters.

Northeastern Siberia has an extremely severe climate, extreme permafrost (as much as 2,000 ft deep), and wide expanses of mountain tundra. It possesses large deposits of gold and tin. Its indigenous people retain a vigorous folk culture with roots deep in antiquity.

The Far East includes the Chukchi and Kamchatka peninsulas and Commander, Kuril, and Sakhalin islands. In the forests are found many fur-bearing animals and medicinal plants. Iron, tin, molybdenum, antimony, gold, and various polymetallic ores as well as coal and oil have been discovered there. On the coast the soil is fertile, and there are hydroelectric and timber resources. The southern islands of the archipelago are in the warm Soi current. Coal, oil, gold, copper, and sulfur have been found on the Kamchatka-Kuril Ridge. On the Kamchatka Peninsula hot subterranean waters have been harnessed for electric power and heating. Sealing and salmon fishing are important in the area.

Heavy industry plays a decisive role in the Russian S.F.S.R. economy, and it is powered by numerous thermal, hydroelectric, and nuclear power plants. Metallurgy, both ferrous and nonferrous, has expanded greatly during the 20th century. Russia is the machine building centre of the Soviet Union. It has important chemical and forestry industries. Light industry has also been greatly expanded.

The first Slav state, the Kievan Rus, arose in the late 9th century on the foundation of three related nationalities: Russian, Ukrainian, and Belorussian. The multiplicity of peoples in the contemporary Russian S.F.S.R. is reflected in 16 autonomous soviet socialist republics and five autonomous *oblast*s within it.

Linguistically, the people of the Russian S.F.S.R. can be divided into an Indo-European group, comprising East Slavic and Iranian speakers; an Altaic group, speaking Turkic, Mongolian, and Manchu-Tungus languages; a Uralic group, including Finno-Ugric and Samoyedic speakers; and a Caucasian group. There are also a few paleo-Asiatic languages represented in Siberia.

The highest organ of state power is the unicameral Supreme Soviet of the R.S.F.S.R. Between sessions its Presidium, appointed by the Supreme Soviet, is the highest organ. It includes a chairman, 16 vice-chairmen (one for each autonomous republic), a secretary, and 13 other members. Like the other constituent republics of the Soviet Union, Russia's economic, political, and social life is subject to the direction of the Communist Party of the republic and of the Soviet Union. Trade unions administer social insurance funds but do not negotiate wages and working conditions with management. Wages depend on the type, chiefly the heaviness, of work or working conditions and the strategic importance of the branch of industry. Higher than average wages are thus paid to construction, transportation, and mining workers. All medical services are free.

Ten years of free and compulsory education is the rule throughout the republic. Schools carry on instruction in 42 different regional languages. There are higher educational institutes in all the regions, autonomous republics, and territories of the Russian S.F.S.R.

Russian achievements in science, literature, music, and the fine arts have received international recognition. Mikhail Lomonosov, Dmitry Mendeleyev, Konstantin Tsiolkovsky, and Ivan Pavlov are famous in Russian science; Aleksandr Pushkin, Mikhail Lermontov, Leo Tolstoy, Anton Chekhov, and Maksim Gorky in literature; Ilya Repin and Vasily

Surikov in art; Peter Ilich Tchaikovsky, Sergey Prokofiev, and Dmitry Shostakovich in music. The Russian theatre and ballet have left indelible imprints on their respective arts.

Area 6,592,800 sq mi (17,075,400 sq km). Pop. (1983 est.) 141,012,000.

Russian Steppe, steppe region, defined by its grassy cover, one of the largest plains in the world, extending across Eurasia in a vast wedge from the Barents Sea in the north to the Black and Caspian seas in the south and from the Baltic Sea in the west into southwestern Siberia in the east.

The following article is a summary of the salient facts about the Russian steppe; for fuller details about its geographical makeup, *see* MACROPAEDIA: Union of Soviet Socialist Republics; for additional detail about its cultural use and history, *see* Steppe, The History of the Eurasian.

Covering an area of about 1,400,000 sq mi (3,500,000 sq km), the Russian Steppe includes the Timan Range, the Central Russian Upland, the Volyn-Podolsk Upland, the Dnepr Plateau, and also the Pechora, Caspian, and the Black Sea lowlands. The average elevation is about 570 ft (175 m), with Podolsk Upland rising to 1,545 ft. Geologically the Steppe lies between the Baltic and Ukrainian shields, and the basement rocks are covered with a mantle of sedimentary deposits. The region is tectonically stable.

In the northern half of the Steppe the land between the river valleys is strewn with lakes and swamps. In the south, watersheds are higher and carved by valleys and ravines. In the Ukrainian steppes near the Black Sea and between the large depressions, the terrain is drained by long winding channels.

The rivers are fed mostly by snow. The network of rivers is not dense, and those belonging properly to the steppe are shallow. The climate is continental, with warm, sunny summers, fairly cold winters in the east, and milder winters in the west. The steppe is covered mainly by turf grasses; annual and perennial plants with short flowering periods occur, particularly in the south. The northern region is humid and is characterized by thick vegetation. The absence of natural shelter on the surface of the steppe determines the kind of animals that inhabit it. Typical rodents include marmots and other burrowing animals and various species of mouse. The skunk, fox, and wolf are common. The birds are bustard, steppe eagle, steppe kestrel, lark, and gray partridge. Insects are many and various.

Russification, political and cultural policy pursued with varying degrees of intensity during the 19th and 20th centuries in the Russian Empire; the policy, directed to the non-Russian nationality groups of the Empire, generally aimed at imposing the Russian language and Orthodox religion on them and at suppressing their distinctive cultures.

In the late 19th century, Moscow intensified its Russification policy, bringing all lands it held but Finland directly under Russian rule, and cutting back on permissible use of local languages. The Soviet Union has, if anything, increased the centralization of Russian government, but it has relaxed the more onerous demands of Russification, even promoting local languages and customs where this would not threaten national unity. Intensive instruction in Marxist ideology and the Russian language are features of Soviet education intended to foster enough national unity to allow for ethnic diversity.

Russkaya Ravnina (Soviet Union): *see* Russian Plain.

Russky Muzey (Leningrad): *see* Russian Museum.

Russo-Finnish War, also called WINTER WAR (Nov. 30, 1939–March 12, 1940), war waged by the Soviet Union against Finland at the beginning of World War II, following the conclusion of the German-Soviet Nonaggression Pact (Aug. 23, 1939). Unable to secure help from Britain and France, Finland made peace on Soviet terms after three months of fighting, agreeing to the cession of western Karelia and to the construction of a Soviet naval base on the Hanko Peninsula.

Russo-Japanese War (1904–05), military conflict in which a victorious Japan forced Russia to abandon its expansionist policy in the Far East, becoming the first Asian power in modern times to defeat a European power. The war developed out of a rivalry for dominance in Korea and Manchuria.

It began when Japan launched a surprise attack on the Russian forces at Port Arthur (Feb. 8, 1904) after Russia had reneged on its agreement to withdraw its troops from Manchuria. Although Russia had just constructed the Trans-Siberian Railroad (1891–1903), it still lacked the transportation facilities necessary to reinforce its limited forces in Manchuria with sufficient men and supplies. Impeded also by incompetent military leadership, the Russians suffered a succession of defeats, culminating with the fall of Port Arthur (January 1905) and the Battle of Mukden (February–March 1905).

In May 1905, in a battle in the Tsushima Straits, the Japanese admiral Togō Heihachirō destroyed the Russian Baltic Fleet, which, commanded by Adm. Z.P. Rozhestvensky, had sailed in October 1904 from the Baltic port of Liepāja to relieve the forces at Port Arthur and at the time of the battle was attempting to reach Vladivostok. That disaster, coupled with domestic revolutionary activity, forced the Russian emperor Nicholas II to negotiate peace.

U.S. President Theodore Roosevelt served as mediator at the peace conference, held at Portsmouth, N.H. (Aug. 9–Sept. 5, 1905). In the resulting Treaty of Portsmouth (*q.v.*) Japan gained control of the Liaotung Peninsula (Port Arthur), the South Manchurian railroad (which led to Port Arthur), and half of Sakhalin Island. Russia, however, remained the dominant power in northern Manchuria.

Russo-Polish War (1919–20), military conflict between Soviet Russia and Poland, which sought to seize the Ukraine. It resulted in the establishment of the Russo–Polish border that existed until 1939.

Although there had been hostilities between the two countries during 1919, the conflict began when the Polish head of state Józef Piłsudski formed an alliance with the Ukrainian nationalist leader Semen Petlyura (April 21, 1920) and their combined forces began to overrun the Ukraine, occupying Kiev on May 7. In June the Soviet Army launched a counteroffensive, reaching the former Polish border by the end of July. In a wave of revolutionary enthusiasm, Soviet forces advanced through Poland to the outskirts of Warsaw (early August). The western European powers, fearing that the Russians might succeed in establishing a Soviet government in Poland and perhaps proceed to Germany, sent a military mission, headed by the French general Maxime Weygand, to advise the Polish Army. The Poles counterattacked in mid-August and forced the Russians to retreat.

An armistice was signed in October 1920. The Treaty of Riga, concluded on March 18, 1921, provided for the bulk of the Ukraine to remain a Soviet republic, although substantial portions of Belorussia and the Ukraine were ceded to Poland.

Russo-Turkish wars, series of conflicts between Russia and the Ottoman Empire in the 17th–19th century, reflecting the decline of the Ottoman Empire and resulting in the gradual extension of Russia's frontier and influence in Ottoman territory. The wars took place in 1676–81, 1687, 1689, 1695–96, 1710–12 (part of the Great Northern War), 1735–39, 1768–74, 1787–91, 1806–12, 1828–29, 1853–56, and 1877–78.

Generally fought on Balkan, Crimean, and Caucasian fronts, the early wars primarily represented strictly Russo-Turkish rivalries. By the 19th century, however, the wars increasingly attracted the interest of the European powers, who intervened in a variety of ways, actually entering the Crimean War (1853–56) as belligerents supporting the Ottoman Empire and applying such strong diplomatic pressure after the conflict of 1877–78 that Russia's military gains were severely restricted.

Nevertheless, as a result of all the Russo-Turkish wars, Russia extended its frontier as far as the Black Sea and to the line of the Prut River in Europe and beyond the Caucasus mountain range in Asia; by the end of the war of 1877–78 it had also contributed greatly to the achievement of Serb and Romanian independence from the Ottoman Empire and had become a major contender for political domination over those countries as well as the remainder of the Ottoman Balkans.

rust, disease of thousands of economically important plants, as well as weeds, caused by more than 4,000 species of fungi. During their life cycle rust fungi parasitize either one species of plant (autoecious, or monoecious, rust) or two distinct species (heteroecious rust). One heteroecious rust with five spore forms during its life cycle is black stem rust (*Puccinia graminis*) of wheat and other cereals and grasses. Other heteroecious rusts include those that use junipers (red cedar) as one host and apple, Japanese quince, hawthorn, rose, and related plants as the other; white pine rust, with five-needled pines as one host and currant and gooseberry (*Ribes*) species as the other; and a rust with douglas fir as one host and poplars as the other.

Examples of autoecious rusts include those that attack asparagus, bean, chrysanthemum, coffee, hollyhock, snapdragon, sugarcane, and sunflower.

Rust usually appears as yellow, orange, red, rust, brown, or black powdery pustules on leaves, young shoots, and fruits. Plant growth and productivity are commonly reduced; some plants wither and die back. Control involves growing resistant varieties and rust-free plants; destroying one of the alternate host plants within several hundred yards of the other; observing stringent sanitation measures; and spraying or dusting at 7- to 10-day intervals, starting two weeks before rust normally appears, using appropriate fungicides.

White rust, caused by several fungi in the genus *Albugo,* differs from the true rusts in not requiring an alternate host. It attacks many herbaceous plants. Light yellow areas develop on leaves, with chalky-white, waxy, and then powdery pustules that finally darken on the underleaf surface and other aboveground parts. Leaves may wither and die early, stems and flower parts may be greatly swollen and distorted, and plants are stunted. Control includes using disease-free plants and resistant varieties; destroying infected plant parts, weeds, and crop refuse after harvest; practicing three-year rotation; and spraying several times at 10- to 14-day intervals during the usual season for white rust, using an appropriate fungicide.

rust fly, any insect of the family Psilidae (order Diptera). This slender, brownish fly has long antennae and is small to medium in size.

The larvae feed on plants and may be garden pests. The carrot rust fly (*Psila rosae*) often damages carrots, celery, and related plants.

Rustamid Kingdom, Rustamid also spelled ROSTAMID (AD 761–909), Islāmic state on the high plateau of northern Algeria, founded by followers of the Ibaḍīyah branch of Khārijism, one of several kingdoms that arose in opposition to the new ʿAbbāsid dynasty and its eastern orientation. The Khārijites preached a puritanical, democratic, and egalitarian theocracy that found support among the Berber tribes. The state was governed by *imāms* descended from ʿAbd ar-Raḥmān ibn Rustam, the austere Persian who founded the state. These *imāms* were themselves under the supervision of the religious leaders and the chief judge. The kingdom was renowned for its religious toleration and secular learning. The state was very active in the trans-Saharan trade, and its size fluctuated with the power of its leaders. The Rustamid kingdom ended with the capture of its capital, Tāhart (near modern Tihert), by the Shīʿī Fāṭimids in 909.

Articles are alphabetized word by word, not letter by letter

Rustaveli, Shota (b. *c.* 1172—d. *c.* 1216), major Georgian poet, author of the Georgian national epic, *The Knight in the Panther's Skin.*

Little is known for certain of Rustaveli's early life. According to Georgian legend, he was orphaned as a child and brought up by an uncle who was a monk. Such a background may be reflected in the poet's religious and philosophical preoccupations. Rustaveli later wrote a series of odes to Queen Tamara (*c.* 1160–*c.* 1210), who reigned during the high point of Georgian power and cultural attainment. As a reward for his poetic praise, the Queen appointed him treasurer of the court. Tradition has it that Rustaveli fell in love with her.

On the basis of the long epic poem *The Knight in the Panther's Skin,* some scholars credit Rustaveli with the creation of the Georgian literary language. Reflected in his poetry are Chinese, Persian, and ancient Greek philosophy, including direct quotations from Plato.

Rustavi, city, Georgian Soviet Socialist Republic, on the Kura River. The city was developed after World War II with the establishment of a large iron and steel works that supply rolled steel and steel tubes to the entire Transcaucasus region. The population is more than twice the size the town was designed to accomodate. A large chemical industry produces fertilizers and synthetic fibre. Pop. (1983 est.) 139,000.

Rustebeuf (medieval poet): *see* Rutebeuf.

Rustenburg, town, Transvaal, South Africa, west of Pretoria. Founded in 1850, its name was allegedly derived from the *rust* ("rest"), which white settlers were able to enjoy between black African attacks. The town was important in the political affairs of the Transvaal in the middle and late 19th century. The farmstead home (now restored) of Paul Kruger, president of South Africa from 1883 to 1902, is just north of Rustenburg. There is extensively irrigated tobacco, wheat, and fruit cultivation in the surrounding area; and the world's largest platinum mine is 8 mi (13 km) east. Chrome, nickel, and granite are also mined. Pop. (1983 est.) mun., 34,578.

rustic style, in general, any peasant or rural decorative inclination; more precisely, a type of furniture made of wood or metal, the main components of which are carved and fretted to resemble the branches of trees. Stemming from the popularization of nature and the "simple life" that occurred in the mid-18th century,



Rustic style cast-iron chair, American, second half of the 19th century; in the Metropolitan Museum of Art, New York City

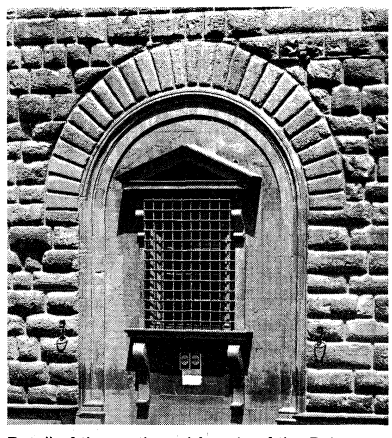
By courtesy of the Metropolitan Museum of Art, New York City, Purchase, 1969, Edgar J. Kaufmann, Charitable Foundation

the vogue for this kind of product persisted well into the 20th century. It was especially popular in Switzerland, Germany, and Austria, where it was produced in large quantities. It naturally endeared itself to the Victorians, with their passion for the picturesque, and was generally admired in the United States by readers of Henry David Thoreau. Inevitably, it commended itself as a style to manufacture that relied on casting methods of production; thus, chairs and tables in cast-iron rustic style proliferated in the late 19th century, and the style was applied even to terra-cotta garden seats.

Rustic style pottery and tableware (with twigs taking the place of branches) were designed to match the furniture. An analogous and even more eccentric decorative fashion that flourished for some years was the use of the horns of stags, deer, and other fauna to create the main supports of chairs and tables.

Rustic ware, in pottery, creations of the French potter Bernard Palissy, who from around 1548 produced large earthenware dishes decorated with naturalistic pictures of reptiles, insects, and the like in high relief. The wares were coloured with lead glazes that enhanced the lifelike quality of the decorative motifs. Rustic ware was imitated by potters in France, Portugal, and England.

rustication, in architecture, type of decorative masonry achieved by cutting back the



Detail of the rusticated facade of the Palazzo Medici-Riccardi, Florence, by Michelozzo di Bartolomme, 1444–59

Brogi—Alinari from Art Resource/EB Inc.

edges of stones to a plane surface while leaving the central portion of the face either rough or projecting markedly. In many architectural styles, only the quoins, or corner blocks, are rusticated, in contrast to the remaining wall surface.

Rusticated masonry is found as early as the platform of the tomb of Cyrus II the Great at Pasargadae in Persia (560 BC) and was commonly used for Greek and Hellenistic retaining walls and terraces. It was similarly used by the Romans, who also rusticated such utilitarian structures as aqueducts (the Pont du Gard at Nîmes, Fr., and the aqueduct at Segovia, Spain). The Romans, however, also realized the purely ornamental value of rustication and used it decoratively in such structures as the Porta Maggiore at Rome (1st century AD), in which the rustication is rough, and the Temple of Augustus at Vienne, Fr., in which it is carefully finished.

Early Renaissance Italian architects further developed the tradition of rustication, using it effectively to decorate 15th-century palaces. Thus, in the Pitti Palace (1458), the Palazzo Medici-Riccardi (1444–59), and the Palazzo Strozzi (*c.* 1489), all in Florence, the carefully designed rustication is the chief ornamental element. During the Mannerist and Baroque periods, rustication assumed great importance in garden and villa design. Fantastic surfaces were employed on the projecting portions of the stones, such as vermiculated work, in which the surface is covered with wavy, serpentine sinkages similar to worm-eaten wood or treated with vertical, dribbled forms similar to lime deposits formed from dripping water. Sometimes the stones had sides bevelled and brought to an abrupt point, or ridge, in the centre. In American colonial architecture, rustication was occasionally simulated by shaping sheathing boards, such as in the Morris-Jumel House in New York City (1765).

Ruston, city, seat of Lincoln Parish, north central Louisiana, U.S., 33 mi (53 km) west of Monroe. It was founded in 1883 by Robert E. Russ, for whom the town was named, on the Shreveport, Vicksburg, and Pacific Railway (now the Illinois Central Gulf). Its agricultural economy (cattle, peaches, poultry) is augmented by light manufacturing and services for nearby oil and gas fields. Ruston is the seat of Louisiana Tech University (founded 1894). Grambling State University (1901) is 5 mi (8 km) west. Inc. 1884. Pop. (1980) 20,585.

rutabaga, root vegetable closely related to the turnip. *See* turnip.

Rutales, order of flowering plants valuable as a source of edible fruit and hardwood timber. Mostly woody shrubs and trees, the order is comprised of 12 families, about 324 genera, and 4,000 species distributed throughout the tropical regions of the world, with a few genera extending into the temperate zones.

A brief treatment of Rutales follows. For full treatment, *see* MACROPAEDIA: Angiosperms.

The largest family within the order, Meliaceae (mahogany), contains 50 genera and 1,400 species of trees and shrubs that are without resin or oil glands. Especially well-known members of the order are the mango (*Mangifera indica*), cashew nut (*Anacardium occidentale*), frankincense (*Boswellia carteri*) and myrrh (*Balsamodendron*).

Some of the Rutales trees can reach remarkable heights; *Irvingia malayana* can grow to 216 feet (66 metres). The trees are also notable for their shapes. *Pentaspadon, Gluta,* and *Parishia* produce buttresses. The crown of *Mangifera lagenifera* is dense and almost hemispherical, that of *Dracantomelon mangiferum* is conical when young, and that of *Campnosperma auriculata* is flat-topped. The genera *Aegle, Citrus,* and *Limonia* are thorny trees, while species of *Canarium* grow aerial roots that may rise 13 ft above the ground.

Many members of Rutales are important sources of food. The mango, one of the first

fruits known to mankind, is deeply connected with life and religion in India, and every part of it is used in some way. The kernel of the fruit of the cashew nut is roasted as a food; its shell, which contains a skin irritant, yields a liquid used in insecticide, electrical insulation, and the production of plastics; and the cashew apple (the axis under the nut that swells into a false fruit) is used as a food and in the distillation of wine.

Citrus trees—the lemon (*Citrus limon*), sour orange (*C. aurantium*), sweet orange (*C. sinensis*), lime (*C. aurantiifolia*), tangerine (*C. reticulata*), grapefruit (*C. paradisi*), and citron (*C. medica*) of the Rutaceae family—are grown for their fruits, their flowers (used in perfumes and as decorations), and their oils (extracted from the fruit rinds). The kumquat (*Fortunella*), hog plum (*Spondias*), and bael (*Aegle*) are also grown for their fruits, while *Pistacia vera* is prized for its pistachio nuts and *Canarium commune* for its Java almonds.

The reddish hardwoods of Rutales are highly prized for cabinetry. They are easy to work, lustrous, and unusually free from warping. Perhaps the best known of these trees is mahogany (*Swietenia mahogani*) of tropical America and the West Indies. Others include the Guiana crab tree (*Carapa guianensis*), the African cedar (*Khaya senegalensis*), the Indian redwood (*Soymida febrifuga*), the Chittagong wood (*Chikrassia tabularis*), the toon (*Toona ciliata*), and the yellow wood (*Flindersia oxleyana*). Veneers and plywood are produced from the gaboon mahogany (okoume; *Aucoumea klaineana*).

Products of the Rutales include tannin, lacquer, myrrh, frankincense, carana gum, balm of Gilead, and copal. The order is also important as a source of medicinal barks. The bark of *Guarea rusbyi,* known as cocillana, has properties similar to ipecacuanha. *Galipea officinalis* yields an extract used as a tonic. The



Orange jessamine (*Murraya koenigii*) of the Rutaceae family

Walter Dawn

bitter fruits of *Brucea amarissima* are used in Asia as medicines, especially for dysentery. Rue (*Ruta graveolens*) has narcotic and stimulant qualities.

Some Rutales trees are valued as ornamentals. These include the tree of heaven (*Ailanthus altissima*), Persian lilac (*Melia azedarach*), cork tree (*Phellodendron*), and orange jessamine (*Murraya koenigii*).

The fruits of the Persian lilac are poisonous to rabbits, poultry, pigs, cattle, and sheep. When ingested by fish, the fruits of *Dysoxylum angustifolium* make the fish poisonous to man and animals. Other Rutales members poisonous to man are *Coriaria* and poison ivy (*Rhus radicans*).

All members of Rutales are perennials. Many of the trees are quick-growing and evergreen or deciduous. The deciduous trees usually flower when they are leafless.

Flowers of the Rutales plants, usually pollinated by insects such as small flies and bees, are conspicuous for their colour, fragrance, and honey. Cross-pollination seems to be preferred, although rue (*Ruta*) is capable of self-pollination. The fruits of the order are of various forms. For example, the mango produces a drupe (stone, single-seeded fruit), *Swietenia* a capsule, *Ailanthus* a winged fruit, some myrrhs a berry, *Aegle* a berry with a woody rind, and *Citrus* a hesperidium (three-layered, berrylike fruit).

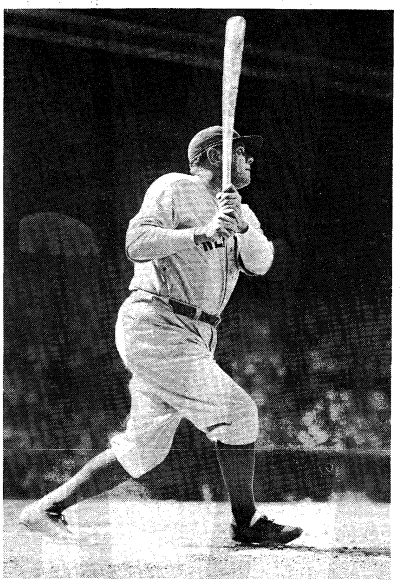
Rutebeuf, also spelled RUTEBUEF, or RUSTEBEUF (fl. 1245–85), French poet and jongleur (*q.v.*) whose pungent commentaries on the orders of society are considered the first expression of popular opinion in French literature. The lack of any contemporary reference to someone of this name has led scholars to suppose that he wrote under a pseudonym. Autobiographical information is found in a number of his poems; for example, in *Le Mariage Rutebeuf* he records that on Jan. 21, 1261, he married an ugly old woman who had neither charm nor a dowry. An account of how he was reduced to poverty by a series of misfortunes is found in *La Complainte Rutebeuf.* Rutebeuf does not appear, however, to have lacked patrons. It was probably in response to commissions that he composed elegies on the deaths of some of the greatest personages of his time: Eude, count of Nevers; Thibaut V, king of Navarre; and Alphonse, count of Poitiers, brother of King Louis IX of France. He also wrote several poems urging commoners and princes to take part in the Crusades.

Rutebeuf's real strength as a poet, however, lay not in solemn official poems but in lively and biting satire and in amusing verse stories (*fabliaux*). The chief targets of his satire were the friars, and he defended the University of Paris against the attacks of the religious orders. Some of Rutebeuf's most successful works are in a far more popular vein; *e.g., Le Dit de l'herberie,* a comic monologue supposed to be spoken by a sharp-tongued seller of quack medicines. Rutebeuf's dislike of the friars also is apparent in his ribald tales of adventures (*contes*). Rutebeuf also wrote one of the earliest miracle plays in French to have survived, *Le Miracle de Théophile,* on the traditional theme of a priest who sells his soul to the devil and is saved by the Virgin.

Rutgers, The State University of New Jersey, coeducational state institution of higher learning founded as private Queens College by the Dutch Reformed Church in 1766. Following a struggle for survival in the years after the Revolution, Rutgers (so named in 1825) became New Jersey's land-grant college in 1864 under the Morrill Act of 1862, and was named the state university in 1917. In 1945 the legislature extended the name, State University of New Jersey, to all colleges and divisions of the institution.

The university includes the original Rutgers College in New Brunswick, formerly a men's college but coeducational from the 1970s; Douglass College, established as a liberal arts college for women; Cook College and Livingston College, coeducational colleges with liberal arts programs as well as specialized and preprofessional programs; the College of Pharmacy; the College of Engineering; and the Mason Gross School of the Arts. A campus in Camden houses the Camden College of Arts and Sciences and a School of Law; a campus in Newark comprises a College of Arts and Sciences, the College of Nursing, the Graduate School of Business Administration, a separate School of Law, and a School of Criminal Justice. University College, oriented toward part-time, evening-session students, has campuses in New Brunswick, Camden, and Newark.

Ruth, Babe, byname of GEORGE HERMAN RUTH (b. Feb. 6, 1895, Baltimore—d. Aug. 16, 1948, New York City), one of U.S. professional baseball's most popular figures, holder of the all-time record of 60 home runs in a



Babe Ruth

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154-game major league season (1927), whose batting feats are the standard by which all other long-ball hitters are judged. His flamboyance fitted into, and to some extent set the pace of, the "Roaring Twenties" in the United States.

Born into a poverty-stricken environment, the future "Sultan of Swat" first became interested in athletics while living at St. Mary's Industrial School, Baltimore. He began his professional career in 1914 with the Baltimore minor league team and was sold later that season to the Boston Red Sox of the American League. In two World Series with the Red Sox (1916, 1918) he set the record of which he was most proud: pitching 29⅔ consecutive scoreless innings (broken by Edward "Whitey" Ford in the series of 1960–62). Ruth, who won 94 big-league games while losing only 46, was the best left-handed pitcher in the American League when, in 1918, he began to play the outfield because of his powerful hitting. In January 1920 he was sold to the New York Yankees for $125,000 and was an outfielder with that club through 1934.

A left-handed hitter who stood 6 feet 2 inches and weighed 215 pounds, Ruth broke the major league home-run record in three consecutive years, 1919–21, and again with his 60 home runs in 1927. (The record of 27 home runs in a season, which he broke in 1919 with 29 home runs, had been set by Ned Williamson of the Chicago National League club in 1884). He led the American League in home runs for 12 years; he hit at least 50 in 4 separate seasons and at least 40 in each of 11 seasons. In 22 major league seasons he hit the lifetime total of 714 home runs, a major league record that remained unbroken until Hank Aaron hit his 715th home run in 1974. Other major league lifetime records established by Ruth include 2,056 bases on balls and a slugging average of .690. In 10 World Series (41 games) he batted .326, hit 15 home runs, and established the slugging average record of .744. He hit .625 in the four-game 1928 series.

In 1925 Ruth was fined $5,000 by Miller Huggins, the Yankees' manager, for "miscon-

duct off the ball field." In 1930 and 1931 Ruth received an annual salary of $80,000, then the all-time high. He played his last season (1935) with the Boston Braves and concluded his baseball career as a coach of the Brooklyn Dodgers (1938). His reputation for irresponsibility prevented his obtaining a major league manager's job, which he greatly desired. He was one of the first five players elected to the Baseball Hall of Fame (1936).

Robert W. Creamer's biography, *Babe*, was published in 1974.

Ruth, Book of, Old Testament book belonging to the third section of the biblical canon, known as the Ketuvim, or Writings. In the Hebrew Bible, Ruth stands with the Song of Solomon, Lamentations, Ecclesiastes, and Esther; together they make up the Megillot, five scrolls that are read at prescribed times on Jewish religious festivals. Ruth is the festal scroll for Shavuot, the Feast of Weeks, 50 days after Passover.

The book is named for its central character, a Moabite woman who married the son of a Judaean couple living in Moab. After the death of her husband, Ruth moved to Judah with her mother-in-law, Naomi, instead of remaining with her own people. Ruth then became the wife of Boaz, a wealthy kinsman of her former husband, and bore Obed, who, according to the final verses of the book, was the grandfather of David. This attempt to make Ruth an ancestor of David is considered a late addition to a book that itself must be dated in the late 5th or 4th century BC. Its author apparently wrote the story to correct the particularism that characterized Judaism after the Babylonian Exile and the rebuilding of the Temple of Jerusalem (516 BC). The redactor who added the genealogy of David (4:17–22) carried the correction one step further by making David the great-grandson of a foreign woman.

Ruthenian, also called RUTHENE, any of those Ukrainians who were formerly Polish or Austrian and Austro-Hungarian subjects. The name is a Latinized form of "Russian," but the Ruthenians are Ukrainians who, by accidents of history in the late Middle Ages, were absorbed into the territory of Lithuania, which in turn was united with Poland. The term Little Russians has also been applied to them. The upper-class Ruthenians in Galicia, Bukovina, and the Carpathian mountains were assimilated into the conquering nations, whose language and Catholic faith they adopted. The peasants sank into a state of great poverty; their Orthodox priests sought the protection of Rome. The Pope accepted, and the Union of Brest-Litovsk (Oct. 6–10, 1596) established a new "uniate church," whereby the Ruthenians retained their Slavonic liturgy and most of the outward forms of the Greek Orthodox Church while acknowledging the spiritual supremacy of the pope.

On the partition of Poland in the late 18th century, a number of Ruthenians passed back under Russian rule. Many of them were quickly reconverted to the Orthodox faith, and every effort was made to Russify them. The Russian government systematically discouraged Ruthenian nationalism until after the Revolution of 1905, when some relaxation was made in the oppressive regulations. Similar efforts were made by the Poles of Galicia and winked at by the Austrian government, but here something was done for the Ruthenians. A metropolitan bishopric was founded at Lemberg in 1806 and suffragans added at Przemysl and Stanislaw. In 1877 a Ruthenian chair was established at Lemberg University.

After World War I the largest body of Ruthenians, those in East Galicia, claimed the right of self-determination, but their short-lived state was soon absorbed in Poland. The Ruthenians in the northeastern Carpathians were given to Czechoslovakia, special guarantees being laid down for their national autonomy. They were formed into the province of sub-Carpathian Russia. The Ruthenians of Bessarabia and Bukovina came under Romanian rule with the protection of the Romanian Minorities Treaty.

After Czechoslovakia was weakened by its loss of territory (Munich Agreement), it appointed an autonomous government in what was now called Ruthenia (Oct. 9, 1938). But on November 2, Germany and Italy forced this Ruthenia to cede its southern districts, including its capital, Užhorod, to Hungary (Vienna Award). A few months later, when Germany destroyed the remainder of the state of Czechoslovakia (March 1939), Ruthenia declared itself the independent Carpatho-Ukraine. A day later, however, it was annexed by Hungary.

Liberated by Soviet armies at the end of World War II, Ruthenia was ceded by the restored state of Czechoslovakia to the Soviet Union, which transformed it into the Zakarpatskaya (or Transcarpathian) *oblast* of the Ukrainian S.S.R. Since the Soviet Union had already acquired most of Bukovina and Galicia, the great majority of Ruthenians were now reunited with other Ukrainians.

Ruthenian Catholic Church, also called CARPATHO-RUSIN CATHOLIC CHURCH, an Eastern Catholic church of the Byzantine rite, in communion with Rome since the Union of Uzhgorod in 1646.

The Ruthenians, a Ukrainian people, have lived on the southern side of the Carpathian Mountains since the early 14th century, mostly under Hungarian rule. A diocese was established in Mukachëvo (residence in Uzhgorod) in 1651 and another in Prešov in 1818. After World War I, a large number of Ruthenians came under Czechoslovakian rule. In 1923, in reaction to the oppressive tactics of their former rulers (the Hungarians) and of their present rulers (the Slovaks), the Ruthenians turned to the Russians, to whom they were ethnically more closely allied, and 100,000 of them became Orthodox. The Hungarians regained authority over the Ruthenians during World War II (1939–44), but the Soviet Union finally annexed Podcarpathian Rus and in 1949 suppressed the diocese of Mukachëvo (Prešov, in Slovakia, was suppressed in 1950). There had been 462,000 Ruthenian Catholics in 1944.

A considerable number of Ruthenians emigrated to the United States after 1880. Some Ruthenians had migrated to Hungary, where, together with a number of Eastern-rite Romanians, they became totally Magyarized and lost their respective languages. The Hungarian Catholic Church has one Ruthenian diocese, Hajdudorog (1912, residence in Nyíregyháza), and one apostolic exarchy, Miskolc (1923), both governed by the same bishop. In the early 1980s there were more than 550,000 members in the United States and Hungary.

Ruthenian language: *see* Ukrainian language.

ruthenium (Ru), chemical element, one of the platinum metals of Group VIII of the periodic table, used as an alloying agent to harden platinum and palladium. Silver-gray ruthenium metal looks like platinum but is rarer, harder, and more brittle. The Russian chemist Karl Karlovich Klaus established (1844) the existence of this rare metal and retained the name his countryman Gottfried Wilhelm Osann had suggested earlier (1828) for a platinum group element the discovery of which had remained inconclusive. Elemental ruthenium occurs in native alloys of iridium and osmium: up to 14.1 percent in iridosmine and up to 18.3 percent in siserskite. It also occurs in sulfide and other ores (*e.g.*, in pentlandite of the Sudbury, Ont., nickel-mining region) in very small quantities that are commercially recovered.

Because of its high melting point, ruthenium is not easily cast; its brittleness, even at white heat, makes it very difficult to roll or draw into wires. Thus, the industrial application of metallic ruthenium is restricted to use as an alloy for platinum and other metals of the platinum group. It serves the same function as iridium for the hardening of platinum and, in conjunction with rhodium, is used to harden palladium. Ruthenium-hardened alloys of platinum and palladium are superior to the pure metals in the manufacture of fine jewelry and of electrical contacts for wear resistance.

Ruthenium is found among the fission products of uranium and plutonium in nuclear reactors. Radioactive ruthenium-106 (one-year half-life) and its short-lived daughter rhodium-106 contribute an important fraction of the residual radiation in reactor fuels a year following their use. Recovery of the unused fissionable material is made difficult because of the radiation hazard and the chemical similarity between ruthenium and plutonium.

Natural ruthenium consists of a mixture of seven stable isotopes: ruthenium-96 (5.51 percent), ruthenium-98 (1.87 percent), ruthenium-99 (12.72 percent), ruthenium-100 (12.62 percent), ruthenium-101 (17.07 percent), ruthenium-102 (31.61 percent), and ruthenium-104 (18.58 percent). It has four allotropic forms. The metal does not tarnish in air at ordinary temperatures and resists attack by strong acids, even by aqua regia. Ruthenium is brought into soluble form by fusion with an alkaline oxidizing flux, such as sodium peroxide (Na_2O_2). The green melt contains the perruthenate ion, RuO_4^-; on dissolving in water an orange solution containing the stable ruthenate ion, RuO_4^{2-}, usually results. Very volatile ruthenium tetroxide, RuO_4, used in separating ruthenium from other heavy metals, contains the element in the +8 oxidation state. All states from zero through +8 are known, but +3, +4, +6, and +8 are most important. Numerous coordination complexes are known, including a unique series of nitrosyl (NO) complexes.

atomic number	44
atomic weight	101.07
melting point	2,250° C (4,082° F)
boiling point	3,900° C (7,052° F)
specific gravity	12.30 (20° C)
valence	1, 2, 3, 4, 5, 6, 7, 8
electronic config.	2-8-18-15-1 or (Kr)$4d^7 5s^1$

Rutherford, borough, Bergen County, northeastern New Jersey, U.S., immediately southeast of Paterson, near the Passaic River. Laid out in 1862, it was originally known as Boiling Springs. In 1875 it was renamed to honour John Rutherfurd, U.S. senator from New Jersey (1791–98). Textile dyeing is the principal industry. A branch of Fairleigh Dickinson University (1941) is there. On campus is the Kingsland House (1670), in which George Washington stayed in August 1783. Rutherford was the birthplace of William Carlos Williams (1883–1963), U.S. poet and physician. Inc. 1881. Pop. (1980) 19,068.

Rutherford, Ernest, BARON RUTHERFORD OF NELSON, OF CAMBRIDGE (b. Aug. 30, 1871, Spring Grove, N.Z.—d. Oct. 9, 1937, Cambridge, Cambridgeshire, Eng.), British physicist whose leadership inspired two generations of physicists and whose influence on scientific thought may be compared to that of Faraday and Newton.

A brief account of the life and works of Lord Rutherford follows; for a full biography, *see* MACROPAEDIA: Rutherford.

Rutherford laid the groundwork for the devel-

opment of nuclear physics by investigating radioactivity, discovering the alpha particle, and developing the nuclear theory of atomic structure. After receiving a master's degree from Canterbury College, Christchurch, Rutherford went to Cambridge in 1895 to work with Sir J.J. Thomson at Cavendish Laboratory. In 1898 he was appointed to the chair of physics at McGill University, Montreal, and in 1907 went to the Victoria University of Manchester to continue his research. He was awarded the Nobel Prize for Chemistry (1908).

In 1919 Rutherford was invited to succeed Thomson in the Cavendish chair at Cambridge. Honours now came in rapid succession. Rutherford had been knighted in 1914. The Copley Medal of the Royal Society was bestowed on him in 1922; the presidency of the British Association for the Advancement of Science in 1923, to be followed, two years later, by the presidency of the Royal Society. In 1925 he was appointed to the Order of Merit. In 1931 he was created Baron Rutherford of Nelson. (The barony became extinct upon his death.)

Rutherford, together with J. Chadwick and C. Ellis, wrote *Radiations from Radioactive Substances* (1930), a book so thoroughly documented that it serves most needs in the way of a chronological list of Rutherford's published papers. His other books include *Radio-Activity* (1904), *Radioactive Transformations* (1906), *Radioactive Substances and Their Radiations* (1913), and *The Newer Alchemy* (1937).

Rutherford, Dame Margaret (b. May 11, 1892, London—d. May 22, 1972, Chalfont St. Peter, Buckinghamshire, Eng.), actress, popular on the British stage and screen from the 1930s in roles as a lovable English eccentric.



Dame Margaret Rutherford, 1967
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Rutherford was raised by two aunts who encouraged her interest in the theatre. After teaching piano for five years and elocution for three, she entered the Old Vic School in London to study theatre (1925). Appearing frequently on the London stage from the early 1930s, she received critical notice for her role in Ibsen's *Master Builder* (1934). Her first great success was as the unconventional Miss Bijou Furse in *Spring Meeting* (1938). In *The Importance of Being Earnest* (1939), she played Miss Prism, a part she repeated on the screen in 1952; and in *Blithe Spirit* (1941), she played the bicycling medium in both the stage and the motion-picture version (1945).

Although she made her film debut in 1936, Rutherford is best known for later pictures, which include *Passport to Pimlico* (1949); *The Mouse on the Moon* (1963); and as Miss Marple in Agatha Christie's detective series, *Murder She Said* (1961), *Murder at the Gallop* (1963), *Murder Ahoy* (1964), and *Murder Most Foul* (1964). For her portrayal of the unconventional Duchess of Brighton in *The VIPs* (1963), Rutherford won the Academy Award for best supporting actress. In 1967 she was made a Dame of the British Empire.

Rutherford, Mark, pseudonym of WILLIAM HALE WHITE (b. Dec. 22, 1831, Bedford, Bedfordshire, Eng.—d. March 14, 1913, Groombridge, Sussex), British writer distinguished as a novelist, critic, and religious thinker.

Trained for the Congregational ministry (but expelled from his college for his heretical views on the inspiration of the Scriptures), White



Mark Rutherford, drawing by A. Ford Hughes, late 19th century
By courtesy of the Mayor and Corporation of Bedford, Bedfordshire

practiced journalism, then spent the rest of his life in the civil service at the Admiralty. The story of his inner life, however, is largely told in his novels and other writings, published under the name of Mark Rutherford. They include *The Autobiography of Mark Rutherford* (1881); *Mark Rutherford's Deliverance* (1885); *The Revolution in Tanner's Lane* (1887); *Miriam's Schooling and Other Papers* (1890); *Catherine Furze* (1893); and *Clara Hopgood* (1896).

White wrote with a quiet intensity. All of his books deal with religious problems or with ordeals of the heart, the intellect, or the conscience.

Rutherford atomic model, description of the structure of atoms, proposed (1911) by the British physicist Ernest Rutherford, as a tiny, dense, positively charged core called a nucleus, in which nearly all the mass is concentrated, around which the light, negative constituents, called electrons, circulate at some distance, much like planets revolving around the Sun. The Rutherford atomic model has been alternatively called the nuclear atom or the planetary model of the atom.

The nucleus was postulated as small and dense to account for the scattering of alpha particles from thin gold foil. Alpha particles, ejected at high speeds from some radioactive materials, are positively charged particles more than 7,000 times as massive as electrons. Most alpha particles were observed to pass straight through the gold foil. A few, however, were scattered at large angles, and some even bounced back toward the source. Only a positively charged and relatively heavy target particle, such as the proposed nucleus, could account for such strong repulsion. The negative electrons that balanced electrically the positive nuclear charge were regarded as travelling in circular orbits about the nucleus. The electrostatic force of attraction between the electrons and the nucleus was likened to the gravitational force of attraction between the revolving planets and the Sun. Most of this planetary atom was open space and offered no resistance to the passage of the alpha particles. The Rutherford model, based wholly on classical physics, was superseded in a few years by the Bohr atomic model (*q.v.*), which incorporated some early quantum theory.

rutherfordium (Rf), an artificially produced radioactive transuranium element (atomic number 104) in Group IVb of the periodic table. Soviet scientists at the Joint Institute for Nuclear Research at Dubna announced, in 1964, the discovery of element 104, which they named kurchatovium, symbol Ku (for Igor Kurchatov, a Soviet nuclear physicist). In 1969, a group of U.S. researchers at the Lawrence Radiation Laboratory of the University of California at Berkeley announced that they had identified isotopes of the element, different from the one identified by the Soviets; the Americans then proposed the name rutherfordium. Because neither group has been able to verify the results of the other, both the name and the priority of discovery are still open to question.

In their experiment, the Soviets bombarded plutonium-242 with ions of neon-22, claiming to have obtained an isotope of element 104 that had a mass number of 260 and a half-life of 0.3 second. The Soviets then performed a series of chemical experiments with the isotope to demonstrate that it behaved in a manner that had been predicted for the element. When the workers at Dubna later used a more refined measuring technique, however, they found that the half-life of the isotope was 0.1 second, not 0.3 second as originally reported. This finding cast doubt on the chemical experiments with the element, because the results of those experiments could not have been obtained with atoms having a half-life of 0.1 second.

The U.S. investigators did not follow the same procedure as the Dubna group, because the American equipment could not accelerate neon-22 ions to the necessary energies. Instead, they bombarded a target of californium-249 with ions of carbon-12 and carbon-13. Although unable to obtain the same isotope as the Soviet scientists, the Berkeley team did report positive identification of two, possibly three, isotopes of element 104. The bombardment of californium-249 with carbon-12 produced an isotope with a mass number of 257 and a half-life of four to five seconds; the carbon-13 bombardment produced an isotope with a mass number of 259 and a half-life of three to four seconds. A third isotope, with a mass number of 258, may have been produced, but its identification was less certain than that of the other two. The investigators at Berkeley subsequently, by bombarding curium-248 with oxygen-18, synthesized an isotope of element 104 that has a mass number of 261 and a half-life of 70 seconds.

Although the Soviets could make only a few atoms of their mass-260 isotope, the Berkeley group obtained thousands of the atoms having mass numbers of 257 and 259. Moreover, because the latter isotopes have longer half-lives, the Berkeley team was able to measure the energies of their emissions (alpha particles) and to detect their decay products (nobelium isotopes), thereby providing more extensive evidence of their discovery. If, however, the earlier Soviet work is authenticated, the name of element 104 will then be kurchatovium, as was first proposed.

atomic number	104
mass of most stable isotope	261
electronic configuration	2-8-18-32-32-10-2 or $(Rn)5f^{14}6d^{2}7s^{2}$

Rutherfurd, Lewis Morris (b. Nov. 25, 1816, Morrisania, N.Y., U.S.—d. May 30, 1892, Tranquility, N.J.), U.S. astrophysicist who made the first telescopes designed for celestial photography.

Although trained as a scientist during his Williams College (Williamstown, Mass.) days, Rutherfurd later became a lawyer. He gave up his practice in 1849 and travelled to Europe because of his wife's health. He had maintained an interest in science and in Europe met the Italian astronomer Giovanni Amici, who was working on achromatism in microscopes. In 1856 he set up a small observatory at his home in New York City and obtained his first

photographs of the Moon two years later. Not satisfied with taking pictures through a regular telescope, he devised a lens system that converted it into a photographic telescope (essentially a camera using a telescope as a lens). He successfully tested his invention in 1860, photographing a solar eclipse from Labrador.

Rutherfurd's interest turned to spectroscopy, and in 1863 he published the first attempt to classify stellar spectra. His classification agrees in essence with the one later published by Angelo Secchi of Italy.

Rutherfurd began systematically photographing the heavens and devised a machine for measuring stellar positions on photographic plates. Convinced that the value of a photographic record of stellar positions depended on stable negatives, he found a method of treating film to increase its stability. He also constructed a machine to rule diffraction gratings (devices for breaking light down to its component colours) with up to 6,700 lines per cm (17,000 lines per inch).

A trustee of Columbia College (later Columbia University), Rutherfurd helped establish the department of geodesy and practical astronomy (1881) and gave the college all his equipment and records of his investigations (1883).

Ruthven, John: *see* Gowrie, John Ruthven, 3rd Earl of.

Ruthven, Patrick Ruthven, 3rd Lord (b. *c.* 1520—d. June 13, 1566, Newcastle upon Tyne, Northumberland, Eng.), Protestant who played an important role in the political intrigues of 16th-century Scotland.

Having been one of the leaders of the reforming opposition to the regent Mary of Lorraine, Ruthven was prominent in arranging the marriage (1565) between Mary Stuart, queen of Scots, and Lord Darnley. In 1566 he rose from a sickbed to lead the murderers of the queen's secretary, David Riccio, after which he fled to England, where he died the following year. His *Relation of the Death of David Rizzi* is preserved in the British Museum and was first printed in 1699.

Ruthven (of Ettrick), Patrick Ruthven, Lord: *see* Forth, Patrick Ruthven, Earl of.

Ruthwell Cross, cross bearing an important English-language runic inscription, from the Dumfries region of Scotland. The cross, which is an excellent example of Northumbrian art of the early 8th century, stands more than 18 feet (5.5 m) high. Entirely religious in nature, it is carved with Gospel scenes and twining vines, as well as 18 verses of *The Dream of the Rood* (*q.v.*), written entirely in runic letters. The inscription has linguistic significance because it contains six runic symbols indicating guttural sounds, whereas the Scandinavians employed only one or two. Much of the inscription is also copied in Latin. *See also* Bewcastle Cross.

rutile, the most abundant of three naturally occurring forms of titanium dioxide (TiO_2; *see also* anatase; brookite). It forms red to reddish brown, hard, brilliant metallic, slender crystals, often completely surrounded by other minerals. Rutile is a commercially important titanium mineral, although most titanium dioxide is produced from ilmenite. Rutile has minor uses in porcelain and glass manufacture as a colouring agent and in making some steels and copper alloys. Rutile is also used as a gem, but artificial rutile produced by the flame-fusion (Verneuil) process is superior to natural crystals for gem use. The artificial material has a yellow tinge, a very high index of refraction, and high dispersion; hence it shows fire and brilliance like that of diamond. Synthetic gems can be produced in various colours by the addition of appropriate metal oxides before fusion.

Rutile is an accessory mineral in igneous rocks but is more common in schists and gneisses; it also occurs in pegmatites and crystallized limestones and is common in detrital deposits. Microscopic needles of rutile are widespread in clays, shales, and slates. Rutile is mined from apatite veins in the Gjerstadvatnet and Vegårshei regions of Norway. It is widespread in the Alps and, in the United States, is abundant in Magnet Cove, Ark.; central Virginia; and on Shooting Creek, N.C. For detailed physical properties, *see* oxide mineral (table).



Rutile on pyrophyllite from Mono County, Calif.
B.M. Shaub

Rutile often forms microscopic oriented inclusions in other minerals; these are responsible for the asterism shown by some phlogopite, rose quartz, ruby, and sapphire. Quartz that contains long, delicate, translucent rutile needles is called rutilated quartz, or Venus's-hairstone; it has been used as an ornamental stone since ancient times and was particularly prized in England and France during the 18th century. Intergrown netlike or reticulated aggregates of rutile in quartz are called sagenite (from the Greek word for "net"). Hairlike crystals of rutile not included in quartz are rare; the quartz crystals mechanically enclose the rutile during growth. Most fine-quality rutilated quartz comes from Minas Gerais, Braz.; Madagascar; Hanover, N.H.; and northern Vermont.

Rutilius Claudius Namatianus (fl. *c.* AD 417), Roman poet who was the author of an elegiac poem, *De reditu suo,* describing a journey from Rome to his native Gaul in the autumn of AD 417. The poem is chiefly interesting for the light it throws on the ideology of the pagan landowning aristocracy of the rapidly disintegrating Western Roman Empire.

Rutilius was a member of one of the wealthy landowning families who almost monopolized high government office in the late empire. The poet himself was master of offices and later, in 414, prefect of Rome. He was clearly a pagan, preoccupied with an idealized picture of the strength and justice of Rome that had little to do with the hard realities of the 5th century AD.

The occasion of his journey was his return to his Gaulish estates, which had been raided by Franks, Burgundians, and Visigoths in 412–414. He sailed up the Italian coast by short stages and reached Luna (on the Gulf of La Spezia). There the poem breaks off. The narrative is smooth and relaxed, full of personal observations and giving the impression of a diary. Much of the poem is taken up by digressions occasioned by places or events of the journey, and it is in these that the attitudes and values of the poet and his circle find their clearest expression.

Rutilius writes Latin of unusual purity for his age, and his elegant and correct elegiac couplets bear witness to his close familiarity with the Augustan elegiac poets, particularly Ovid. Rutilius is an accomplished and pleasing poet, and, had more of his work survived, he might have vied with his contemporary Claudian for the title of last of the Roman poets.

Rutlām (India): *see* Ratlām.

Rutland, district, county of Leicestershire, England, in the East Midlands. Rutland was a separate county until the administrative reorganization of 1974, at which time it was merged with Leicestershire. With an area of only 152 square miles (394 square km), Rutland was the smallest county in England.

In ancient times the area was sparsely populated oak woodland that was settled by Saxons in the 5th and 6th centuries AD. Rutland is first mentioned as a separate county in 1159, having probably been part of Nottinghamshire and Nothamptonshire before then. The county played little subsequent role in English history.

Rutland is a rural upland area. It contains many villages and the historic market towns of Oakham and Uppingham, each with a famous school. Oakham has, in addition, a large 14th-century church and a 12th-century castle that is one of the finest examples of late Norman domestic architecture. Rutland has many fine old churches and houses, whose high quality is partly due to the sandstone beds in the locality that have provided excellent building stone. Apart from agriculture, the main economic activity, the district has some industry producing electrical products, cement, plastics, and clothing. In the late 1970s one of the largest artificial reservoirs in Great Britain—Rutland Water, covering more than 3,000 acres (1,200 hectares)—was created in the centre of the district to serve the enlarged urban areas of Northampton and Peterborough. Pop. (1986 est.) 35,600.

Rutland, city, seat (1784) of Rutland county, south-central Vermont, U.S. It lies between the Green and Taconic mountains on Otter Creek. In 1759 the site was an outpost on the military road built by the British general Sir Jeffrey Amherst across Vermont, connecting forts on Lake Champlain with the Connecticut River valley. Chartered in 1761, the settlement was named for Rutland, Mass. The first settlers, New England Yankees, arrived in 1770. During the American Revolution, Forts Rutland (originally Picket) and Ranger were built in the vicinity. Rutland was the capital of Vermont from 1784 to 1804. It is the home of Vermont's oldest newspaper, the *Rutland Daily Herald,* published continuously since 1794.

After its incorporation as a village in 1847, railroad construction and marble quarrying stimulated growth, and about 1880 Rutland was Vermont's largest municipality. In 1886 the three surrounding marble-producing communities (Proctor, Rutland Town, and West Rutland Town) withdrew from Rutland, and since then Rutland city (incorporated in 1892) has been second in size to Burlington. Marble remains an economic factor; manufactures include scales, castings, plywood, machinery, and airplane parts. Rutland is the seat of the College of St. Joseph the Provider (1957). It is headquarters of the Green Mountain National Forest, and winter sports (especially at nearby Pico Peak) and tourism are added sources of income.

A marble exhibit with more than 100 kinds of marble and granite is at Proctor a few miles northwest. Pop. (1986 est.) 18,080.

Rutland, John James Robert Manners, 7th Duke of, MARQUESS OF GRANBY, EARL OF RUTLAND, LORD MANNERS OF HADDON (b. Dec. 13, 1818, Belvoir Castle, Leicestershire, Eng.—d. Aug. 4, 1906, Belvoir Castle), Conservative Party politician of reformist inclinations who was a leading figure

in the "Young England" movement of Britain in the 1840s.

The younger son of the 5th Duke of Rutland, he enjoyed the courtesy title of Marquess of Granby and was educated at Eton and at Trinity College, Cambridge. Entering the House of Commons in 1841, Granby and his friend George Smythe (later 7th Viscount Strangford) became disciples of the future prime minister Benjamin Disraeli, who memorialized them in his novel *Coningsby* (1844) as Lord Henry Sidney and Harry Con-



Rutland, detail of an oil painting by W.W. Ouless, 1886; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

ingsby, respectively. After serving as postmaster general under Disraeli (1874–80) and the 3rd Marquess of Salisbury (1885–86), Granby succeeded to the dukedom of Rutland (1888) upon the death of his elder brother, the 6th duke, in 1879.

The Young Englanders looked back to an imaginary golden age in which the landowning aristocracy treated with benevolent paternalism a prosperous and grateful peasantry. Rutland emphasized the responsibility that the wealthy bear, both that of the old landowners toward their tenants and that of the new industrialists toward their labourers.

Rutledge, John (b. September 1739, Charleston, S.C. [U.S.]—d. July 18, 1800, Charleston, S.C.), American legislator who, as a delegate to the Constitutional Convention of 1787, strongly supported the protection of slavery and the concept of a strong central government.

After studying in England, Rutledge returned to Charleston to practice law. Reflecting views acceptable to both planters and merchants in his area, he was chosen as a delegate to the Stamp Act Congress (1765) and to the Con-



John Rutledge, oil painting on wood by John Trumbull, 1791; in the Yale University Art Gallery

By courtesy of the Yale University Art Gallery

tinental Congress (1774–77, 1782–83). After chairing the committee that framed the South Carolina constitution (1776), he was elected president of the state's General Assembly, but he resigned in 1778 when the constitution was amended to include provisions he considered too democratic. In 1779 he was elected South Carolina's governor, and, after the state was invaded by the British in that year, he held the skeleton colonial government together until the end of the war.

At the Constitutional Convention in 1787, Rutledge spoke for Southern planters by supporting slavery. He argued in favour of dividing society into classes as a basis for representation and also postulated high property qualifications for holding office. As chairman of the Committee on Detail, he recommended the granting of indefinite powers of legislation to the national government for the purpose of promoting the general welfare.

From 1789 to 1791 he served as an associate justice of the U.S. Supreme Court and for the next four years as chief justice of the South Carolina Supreme Court. Nominated Chief Justice of the United States in 1795, he failed to win Senate confirmation because of his outspoken opposition to the Jay Treaty of the previous year.

His brother Edward Rutledge was a signer of the Declaration of Independence (1776), fought against the British in South Carolina during the American Revolution, and served in the South Carolina legislature (1782–98) and as governor (1798–1800) of the state.

Rutledge, Wiley B(lount), Jr. (b. July 20, 1894, Cloverport, Ky., U.S.—d. Sept. 10, 1949, York, Maine), associate justice of the United States Supreme Court (1943–49).

Rutledge taught high school and studied law in his youth, receiving his law degree from the University of Colorado in 1922. After two years of private practice, he taught law at various universities until his appointment to the federal Court of Appeals in the District of Columbia in 1939. In 1943 President Franklin D. Roosevelt appointed Rutledge to the Supreme Court.

Rutledge was almost immediately called upon to cast the deciding vote in several important cases, including *West Virginia State Board of Education* v. *Barnette,* which involved the right of Jehovah's Witnesses to refuse to salute the flag, and *Schneiderman* v. *United States,* the case of a California resident whose naturalization had been revoked because of his communist beliefs. In both cases he voted with the court's liberal bloc.

Rutledge's work was painstaking and his opinions frequently encyclopaedic. Some of his opinions contained basic analyses of technical legal problems, especially those having to do with government agencies. He wrote several noted and controversial opinions, including his dissent against the execution of the Japanese general Yamashita Tomoyuki (*In re Yamashita,* 1946) for war crimes. Rutledge objected to the use of hearsay evidence in the trial and won wide public approval for his defense of the right of even a defeated enemy to a fair trial.

Ruusbroec, Jan van: *see* Ruysbroeck, Jan van.

Ruvigny, Henri de Massue, Marquis de: *see* Galway, Henri de Massue, Earl of.

Ruvo di Puglia, Latin RUBI, town, Bari *provincia,* Puglia (Apulia) *regione,* southeastern Italy. It lies on the eastern slopes of the Murge plateau, west of Bari city. Ancient Rubi was the centre of the Peucettii, an ancient Apulian tribe. It then became a flourishing Greek town that was famous in the 5th–3rd century BC for its potteries, which were imitations of imported Corinthian and Attic black- and red-figure ware, but with a marked local character. A large collection of these is preserved in the Jatta Museum in the town. A belt of modern dwellings surrounds the medieval centre of Ruvo, which is dominated by the 13th-century Romanesque cathedral, with a beautiful rose window and a freestanding campanile that was reconstructed in the 18th century.

Ruvo is a centre for the processing of local agricultural products, wine, and olive oil. Pop. (1988 est.) mun., 24,140.

Ruvubu River, Ruvubu also spelled RUVUVU, river that rises in several branches east of Bujumbura, Burundi. It flows first south and then north-northeast to form a part of the Tanzania-Burundi border. It eventually joins the Kagera River in southern Rwanda, some 19 miles (30 km) southeast of the town of Kibungu, Rwanda. The Ruvubu River is approximately 300 miles (480 km) in length, and its longest headstream, the Ruvironza, may be considered the Nile's remotest source.

Ruvuma River, Portuguese RIO ROVUMA, perennial river rising in the Matagoro Mountains in southeastern Tanzania. Flowing eastward into the Indian Ocean at a point about 20 miles (32 km) north of Cape Delgado, the Ruvuma forms the boundary between Tanzania and Mozambique for a length of 400 miles (650 km) from the coast and has a total length of about 475 miles (760 km). Its chief tributaries are the Lugenda, Lucheringo, Likonde, Muhuwesi, and Lumesule rivers. The river passes over several cataracts, so that it is navigable only by small craft up to the Upinda Rapids, about 60 miles (100 km) inland.

Ruways, ar-, also spelled RUWEIS, or RU'AYS, site of a giant industrial complex, Abu Dhabi emirate, United Arab Emirates. It lies along the Persian Gulf about 140 miles (220 km) west of Abu Dhabi, the national capital. Ar-Ruways has natural-gas processing plants under the control of the Abu Dhabi National Oil Company (ADNOC). Ar-Ruways has a small airport and is linked by road with Abu Dhabi city and Jabal az-Zannah.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Ruwenzori National Park, national park, southwestern Uganda. It occupies an area (849 square miles [2,200 square km]) of rolling plains east of Lake Edward and the foothills south of the Ruwenzori Mountains. The park is located within the western branch of the Rift Valley system, and its landscape is dotted with Pleistocene volcanic craters.

Established in 1952, the park is one of the largest in Uganda and adjoins the frontier of Zaire to the west. Its vegetation consists mostly of thickets of various types of small trees, including acacias and evergreens. There are also areas of rain forest and of savanna grassland. The park's wildlife includes chimpanzee, leopard, lion, elephant, hippopotamus, water buffalo, and several types of antelopes, such as duiker, reedbuck, and topi. The park has an extremely rich avian fauna, prominent among which are many species of kingfishers.

Ruwenzori Range, mountain range bordering Uganda and Zaire; the range is thought to be the "Mountains of the Moon" described by the 2nd-century-BC geographer Ptolemy. The mountains were long thought to be the source of the Nile. Lying slightly north of the equator, the Ruwenzori Range has a maximum breadth of 30 miles (50 km) and extends south-north for 80 miles (130 km) between Lake Edward (Lake Idi Amin Dada) and Lake Albert (Lake Mobutu Sese Seko). The range falls steeply westward to the Rift Valley, while its descent to the east is more gradual, leading to the uplands of western Uganda. Unlike most African snow peaks, the Ruwenzori is not of volcanic origin but is a gigantic horst of six separate glaciated

masses, reaching a high point in Mount Stanley at Margherita Peak (16,763 feet [5,109 m]). The largest mountains are separated by passes and deeply cut river valleys that all eventually drain into the Semliki River. Glaciers and small lakes occur in the upper valleys. The permanent snow line stands at about 14,800 feet (4,511 m) on the east and 15,900 feet (4,846 m) on the west. The summits are often hidden in cloud cover, created periodically by moist airstreams from the Atlantic and Indian oceans. Ruwenzori National Park (established 1952) is located east of Lake Edward and south of the Ruwenzori Range in southwestern Uganda.

The Ruwenzori is economically important for copper and cobalt deposits, mined at Kilembe, Uganda. Hydropower for mining is provided by the Mubuku, the range's largest river. The Amba and Konjo peoples of the lower eastern slopes are mainly cultivators of beans, sweet potatoes, and bananas.

Consult the INDEX *first*

Ruysbroeck, Jan van, Jan also rendered JOHANNES, Ruysbroeck also spelled RUUSBROEC (b. 1293, Ruisbroek, near Brussels—d. Dec. 2, 1381, Groenendaal, Brabant [Belgium]), Flemish mystic whose writings influenced Johann Tauler, Gerhard Groote, and other mystics.

After holding the chaplaincy of Sainte Gudule, Brussels (1317–43), he founded the Augustinian abbey at Groenendaal, where he wrote all but the first of his works, *Van den Rike der Ghelieven* (*The Kingdom of the Lovers of God*). Ruysbroeck derived much from the mystic Hadewijch, who had viewed the relationship of the soul to God as similar to that between the lover and the beloved. Ruysbroeck's systematic compendium of teaching and belief, however, contrasted with the more introspective nature of Meister Eckehart's writings. *Die Chierheit der gheesteliker Brulocht* (1350; *The Spiritual Espousals*), considered to be his masterpiece, develops his view of the Trinity and is a guide for the soul in search of God. Though his many writings were produced for his contemporary Augustinians, they spread rapidly through Latin translations and anticipated the 15th-century *devotio moderna*, whose most representative work is *Imitatio Christi*, ascribed to Thomas à Kempis. Ruysbroeck was beatified in 1908; his feast is traditionally celebrated on the anniversary of his death.

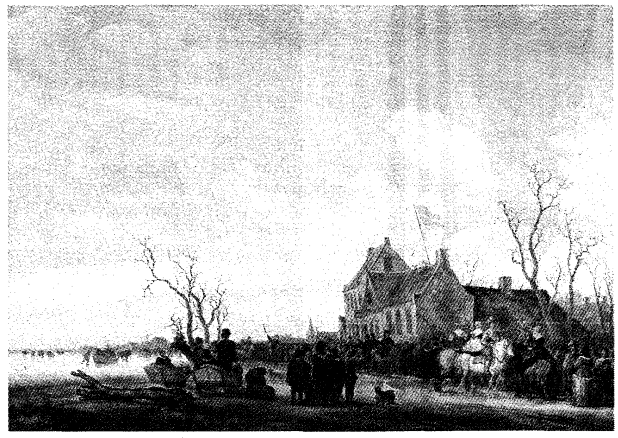
Ruysbroeck, Willem van: *see* Willem van Ruysbroeck.

Ruysdael, Jacob van: *see* Ruisdael, Jacob (Isaakszoon) van.

Ruysdael, Salomon van, original name SALOMON DE GOYER (b. *c.* 1600, Naarden, Neth.—buried Nov. 1, 1670, Haarlem), Dutch landscape painter of the Baroque style, uncle of the landscape artist Jacob van Ruisdael.

Originally named de Goyer, as was his brother Isaak (also a painter and the father of Jacob van Ruisdael), Salomon entered the Haarlem Guild of St. Luke in 1628. His first dated pictures are from 1627. He spent his whole life in Haarlem, where he was head of the guild in 1648.

Salomon's early works—winter scenes—continue the tradition of Esaias van de Velde, and his early landscapes are based on the colour schemes and compositions of Pieter Molijn; it has been suggested that he may have studied with either or both painters. At least by 1628 he is mentioned as a landscape painter of Haarlem. Unlike certain other landscape painters of the period, his nephew among them, van Ruysdael generally painted actual landscapes of such places as Arnhem, Dordrecht, and Utrecht, sometimes combining motifs from different places in one picture. His early river landscapes of the 1630s, which are characterized by diagonal compositions of the dunes, are similar in composition and use of colour to the celebrated river scenes of his contemporary Jan van Goyen. Experts agree that van Ruysdael's most powerful work was done after 1645. His command of the landscape elements—great trees anchoring one side of the composition, distant views that draw the eye, and a vast expanse of sky and clouds—seems more assured, and his use of colour for effect more brilliant. From that point van Ruysdael became increasingly interested in light effects and decorative elements in his compositions. Critics have speculated that his change of style was in part owing to the influence of several Dutch painters (such as Jan Both) who were returning to Holland from study in Italy. Many of van Ruysdael's later works are monumental in format and design, and they exhibit a masterly rendering of atmospheric effects. Though his landscapes are most characteristic of his work, between 1659 and 1662 van Ruysdael also painted a number of excellent still lifes of game. His son Jacob Salomonszoon (1635–81) was also a landscape artist.



"Drawing the Eel," oil on wood, by Salomon van Ruysdael, 165(?), in the Metropolitan Museum of Art, New York City

Copyright © 1987 The Metropolitan Museum of Art, New York City, purchase, 1871 (71.75)

Ruyter, Michiel Adriaanszoon de (b. March 24, 1607, Vlissingen, United Provinces [Neth.]—d. April 29, 1676, Syracuse, Sicily [Italy]), Dutch seaman and one of his country's greatest admirals, whose brilliant naval victories in the Second and Third Anglo-Dutch wars enabled the United Provinces to maintain a balance of power with England.

Employed at sea at the age of nine, de Ruyter by 1635 was a merchant captain. After serving as rear admiral of a fleet assisting Portugal against Spain in 1641, he returned to the merchant service for the next 10 years, fighting against the Barbary pirates off the North African coast. With the outbreak of the First Anglo-Dutch War (1652–54), he accepted a naval command, serving with distinction under Maarten Tromp and attaining the rank of vice admiral in 1653 after his victory off Texel. De Ruyter's successes in battle have been attributed to his development of an effective combat order, stressing fleet discipline.

In 1659 de Ruyter supported Denmark against Sweden in the Baltic in the First Northern War (1655–60). He fought against the English (1664–65) off the Guinea Coast of Africa, helping to restore the Dutch West India Company's commercial dominance in the area, but he was unsuccessful in later campaigns against the English in the West Indies.

Returning to the United Provinces in 1665, de Ruyter was named lieutenant admiral of Holland and worked closely with Johan de Witt to strengthen the Dutch Navy. In the Second Anglo-Dutch War (1665–67), his greatest victories were in the Four Days' Battle (June 1666) and in the raid on the Medway (June 1667), in which much of the English fleet was destroyed, accelerating Anglo-Dutch peace negotiations begun at Breda in April 1667. De Ruyter's blaming Admiral Cornelis Tromp for the defeat in the St. James's Day battle in August 1666 resulted in withdrawal of Tromp's commission and his resignation from the navy until 1673, when the two distinguished commanders were reconciled.

De Ruyter's performance in the Third Anglo-Dutch War (1672–74) has been considered his greatest achievement: his victories over larger Anglo-French forces off Solebay (1672) and Ostend and Kijkduin (1673) prevented an invasion of the Dutch Republic from the sea. In 1675–76 he fought against the French in the Mediterranean and was mortally wounded off Sicily.

Ruzhen DYNASTY (China): *see* Chin dynasty (1115–1234).

Ružička, Leopold (Stephen) (b. Sept. 13, 1887, Vukovar, Croatia—d. Sept. 26, 1976, Zürich), Swiss chemist and joint recipient, with Adolf Butenandt of Germany, of the 1939 Nobel Prize for Chemistry for his work on ringed molecules and on the terpenes, a class of hydrocarbons found in the essential oils of many plants.

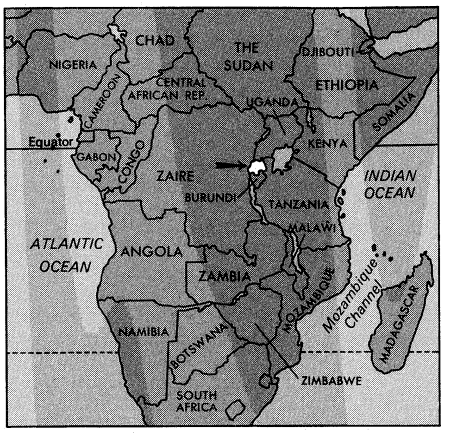
An assistant to the German chemist Hermann Staudinger, Ružička investigated the composition of the insecticides in pyrethrum (1911–16). Accompanying Staudinger to the Federal Institute of Technology in Zürich, he became a Swiss citizen and lectured at the institute. In 1926 he became professor of organic chemistry at the University of Utrecht in The Netherlands, and three years later he returned to Switzerland to become professor of chemistry at the Federal Institute of Technology.

Ružička's investigations of natural odoriferous compounds, begun in 1916, culminated in the discovery that the molecules of muskone and civetone, important to the perfume industry, contain rings of 15 and 17 carbon atoms, respectively. Before this discovery rings with more than eight atoms had been unknown and indeed had been believed to be too unstable to exist. Ružička's discovery greatly expanded research on these compounds. In the mid-1930s he discovered the molecular structure of several male sex hormones, notably testosterone, and subsequently synthesized them.

Rwanda, officially REPUBLIC OF RWANDA, French RWANDA, or RÉPUBLIQUE RWANDAISE, Rwanda REPUBLIKA Y'U RWANDA, landlocked republic lying south of the Equator in east

central Africa, covering an area of 10,169 sq mi (26,338 sq km). The capital is Kigali. It is bounded on the west by Zaire and Lake Kivu, on the north by Uganda, on the east by Tanzania, and on the south by Burundi. The population in 1985 was estimated to be 6,115,000.

A brief treatment of Rwanda follows. For full treatment, *see* MACROPAEDIA: Central Africa.



Rwanda

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. Rwanda lies at an elevation of more than 5,000 ft (1,500 m) above sea level and forms part of the Nile–Congo Divide. At the western edge of the country is Lake Kivu, whose area is 1,042 sq mi. The Ruzizi River draining Lake Kivu to the south forms part of Rwanda's western boundary with Zaire. To the east, a high plateau declines gently to the low marshy plains of the Kagera River (the eastern boundary with Tanzania). In the southeast, numerous lakes are scattered through a great bowl-shaped depression, while the northern reaches are dominated by the lofty volcanic peaks of the Virunga, reaching 14,787 ft at Karisimbi, the country's highest peak.

Because of its high elevations, Rwanda's average temperatures are cool (68° F [20° C]). During the dry quarter of the year (June through August), the country receives about one-twentieth of its annual average precipitation of 45 in. (1,140 mm). Two-fifths of the land is arable; another one-fifth is pasture, supporting substantial herds of goats, cattle, and sheep. About one-tenth of the country is forested, mostly in the western mountains. In the volcanic northwest, at the higher elevations, bamboo forests can be found. Much of the remainder of the country is wooded (northeast) or grassy savanna. The country's rich and varied wildlife includes the elephant, lion, gorilla, chimpanzee, buffalo, various antelopes, warthogs, and zebra. The Kagera National Park and Mutura Hunting Reserve in the northeast protect these and other species, including the rare giant pangolin (a kind of anteater).

Rwanda's substantial reserves of tin (cassiterite) and tungsten (wolfram) constitute its major reserves of minerals. It also has reserves of peat, colombo-tantalite, beryl, and gold. There are natural gas deposits in the vicinity of Lake Kivu.

The people. About three-fifths of Rwanda's 1981 population was under 30 years of age. The annual rate of growth is 3.5 percent. With a density of about 601 persons per sq mi (232 persons per sq km) Rwanda is the most densely populated country in Africa. There are three distinct ethnic groups: the Hutu, who are primarily farmers, make up 90 percent of the population; the Tutsi, who raise longhorn cattle; and the Twa, a Pygmoid people, who are potters and hunters. Rwanda (Kinyarwanda) and French are the official languages, although a local dialect of Swahili is commonly spoken, particularly in Arab or Arab-influenced town districts. Christianity (mostly Roman Catholic) is the religion of 68 percent of Rwanda's population, Islām the religion of 9 percent; 23 percent follow traditional beliefs. In 1983 Rwanda had an exceptionally high birth rate of 52 per 1,000 population. The death rate was 19 per 1,000. Family planning programs have focused on health and welfare rather than on lowering the level of fertility.

The economy. Rwanda is a developing country with a mainly free enterprise economy. The gross national product (GNP) in 1983 was U.S. $1,540,000,000, about $270 per capita. Annual growth of the real GNP (1970–80) was 1.7 percent. Agriculture, manufacturing, and trade are the main components of the GNP.

The agricultural sector, employing about nine-tenths of the labour force, accounts for about two-fifths of the GNP. Principal domestic (subsistence) crops are plantains, sweet potatoes, cassava, potatoes, sorghum, dry beans, and bananas. Cash crops include coffee, tea, sugarcane, pyrethrum flowers, and quinine.

Forestry and fishing are mainly local activities. All fishing is done in Lake Kivu or streams; hunting is still prevalent among the Twa people. Of the wood and brush cut, most is used for fuel. An extensive reafforestation program was undertaken in the early 1980s.

Mining, principally of tin and tungsten, and quarrying make up about 0.5 percent of the GNP. The quarrying of peat began in the early 1980s.

Manufacturing accounts for more than one-sixth of the GNP. The principal products include processed foods, tinware, cotton textiles, plastic pipes, shoes, plant extracts, matches, and transistors. Electric energy production (1983) was 157,000,000 kilowatt-hours, 95 percent from hydroelectric plants. Rwanda imports about half of its electricity from the Mururu hydroelectric station in Zaire. Construction projects (about 4 percent of the GNP) in the 1980s included a dam and hydroelectric power plant on the Rwanda–Zaire border and road and airport construction.

The labour force in 1983 represented almost half of the population. There was substantial underemployment in the agricultural sector. Trade unions are legal but regulated by the 1967 Labour Code, which sets wages and work conditions and imposes mandatory arbitration in labour disputes.

The government regulates the economy through multiyear development plans. Persistent trade deficits have made foreign aid, mainly from Belgium, France, and Germany, essential for development. Rwanda's government helps finance industry, but it has left control in private hands.

About one-fifth of the budget annually is devoted to development. Revenue comes mostly from import and export duties, taxes on goods and services, and income tax. The principal expenditures are for education, defense, and economy and finance.

About 5 percent of the nation's road network is paved. Although the rivers are unnavigable, there are ports on Lake Kivu with privately operated shipping to Zaire. International airports are located at Kigali-Kanombe and at Kamembe.

Exports in the early 1980s were only about one-third of imports, with the deficit made up by income from Rwandans abroad and foreign aid. Principal exports include coffee, tea, cassiterite, and wolframite, exported mainly to Belgium-Luxembourg, Uganda, Germany, France, and the United Kingdom. Principal imports are machinery and transport equipment; mineral fuels and lubricants; textiles, clothing, and footwear; and food, obtained mainly from Kenya, Belgium-Luxembourg, Japan, Germany, and China. Most of Rwanda's exports and imports are routed through Uganda to Mombasa, Kenya, on the Indian Ocean.

Administrative and social conditions. Rwanda is a one-party republic dominated by the military. Supreme power rests with the Mouvement Revolutionnaire National pour le Developpement (MRND), which includes civilians and military officers. The 1978 constitution grants executive power to the president, who appoints an 18-member Council of Ministers as his cabinet. Legislative responsibility rests with a 70-member National Development Council elected by universal adult suffrage from the MRND's list of candidates. The political scene has been dominated by Maj. Gen. Juvénal Habyarimana, founder of the MRND and president of Rwanda, from 1973. All military forces are under the control of the army.

The system of social security provides benefits to working persons for work injury, maternity, disability, and old age. There is also a government-assisted Native Welfare Fund, which finances community centres and medical services.

Health conditions in Rwanda are generally poor. Malaria, venereal and enteric diseases, respiratory ailments, and parasitic diseases still infect significant numbers of people. The country's infant mortality rate is 125 deaths per 1,000 live births, and life expectancy is only about 45 years for men and 48 years for women. There is an acute shortage of physicians—only one for every 22,000 people.

Education in Rwanda is free and compulsory for children between the ages of 7 and 15, but at primary levels only about two-thirds attend. The educational system includes public schools and others operated by religious organizations. The National University of Rwanda was founded in 1963 at Butare.

Cultural life. Rwandans' cultural life remains traditional. The most important form of expression is music; singing and dancing accompany ceremonies associated with birth, marriage, death, harvest, and hunting. Songs and dances are accompanied by drums and the eight-stringed *lulunga.* Rwandans also have a rich oral literature that takes the form of myths, folk tales, proverbs, and poetry. Artistic expression usually involves weaving and basketry; the skill and expressiveness displayed in a family's baskets indicates its social status. The Rwanda National Museum in Butare exhibits traditional arts.

History. The original inhabitants of Rwanda were the Twa, a Pygmoid people engaged in hunting and pottery making; but the dominant ethnic group was and is the Hutu. Exactly when the Hutu arrived in Rwanda is not known, but they were well established when the Tutsi appeared beginning in the 14th century. The pastoral Tutsi established dominance over the Hutu agriculturalists by a series of land and cattle contracts. In the 15th century, Ruganzu Bwimba, a Tutsi leader, founded a kingdom near Kigali. What is now central Rwanda was absorbed in the 16th century, and outlying Hutu communities were subdued by the *mwami* (king) Ruganzu Ndori in the 17th century. The borders of the kingdom were rounded out in the late 19th century by Kigeri Rwabugiri, who is regarded as Rwanda's greatest king. By the 20th century Rwanda was a unified state with a centralized military structure.

The Germans claimed Rwanda as a part of German East Africa from 1890 but kept their presence there minimal. The Belgians occupied Rwanda without opposition in 1916, and the League of Nations created Ruanda-Urundi as a Belgian mandate in 1923.

The Belgians ruled through the traditional kings but encouraged the rise of the Hutu lower classes. In 1959, war erupted between the Tutsi and the Hutu, and *mwami* Kigeri V was forced into exile. He was deposed and Rwanda was declared a republic in January of 1961 and became independent the next year.

Large numbers of Tutsi were forced to leave the country after independence. A raid they launched from Burundi in 1963 brought severe reprisals against Tutsi within Rwanda. Resentment of certain Tutsi holding important government posts led to a military coup in 1973. The new government pledged to put an end to tribal hostility. A new constitution (1978) paved the way for normalization of government. Elections held in 1981 brought Rwanda its first elected legislature since the military coup of 1973.

Rwanda language, also spelled RUANDA, Bantu language spoken in Rwanda, Zaire, Uganda, Tanzania, and Burundi. (The Bantu languages form a subgroup of the Benue-Congo branch of the Niger-Congo language family.) Rwanda is spoken by more people than any other Bantu language.

Rwanda, Kingdom of, traditional East African state, now the Republic of Rwanda. The Tutsi, a pastoral people, established dominance over the Hutu agriculturalists who had preceded them in the area, and around the 15th century Ruganzu Bwimba, a Tutsi leader, founded a kingdom in the Bwanacambwe region near Kigali. What is now central Rwanda was absorbed in the 16th century, and outlying Hutu communities were subdued by the *mwami* ("king") Ruganzu Ndori in the 17th. The borders of the kingdom were rounded out in the late 19th century by Kigeri Rwabugiri, who is regarded as Rwanda's greatest king. By 1900 Rwanda was a unified state with a centralized military structure. The Germans claimed it as part of German East Africa from 1890, but they never really controlled it. Following World War I it was assigned, along with neighbouring Burundi, to Belgium as part of the League of Nations mandate (later the United Nations trust territory) of Ruanda-Urundi. The Belgians ruled through the traditional kings but encouraged the rise of the Hutu lower classes. In 1959 war erupted between the Tutsi and the Hutu, and the *mwami* Kigeri V was forced into exile. He was deposed and Rwanda was declared a republic in January 1961. It became independent on July 1, 1962. Large numbers of Tutsi were forced to leave the country. A Tutsi raid launched from Burundi in 1963 was followed by severe reprisals against Tutsi in the Hutu-dominated republic (1964).

Where the same name may denote a person, place, or thing, the articles will be found in that order

rya rug, floor covering handmade in Sweden and Finland using techniques resembling those employed in Oriental carpets but having extremely long, recumbent pile and great flexibility. In one Swedish type the nap is produced by Ghiordes knots that include a third warp, the fabric having been made on a cloth loom with open shed. Early examples, intended for use as bedspreads, have pile in uncut loops, and some also have pile at the back for greater warmth. Some ryas combine pile with surface areas in other weaving techniques or vary the technique or colour of the weft areas that lie between the rows of pile.

Originally, the ryas seem to have been patternless or striped. After a period of relative complexity in which designs of a folk-art character were used, recent weavings again are simpler, with greater accent placed upon textures.



Swedish rya rug from the parish of Segerstad, in Hälsingland, 18th century; in the Röhsska Konstslöjdmuseet, Göteborg, Swed.

By courtesy of Rohsska Konstslojdmuseet, Goteborg, Swed.

Ryabushinsky FAMILY, Ryabushinsky also spelled RIABUSHINSKII, family of wealthy Russian industrialists. Descended from peasants, they successfully invested in textiles, land, and banking in the 19th and early 20th centuries. They were prominent in liberal politics prior to the Russian Revolution in 1917.

Mikhayl Ya. Ryabushinsky purchased a fabric store in Moscow in 1844 and two years later opened a cloth factory. His sons, Pavel and Vasily Mikhaylovich Ryabushinsky, expanded the business, eventually consolidating their manufacturing facilities at a large complex near Vyshny-Volochek in 1869. In 1900 seven of Pavel's sons took control of the Kharkov Land Bank and, in 1902, opened their own banking house, extending branches throughout northern and western Russia. In 1912 this institution was reorganized as the Moscow Bank.

The Ryabushinskys were prominent in numerous trade and industrial organizations after the turn of the century. Hostile to the government, they were leaders of the Progressive Party, publishing the newspaper *Utro Rossy* ("Russia's Morning"). Pavel Pavlovich Ryabushinsky (1871–1924), the oldest brother and, from 1894, head of the family's business concerns, opened the first Russian auto factory in Moscow in 1916. A staunch supporter of the Russian war effort in World War I, he opposed the Bolsheviks, and Soviet historians claim that he helped organize the Kornilov Rebellion (of 1917) and other anti-Soviet military efforts.

Another family member, N.P. Ryabushinsky, subsidized and edited *Zolotoye Runo* ("Golden Fleece"), a seminal avant-garde arts journal published 1906–09.

Ryan, (Lynn) Nolan, (Jr.) (b. Jan. 31, 1947, Refugio, Texas, U.S.), U.S. professional right-handed baseball pitcher, who in 1983 was the first pitcher to surpass Walter Johnson's record of 3,508 career strikeouts, set in 1927.

Ryan was taught to play baseball by an elder brother and was a wild but fast pitcher for Alvin (Texas) High School before he was signed by the National League New York Mets in 1965. He pitched for their minor league teams (1965–67). Except for time out for military service, he pitched regularly for the Mets through the 1971 season and was then traded to the American League California Angels. Although he pitched brilliantly in relief for the Mets in 1969 when they won the pennant and the World Series, he came into his own as a pitcher with the Angels, leading the league in strikeouts seven of his first eight years with them (1972–74, 1976, 1977–79). In 1980 he was traded to the National League Houston Astros.

By the mid-1980s, in addition to his career strikeout record, he held the record for most strikeouts in a season (383 in 1973) and had pitched five no-hit games, another record.

Ryan, T(ubal) Claude (b. Jan. 3, 1898, Parsons, Kan., U.S.—d. Sept. 11, 1982, San Diego, Cal.), U.S. airline entrepreneur and aircraft manufacturer who designed the plane from which Lindbergh's "Spirit of St. Louis" was built.

Ryan learned to fly in 1917, trained with the Army Air Corps in 1919 at Marsh Field, California, and served with the United States Aerial Forest Patrol until 1922. Ryan established a flight school and a business flying sightseers around San Diego and then, as Ryan Airlines, flew passengers between San Diego and Los Angeles (1925–27). The company moved into design and manufacture of planes, including the M-1, used to fly airmail, but Ryan left the firm in 1926. After a period of selling engines, Ryan established another company in 1929 and designed the Ryan S-T, used by the Army as its basic-training plane, the PT-22. Ryan held contracts for the training of thousands of Army pilots, and his company boomed throughout World War II. In the postwar slump the company produced coffins but then turned out Navion planes until the Korean War. Later the company diversified, and was sold in 1969. Ryan founded Ryson Corporation, a design firm, with his son to build powered glider planes and planes flown by remote control. His biography *Ryan the Aviator* (1971) was written by his colleague William Wagner.

Ryan, Thomas Fortune (b. Oct. 17, 1851, Lovingston, Va., U.S.—d. Nov. 23, 1928, New York City), U.S. financier who played a key role in numerous mergers and business reorganizations around the turn of the 20th century, including those resulting in the creation of the American Tobacco Company and Southern Railway.

Born in poverty and orphaned at the age of 5, Ryan came to New York at 22, joining the New York Stock Exchange in 1874. Later, in company with such notable financial manipulators as Jay Gould, he became involved in the consolidation of utility companies in New York and elsewhere. In 1892 he began to build the Metropolitan Street Railway Co., a large traction empire in New York City, which ultimately merged with August Belmont's Interborough Rapid Transit Company in 1905. Ryan also had interests in railroads, coke, coal, diamonds in the Belgian Congo, oil, rubber, and lead.

Shrouding his operations in secrecy most of his life, Ryan was little known to the public until 1905, when he purchased control of the floundering Equitable Life Assurance Co., arousing the protest of policyholders. Later he turned the firm over to trustees. In 1908 Ryan was accused of misdealings, but a grand jury investigation failed to substantiate any charges. At the time of his retirement he dominated or controlled utilities valued at $1,500,000,000.

Ryazan, also spelled RIAZAN, or R'AZAN', *oblast* (administrative region), western Russian Soviet Federated Socialist Republic, occupying an area of 15,300 sq mi (39,600 sq km) in the middle Oka River basin and extending southward across the northern end of the Central Russian Upland and Oka–Don Plain to the upper Don River basin. North of the Oka is the Meshchera Lowland, with extensive swamps of reed and grass marsh and mixed forest of oak, spruce, pine, and birch. Considerable swamp reclamation has taken place since the 1870s, but the area is still thinly populated. South of the Oka, nearly all the gray forest and leached soils of the forest-steppe

have been plowed. Agriculture and the processing of farm produce in the small towns dominate the economy. Grains are the main crop, with flax and hemp in the north and sugar beet and tobacco in the south. Vegetables are important along the Oka. Industry is concentrated in Ryazan city, the *oblast* headquarters. Pop. (1989) 1,346,000.

Ryazan, also spelled RIAZAN, or R'AZAN', city and administrative centre of Ryazan *oblast* (province), western Russian S.F.S.R., on the Oka River on the site of the ancient town of Pereyaslavl-Ryazansky. The original Ryazan, first recorded in 1095, lay downstream at the Pronya confluence. The seat of the early princedom, it was destroyed in 1237 by the Tatars; only the ruins of its ramparts remain. Pereyaslavl-Ryazansky, thought to have been founded in 1095, was unimportant until the 13th century when the Ryazan bishopric was moved there. Sacked by Moscow in 1371 and by the Tatars in 1372 and 1378, it became the seat of the Ryazan princedom in the 15th century. In 1521 it passed to Moscow and was renamed Ryazan in 1778. The modern city has major engineering, petrochemical, and oil-refining industries; its population roughly doubled between 1959 and 1975. Pop. (1989 prelim.) 515,000.

Rybachy Peninsula, also spelled RYBAČIJ, Russian POLUOSTROV RYBACHY, peninsula in the northwestern part of the Murmansk *oblast* (province), northwestern Russian S.F.S.R., jutting into the Barents Sea. Its most northerly point is Cape Nemetsky. Geologically, the peninsula is strikingly different from the rest of the Kola Peninsula, from which it is separated by the Gulf of Motovsky. It consists of sedimentary strata of the Early Silurian epoch (438 to 421 million years ago), considerably more recent than those of Kola. The peninsula reaches an elevation of 981 feet (299 m) and is covered with tundra vegetation.

Rybachye, town, seat of Issyk-Kul *oblast* (province), Kirgiziya, U.S.S.R. It is a port located on the western shore of Lake Issyk-Kul and is linked to Frunze, about 87 miles (140 km) north-northwest. Rybachye's economy centres on a food industry, including meat-packing and cereal processing, and the town serves as a major transportation centre, with a shipyard. Pop. (1974 est.) 33,000.

Rybinsk, formerly (1946–57) SHCHERBAKOV, or (1984–88) ANDROPOV, city, Yaroslavl *oblast* (province), northwestern Russian S.F.S.R., on the Volga River. The 12th-century village of Rybnaya *sloboda* became the town of Rybinsk in 1777. Its river port flourished with the opening (1810) of the Mariinsk Waterway, linking the Volga to the Baltic Sea, and again with its reconstruction as the deep Volga–Baltic Waterway in 1964. A wide range of engineering and other products are made there.

In 1941 a large barrage and a hydroelectric station were completed on the Volga immediately above Rybinsk. The city's first name change occurred in 1946, when it was renamed for A.S. Shcherbakov, an associate of Joseph Stalin; Nikita Khrushchev restored the city's original name in a de-Stalinization program in 1957. A second name change in 1984 commemorated Yury V. Andropov. In 1988 the name reverted to Rybinsk. Pop. (1989 prelim.) 252,000.

Rybinsk Reservoir, Russian RYBINSKOYE VODOKHRANILISHCHE, large artificial body of water on the upper Volga River, northwestern Russian S.F.S.R., formed by two dams on the Volga and its tributary, the Sheksna. The project began in 1935, the artificial lake began to form in 1941, and, when the project was completed in 1947, a lake of 1,768 square miles (4,580 square km) in area, a maximum width of 37 miles (60 km), and an average depth of 18 feet (5.6 m) had been formed. At that time, the Rybinsk Reservoir was the largest man-made water body in the world. As well as regulating the flow of the Volga and providing power for Moscow and other cities, the reservoir forms part of the Volga–Baltic Waterway.

Rybnik, town and *powiat* (county) capital, southwestern Katowice *województwo* (province), southern Poland, on the Nacyna River. Situated in a sub-Carpathian valley in a forested area of the Upper Silesian coalfields, Rybnik has coal mining, metalworks, and several vocational schools.

Beginning as a fishing village in the 10th century, Rybnik became capital of the Racibórz principality in 1282. It was granted municipal rights in the 13th century and became part of Bohemia in 1532. Seized by Prussia in 1742, it was returned to Poland in 1921. Pop. (1988 est.) 141,000.

Ryckel, Denys: *see* Dionysius the Carthusian.

Rydberg, (Abraham) Viktor (b. Dec. 18, 1828, Jönköping, Swed.—d. Sept. 21, 1895, Djursholm), author of the Romantic school who, with his broad range of achievements, greatly influenced Swedish cultural life.

Rydberg grew up among strangers, with no home of his own; his mother had died in a cholera epidemic, and his father became an alcoholic. He had to break off his studies for lack of money. In 1855 he began to work for the liberal newspaper *Göteborgs handelstidning,* in which *Den siste Atenaren* (*The Last Athenian*), the novel that made his name, appeared serially in 1859. Its description of the clash between paganism and Christianity in ancient Athens revealed his opposition to clerical intolerance and orthodoxy and had a direct bearing on conditions in Sweden. He had previously published *Singoalla* (1857; revised 1865), a romantic lyrical tale of the Middle Ages in Sweden. In his *Bibelns Lära om Kristus* (1862; "The Teaching of the Bible Concerning Christ"), he maintained that Christ was not God. The ensuing disputes with the clergy, however, caused him great emotional tension and depression.

In the 1870s Rydberg entered the Swedish Parliament for a short time. He advocated linguistic reform, particularly to reduce the number of words borrowed from the German. In 1874 he visited Rome and on his return wrote *Romerska dagar* (1877; "Roman Days"), in which his interest in classical antiquity finds its most mature expression. In 1876 he completed his translation of part one of J.W. von Goethe's *Faust,* which had occupied him for many years. He also displayed outstanding talent as a poet; his collection *Dikter* (1882; "Poems") established him as Sweden's foremost lyrical poet since Esaias Tegnér and Erik Stagnelius.

Gradually Rydberg gained official recognition. He was given an honorary doctorate by Uppsala University in 1877, elected to the Swedish Academy in 1878, and in 1884 became professor of cultural history at the University of Stockholm. (The professorship was subsequently changed to one in the theory and history of art.)

In the 1880s he was chiefly concerned with research into mythology, the results of which were published in *Undersökningar i germanisk mythologie,* 2 vol. (1886–89; "Investigations into Germanic Mythology"). In 1891 he published two literary works: *Vapensmeden* ("The Armourer"), a novel describing life at the time of the Reformation in Sweden, and a new collection of poems, one of which, "Den nya Grottesången" ("The New Grotto Song"), is a remarkable indictment of social conditions.

Rydberg achieved an unequaled position of authority in Swedish culture.

Rydberg constant (symbol R_∞), fundamental constant of atomic physics that appears in the formulas developed (1890) by the Swedish physicist J. R. Rydberg, describing the wavelengths or frequencies of light in various series of related spectral lines, such as those emitted by hydrogen atoms. The value of this constant is based on the premise that the nucleus of the atom emitting light is exceedingly massive compared with a single orbiting electron (hence the infinity symbol ∞).

The value of the Rydberg constant R_∞ is 1.097373177×10^7 per metre, or 109737.31 per centimetre. When used in this form in the mathematical description of series of spectral lines, the result is the number of waves per unit length, or the wave numbers. Multiplication by the speed of light yields the frequencies of the spectral lines.

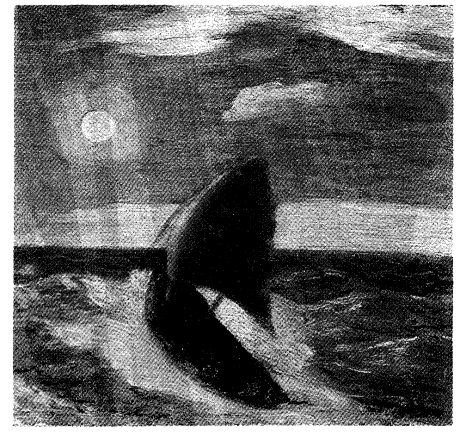
Ryde, locality in Medina borough, on the northeastern coast of the county of Isle of Wight, England, opposite Portsmouth on the mainland. It is located on the site of a former village called La Rye, which the French destroyed early in the 14th century. Still a small fishing hamlet by 1800, Ryde grew rapidly in the railway age as an attractive holiday resort (being incorporated in 1868) and was linked with the mainland by ferry service. Pop. (1981) 19,843.

Ryder, Albert Pinkham (b. March 19, 1847, New Bedford, Mass., U.S.—d. March 28, 1917, Elmhurst, N.Y.), American painter, noted for his highly personal seascapes and mystical allegorical scenes.

About 1870 Ryder settled permanently in New York City, where he briefly studied painting. His formal training, however, did little to affect his early work, consisting largely of naive and idyllic landscapes. He made several short trips to Europe, but paintings in art galleries interested him little. He was an imaginative, solitary painter. His lifework of about 150 paintings was produced slowly; his works are, therefore, difficult to date with certainty.

Ryder was a mystic and a romantic. Works such as "Toilers of the Sea" reflect his obsession with the sea as well as his notion that man is helpless against the forces of nature. Many of his works, such as his "Jonah," were drawn from the Bible, while other paintings, such as "Macbeth and the Witches," "The Temple of the Mind," and "Siegfried and the Rhine Maidens," were depictions of episodes from William Shakespeare, Edgar Allan Poe, and Richard Wagner.

Ryder's works are pervaded by thick, yellow light (usually moonlight), which heightens the mood of such paintings as "The Race Track" or "Death on a Pale Horse." He omitted nonessential details from his paintings, con-



"Toilers of the Sea," oil on wood panel by Ryder, before 1884; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York, George A. Hearn Fund, 1915

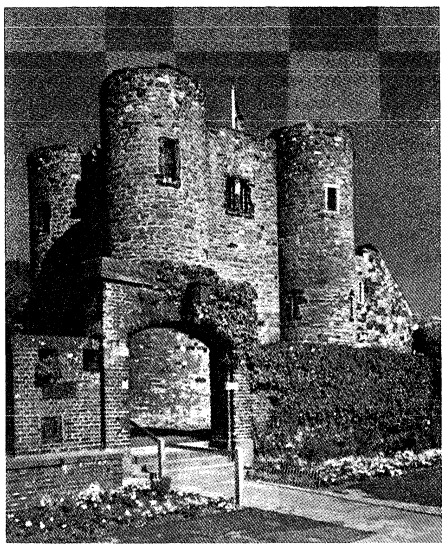
centrating instead on generalized forms and masses of colour, often applying broad, thick layers of pigment with a palette knife.

By 1900 his powers were impaired, and he injured some earlier paintings with misjudged reworkings. Because of his inadequate technical knowledge, many of Ryder's paintings have suffered from rapid deterioration. Toward the end of his life, his native misanthropy increased, and he died an impoverished recluse, tended by his few remaining friends.

Ryder Cup, biennial professional team golf event first held in 1927. Until 1979 it was played between teams of golfers from the United States and Great Britain, but in 1979 and thereafter players opposing the United States were chosen from all of Europe.

The trophy was donated by Samuel Ryder, a British seed merchant, for a biennial golf competition to alternate between British and U.S. venues. The players for each side were chosen by professional golf associations. Teams were composed of eight players, two alternates, and a captain. The competition has been match play, foursomes (partners taking alternate strokes) one day and singles the next, with a day of four-ball play (each player plays his own ball, and each team only counts the better score on each hole) added in 1963. Each match is worth one point to the winning side. For the results of the Ryder Cup competition, *see* Sporting Record: *Golf.*

Rye, parish (town), Rother district, county of East Sussex, England, on a hill by the River Rother. The community's cobbled streets and timber-framed and Georgian houses attract many tourists. Originally a seaport, Rye was



Ypres Tower at Rye, Eng.
Kenneth Scowen

incorporated in 1289 and became a full member of the Cinque Ports (a confederation of English Channel ports) in about 1350. Edward III walled the town, but, of the three 14th-century entrance gates, only Land Gate remains, together with the earlier Ypres Tower (12th century). Buildings of special interest include the Mermaid Inn (1420) and the 18th-century house in which the novelist Henry James spent his later years. From the 15th century the port declined as silting proceeded (the sea is now 2 miles [3 km] away), and the town has grown little outside its medieval perimeter. Pop. (1981) 4,299.

Rye, city and town (township), on Long Island Sound, in Westchester County, southeastern New York, U.S. The original townsite, at Pendingo Neck, was first settled (1660) by a company of men from Greenwich, Conn., and named (1665) for Rye in Sussex, Eng. Its boundaries were officially delineated in 1788.

The Village of Rye, which was separately incorporated in 1904 and already a popular beach resort, developed rapidly as a residential suburb of New York City (24 miles [39 km] southwest) with the advent of trolley cars and commuter trains; it was chartered as a city in 1942. Its Square House (once the Haviland Inn, *c.* 1731) was a stopping place on the old Boston Post Road.

The Town of Rye, which surrounds but does not include the city, also encompasses the Village of Port Chester (incorporated 1868) and part of Mamaroneck (1895). The Museum of Cartoon Art, tracing the history of cartoons, is near Port Chester. Pop. (1984 est.) city, 15,244; town, 38,506.

rye (*Secale cereale*), cereal grass and its edible grain. The plant, growing to a height of four to six feet (one to two metres), has spikes composed of two or more spikelets bearing florets that develop one-seeded fruits, or grains. Rye cultivation probably originated in southwestern Asia about 6500 BC, migrating westward across the Balkan Peninsula and over Europe. Today rye is grown extensively in Europe, Asia, and North America. It is mainly cultivated where climate and soil are relatively unfavourable for other cereals and as a winter crop where temperatures are too cool for winter wheat. The plant, which thrives in high altitudes, has the greatest winter hardiness of all small grains, growing as far north as the Arctic Circle.

Rye is used chiefly as flour for bread, as livestock feed, and as a pasture plant. It is high in carbohydrates and provides small quantities of protein, potassium, and B vitamins. It is the only cereal other than wheat having the necessary qualities to make a loaf of bread, but it is inferior to wheat for the purpose, lacking elasticity, and is frequently blended with wheat flour. Because of its dark colour, a loaf made entirely from rye flour is called black bread. Rye is also used in the production of alcoholic beverages. As livestock feed it is usually part of a mixture. The tough and fibrous straw is used less for feed than for litter or bedding, and it is also used for thatching, mattresses, hats, and paper. Rye may be grown as a green manure crop that is plowed under to improve the soil.

The Soviet Union accounts for about a third of world production of rye. Other important rye-producing countries include Poland, Germany, Argentina, Turkey, the United States, Spain, Hungary, France, The Netherlands, Austria, and Denmark.

Rye House Plot (1683), alleged Whig conspiracy to assassinate or mount an insurrection against Charles II of England because of his pro-Roman Catholic policies. The plot drew its name from Rye House at Hoddeston, Hertfordshire, near which ran a narrow road where Charles was supposed to be killed as he traveled from a horse meet at Newmarket. By chance, according to the official narrative, the king's unexpectedly early departure in March foiled the plot. Ten weeks later, on June 1, an informer's allegations prompted a government investigation.

The facts remain cloudy, but the named figures in the plot included James Scott, duke of Monmouth; Arthur Capel, earl of Essex; Lord William Russell; Algernon Sidney; Sir Thomas Armstrong; Robert Ferguson; and Lord William Howard. All had allegedly met at the house of one Sheppard, a London wine merchant, and at their own houses and discussed various means of ridding the country of Charles II or denying the succession to his openly Roman Catholic brother, the future James II. The Rye House assassination was but one of the schemes discussed. After exposure, Essex was arrested and died in the Tower of London, probably a suicide; Russell, Sidney, and Armstrong were tried, convicted of treason, and beheaded; the other figures escaped punishment.

rye whiskey, whiskey distilled from a mash in which rye grain predominates. *See* whiskey.

Ryedale, district, county of North Yorkshire, England, named for a small dale and river draining into the Vale of Pickering. It is predominantly rural. With an area of 617 square miles (1,598 square km), it is the largest district in North Yorkshire. It includes the Vale of Pickering and the ring of highlands that enclose it: the Howardian Hills, the escarpment of the Yorkshire Wolds, and the heather North York Moors. The moors, more than 1,200 feet (370 m) above sea level and separated by deep, sheltered valleys, are preserved in the North York Moors National Park, about one-third of which lies within Ryedale district.

Bronze Age settlement was confined to the drier uplands on the western margin of the Vale of Pickering. Anglian and Danish farmers established their villages in the vale, and in the Middle Ages markets came into being at Malton and the castle towns of Pickering, Kirkbymoorside, and Helmsley. Religious communities seeking secluded sites established houses in the area: a monastery at Lastingham dedicated to St. Cedd (AD 654; the Saxon crypt survives in the present church); St. Gregory's Minster at Kirkdale, with Britain's best example of a Saxon sundial; Cistercian abbeys at Rievaulx, Byland, and Rosedale; and Augustinian priories at Kirkham and Newburgh. The monks used charcoal from wooded valleys to smelt local ironstone, and they quarried sandstone and limestone for buildings; they also reared sheep for wool. The drainage of the marshes, begun by the monks, continued after the dissolution of the monasteries (1536), and lowland farming prospered. Wealthy landowners built and extended country houses at Gilling East, Hovingham, and elsewhere.

Sheep are still reared on moorland farms, and there is mixed farming on the hills and lower dales. Conifer plantations and limestone quarries near Pickering provide additional employment, and light industries have been developed. Pop. (1985 est.) 88,800.

ryegrass, any of about 10 species constituting the genus *Lolium* (family Poaceae), which includes forage and lawn grasses of temperate Eurasia and the noxious weed known as darnel (*L. temulentum*). Ryegrasses are about 0.3 to 1 metre (1 to 3 feet) tall and have tough, dark-green leaves. The flower spikelets grow in the angles of a zig zag rachis (flower stem). Both perennial ryegrass (*L. perenne*) and Italian ryegrass (*L. multiflorum*) germinate early and are important constituents of pasture and lawn-seed mixtures.

Darnel (poison ryegrass, or tare) often is infected with a poisonous fungus besides containing a poisonous narcotic in its seeds; both substances are dangerous to grazing animals. Modern winnowing techniques now separate the seed from rye seed, but in earlier times contaminated rye flour was a health hazard.

Ryerson, (Adolphus) Egerton (b. March 24, 1803, near Vittoria, Norfolk County, Upper Canada [Ontario]—d. Dec. 19, 1882, Toronto), provincial educator who founded the public education system of what is now Ontario.

After his own local education, Ryerson taught for a time at a nearby school. He took further studies in Hamilton and then entered the ministry as a Methodist circuit-riding preacher and, later, missionary to Indians. He founded the first non-Anglican school to receive a royal charter in Canada, the Upper Canada Academy at Cobourg, in 1836. The school was renamed Victoria College in 1841, and he was its principal.

He was named superintendent of common

schools in 1843 and served until 1876. He was largely responsible for the creation of the Provincial Normal School in Toronto to provide professional training of teachers. Ryerson also saw to the establishment of the provincial Educational Depository (to supply schools and teachers with books and other teaching materials at reduced prices), the distribution of uniform textbooks, and the adoption of an efficient system of school inspection.

Early in his administration, Ryerson travelled to the United States and throughout Europe to study a variety of school systems. His report on his observations contained many recommendations, some of which were later transformed into law by the Common School acts of 1846 and 1850.

In addition to many addresses and other works aimed at increasing understanding of public education in Ontario, Ryerson wrote *The Story of My Life* and *A History of the United Empire Loyalists.*

Rykov, Aleksey Ivanovich (b. Feb. 25 [Feb. 13, old style], 1881, Saratov, Russia—d. March 14, 1938, Moscow), Bolshevik leader who became a prominent Soviet statesman after the Russian Revolution (October 1917) and one of Joseph Stalin's major opponents during the late 1920s.

Rykov joined the Russian Social-Democratic Workers' Party at the age of 18, became a member of its Bolshevik wing, conducted revolutionary activities both inside Russia and abroad, and participated in the Russian Revolution of 1905. In 1907, however, in opposition to the Bolshevik leader Lenin, he began to work for reconciliation among all the factions of the Social-Democratic Workers' Party; after two years in Paris (1910–11), he returned to Russia but was soon arrested and exiled to Siberia.

Returning to Moscow after the February Revolution (1917), Rykov advocated the formation of a coalition government of all the Socialist political parties and again clashed with Lenin, who was determined that the Bolsheviks seize and hold power alone. Nevertheless, Rykov participated in the October Revolution and became commissar of the interior in the first Bolshevik government. Despite his political views, he subsequently accepted and supported the Communist dictatorship, serving it as chairman of the Supreme Council of National Economy (1918–21), as well as deputy chairman and, after Lenin's death in January 1924, chairman of the Council of People's Commissars. Also a member of the party's Politburo (after 1923), he joined Lenin and the party majority to defeat the dissident party factions that demanded more democracy and less central, authoritarian control in the party. After Lenin died, he helped Stalin in his power struggle against Grigory Zinovyev and Lev Kamenev.

Rykov's alliance with Stalin rested upon Stalin's advocacy of an economic policy that encouraged the development of a prosperous agricultural sector that would finance gradual industrialization. But when Stalin defeated his left-wing rivals, who had favoured rapid industrialization financed by wealth extracted from a collectivized peasantry, he adopted their economic policy and launched an attack on Rykov and his right-wing associates, Nikolay Bukharin and Mikhail Tomsky. By 1930 the "Right Opposition," as Rykov and his colleagues came to be known, had been discredited. Rykov was obliged to recant his views publicly (November 1929) and was also dismissed from his most important posts. In 1936 and 1937 he was implicated in fabricated treasonous conspiracies by the defendants of the first two show trials of the Great Purge, and early in 1937 he was arrested and expelled from the party. In March 1938 he was tried in the third show trial, convicted of treason, and executed.

Ryle, Gilbert (b. Aug. 19, 1900, Brighton, Sussex, Eng.—d. Oct. 6, 1976, Whitby, North Yorkshire), British philosopher, leading figure in the "Oxford philosophy," or "ordinary language," movement. Throughout his career, which was centred at Oxford, he attempted—as Waynflete professor of metaphysical philosophy, in his writings, and as editor (1948–71) of the journal *Mind*—to dissipate confusion arising from misapplication of language.

Ryle's first book, *The Concept of Mind* (1949), is considered a modern classic. In it he challenges the traditional distinction between body and mind as delineated by René Descartes. Traditional Cartesian dualism, Ryle says, perpetrates a serious confusion when, looking beyond the human body (which exists in space and is subject to mechanical laws), it views the mind as an additional mysterious thing not subject to observation or to mechanical laws, rather than as the form or organizing principle of the body. What Ryle deems to be logically incoherent dogma of Cartesianism he labels as the doctrine of the ghost-in-the-machine.

In *Dilemmas* (1954) Ryle analyzes propositions that appear irreconcilable, as when free will is set in opposition to the fatalistic view that future specific events are inevitable. He believed that the dilemmas posed by these seemingly contradictory propositions could be resolved only by viewing them as the result of conceptual confusion between the language of logic and the language of events.

Among other well-known books are *Philosophical Arguments* (1945), *A Rational Animal* (1962), *Plato's Progress* (1966), and *The Thinking of Thoughts* (1968). Ryle's *Collected Papers* were published in two volumes in 1971.

Ryle, Sir Martin (b. Sept. 27, 1918, Brighton, Sussex, Eng.—d. Oct. 14, 1984, Cambridge, Cambridgeshire), British radio astronomer who developed revolutionary radio telescope systems and used them for accurate location of weak radio sources. With improved equipment, he observed the most distant known galaxies of the universe. Ryle and Sir Antony Hewish shared the Nobel Prize for Physics for 1976, the first Nobel prize awarded in recognition of astronomical research. Ryle was the nephew of the philosopher Gilbert Ryle.

During World War II Ryle worked with the Telecommunications Research Establishment on the design of radar equipment. After the war he received a fellowship at the Cavendish Laboratory of the University of Cambridge, where he became an early investigator of extraterrestrial radio sources and developed advanced radio telescopes using the principles of radar. While serving as university lecturer in physics at Cambridge from 1948 to 1959, he became director of the Mullard Radio Astronomy Observatory (1957) and, later, professor of radio astronomy (1959). He was elected a fellow of the Royal Society in 1952, was knighted in 1966, and succeeded Sir Richard Woolley as Astronomer Royal (1972–82).

Ryle's early work centred on studies of radio waves from the Sun, sunspots, and a few nearby stars. He guided the Cambridge radio astronomy group in the production of radio source catalogues. The *Third Cambridge Catalogue* (1959) helped lead to the discovery of the first quasi-stellar object (quasar; *q.v.*).

To map such distant radio sources as quasars, Ryle developed a technique called aperture synthesis. By using two radio telescopes and changing the distance between them, he obtained data that, upon computer analysis, provided tremendously increased resolving power. In the mid-1960s Ryle put into operation two telescopes on rails that at the maximum distance of 1.6 kilometres (one mile) provided results comparable to a single telescope 1.6 km in diameter. This telescope system was used to locate the first pulsar, which had been discovered in 1967 by Antony Hewish and Jocelyn Bell of the Cambridge group.

Ryleyev, Kondraty Fyodorovich, Ryleyev also spelled RYLEEV (b. Sept. 29 [Sept. 18, old style], 1795, Batovo, Russia—d. July 25 [July 13, O.S.], 1826, St. Petersburg), Russian poet and revolutionary, a leader in the Decembrist revolt of 1825.

Ryleyev came from a family of poor gentry. He served in the army, spending time in Germany, Switzerland, and France. After his return to Russia, he went to live in Voronezh province, where his impressions from abroad sharply contrasted with the life around him. On his father's death he went to St. Petersburg and began his literary career. Some of his poems are historical and patriotic; perhaps his best verse, however, is that inspired by his revolutionary spirit.

Ryleyev continued to write up to the last few days before the Decembrist revolt, producing eloquent revolutionary verses. The revolt was quickly suppressed, with the arrest of Ryleyev and his co-conspirators. He was hanged in Peter-Paul Fortress in 1826.

Rymer, Thomas (b. 1643?, near Northallerton, Yorkshire, Eng.—d. Dec. 14, 1713, London), English literary critic who introduced into England the principles of French formalist Neoclassical criticism. As historiographer royal, he also compiled a collection of treaties of considerable value to the medievalist.

Rymer left the University of Cambridge without taking a degree and began to study law at Gray's Inn, London. Although called to the bar in 1673, he almost immediately turned his attention to literature. He translated René Rapin's *Réflexions sur la poétique d'Aristote* as *Reflections on Aristotle's treatise of Poesie,* in 1674. He required that dramatic action be probable and reasonable, that it instruct by moral precept and example (it was Rymer who coined the expression "poetic justice"), and that characters behave either as idealized types or as average representatives of their class. In 1678 he wrote *The Tragedies of The last Age,* in which he criticized plays by the Jacobean dramatists Beaumont and Fletcher and John Milton's *Paradise Lost.* In 1693 he published *A Short View of Tragedy,* in which his Neoclassicism was at its narrowest (and in which he criticized Shakespeare's *Othello* as "a . . . Bloody farce, without salt or savour"). In *A Short View,* Rymer rejected all modern drama and advocated a return to the Greek tragedy of Aeschylus.

Rymer's influence was considerable during the 18th century, and his work stimulated John Dryden to reformulate his own theories about drama. Alexander Pope called him "learned and strict." He was, however, ridiculed in the 19th century; Thomas Babington Macaulay called him "the worst critic that ever lived."

In 1692 Rymer was appointed historiographer royal, and, when William III's government decided to publish for the first time copies of all past treaties entered into by England, Rymer was appointed editor of the project. The first volume, which covered the years 1101–1273, was published in 1704. The 15th volume, covering 1543–86, appeared in 1713, the year of Rymer's death. His successor brought out a further five volumes. Despite its deficiencies, the work, whose short title is *Foedera* ("Treaties"), is a considerable and valuable achievement.

Ryōbu Shintō (Japanese: Dual Aspect Shintō), also called SHINGON SHINTŌ, in Japanese religion, the syncretic school that combined Shintō with the teachings of the Shingon sect of Buddhism. The school developed during the late Heian (794–1185) and Kamakura (1192–1333) periods. The basis of the school's

beliefs was the Japanese concept that Shintō deities (*kami*) were manifestations of Buddhist divinities. Most important was the identification of the sun goddess Amaterasu with the Buddha Mahāvairocana (Japanese Dainichi Nyorai: "Great Sun Buddha"). The school's theorists interpreted the Shingon belief in the two realms of Dainichi as corresponding to the two kami enshrined at the Ise Shrine (Isejingū): Amaterasu was considered to be the equivalent of *taizō-kai* ("womb world"), and Toyuke (or Toyouke) Ōkami, the kami of food, clothing, and shelter, was equated with *kongō-kai* ("diamond world"). Their shrines at Ise were identified with the two mandalas (*see* mandala) used to represent the dual nature of Dainichi.

Ryōbu Shintō was highly influential in the development of other syncretic schools, notably Sannō Ichijitsu Shintō (*q.v.*). The original school split into several branches, but these continued to flourish until the 18th century.

Ryōkan, original name YAMAMOTO EIZŌ (b. 1758, Izumozaki, Japan—d. Feb. 18, 1831, Echigo Province), Zen Buddhist priest of the late Tokugawa period (1603–1867) who was renowned as a poet and calligrapher.

The eldest son of a village headman, he became a Buddhist priest at about the age of 17 under the religious name of Taigu Ryōkan. When he was 21 he met an itinerant monk, Kokusen, and followed him to his temple, Entsū-ji, at Tamashima, Bitchū Province. He followed a life of monastic discipline there for 12 years. After Kokusen's death he traveled to various parts of Japan as a mendicant priest. In old age he returned to his native Echigo Province, where he studied the *Man'yōshū* and ancient calligraphy. He developed a strong master–pupil relationship with a young nun, Teishin, who after his death compiled *Hachisu no tsuyu* (1835; "Dew on the Lotus"), a collection of his haiku and *waka* poems. He also executed many pieces of calligraphy that are esteemed for their elegant beauty.

Rysbrack, John Michael, Flemish JAN MICHIEL RIJSBRACK (b. June 27, 1694, Antwerp—d. Jan. 8, 1770, London), one of the principal sculptors and designers in England in the 18th century.

Rysbrack studied at Antwerp, probably in the workshop of Michael van de Voort. In 1720 he established himself in London, where he lived until his death.

Rysbrack worked in a classical, sometimes eclectic manner, avoiding emphatic gestures, exaggerated asymmetry, and extremes of illusionism. His work includes 16 monuments in Westminster Abbey, London; the splendid equestrian statue of William III in Bristol, Gloucestershire; tombs in parish churches all over England; and innumerable portrait busts. In some respects Rysbrack outshone Louis-François Roubiliac, his only rival for preeminence in England at that time. Pyramidal composition and judicious choice of material are characteristic features of his funeral sculpture.

Rysdyk's Hambletonian (harness racehorse): *see* Hambletonian.

Ryswick (The Netherlands): *see* Rijswijk.

Ryukyu Islands, also called NANSEI ISLANDS, Japanese RYŪKYŪ-SHOTŌ, or NANSEI-SHOTŌ, Ryukyuan OKINAWA, archipelago, extending almost 400 mi (650 km) southwest from Kyushu, southern Japan, to the northern tip of Taiwan bordering the Philippine Sea (east) and the East China Sea (west). Since 1972 the islands have comprised Okinawa Prefecture (*ken*), Japan. With a total land area of 870 sq mi (2,254 sq km), they consist of 55 islands and islets divided into three major groups: the Amami-guntō (north), the central Okinawa-guntō (484 sq mi; Okinawa-jima is the largest), and the Sakishima-guntō (south). The larger islands are generally volcanic in origin and have mountainous terrain, while most of the smaller islands are coralline and relatively flat. With a semitropical climate, the Ryukyus are subject to annual typhoons.

The people of the islands seem to be descendants of Japanese and Southeast Asians who migrated to the Ryukyus in prehistoric times. They most closely resemble the Japanese in physical type. Similarly, the Ryukyuan language is classified with Japanese, although there is no mutual intelligibility. Japanese is most frequently spoken by the majority of the Ryukyuans.

Culturally, the Ryukyuans have been subjected to both Japanese and Chinese influence. In ancient times the islands formed an independent kingdom. Chinese and Japanese sovereignty were successively forced on the archipelago from the 14th to the 19th century, and in 1879 the Ryukyus became an integral part of Japan.

After the defeat of Japan in World War II, the United States took control of the islands. The military government was replaced in 1951 by a civil administration based in Naha (Okinawa-jima), the islands' capital and largest city. The chief executive, who originally was appointed by the U.S. high commissioner, was elected by the legislature in 1966. His election was made popular two years later. By terms of the treaty ending World War II (1952) the United States recognized Japan's residual sovereignty over the Ryukyus, and the Amami-guntō was returned in 1953. Following a second treaty signed in 1971, the remaining islands were returned in 1972. The United States continues to maintain 88 military installations and thousands of troops on Okinawa-jima.

The Ryukyus are primarily rural. Agriculture is the dominant occupation, with sweet potatoes and rice the staple crops. Sugar and canned pineapples are among the leading exports. Tuna fishing is increasingly important. Traditional industries include lacquer and pottery manufacture; newer enterprises produce whale products and industrial compounds.

Okinawa University, Kokusai University, and the University of the Ryukyus are all located on Okinawa-jima. Pop. (1984 est.) 1,161,000.

Ryukyu Trench, also called NANSEI-SHOTŌ TRENCH, deep ocean trench running north along the eastern edge of the Ryukyu Islands (Japan) in the Philippine Sea, between Taiwan and the Japanese archipelago. The Ryukyu Trench reaches a maximum depth of 24,629 ft (7,507 m) about 60 mi (90 km) south of Okinawa. It is 1,398 mi long and its mean width is 37 mi. Its floor area extends over some 52,000 sq mi (135,000 sq km), mostly covered by red clay.

Ryurik (Varangian prince): *see* Rurik.

Ryzhkov, Nikolay Ivanovich (b. Sept. 28, 1929), premier of the Soviet Union from 1985.

Little is known certainly of his early career. He seems to have begun his working career as a miner and then, by 1950, was a shift foreman at the S. Ordzhonikidze Uralmash plant (for heavy machinery) in the Urals, later rising to positions of shop superintendent and deputy manager. In 1956 he joined the Communist Party, and in 1959 he graduated from the S.M. Kirov Urals Polytechnic Institute, which led to his becoming chief engineer of the Uralmash plant in 1965 and finally, in 1970, director-general of the Uralmash Production Amalgamation.

In 1975 Ryzhkov was appointed first deputy minister of heavy and transport machine building, and in 1979 he became first deputy chairman of GOSPLAN (the state planning committee of the U.S.S.R.). In 1981 he became a member of the Communist Party's Central Committee and, in 1982, head of its economic department. In September 1985 he became premier (that is, chairman, or *predsedatel,* of the Council of Ministers) of the Soviet Union.

Ryzhkov was closely identified with Mikhail S. Gorbachev's policies of trying to reinvigorate the Soviet economy through advanced technology, improved work habits, more disciplined management, and a measure of decentralized planning.

Rzeszów, *województwo* (province), southeastern Poland, established 1975, comprising an area of 1,698 sq mi (4,397 sq km). It is bordered by the provinces of Tarnobrzeg and Zamość on the north, Przemyśl on the east, Krosno on the south, and Tarnów on the west. The province consists of the Sandomierz Basin in the north and the Western Carpathian Mountain region in the south. The main rivers are the San (a tributary of the Vistula) in the northeast, the Wisłok in the southeast, and the Vistula on the northwestern border. The plains area produces wheat, rye, sugar beets, and potatoes. The mountainous areas yield natural gas and petroleum.

The economy of the province is based on food processing, textile manufacturing, lumber milling, and agricultural-machinery production, together with the manufacture of building materials, porcelain, glass, and chemicals. The provincial capital is Rzeszów city; other large towns include Mielec, Łańcut, and Leżajsk. Pop. (1983 est.) 674,900.

Rzeszów, city, capital of Rzeszów *województwo* (province), southeastern Poland, on the Wisłok River at the juncture of the Carpathian Mountains and the Sandomierz Basin. The town lies on the main Kraków–Lvov (Soviet Union) road and rail line. The economy has expanded greatly since World War II, and some of Poland's largest metal-production plants are located there, as are textile mills and food-processing facilities.

Founded in the 14th century on a trade route to Hungary, it suffered greatly during the 17th century through wars and was seized by Austria in 1772; it was returned to Poland in 1918. The town's regional museum contains a fine ethnographical collection. Pop. (1983 est.) 134,400.

Rzhev, also spelled RŽEV, city, Kalinin *oblast* (administrative region), northwestern Russian Soviet Federated Socialist Republic, on the upper Volga River at the crossing of the Moscow–Riga and Leningrad–Bryansk trunk railways. First mentioned in 1216 as an independent princedom, Rzhev has always been a route centre on the western approaches to Moscow. The city has had a stormy history. It was held at various times by the princes of Tver and Smolensk and was taken by Lithuania in 1356 for two years. It passed to Moscow in 1390. In 1610, during the Time of Troubles, it was captured by the Poles. The modern city has light engineering and industries engaged in the processing of agricultural products. Pop. (1984 est.) 70,000.

S Doradus, variable supergiant star in the Large Magellanic Cloud, one of two galactic companions to the Milky Way Galaxy in which the solar system is located. S Doradus (and the Large Magellanic Cloud) is visible to viewers in the Southern Hemisphere in the constellation Dorado. It is one of the most luminous stars known, radiating almost 1,000,000 times as much energy as the Sun.

's-Gravenhage (The Netherlands): *see* Hague, The.

's Hertogenbosch, also called DEN BOSCH, French BOIS-LE-DUC, capital, Noordbrabant *provincie* (province), south central Netherlands, where the Dommel and Aa rivers join to form the Dieze, and on the Zuid-Willemsvaart (canal). Chartered in 1185 by Henry I, duke of Brabant, who had a hunting lodge nearby (hence the name, meaning "the duke's wood"), it was an important medieval wool centre and became a bishopric in 1559. Subject to many sieges, owing to its strategic position on the Catholic–Protestant line of division, it was unsuccessfully assaulted by Maurice of Nassau (1601, 1603) during the Dutch revolt against Spain and was captured by Prince Frederick Henry of Orange in 1629. Falling to the French in 1794, it was the chief town of the French *département* of Bouches-du-Rhin until 1814. Historic landmarks include the town hall (1671) and the Flamboyant Gothic St. John's Cathedral (rebuilt 1419–1520 on Romanesque foundations), the largest Catholic church in The Netherlands. Opposite the town hall is a statue of the painter Hieronymus Bosch, who was born in 's Hertogenbosch.

A rail junction and an important cattle market, it has food-processing industries and manufactures metal goods, shoes, and cigars. Pop. (1982 est.) 89,601; metropolitan area, 186,627.

SA, abbreviation of STURMABTEILUNG (German: Assault Division), byname STORM TROOPERS, or BROWNSHIRTS, German STURMTRUPPEN, or BRAUNHEMDEN, in the German Nazi Party, a paramilitary organization whose methods of violent intimidation played a key role in Adolf Hitler's rise to power. The SA was founded in Munich by Hitler in 1921 out of various roughneck elements that had attached themselves to the fledgling Nazi movement. The SA drew its early membership largely from the Freikorps (Free Corps), armed freebooter groups, made up largely of ex-soldiers, that battled leftists in the early days of the Weimar Republic. Outfitted in brown uniforms after the fashion of Mussolini's Fascist Blackshirts in Italy, the SA men protected Party meetings, marched in Nazi rallies, and physically assaulted political opponents. Temporarily in disarray after the failure of Hitler's Munich Putsch in 1923, the SA was reorganized in 1925 and soon resumed its violent ways, intimidating voters in national and local elections. From January 1931, the SA was headed by Ernst Röhm, who harboured radical anti-capitalist notions and who dreamed of building the SA into Germany's main military force. Under Röhm, SA membership, swelled from the ranks of the Great Depression's unemployed, grew to 400,000 by 1932 and to perhaps 2,000,000—20 times the size of the regular army—by the time that Hitler came to power in 1933. During the early days of the Nazi regime, the SA carried out unchecked street violence against Jews and Nazi opponents. The SA was eyed with suspicion by the regular army and by the wealthy industrialists, two groups whose support Hitler was trying to secure. On June 30, 1934, the Night of the Long Knives (*die Nacht der langen Messer*), Hitler, using SS forces, carried out a "Blood Purge" of the SA leadership. Röhm and hundreds of SA leaders were summarily executed. Thereafter the SA, reduced in strength, continued to exist, but ceased to play a major political role in Nazi affairs. From 1939, the SA was in charge of training all able-bodied men for Home Guard units.

Ṣā al-Ḥajar (Egypt): *see* Sais.

Sá-Carneiro, Mário de (b. May 19, 1890, Lisbon—d. April 26, 1916, Paris), poet and novelist, one of the most original and complex figures of the Portuguese Modernist movement.

Sá-Carneiro studied in Paris at the Sorbonne. His first poems, *Dispersão,* ("Dispersion"), were written in Paris and published in 1914. In the same year he published a novel, *A Confissão de Lúcio,* ("The Confession of Lúcio"), and back in Portugal he launched the revue *Orpheu* in 1915 in collaboration with Fernando Pessoa, the greatest literary figure of the generation and a long-time friend and mentor to Sá-Carneiro. Returning to Paris, Sá-Carneiro suffered a moral and financial crisis, abandoned his studies, quarrelled with his father, and gave himself up to the life of a literary bohemian. The crisis came to a head in 1916 when the poet committed suicide. Before his death, he sent his unpublished poems to Pessoa and these appeared in 1937 under the title *Indicios de Oiro.* ("Traces of Gold").

Sá da Bandeira (Angola): *see* Lubango.

Sá de Miranda, Francisco de (b. Aug. 28, 1481?, Coimbra, Port.—d. May? 1558, Tapada), the first of the Portuguese Renaissance poets.

The illegitimate son of a canon of Coimbra, Gonçalo Mendes de Sá, and Dona Inês de Melo, he was made legitimate in 1490. He studied at the university, which was then in Lisbon, and seems to have lived mainly in the capital until 1521, frequenting the royal court and taking part in the poetical improvisations there and, possibly, teaching at the university. The years from 1521 to 1526 he spent in Italy, visiting Milan, Venice, Florence, Rome, Naples, and Sicily. He made the acquaintance of Giovanni Ruccellai, Lattanzio Tolomei, and Jacopo Sannazzaro; he met the illustrious Vittoria Colonna, a distant connection of his family, and in her house he probably talked with Cardinal Pietro Bembo and Ariosto, and perhaps met Machiavelli and Francesco Guicciardini. By the time he returned home in 1526 he had become familiar with Italian verse forms and metres: the sonnet and *canzone* of Petrarch, the tercet of Dante, the ottava rima of Ariosto, the eclogue in the manner of Sannazzaro, and Italian hendecasyllabic verse. He did not, however, abandon the short national metre, which he carried to perfection in his *Cartas,* or epistles in verse.

His play *Os Estrangeiros* ("The Foreigners"), written *c.* 1527, was the first Portuguese prose comedy in the classical manner, and he wrote another, *Os Vilhalpandos, c.* 1538 (published 1560). His *Cleópatra* (written *c.* 1550), of which only a dozen lines are extant, was probably the first Portuguese classical tragedy. About 1528 Sá de Miranda made his first attempt to introduce the new Renaissance forms of verse by writing in Spanish a *canzone* entitled *Fábula do Mondego* ("Fable of the Mondego"), and this was followed a year or two later by the eclogue *Alexo.*

In about 1530, the year he married, he left Lisbon finally and settled on his country estate in the Minho. It is in this later period that he produced his best work: the eclogue *Basto,* the *Cartas,* and the satires, in which he shows himself a stern critic of contemporary society. Some of the sonnets of this period combine a grave tenderness of feeling and refinement of thought with simplicity of expression.

Sá de Miranda was the leader of a revolution in Portuguese literature and especially in poetry, which under his influence became higher in aim, purer in tone, and broader in sympathy. As well as introducing the poetic and dramatic forms and spirit of the Renaissance into Portugal, he made an austere stand against the growing materialism of this time. *Poesias de F. de Sá de Miranda* was edited, with life, notes, and glossary, by C. Michaëlis de Vasconcelos (1885); *Obras completas de F. de Sá de Miranda* was edited by M. Rodrigues Lapa, 2 vol. (1937).

Sa Dec, formerly SA DAC, town, on the Mekong delta, southern Vietnam. It is a river port, agricultural trading centre, and transshipment point for small craft on the left bank of the shallow Song Han Giang (Bassac River), 88 mi (140 km) southwest of Ho Chi Minh City (formerly Saigon). It is linked by highway to Rach Gia, on the Gulf of Thailand, via Long Xuyen, provincial seat of An Giang province. It is crossed east–west by a waterway linking the two branches of the Mekong. Pop. (1971 est.) 59,893.

Sa el-Hagar (Egypt): *see* Sais.

Sa-skya-pa, also spelled SAKYAPA, Tibetan Buddhist sect that takes its name from the great Sa-skya (Sakya) monastery founded in 1073, 50 miles (80 kilometres) north of Mt. Everest. The sect follows the teachings of the noted traveller and scholar 'Brog-mi (992–1072). He translated into Tibetan the important Tantric work the *Hevajra Tantra,* which remains one of the basic texts of the order. He also transmitted into Tibet from India the teachings of the *lam-'bras* ("way and effect"), which uses the symbolism of sexual union as a means of achieving mystical reintegration of the self.

From about 1270 to 1340 the abbots of the Sa-skya monastery were invested by the Mongol overlords with the temporal authority of Tibet, but they lost power as the Mongol dynasty declined.

The tutelary deity of the sect is the fierce protective Hevajra. Abbots are permitted to marry, and succession passes from father to son or from uncle to nephew.

Saab-Scania Aktiebolag, major Swedish manufacturer of motor vehicles and industrial equipment. Headquarters are in Linköping.

The company, founded in 1937 as Svenska Aeroplan Aktiebolaget, initially engaged primarily in automobile production. In 1965 the name was changed to Saab Aktiebolag, and in 1970 the present name was adopted.

The company is best known for its manufacture of Saab automobiles and Scania trucks and buses, which are exported throughout the world. The company also manufactures Scania diesel engines for marine and industrial use. Since 1980 Saab has been engaged in a joint venture with Fairchild Industries Inc. to produce small passenger aircraft. Other products include missiles, aviation electronics, computer systems, medical equipment, control and instrument systems, and power plant equipment, including valves, boilers, and pipe systems. The company has major manufacturing subsidiaries in Scandinavia, the United States, South America, France, and Germany, and it operates marketing subsidiaries throughout the world.

Saad al-'Ālī: *see* Aswān High Dam.

Saada (Yemen): *see* Ṣa'dah.

Sa'ādah, Anṭūn (b. 1904, Brazil—d. July 9, 1949, Beirut), Syrian political agitator who sought to unify Syria with neighbouring geographic areas that he considered really parts of Syria.

His father emigrated to Latin America around the turn of the 20th century. Antun gained experience as a journalist for a magazine that his father had started; in the 1920s he moved to Damascus, where he worked on the news-

paper *al-Ayyām.* Soon, however, he left for Beirut, working his way into the social and intellectual life of the students of the American University of Beirut, although he was never formally affiliated with that institution. On Nov. 16, 1932, he established a secret society, which by 1935 had grown to several thousand members, with branches in Syria as well. In December 1935, after Sa'ādah had brought the organization into the open as the Syrian Nationalist Party and held the first plenary conference, he was jailed by the French authorities (France had acquired a sphere of influence in Syria and Lebanon at the close of World War I).

Sa'ādah had created perhaps the first indigenous Arab youth organization. It stressed discipline, struggle, and service and was a channel for the expression of discontent against French rule.

After a short while he was released from jail, having turned his trial to excellent use as a publicity forum. Toward the end of 1938 he visited Italy and Germany for a short while and then moved to South America before the start of World War II. In 1947 he returned to Beirut to renew his agitation for a united Syria and renamed the party the Syrian Social Nationalist Party. By June 1949 armed clashes erupted between Sa'ādah's followers, who had largely remained loyal, and another paramilitary organization that was their major local opposition. Sa'ādah was forced to flee Syria, but the Syrian authorities eventually turned him over to the Lebanese government. In Beirut he was convicted of high treason by a military court and was executed, the whole proceeding taking less than 24 hours.

Sa'adia ben Joseph, Arabic SA'ĪD IBN YŪSUF AL-FAYYŪMĪ (b. 882, Dilaz, in al-Fayyūm, Egypt—d. September 942, Sura, Babylonia), Jewish exegete, philosopher, and polemicist whose influence on Jewish literary and communal activities made him one of the most important Jewish scholars of his time. His unique qualities became especially apparent in 921 in Babylonia during a dispute over Jewish calendrical calculations. He produced his greatest philosophical work, *Kitāb al-amānāt wa al-i'tigādāt* ("The Book of Beliefs and Opinions") at Sura in 935. His Arabic translation of the Old Testament is exceptionally valuable for its commentaries.

Life. Little is known of Sa'adia's early years. When he departed from Egypt, at the age of about 23, he left behind, besides his wife and two sons, a distinguished group of devoted students. By that time he had already composed a Hebrew–Arabic dictionary, later expanded and issued under the name *ha-Egron.* For unknown reasons he migrated to Palestine. There he found a growing community of Karaites, a heretical Jewish sect that rejected the Talmud (the authoritative rabbinic compendium of law, lore, and commentary); this group enjoyed the support of the local Muslim authorities.

Apparently disappointed with the standards of learning in Palestine, he left for Babylonia. There he was confronted with not only the Karaitic schism but also a gnostic trend (derived from an ancient dualistic, theosophical movement), which rejected the foundations of all monotheistic religions. Books such as that of the Persian Jewish heretic Ḥiwi al-Balkhī, which denied the omnipotence, omniscience, and justice of the biblical God and pointed to biblical inconsistencies, were then popular. In the face of such challenges, Sa'adia marshalled his great talents in the defense of religion in general and Jewish tradition in particular. Employing the same manner as Ḥiwi, Sa'adia composed his refutation of him in a somewhat complicated rhymed Hebrew. Then, too, he wrote his *Kitāb ar-radd 'alā 'Anān* ("Refutation of Anan," the founder of Karaism), a lost work that has been identified with Sa'adia's partially extant polemical poem *Essa meshali.*

In 921 Sa'adia, who by then had attained scholarly prominence, headed the Babylonian Jewish scholars in their conflict with the Palestinian scholar Aaron ben Meir, who had promulgated a far-reaching change in the Jewish calendrical computation. The conflict ended with no definite victory for either side. Yet, Sa'adia's participation in it demonstrated his indomitable courage and his importance for the Jewish community in Babylonia. Throughout this period he continued his literary polemics against the Karaites. In 928 he completed his *Kitāb attamyīz* ("Book of Discernment"), a defense of the traditional Rabbanite calendar.

On May 22 of the same year he was appointed by the exilarch (head of Babylonian Jewry) David ben Zakkai as the *gaon* (head) of the academy of Sura, which had been transferred to Baghdad. Upon assuming this office, he recognized the need to systematize Talmudic law and canonize it by subject. Toward this end he produced *Kitāb al-mawārīth* ("Book on the Laws of Inheritance"); *Aḥkam al-wadī'ah* ("The Laws on Deposits"); *Kitāb ash-shahādah wa al-wathā'iq* ("Book Concerning Testimony and Documents"); *Kitāb aṭ-ṭerefot* ("Book Concerning Forbidden Meats"); *Siddur,* a complete arrangement of the prayers and the laws pertaining to them; and some other minor works. In the *Siddur* he included his original religious poems. These works clearly show the Greco-Arabic methods of classification and composition.

His accomplishments intensified his sense of chosenness and made him more unyielding and less compromising. As it seems, these attitudes alienated some of his friends and provoked the envy of the Exilarch. In 932, when Sa'adia refused to endorse a decision issued by the Exilarch in a litigation, an open breach ensued between the two leaders. The Exilarch excommunicated Sa'adia, and the latter retaliated by excommunicating the Exilarch. After three years of embittered struggle, in which each side enjoyed the support of some rich and politically influential Jews of Baghdad, Ben Zakkai succeeded in having the Muslim ruler al-Qāhir remove Sa'adia from his office. The Gaon went into seclusion.

The years that followed turned out to be the brightest in Sa'adia's literary career. During these years he composed his major philosophical work, *Kitāb al-amānāt wa al-i'tiqādāt.* The objective of this work was the harmonization of revelation and reason. In structure and content it displays a definite influence of Greek philosophy and of the theology of the Mu'tazilī, the rationalist sect of Islām. The introduction refutes skepticism and establishes the foundations of human knowledge. Chapter one seeks to establish *creatio ex nihilo* (creation out of nothing) in order to ascertain the existence of a Creator-God. Sa'adia then discusses God's uniqueness, justice, revelation, free will, and other doctrines accepted both by Judaism and by the Mu'tazilī (a great Islāmic sect of speculative theology, which emphasized the doctrines of God's uniqueness and absolute justice). The second part of the book deals with the essence of the soul and eschatological problems and presents guidelines for ethical living.

In 937 a reconciliation between the Gaon and the Exilarch occurred, and Sa'adia was reinstated as *gaon.* In 940 Ben Zakkai died and seven months later his son died, leaving behind a young child. Sa'adia took the orphan into his home and treated him like his own. Sa'adia himself died in September 942.

Sa'adia's works. Exact chronology for many of Sa'adia's works cannot be definitely determined. The most important of these in philology are: *Kutub al-lughah* ("Books on Grammar"), fragments of which were published by Solomon Skoss, and *Tafsīr as-sab'īn lafẓah* ("The Explanation of the Seventy Hapaxlegomina"), fragments of which were edited by N. Alony.

Sa'adia's opus magnum was on exegesis. He prepared an Arabic translation of the whole Pentateuch (published by Joseph Derenbourg) and a translation with an extensive commentary on Genesis 1–28, Exodus, and Leviticus. Only a few fragments of this extensive commentary have been published. His translation and commentaries on Isaiah, Proverbs, Job, and Psalms are extant in their entirety. Fragments of his commentaries on Daniel and Canticles, Esther, and Lamentations are preserved in the Geniza collection (fragments of medieval texts found in an old synagogue in Cairo and transferred to various libraries). In his biblical commentaries the Gaon formulated new principles of interpretation modelled on the rules of Greco-Arabic rhetoric.

His anti-Karaite works include *Kitāb ar-radd 'alā Ibn Sākawayhī* ("Refutation of Ibn Sākawayhī") and *Kitāb taḥṣīl ash-sharā'i' as-samā'īyah* ("Book Concerning the Sources of the Irrational Laws"). In the latter work the Gaon contends that matters pertaining to the irrational commandments of the Mosaic Law may never be decided by means of analogy but only by the regulations transmitted through oral tradition. Talmudic tradition is therefore, he argues, indispensable. Another anti-Karaite work is the *Maqālah fī sirāj as-sabt* ("Treatise on the Lights of Sabbath"). It refutes the Karaite injunction forbidding the preparation of light for the sabbath.

In philosophy he wrote a philosophical commentary on the mystical book *Sefer yetzira.* In contrast to his "Book on Beliefs and Opinions," this volume does not show any influence of *kalām* (Islāmic scholastic theology).

(M.Z.)

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Saale Glacial Stage, division of Pleistocene deposits and time in northern Europe (the Pleistocene Epoch began about 2,500,000 years ago and ended about 10,000 years ago). The Saale Glacial Stage followed the Holstein Interglacial Stage and preceded the Eemian Interglacial Stage, both relatively mild climatic

periods. The extensive and complex Saale deposits are correlated with the Gipping Glacial Stage of Britain and the Riss Glacial Stage of the European Alpine region. The Saale is roughly contemporaneous with the Illinoian Glacial Stage of North America.

It is probable that the Saale episode of glaciation was complex: at least three phases are recognized. These are the Drente, Treene, and Warthe substages. The Drente and Warthe represent periods of glacial advance, or maxima, whereas the Treene represents an interstadial period of glacial retreat between the early Drente and the late Warthe. In the region of central Europe, the Saale is represented by three glacial maxima separated by two periods, or interstades, of moderating climatic conditions. The Saale Glacial Stage was named for the German river, a tributary of the Elbe.

Saale River, left tributary of the Elbe River, 265 miles (426 km) long and draining 9,165 square miles (23,737 square km). It rises in the Fichtelgebirge, a Bavarian highland area in southern Germany, and flows north and northwest past Hof, Saalfeld, Rudolstadt, Jena, Naumburg, Weissenfels, Merseburg, Halle, Bernburg, and Niemberg to join the Elbe just above Barby. Initially passing through well-wooded hills, the river crosses the state and historic region of Thuringia, where it is called Thüringian or Saxonion (German Thüringische or Sächsische) Saale, and enters a deep valley that is dominated by picturesque castles. The fertile land around the river's lower course produces wheat, barley, and sugar beets. The Saale is navigable by barges of 200 tons to Naumburg and by those of 1,000 tons to Halle. Bleiloch and Hohenwarte are two large dams on the river's upper course whose lakes supply hydroelectric power and draw tourists. The main tributaries of the Saale are the Ilm and Unstrut (west) and Weisse, or White, Elster (east).

Saalfeld, city, Thuringia *Land* (state), east-central Germany, on the Saale River, at the northeast edge of the Thüringer Wald (forest), south of Weimar. First mentioned in 899 as a royal palace, it was the site of a Benedictine monastery founded in 1071. The present town dates from 1200. It was sold by the counts of Schwarzburg in 1389 to the House of Wettin and was the seat of the Duchy of Saxe-Saalfeld from 1680 to 1735. In 1826 it came under Saxe-Meiningen. Notable buildings include the Hoher Schwarm (High Swarm), two towers surviving on a 12th–13th-century citadel; the former ducal castle (1677–1726); the town hall (1526–37); the Church of St. John (1389–1456); and a former Franciscan abbey church (1275), now housing a museum.

There are important ironworks and steelworks in Saalfeld, and machinery, dyes, and chocolate are manufactured. Slate is mined in the surrounding rural district. Pop. (1989 est.) 34,684.

Saalfelden, also called SAALFELDEN AM STEINERNEN MEER, town, *Bundesland* (federal province) Salzburg, west central Austria, at the southwest foot of the Steinernes Meer (Sea of Stones) Mountains, near the Saalach River southwest of Salzburg. An old market town, it is also a winter and summer resort and makes leather goods and beer. There are several castles nearby, including the 14th-century Schloss Lichtenberg. The late Gothic Chapel of St. George (1675) is on the south slope of the Steinernes Meer. Pop. (1981) 11,436.

Saanen, popular breed of dairy goat originating in the Saanen Valley of Switzerland. The coat of the Saanen is fine and light-coloured, with white being generally preferred. In build it is similar to the Toggenburg, with smallish frame, straight or dished face, and erect ears. As is that of other goats, milk of the Saanen is whiter and more easily digestible than cow's milk. The breed is highly valued in Europe and the United States as an even, persistent producer.

Saar River, French SARRE, right-bank tributary of the Moselle (German Mosel) River. It flows for 153 mi (246 km) across northeastern France into Germany and drains an area of 2,800 sq mi (7,300 sq km). Rising at the foot of Donon (mountain) in the northern Vosges (mountains), the river flows generally northward to its confluence with the Mosel at Konz, 6 mi southwest of Trier. Within Germany the Saar flows in meanders (which are deeply intrenched north of Merzig and include a remarkable hairpin bend above Mettlach) through the Saar coalfield and the southern outliers of the Hunsrück (upland). Its chief tributaries are the left-bank Nied and the right-bank Blies and Prims rivers. The northern part of the valley is a wine-growing district; the middle stretch between Saarbrücken and Dillingen is a centre of heavy industry. Canalized upstream from Völklingen, the river is navigable to the junction near Sarralbe (German Saaralben) with the 39-mi Canal des Houillères de la Sarre, which joins the Rhine-Marne Canal.

Saarbrücken, city, capital (1959) of Saarland *Land* (state), southwestern Germany, on the Saar River at the mouth of the Sulz River, a frontier station opposite Forbach, Fr. There were Celtic and Roman settlements in the vicinity, but the name is derived from the Frankish royal castle of Sarrabrucca, referring to a bridge across the river dating from Roman times. Its early rulers were the bishops of Metz and the counts of Saarbrücken. Chartered in 1321, it belonged to the counts of Nassau-Saarbrücken until it was occupied by the French in 1793. It passed to Prussia in 1815 and became the capital of the Saar region in 1919. The present city was formed in 1909 by the union of the former Saarbrücken with Burbach-Malstatt, Sankt Johann, and Sankt Arnual. Heavily bombed during World War II, it has been rebuilt. Historic buildings include the old town hall (1750), the Baroque Ludwigskirche (1762–75), the Gothic abbey church of St. Arnual (*c.* 1270–1330), the Old Bridge over the Saar (1546), and the 15th-century castle church. The 18th-century castle, formerly belonging to the counts of Nassau-Saarbrücken, stands on the site of the Sarrabrucca.

The city is the industrial, commercial, and cultural centre of the great Saar coal-mining region. It is the site of the University of Saarland (1948) and has specialized technical colleges, the State Museum of Pre- and Early History, and the *Land* administrative offices and courts. Iron and steel are the most important industries; there are also breweries, food-processing plants, printing works, and factories producing machinery, optical instruments, clothing, paper, soap, lime, and cement. The international Saar Fair is held there annually. The city is an important road and rail junction, and there is an airport to the east. Pop. (1989 est.) 188,467.

Saaremaa, German and Swedish ÖSEL, Russian SAREMA, largest of the islands in the Muhu archipelago that divides the Baltic Sea from the Gulf of Riga. It lies within the Estonian Soviet Socialist Republic and has an area of 1,032 sq mi (2,674 sq km). The island is low-lying and is composed largely of limestones and dolomites. Some of the places with poorer soils are characterized by the *alvary*—poor bushy vegetation, frequently stony and rocky areas, and occasional pine forests, used mainly as natural pasture. The northern and western parts of the island have numerous low hills and ridges, while the eastern and southern regions are lower and more fertile.

The island was occupied in 1227 by the Brothers of the Sword, who founded a bishopric there. It came under Danish (1559), Swedish (1645), and Russian (1721) rule before becoming part of Estonia in 1918. On the south coast is the main city, Kingissepa (pop. 1970, 12,140). Saaremaa is connected by causeway to the neighbouring island of Muhu. Economic activities include agriculture, livestock rearing, and fishing. Pop. (1974 est.) 36,000.

Saarinen, Eero (b. Aug. 20, 1910, Kirkkonummi, Fin.—d. Sept. 1, 1961, Ann Arbor, Mich., U.S.), Finnish-born U.S. architect who was one of the leaders in a trend toward exploration and experiment in American architectural design during the 1950s.



Eero Saarinen seated in one of the chairs he designed; photograph by Arnold Newman, 1948
© Arnold Newman

Life. Eero was the son of the noted architect Eliel Saarinen and Loja Gesellius, a sculptor. The Saarinen family of four, including a sister, Eva-Lisa, moved to the United States in 1923. Eero attended public schools in Michigan. In 1929 he studied sculpture at the Académie de la Grande Chaumière in Paris but, as he recounted years later, "it never occurred to me to do anything but follow in my father's footsteps." Between 1931 and 1934 he studied architecture at Yale University, where the curriculum was untouched by modern theories. His father's architecture in Finland had focussed on a free adaptation of medieval Scandinavian forms, and in the United States he designed various private school buildings from 1925 to 1941, including Cranbrook Academy of Art in Bloomfield Hills, Mich., following this loose, romantic style. At Yale, young Saarinen won a travelling fellowship that made possible a leisurely European visit in 1934–35. He stayed an additional year in Helsinki working with the architect Jarl Eklund.

Eero Saarinen's professional work in the United States began in 1936 with research on housing and city planning with the Flint Institute of Research and Planning in Flint, Mich. He joined his father's practice in Bloomfield Hills in 1938, and one year later their collaborative design—tranquil yet monumental—for the mall in Washington, D.C., won first prize in the Smithsonian Institution Gallery of Art competition. Unfortunately the design was never executed.

In 1939 Saarinen married Lillian Swann,

a sculptor, and they had two children, Eric and Susan. This marriage ended in divorce in 1953, and Saarinen was remarried the following year to Aline Bernstein Loucheim, an art critic. A son, Eames, was born later that year.

In 1940 Eero and his father designed Crow Island School in Winnetka, Ill., which influenced postwar school design, being a one-story structure, generously extended in plan, and suitably scaled for primary-grade children. Also in 1940 he became a naturalized citizen of the United States. In 1945 Eero joined a partnership with Eliel Saarinen and J. Robert F. Swanson that had been organized in 1939. This partnership was dissolved in 1947 and a new partnership of Saarinen, Saarinen and Associates was then formed that lasted until the elder Saarinen's death.

In the 11 years that he survived his father, Saarinen's own work included a series of dramatically different designs that displayed a richer and more diverse vocabulary. In questioning the presuppositions of early modern architecture, he introduced sculptural forms that were rich in architectural character and visual drama unknown in earlier years. The exciting results were welcomed by many who were bored by the uniformity and austerity of the International Style of modern architecture.

Saarinen's first independent work, one that brought immediate renown, was the vast General Motors Technical Center in Warren, Mich. Here Saarinen arranged five major building complexes, each for a different research study, around a 22-acre (9-hectare) reflecting pool. Strips of planted forest rimmed the 320-acre (130-hectare) site. The precision and modular rhythm of the low buildings recalls the design of the German-American architect Ludwig Mies van der Rohe, as well as the early automobile factories of the U.S. architect Albert Kahn. Saarinen's technical solution of the curtain wall (metal panels and glass set in aluminum frames) was widely copied. The scale and visual splendour of the centre suggests a 20th-century Versailles.

In 1953 Saarinen began to design the Kresge Auditorium and chapel of the Massachusetts Institute of Technology, choosing the basic forms of an eighth of a sphere for the auditorium and a cylinder for the chapel. The partial sphere is a "handkerchief" dome resting on three points. The auditorium is arranged entirely within this dramatically simple form. The small chapel is a stark, red-brick cylinder, lighted only from above. Both were completed in 1955. While some critics felt that the solutions were forced and arbitrary, these buildings indicated the search Saarinen had begun for significant and identifying character in public buildings.

Although Saarinen continued to use rectilinear forms on occasion, such as the United States Embassy in London (1955–60) and the Law School at the University of Chicago (1956–60), it was his freely sculptural designs that achieved greater attention. In 1956 two such works were initiated that can be considered representative: Ingalls Hockey Rink at Yale University in New Haven, Conn. (1958), and the Trans World Airlines (TWA) terminal at John F. Kennedy International Airport, New York City (1956–62). For the Yale rink, Saarinen, avoiding the typical field house, achieved a unique and sympathetic sports building. From a lengthwise curved spine in reinforced concrete, he suspended cables to anchors on the oval periphery. This tentlike form suggests an almost Oriental shrine for the game of hockey, a blending of the structural, emotional, and aesthetic that Saarinen himself was proud of. For the design of the TWA terminal, Saarinen continued exploration of interior–exterior sculptural effects. Based on a symmetrical plan, two major cantilevered concrete shells extend dramatically outward, suggesting wings, and on the inside sculptural supports and curving stairways evoke a feeling of movement. In this distinctive and memorable building, Saarinen presented a symbol of flight. While to some it proclaimed virtuosity over logic, Saarinen believed "we must have an emotional reason as well as a logical end for everything we do." Later, Saarinen designed the Dulles International Airport at Chantilly, Va., outside Washington, D.C. (1958–62), with a hanging roof suspended from diagonal supports.

Saarinen's effort was primarily concerned with institutional buildings for education and industry. He built only one skyscraper, the CBS Headquarters in New York City (1960–64), and one house, in the Midwest. His 1948 prizewinning Jefferson National Expansion Memorial design for St. Louis, Mo., was completed in 1964. It is a graceful and spectacular arch of stainless steel, with a span and height of 630 feet (190 metres). It conveys a sense of ceremony and special place yet also one of delight and ease, qualities that are present in all Saarinen's works, whatever their function.

Furniture design. Like many contemporary architects, Saarinen was challenged by furniture design, especially the chair, which presents aesthetical and structural problems that are particularly difficult to solve. In 1941 he and the designer-architect Charles Eames won a national furniture award for a chair design in molded plywood. In 1948 Saarinen created a womblike chair using a glass fibre shell upholstered in foam rubber and fabric.

His last furniture designs comprised a series of pedestal-based chairs and tables (1957) that combined a sculptural aluminum base with plastic shells for the chairs and discs of marble or plastic for the table tops. The curvilinear forms of his furniture designs paralleled his growing interest in sculptural architectural forms.

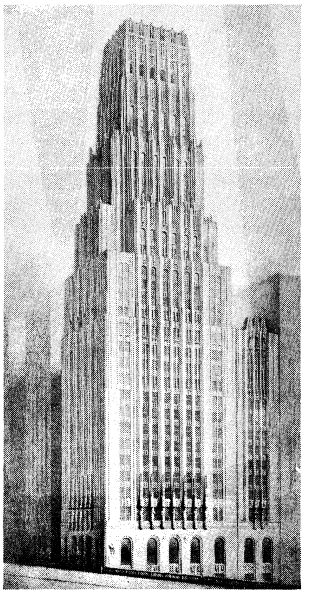
Assessment. As a person, Saarinen was outwardly a stocky, calm man of informal manner and puckish humour, but underneath he was intensely serious about architecture and seemed compulsively competitive with his own most recent designs. His wish that a building make an expressive statement established new horizons for modern architecture. He was exploratory in his thinking and committed to research on every level. His buildings were created with meticulous care, from the original analysis of a client's problem to the final execution, and were sympathetically received by both the general public and his fellow architects.

Saarinen died in 1961, leaving numerous projects to be completed by his associates. Always immersed in architecture, he had no other real interest. He never wrote a book and commented only occasionally on his buildings and architectural philosophy. He largely initiated a trend, however, toward exploration and experiment in design—a trend that departed from the doctrinaire rectangular prisms that were characteristic of the earlier phase of modern architecture. (H.F.K.)

MAJOR WORKS. General Motors Technical Center, Warren, Mich. (1948–56); Jefferson National Expansion Memorial, St. Louis, Mo. (1948–64); Milwaukee County War Memorial, Milwaukee (1953–57); Concordia Senior College, Fort Wayne, Ind. (1953–58); Kresge Auditorium and chapel, Massachusetts Institute of Technology, Cambridge, Mass. (1955); U.S. Embassy, Oslo (1955–59); U.S. Embassy, London (1955–60); Law School, University of Chicago (1956–60); Trans World Airlines terminal, John F. Kennedy Airport, New York City (1956–62); Thomas J. Watson Research Centre, IBM, Yorktown, N.Y. (1957–61); Deere & Company, Moline, Ill. (1957–63); Ingalls Hockey Rink, Yale University (1958); Dulles International Airport, Chantilly, Va., serving Washington, D.C. (1958–62); North Christian Church, Columbus, Ind. (1959–63); Ezra Stiles and Morse College, Yale University (1962); Vivian Beaumont Theatre, Lincoln Center, New York City (1962–63); CBS Headquarters, New York City (completed 1964).

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Saarinen, (Gottlieb) Eliel (b. Aug. 20, 1873, Rantasalmi, Fin.—d. July 1, 1950, Bloomfield Hills, Mich., U.S.), architect notable for his influence on modern architecture in the United States, particularly on skyscraper and church design. His son, Eero Saarinen, was also an outstanding American architect.



Rendering of the design by Eliel Saarinen for the *Chicago Tribune* competition, 1922

Courtesy, the estate of Eero Saarinen

He became the foremost architect of his generation in Finland before he moved to the U.S. in 1923. By 1914 he was widely known in Europe for his Helsinki railroad station (1904–14) and urban planning projects for Reval, Estonia (modern Tallinn, Estonian S.S.R.), and Canberra, Australia. In 1922 he won second prize in a competition to build an office tower for the *Chicago Tribune.* His plan, with its bold approach to massing, had a profound influence on U.S. skyscraper design.

From 1932 to 1948 Saarinen was president of Cranbrook Academy of Art, at Bloomfield Hills, near Detroit, and thereafter, until his death, head of the graduate department of architecture and city planning. He designed a group of buildings in Bloomfield Hills, including Cranbrook School for Boys (1925–30), Kingswood School for Girls (1929–30), the Institute for Science (1931–33), and the Academy of Art (1926–41). In 1947 he and his son Eero won the American Institute of Architects' highest award for their design for an addition to the Smithsonian Institution, Washington, D.C. Notable are his two churches: Tabernacle Church of Christ, in Columbus, Ind. (1940–42), and Christ Lutheran Church, in Minneapolis, Minn. (1949–50)—his last and considered by some his finest building. Saarinen's writings include *The City, Its Growth, Its Decay, Its Future* (1943) and *Search for Form* (1948).

Saarland, also called SAAR, *Land* (state) in the southwestern portion of Germany. It is bounded by France on the south, Luxembourg on the west, and the *Land* of Rhineland-Palatinate on the north and east. It covers an area of 992 square miles (2,569 square km). The capital is Saarbrücken, which lies along the Saar River.

History. The Celts and Germanic Franks were the earliest known inhabitants of the area, which subsequently became part of the Carolingian empire and the eastern Frankish empire. By the Middle Ages the Saar consisted of several small territories, the largest of which was centred on the city of Saarbrücken. From 1381 to 1793 Saarbrücken was ruled by the counts of Nassau-Saarbrücken. The territory around Saarbrücken, though inhabited by German-speaking people, was much influenced by France in the 150 years following the Treaty of Westphalia (1648). The Saar became a French province in 1684 under the Truce of Regensburg, but in 1697 France was forced to surrender all of the Saar except the town of Saarlouis under the Treaty of Rijswijk. From 1792 to 1815 France again occupied the Saar, together with the entire west bank of the Rhine. With the final defeat of Napoleon in 1815, France was forced to cede most of the Saar to Prussia, which made the area part of its Prussian Rhine province. When Alsace-Lorraine was added to the German empire in 1871, the Saar ceased to be a boundary state and experienced rapid industrial development based on its own coal deposits and the iron-ore deposits of Lorraine.

After World War I the Saar coal mines were awarded to France, and the Saarland was placed under the administration of the League of Nations for 15 years, at the end of which time a plebiscite would permit the inhabitants to choose between being part of France or Germany. In the actual plebiscite held on Jan. 13, 1935, more than 90 percent of the inhabitants of the Saar voted for its return to Germany, which was duly accomplished.

In 1945, following World War II, French military forces occupied the Saar, and two years later the first Saar state Parliament adopted a constitution that called for an autonomous Saar in an economic union with France. By 1954, however, West Germany's renewed prosperity was attracting the sympathies of most Saarlanders, and in that year France and the Federal Republic of Germany agreed to a statute that provided for the Saar's autonomy under a European commissioner. The new status was to be approved by a referendum, however, and in the event (Oct. 23, 1955) 68 percent of the Saar's voters rejected the statute and, by implication, the separation of the Saar from Germany. The French subsequently agreed (1956) to the return of the Saar to West Germany, and on Jan. 1, 1957, the Saarland finally achieved its present status as a federal *Land* of Germany.

The land and the people. The heart of the Saarland is an area of thickly forested hills that is crossed from southeast to northwest by the valley of the Saar River. The Saar River valley is in parts underlain by extensive coal deposits, and coal mines and mining settlements are dispersed in the wooded countryside. Concentrated along the river valley, from Saarbrücken to Völklingen, are blast furnaces and steelworks. This lowland is framed on the north by the edge of the Hunsrück highland and on the south by the scarps of French Lorraine. The small Blies and Prims rivers flow into the Saar River. The highest elevation, of 2,280 feet (695 m), is attained by the Weiskircher Heights. The climate is largely continental in character, but a maritime influence is quite evident in the Saarland's moderately warm summers and mild winters. The annual precipitation amounts to about 31 inches (800 mm).

Most of the *Land* is settled in small agricultural or mining towns, and the only area with a pronounced industrial character is a 9-mile-(14-kilometre-) long strip between Brebach, a suburb of Saarbrücken, and Völklingen, where several of the *Land*'s large smelting works are located. The greatest population density lies along and immediately north of the Saar River valley in a triangle linking Saarbrücken, Dillingen, and Neunkirchen. In addition to functioning as the state capital, Saarbrücken is the largest city; other urban areas include Neunkirchen, Völklingen, and Saarlouis.

The majority of Saarland residents are Roman Catholic; the remainder belong to the Evangelical and Protestant churches. The official language is German, but French is also spoken. The population has quadrupled during the last century, while the mining and iron-producing industries were becoming major economic activities. During the 19th century, the Saar's coal mines attracted workers from all over Germany. In later decades, additions to the population continued to be drawn from other, less-developed regions.

The economy. The Saar is dominated by its highly developed industrial activity. Most of the gross domestic product is contributed by industry and mining, followed by services, trade and transportation, and agriculture. Of the state's industrial workers, most are engaged in coal mining, iron and steel production, and manufacturing.

The coal seams stretch for a distance of about 20 miles (32 km) from Saarlouis and Völklingen in the west to Neunkirchen in the east. The reserves of coal are located at depths of up to 4,000 feet (1,200 m). The extraction of coke from bituminous coal and the smelting of iron ore rich in phosphorous have been the bases assisting the growth of the iron industry since the 19th century. The iron- and metal-processing industries include the production of steel and the construction of machinery and motors. Other important industries include the manufacture of ceramics and textiles and food processing.

Agriculture is relatively insignificant. The major products are grains, potatoes, vegetables, fruit, dairy products, and livestock. Production is oriented toward the need of the Saar's urban population, but small quantities of dairy produce are exported to the other *Länder,* and meat, cattle, and bread are sold abroad.

France is the most important trading partner of the Saar. Primary exports to France include bar and cast iron, sheet metal, tools, wire, coal, coke, and ceramics. Among the imports from France are meat and meat products, motor vehicles, sheet metal, and iron ore. About half of the Saar's industrial products—excluding mining and electrical-engineering equipment—are sold to the other *Länder.*

The Saar has a well-developed road network. A superhighway connects the Saar with the Rhine–Main area, and other roads link the state with Paris, Luxembourg, Karlsruhe, and Cologne.

The railway system is equally extensive, and the main lines have been electrified. There are several multiple-railed stretches. Water transport, such as that along the canalized portion of the Saar River, is important. An airport at Saarbrücken-Ensheim handles both domestic and international traffic.

Cultural life. A well-developed educational system includes a series of technical high schools and the University of the Saarland at Saarbrücken. Cultural institutions—including the City Theatre, Radio Saarland, and the Modern Gallery of Saarbrücken—draw support from both Germany and France. There are a dozen museums and galleries and a large number of singing, musical, and theatrical groups. Pop. (1989 est.) 1,054,142.

Saarlouis, city, Saarland *Land* (state), southwestern Germany. It lies along both sides of the Saar River, near the French border, northwest of Saarbrücken. Founded and named by Louis XIV of France in 1680 and fortified by the military engineer Sébastien de Le Prestre Vauban (1680–86), it became the capital of the French Sarre province. The site of an important arms works in the Napoleonic era, it was ceded to Prussia in 1815, and the fortress was razed in 1889, although remnants survive. From 1936 to 1945 the town was called Saarlautern. Largely destroyed during World War II, it has been rebuilt. Saarlouis is situated on the fringe of the Saar coalfield and has important iron and steel works. Pop. (1989 est.) 37,662.

Saavedra (Ramírez de Baquendano), Ángel de, duque de Rivas (b. March 10, 1791, Córdoba, Spain—d. June 22, 1865, Madrid), Spanish poet, dramatist, and politician, whose fame rests principally on his play *Don Álvaro, o la fuerza del sino* ("Don Álvaro, or the Power of Fate"), which marked the triumph of Romantic drama in Spain.

After entering politics Saavedra was condemned to death in 1823 for his extreme liberal views. He fled to London and lived subsequently in Italy, Malta, and France, where he earned his living by painting. During his exile he came under that Romantic influence which, already visible in *El moro expósito* (1834; "The Foundling Moor"), was to triumph in his *Romances históricos* (1841; "Historical Romances"), both significant examples of his Romantic poetry.

Returning to Spain after the amnesty of 1833, he presently inherited the title of duke de Rivas and on March 22, 1835, staged *Don Álvaro,* whose place in the history of the Spanish theatre is analogous to that of Victor Hugo's drama *Hernani* in France. The Italian composer Giuseppe Verdi later used *Don Álvaro* as the source for his opera *La forza del destino.* Saavedra's later dramas are undistinguished. In 1836 he became minister of the interior under Francisco de Istúriz and in the following year was again compelled to flee the country owing to his conversion to conservative opinions. Returning to Spain in 1838, he entered the Senate and was subsequently ambassador in Naples and Paris. He died while serving as president of the Spanish Royal Academy.

Where the same name may denote a person, place, or thing, the articles will be found in that order

Saavedra Fajardo, Diego de (b. May 6, 1584, Algezares, Spain—d. Aug. 24, 1648, Madrid), Spanish diplomat and man of letters, best known for his anti-Machiavellian emblem book, the *Idea de un príncipe político cristiano* (1640; *The Royal Politician*), which urged a return to traditional virtues as the remedy for national decadence.

After studying law at the University of Salamanca, Saavedra went to Rome, where he served under the Spanish ambassador to the Vatican. Rising steadily in the diplomatic ranks, he became one of the few Spaniards of his generation to travel widely and to become familiar with international politics. Distressed by Spain's declining political strength and prestige, he wrote his *Idea* to counsel the Spanish ruler. It comprises a meditation on the subject of principle versus opportunism, a Christian answer to Niccoló Machiavelli in the form of a commentary on 100 emblems. Saavedra is also remembered for *La república literaria* (1655; "The Republic of Letters"), a witty survey of Spanish literature, and for his *Corona gótica* (1646; "The Gothic Kingdom"), a history of Spain under the Goths.

Saavedra Lamas, Carlos (b. Nov. 1, 1878, Buenos Aires—d. May 5, 1959, Buenos Aires), Argentine jurist who in 1936 was awarded the Nobel Prize for Peace for his part in ending the Chaco War (1932–35), fought between Bolivia and Paraguay over the northern part of the Gran Chaco region and especially its oil fields. He organized and presided over the international mediation committee (Brazil, Chile, Peru, Uruguay, and the United States) that secured an armistice (June 12, 1935). Subsequently he was prominent in negotiations resulting in a permanent peace agreement (July 21, 1938).

Educated in law, Saavedra Lamas taught at the National University of La Plata and at the University of Buenos Aires, of which he was rector from 1941 to 1943. In 1915 he became Argentinian minister of justice and of public education, and from 1932 to 1938 he served as minister of foreign affairs. He was president of the International Labour Congress, Geneva (1928); the Pan-American Conference, Buenos Aires (1936); and the League of Nations Assembly (1936).

Between October 1933 and June 1934 the United States, Italy, and 14 Latin-American nations signed an antiwar treaty prepared by Saavedra Lamas. He also wrote several books on international law and peace keeping, economics, and education.

Saba', biblical SHEBA, kingdom in pre-Islāmic southwestern Arabia, frequently mentioned in the Bible (notably in the story of King Solomon and the Queen of Sheba) and variously cited by ancient Assyrian, Greek, and Roman writers from about the 8th century BC to about the 5th century AD. Its capital, at least in the early period, was Ma'rib (75 miles [120 kilometres] east of present-day San'ā', Yemen). A second major city was Ṣirwāḥ.

The Sabaeans were a Semitic people who, at an unknown date, entered southern Arabia from the north, imposing their Semitic culture on an aboriginal population. In the early Sabaean period, besides "kings of Saba'" there were individuals styling themselves "*mukarrib*s of Saba'," who apparently either were high priest-princes or exercised some function parallel to the kingly function. The early period was characterized above all by a tremendous outburst of building activity, principally at Ma'rib and Ṣirwāḥ, and most of the great temples and monuments, including the great Ma'rib Dam, on which Sabaean agricultural prosperity depended, date back to this period. Further, there was an ever-shifting pattern of alliances and wars between Saba' and other peoples of southwestern Arabia—not only the important kingdoms of Qatabān and Ḥaḍramawt but also a number of lesser but still independent kingdoms and city-states.

Saba' was rich in spices and agricultural products and carried on a wealth of trade by overland caravan and by sea. For centuries it controlled Bāb el-Mandeb, the straits leading into the Red Sea, and established a number of colonies on the African shores. That Abyssinia (Ethiopia) was peopled from South Arabia is proved linguistically; but the difference between the Sabaean and Ethiopian languages is such as to imply that the settlement was very early and that there were many centuries of separation, during which the Abyssinians were exposed to foreign influences. New colonies, however, seem to have followed from time to time; and some parts of the African coast were under the suzerainty of the Sabaean kings as late as the 1st century BC.

Toward the end of the 3rd century AD, a powerful king named Shamir Yuhar'ish (who seems incidentally to be the first really historical personage whose fame has survived in the Islāmic traditions) assumed the title "king of Saba' and the Dhū Raydān and of Ḥaḍramawt and Yamanāt." By this time, therefore, the political independence of Ḥaḍramawt had succumbed to Saba', which had thus become the controlling power in all southwestern Arabia. In the mid-4th century AD, it underwent a temporary eclipse, for the title of "king of Saba' and the Dhū Raydān" was then claimed by the king of Aksum on the east African coast. At the end of the 4th century, southern Arabia was again independent under a "king of Saba' and the Dhū Raydān and Ḥaḍramawt and Yamanāt." But within two centuries the Sabaeans would disappear as they were successively overrun by Persian adventurers and by the Muslim Arabs.

Saba, island of the Bovenwindse Eilanden (Dutch: Windward Islands) of the Netherlands Antilles in the Caribbean Sea, 16 mi (26 km) northwest of Sint Eustatius, with which it forms the northwestern termination of the inner volcanic arc of the Lesser Antilles.



The village of Bottom, chief settlement of Saba, Netherlands Antilles
Arthur Griffin—EB Inc.

Saba (area 5 sq mi [13 sq km]) is actually the peak of an extinct volcano, Mt. Scenery (2,821 ft [860 m]), surrounded by sea cliffs. It is windward with respect to the northeastern tradewinds and receives about 44 in. (1,125 mm) of rain annually. The villages of Bottom and Windwardside, occupying the old crater, are approached up a steep road from a rocky landing place on the southern coast.

Saba was settled by the Dutch in 1632 but, because of its inaccessibility and ruggedness, never achieved economic importance and often functioned as a buccaneers' stronghold. In 1828 Saba together with Sint Eustatius formed a colony of the Dutch West Indies and became a part of the Netherlands Antilles in 1845. It is governed through the island government of the Bovenwindse Eilanden. The spoken language is English, and Roman Catholicism is the dominant religion. Its chiefly white population is engaged in raising livestock and cultivating vegetables, particularly potatoes, which are exported to neighbouring islands. Pop. (1981 est.) 1,008.

Sabacon (Cushite king of Egypt): *see* Shabaka.

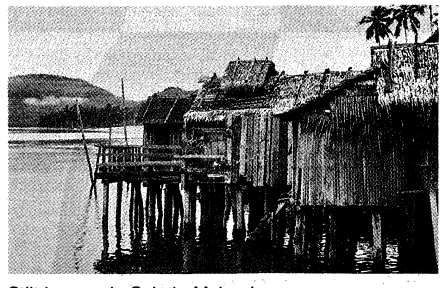
Sabadell, city, Barcelona province, in the autonomous community (region) of Catalonia, northeastern Spain. The city, just north of Barcelona in the Vallés parish, originated as an Iberian and Roman settlement known as Arragona and became a medieval fief of the Castle of Arahona. Called Sabadell in the 12th century, in 1373 it was incorporated as a royal village (with municipal rights) in the kingdom of Aragon. It was elevated to city status in the 19th century, largely because of its importance as a textile centre, which was increased by the introduction of motor-driven mills. Other industries include metallurgy, chemicals, electrical goods, and leather products. Its architecture is essentially modern, most of its older churches and buildings having been destroyed during riots in 1835 and 1909. Pop. (1981) 184,943.

Sabae, city, Fukui Prefecture (*ken*), Honshu, Japan, in the northern end of the Takefu basin. The city first formed around the Buddhist Jōshō temple and became a post town after 1720. An administrative centre in the late 19th century, it gained importance as a centre for the production of silk and synthetic fibres. Specialized industries, such as the manufacture of optical frames and roof tiles, have also been established. Pop. (1980) 59,579.

Sabaean, member of a people of South Arabia in pre-Islāmic times, founders of the kingdom of Saba' (*q.v.*), biblical Sheba.

Sabah, state (*negeri*) of East Malaysia, forming the northern part of the great island of Borneo, bordered by Sarawak (southwest) and Kalimantan, or Indonesian Borneo (south), with an 800–900-mi (1,290–1,450-km) heavily indented coastline washed by the South China, Sulu, and Celebes seas. It was known as North Borneo during the British colonial period (until 1963). Its 29,388-sq-mi (76,115-sq-km) area is dominated by Mt. Kinabalu (13,455 ft [4,101 m]). A great tangle of ranges—the Crocker, Terus Madi, and Witti—serrate the interior and include many peaks between 4,000 and 6,000 ft. Between the Crocker Range and the sea on the west coast is an extensive, well-populated coastal plain; other plains (the Tenom, Tambunan, and Keningau) lie inland between the mountain massifs, while the eastern lowlands are partly dissected peneplains.

Although there is evidence of Chinese trade from the 7th century onward, Sabah's contacts were confined to the Philippines for centuries. It was known to the Sulu pirates as the "Land Below the Wind" because of its position below the typhoon belt. European influence intensified after the Scottish voyager Alexander Dalrymple reached the Sulu Sea (1759). Although the British were active in



Stilt houses in Sabah, Malaysia
Harrison Forman

the area throughout the 19th century, notably on the offshore island of Labuan (*q.v.*), which became a crown colony in 1848, the mainland was not occupied until 1877, when a private syndicate (chartered in 1881 as the British North Borneo Company) obtained land grants from the sultans of Brunei and Sulu. The territory acquired its boundaries in 1898. After Japanese occupation during World War II, crown colony status was granted (1946), and Sabah joined Malaysia in 1963. In the early 1960s the Philippines unsuccessfully revived its long-standing claim to the territory.

Plantation agriculture began early in the 20th century and includes tobacco (Sempurna Peninsula and Segma Valley), coconuts (Kudat district), and oil palm (Sandakan district). Rice and rubber are grown on the western coastal plain. Although wet paddy (rice) predominates and irrigation is employed, rice must still be imported, usually from Thailand. Exports include timber, rubber, copra, and abaca. Several deep bays provide good ports at Victoria, Kota Kinabalu (*q.v.*; the capital), Kudat, Sandakan, and Tawau. Stone, coral sand, and clay are extracted for building materials. Gold is found near the Sungai (River) Taliwas, and offshore drilling for oil led to development of the Tembungo field. Indus-

tries include sawmilling and the manufacture of rubber goods.

The Malay, Kadazan, Chinese, Bajau, and Murut are the main ethnic groups. Unlike other Bornean territories, Sabah has only one river—the Kinabatangan—that is navigable far inland. Rivers remain the only means of communication in some districts, but travel is predominantly overland by four-wheel-drive vehicle, pony, or buffalo. There are small road networks and usually airports at the main port towns. A major road extends from Kota Kinabalu to Kudat, and Sabah's railway stretches for 116 miles (187 km) from the capital to Tenom. Pop. (1984 est.) 1,176,400.

Sabang, *kotamadya* (city) and free port, Aceh *daerah istimewa* (special district), Indonesia, on the northeastern coast of We Island, off the northern tip of Sumatra. It lies at the northern entrance to the Strait of Malacca and is the first port of call in the Malay Archipelago for vessels coming from the west. The harbour, built in 1887, is sheltered from the strong winds and heavy swells of the Indian Ocean. Sabang, which has an airfield, was occupied during World War II by the Japanese, who used it as a fueling point. Pop. (1980) 23,821.

Sabará, city, east-central Minas Gerais state, Brazil, on the Velhas River, east of Belo Horizonte, the state capital, at 2,313 feet (705 m) above sea level. Made a seat of a municipality in 1711, it was elevated to city status in 1838. Cobblestone streets, colonial buildings, and a gold-mining museum attest to Sabará's former eminence as a mining centre. A spinning and weaving factory and other industrial establishments now sustain the community, although iron mining and metallurgy are of growing importance. Pop. (1980 prelim.) 22,883.

Sabas, SAINT, also spelled SABBAS (b. January 439, Moutalaske, Cappadocia, Asia Minor—d. Dec. 5, 532, near Jerusalem; feast day December 5), Christian Palestinian monk, champion of orthodoxy in the 5th-century controversies over the nature of Christ. He founded the monastery known as the Great Laura of Mar Saba, a renowned community of contemplative monks in the Judaean desert near Jerusalem. This community became a prototype for the subsequent development of Eastern Orthodox monasticism.

After his monastic initiation in Cappadocia, Sabas went on pilgrimage to Palestine in 457 and, having associated with several monasteries there, finally asked permission to withdraw as a solitary and to settle in the Kidron gorge, near Jerusalem, northwest of the Dead Sea. The gathering of numerous disciples about him required the construction in about 483 of a number of small cottages grouped about a chapel. From this beginning, Mar Saba established 14 monasteries and four hospices throughout southern Palestine to accommodate travelers in the Holy Land. Sabas, directed to receive priestly orders, was named spiritual head of Palestinian monasticism.

A dispute between Sabas and a monastic faction favouring the doctrines of Origen divided the community, and monasteries were established elsewhere. Sabas continued as a standardbearer of orthodoxy. He interceded at the imperial court in Constantinople against the heresy of the Monophysites. Sabas composed an influential monastic rule extant only in altered copies. He is depicted in art with an apple, denoting that he refused to eat that fruit because of its part in the biblical account of the Fall of man.

Sabas, Saint (Serbian monk): *see* Sava, Saint.

Sabaṣṭiyah (ancient town, Palestine): *see* Samaria.

Sabatier, (Louis-) Auguste (b. Oct. 22, 1839, Vallon, Fr.—d. April 12, 1901, Paris), French Protestant theologian and educator who helped revolutionize biblical interpretation by applying methods of historical criticism and promoted the development of liberal theology and the Roman Catholic Modernist movement by his interpretation of Christian doctrine as the symbolism of religious feelings. Among his principal writings that have been translated into English are *The Apostle Paul* (1891), *Outlines of a Philosophy of Religion* (1897), and *Religions of Authority and the Religion of the Spirit* (1904).

Sabatier, Paul (b. Nov. 5, 1854, Carcassonne, Fr.—d. Aug. 14, 1941, Toulouse), organic chemist who shared the Nobel Prize for Chemistry in 1912 with Victor Grignard for researches in catalytic organic synthesis, and particularly for discovering the use of nickel as a catalyst in hydrogenation (the addition of hydrogen to molecules of carbon compounds).

Sabatier studied at the École Normale Supérieure and under P.E. Marcellin Berthelot at the Collège de France, taking his doctor's degree in 1880. After a year at the University of Bordeaux, he moved to the University of Toulouse in 1882, where he became professor (1884) and dean (1905) and where he remained until retirement in 1930.

Sabatier's various discoveries formed the bases of the margarine, oil hydrogenation, and synthetic methanol industries, as well as of numerous laboratory syntheses. He explored nearly the whole field of catalytic syntheses in organic chemistry, personally investigating several hundred hydrogenation and dehydrogenation reactions, showing that several other metals besides nickel possess catalytic activity, though in smaller degree. He also studied catalytic hydration and dehydration, examining both the feasibility of specific reactions and the general activity of the various catalysts.

Sabatier, Paul (b. Aug. 3, 1858, Saint-Michel-de-Chabrillanoux [Ardèche], Fr.—d. March 4, 1928, Strasbourg), French historian and educator who is chiefly remembered for his biography of St. Francis of Assisi.

A Calvinist from birth, Sabatier began his studies at the Protestant faculty of theology in Paris in 1880 and became pastor of St. Nicholas, Strasbourg, in 1885. He was expelled from Alsace in 1889 because he refused to become a German subject, and, although he was given a parish in the Cévennes, ill health forced him to retire. He devoted himself to historical research. He was professor of Protestant theology at Strasbourg from 1919 until his death.

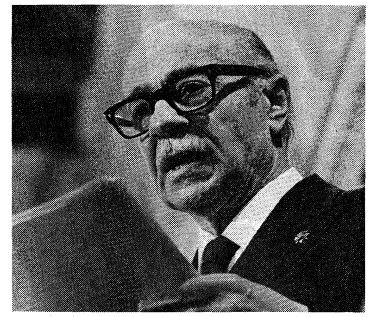
Sabatier's *Vie de St. François d'Assise* (1893), which showed little regard for historical objectivity, enjoyed an immediate success and ran through more than 40 editions during its author's lifetime.

Sábato, Ernesto (b. June 24, 1911, Rojas, Arg.), Argentine novelist, journalist, and essayist.

Educated as a physicist and mathematician, he attended the National University of La Plata (1929–36), where he received his doctorate in physics in 1937, and studied at the Curie Laboratory in Paris (1938) and Massachusetts Institute of Technology (1939). He returned to Argentina in 1940. From 1940 to 1945 he taught theoretical physics at the National University of La Plata and at a normal school in Buenos Aires. He began to contribute articles to the literary section of *La Nación,* one of Argentina's leading newspapers, and he was removed from his teaching post in 1945 for his opposition to the Perón government.

Uno y el universo (1945; "One and the Universe"), a series of aphorisms, statements, and personal observations by Sábato on diverse philosophical, social, and political matters, was his first literary success. The novel *El túnel* (1948; "The Tunnel"; Eng. trans., *The Outsider*) won Sábato national and international fame. The protagonist of the novel is a typical Existential antihero who is unable to communicate with anyone. Faced with the absurdity of the human condition, he withdraws within himself.

After the fall of Perón in 1955, Sábato published *El otro rostro del peronismo* (1956; "The Other Face of Peronism"), which is an



Sabato, 1985
AP/World Wide Photos

attempt to study the historical and political causes of the violence and unrest of Perón's rule. The essay *El caso Sábato* (1956; "The Sábato Case") is a plea for reconciliation of Peronist and anti-Peronist forces.

His second novel, *Sobre héroes y tumbas* (1961; *On Heroes and Tombs*), is a penetrating psychological study of man, interwoven with philosophical ideas and observations previously treated in his essays. *Tres aproximaciones a la literatura de nuestro tiempo* (1968; "Three Approximations to the Literature of Our Times") are critical literary essays that deal specifically with the works of Alain Robbe-Grillet, Jorge Luis Borges, and Jean-Paul Sartre. The novel *Abaddón el exterminador* (1974, corrected and revised, 1978; "Abaddón the Exterminator") contains the ironic statements on literature, art, philosophy, and the excesses of rationalism that characterize his work.

Sábato in 1984 received the Miguel de Cervantes Prize, Hispanic literature's most prestigious award. The award followed the publication in Spain of the "Sábato Report" (*Nunca más;* an investigation of human-rights violations in Argentina), of which Sábato was the principal author.

Sabbas, SAINT (Palestinian monk): *see* Sabas, Saint.

Sabbatai Zebi (Jewish false messiah): *see* Shabbetai Tzevi.

Sabbatarianism, doctrine of those Christians who believe that Sunday (the Christian Sabbath) should be observed in accordance with the Fourth Commandment, which forbids work on the Sabbath because it is a holy day. Some other Christians have contended that the Fourth (or Third in some systems) Commandment was a part of the Hebrew ceremonial, not moral, law. They believe that this law was entirely abolished by Jesus Christ, whose Resurrection on the first day of the week established a new kind of day, characterized by worship rather than absence of work. In Christianity there are many shades of opinion between these two views.

Legislation concerning what may or may not be done on Sunday is as old as the time of Constantine, who decreed regulations against Sunday labour in 321. In its strictest form, however, Sabbatarianism was the creation of the Scottish and English Reformers, especially John Knox. The Scottish Presbyterians and the Puritans took their views to the American colonies, where rigorous "blue laws" were enacted. Although reduced in number and effect, Sunday observance laws are still promoted in England, and in the United States many ef-

fective state or local laws bar certain business activities and sporting events on Sunday.

Those Christians who believe that the weekly holy day should still be observed on Saturday rather than on Sunday (such as the Seventh-day Adventists) are also sometimes called Sabbatarians.

Sabbath, Hebrew SHABBAT (from *shavat*, "cease," or "desist"), day of holiness and rest observed by Jews from sunset on Friday to nightfall of the following day. The time division follows the biblical story of creation:



Havdala ceremony marking the end of the Sabbath, with wine and candle; woodcut from the Minhagim Book, Amsterdam, 1662

Jewish Museum, New York City—Art Resource/EB Inc.

"And there was evening and there was morning, one day" (Genesis 1:5).

The sacredness of the Sabbath has served to unite Jews during the long course of their history and has been for them a joyous reminder of their perpetual Covenant with God. The prophets, nevertheless, often found it necessary to remind the Jews of God's commandment to keep holy the Sabbath. Since abstention from work was fundamental to Sabbath observance, God miraculously provided a double portion of manna ("bread from heaven") on Friday so that the Israelites would not be compelled to gather food on the Sabbath during their 40 years of wandering in the wilderness.

In Maccabean times (2nd century BC) observance of the Sabbath was so strict that the Jews allowed themselves to be slaughtered on that day rather than take up arms to defend themselves. Realizing that such an attitude could mean their extinction, the Jews determined to fight if attacked again on the Sabbath. The Talmud sanctioned this decision and said that 39 general categories of forbidden works were suspended when life or health were seriously endangered, for "the Sabbath was given to man, not man to the Sabbath."

In the synagogue a portion of the Torah is read during the morning service, followed by the chanting of the Haftara (a selection from the prophets). Psalms are also part of the day's liturgy. During the morning Sabbath service, a Jewish boy whose 13th birthday has occurred during the previous week customarily celebrates his Bar Mitzvah (religious adulthood) and may chant the Haftara.

In Jewish homes the woman of the house lights white Sabbath candles before sunset on Friday evening and pronounces a benediction. The Sabbath meal that follows is preceded by the Qiddush (blessing of sanctification). An abbreviated Qiddush is recited the next morning before breakfast, which is taken after the service. A special blessing (Havdala), emphasizing the idea of separation (between the Sabbath and weekdays, between the sacred and the profane, and between light and darkness), concludes the Sabbath.

In modern times Orthodox Jews strive to observe the Sabbath with full solemnity. Conservative Jews vary in their practice, some seeking certain modifications to permit, for instance, travel on the Sabbath. Reform Jews, in some cases, hold synagogue services on Sunday. Among post-Reformation Christians, a few groups, such as the Seventh-day Adventists, observe Saturday as their day of rest and worship.

A number of Sabbaths during the Jewish religious year have distinctive designations. Four occur between the end of Shevat (fifth month of the Jewish civil year) and the first day of Nisan (seventh month). The specific name of each of these Sabbaths is related to an additional reading from the Torah (first five books of the Old Testament) that replaces on that day the Maftir (last portion of the assigned Torah reading). For each of these four Sabbaths there is also a distinctive Haftara.

Sheqalim ("shekels"), occurring on or before Adar I, refers to taxes and has as its text Exodus 30:11–16. On Zakhor ("remember"), Deuteronomy 25:17–19 reminds Jews how they were attacked by Amalek in the wilderness after their Exodus from Egypt. This Sabbath precedes the festival of Purim. On Para ("red heifer"), Numbers 19:1–22 admonishes the Jews to be ritually pure for the approaching festival of Passover (Pesaḥ). Ha-Ḥodesh ("the month") falls shortly before Passover; the text is from Exodus 12:1–20. These four Sabbaths are known by the collective Hebrew name *arbaʿ parashiyyot* ("four [Bible] readings"). The Sabbath that immediately precedes Passover is called Shabbat ha-Gadol ("great Sabbath").

Three other Sabbaths are designated by a key word from the Haftara chanted on that day: Shabbat Ḥazon (Isaiah 1:1), preceding the 9th day of Av (Tisha be-Av)—a fast day; Shabbat Naḥamu (Isaiah 40:1) following the 9th of Av; and Shabbat Shuva (Hosea 14:2), immediately preceding Yom Kippur (Day of Atonement).

Finally, there are Shabbat Bereshit ("Sabbath of the beginning"), when the annual cycle of Torah readings recommences with Genesis 1; Shabbat Shira ("Sabbath song"), when the triumphal song of Moses is read from Exodus 15; and the two Sabbaths of *ḥol ha-moʿed* ("intermediate days"), falling between the initial and final days of the Passover and Sukkot festivals.

Sabbath River, in Jewish legend, a river beyond which the Ten Lost Tribes of Israel were exiled. *See* Sambation.

Sabbatini, Nicola (b. 1574, Pesaro, Italy—d. Dec. 25, 1654, Pesaro), Italian architect and engineer who pioneered in theatrical lighting techniques. He worked in Pesaro, where he designed the Teatro del Sole, and possibly in Ravenna and Modena.

In his major and most enduring written work, *Pratica di fabricar scene e macchine ne' teatri* (1638; "Manual for Constructing Scenes and Machines in the Theatre"), Sabbatini described contemporary theatrical techniques, particularly stage lighting for dramatic effect. He demonstrated how a bank of stage lights could be illuminated or dimmed simultaneously and discussed proper light positioning. Among his other devices were the sliding of wings and scenery on grooves in the floor and methods of simulating fire and waves. Although most of the stage machinery described by Sabbatini was probably not of his invention, the *Practica* remains a comprehensive documentation of practical stagecraft of the Renaissance.

śabda (Sanskrit: "sound"), in Indian philosophy, verbal testimony as a means of obtaining knowledge. In the orthodox philosophical systems (*darśana*), *śabda* is equated with the authority of the Vedas (most ancient sacred scriptures) as the only infallible testimony, since the Vedas are deemed both eternal and authorless and without contradiction. *Śabda* is of particular importance to the exegetic Mimāṃsā school. Mimāṃsā defines the authoritativeness as applying bindingly only to scriptural statements that exhort to purposive action and whose efficacy would not be known by any other means of knowledge. The Vedānta school extends this authoritativeness to suprasensual objects—*e.g.*, to Brahman, the ultimate reality. The school of logic, Nyāya, accepts verbal testimony, both human and divine, as a valid means of knowledge but notes that only the divine knowledge of the Vedas is infallible.

The nonorthodox systems of Buddhism and Jainism, though they reject the authoritativeness of the Vedas, rely in fact on the *śabda* of their own scriptures.

Sabellianism, Christian heresy that was a more developed and less naive form of Modalistic Monarchianism (*see* Monarchianism); it was propounded by Sabellius (fl. *c.* 217–*c.* 220), who was possibly a presbyter in Rome. Little is actually known of his life because the most detailed information about him was contained in the prejudiced reports of his contemporary, Hippolytus, an anti-Monarchian Roman theologian. In Rome there was an active struggle between the Monarchians, or Modalists, and those who affirmed permanent distinctions ("Persons") within the Godhead. The Monarchians, in their concern for the divine monarchy (the absolute unity and indivisibility of God), denied that such distinctions were ultimate or permanent. Sabellius evidently taught that the Godhead is a monad, expressing itself in three operations: as Father, in creation; as Son, in redemption; and as Holy Spirit, in sanctification. Pope Calixtus was at first inclined to be sympathetic to Sabellius' teaching but later condemned it and excommunicated Sabellius.

The heresy broke out again 30 years later in Libya and was opposed by Dionysius of Alexandria. In the 4th century, Arius accused his bishop of Sabellianism, and throughout the Arian controversy this charge was levelled at the supporters of Nicene orthodoxy (those who accepted the doctrine of the Trinity set forth in the Nicene Creed), whose emphasis on the unity of substance of Father and Son was interpreted by Arians to mean that the orthodox denied any personal distinctions within the Godhead. About 375 the heresy was renewed at Neocaesarea and was attacked by Basil the Great. In Spain Priscillian seems to have enunciated a doctrine of the divine unity in Sabellian terms.

At the time of the Reformation, Sabellianism was reformulated by Michael Servetus, a Spanish theologian and physician, to the effect that Christ and the Holy Spirit are merely representative forms of the one Godhead, the Father. In the 18th century, Emanuel Swedenborg, a Swedish mystical philosopher and scientist, also taught this doctrine, as did his disciples, who founded the New Church.

Sabellic dialects, group of minor Italic dialects spoken in central and southern Italy, closely related to the Oscan language (*q.v.*). Those dialects spoken by the Paeligni, Marrucini, and Vestini are considered North Oscan, and those spoken by the Volsci, Marsi, Aequi, and Sabini are sometimes called Latinian.

A group of inscriptions from eastern central Italy, sometimes referred to as Sabellic, or Old Sabellic, are not so closely related to Oscan (although there are certain affinities) and are better termed Central Adriatic. These Central Adriatic inscriptions are among the oldest written documents yet found in Italy and date at least from the 6th century BC.

SABENA, abbreviation of SOCIÉTÉ ANONYME BELGE D'EXPLOITATION DE LA NAVIGATION AÉRIENNE (French: Belgian Limited-

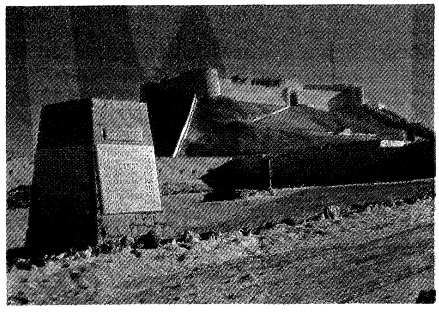
liability Company for the Development of Aerial Navigation), Belgian airline formed on May 23, 1923. Its initial passenger and cargo services extended from Brussels to Amsterdam and to Strasbourg, Fr., and Basel, Switz. By the late 20th century its routes reached throughout the Low Countries and the major cities and resorts of Europe and also overseas to the United States, Canada, Mexico, Africa, the Middle East, India, Southeast Asia, the Philippines, and Japan. Until 1960 public and private ownership of shares was almost equal; recapitalization afterward resulted in about 90 percent ownership by the Belgian government. Headquarters are in Brussels. SABENA's subsidiaries consist principally of airlines and hotel chains.

SABENA's first efforts in the 1920s were to establish a network across Belgium linking London and Cologne, France and Scandinavia, and the Low Countries and Switzerland. In 1925 air service began within Belgium's major colony, the Belgian Congo (Zaire); and, although routes proliferated within the colony, regularly scheduled service between Brussels and Léopoldville (Kinshasa) did not begin until 1935. World War II interrupted further development, but the postwar recovery led to a new expansion of networks, soon exceeding those of 1939. The Brussels–New York service was inaugurated on June 4, 1947. By the 1980s SABENA was serving more than 50 countries.

saber, saber-: *see under* sabre, sabre- (*e.g.*, sabre; sabre-toothed cat).

Saberht, also spelled SAEBERHT, or SEBERT (d. 616/617), first Christian king of the East Saxons, or Essex (from sometime before 604). He reigned as a dependent of his uncle Aethelberht I, king of Kent, and became a Christian after Aethelberht's conversion. A late and doubtful legend attributes the founding of Westminster Abbey to Saberht—London being then the chief city of the East Saxons. He was succeeded by his sons, all known heathens, and the country of the East Saxons returned to heathenism.

Sabhā, also spelled SEBHA, town, southwestern Libya, in a Saharan oasis. An active caravan centre since the 11th century, it served as capital of Fezzan (Fazzān) province (1943–



Fort Elena on a hill near Sabhā, Libya

J. Allan Cash—EB Inc.

63). The modern town of stark white buildings and wide streets is surrounded by older settlements of mud-walled dwellings and covered alleyways. The former Italian Fort Elena, on a nearby hill, is now used for offices, shops, and a hospital. The town continues as a trade and transport centre, servicing motor caravans from Tunisia and Chad; it is linked to the Mediterranean coast by road and air service. Sabhā has a government printing press, a date-packing factory, handicraft industries, teacher-training schools, a national museum, and an agricultural school. Much of the town's food and water must be imported from other oases. An agricultural project developed by the government has introduced farms and improved irrigation in the adjoining oases. Pop. (1979 est.) 35,000.

sabha, Hindi and Sanskrit SABHĀ ("assembly"), important unit of self-government in Hindu society. It is basically an association of persons who have common interests, such as members of the same endogamous groups, but may also be an intercaste group (*e.g.*, a *mazdūr sabhā*, or association of labourers).

The sabha differs from the panchayat (caste or subcaste council) in that its scope is much larger; rather than sitting in judgment on individuals, it discusses matters of general interest. Typical is the Vaiśya *mahāsabhā*, the executive of the Vaiśya conference, the objects of which are the spread of education and social reform and the reduction of expenses required for marriages and festivals among its members, who belong to various castes of merchants and artisans.

Sabi River, also called SAVE RIVER, river of southeastern Africa, flowing through Zimbabwe and Mozambique. The river rises as the Sabi about 50 mi (80 km) south of Harare (formerly Salisbury) and flows southeast from the Zimbabwean highveld to its confluence with the Odzi. It then turns south, drops over the Chivirira ("Place of Boiling") Falls, and is joined by the Lundi at the Mozambique border. The river continues as the Save, following an east-northeasterly course to its mouth near



Birchenough Bridge spanning the Sabi River, Zimbabwe

Eric Carle—Shostal/EB Inc.

Mambone on the Mozambique Channel of the Indian Ocean.

The 400-mi-long river flows through fertile country until it reaches the Zimbabwean lowveld, where a complex irrigation system (the Sabi-Limpopo Project, begun in 1965) waters about 370,000 ac (150,000 ha), originally for sugar cultivation, later also for wheat, rice, cotton, and citrus fruit. It is crossed by the 1,080-ft (329-m) single-span Birchenough Bridge, 83 mi south of Mutare (formerly Umtali), just north of its confluence with the Devure River. The river is navigable for light craft 100 mi above its mouth.

Sabin, Albert Bruce (b. Aug. 26, 1906, Białystok, Pol., Russian Empire), Polish-American physician and microbiologist best known for developing the oral polio vaccine. He is also well known for his research in the fields of human viral diseases, toxoplasmosis, and cancer.

Sabin immigrated with his parents to the United States in 1921 and became an American citizen nine years later. He received his M.D. from New York University in 1931, where he began research on human poliomyelitis. After serving for two years as a house physician at Bellevue Hospital, New York City, he attended the Lister Institute of Preventive Medicine in London. In 1935 he joined the staff of the Rockefeller Institute for Medical Research, New York City, where he was the first researcher to demonstrate the growth of polio virus in human nervous tissue outside the body.

In 1939 Sabin became associate professor of pediatrics at the University of Cincinnati College of Medicine and chief of the division of infectious diseases at the Children's Hospital Research Foundation of the college. He later became professor of research pediatrics. While at the college he disproved the prevailing theory that the polio virus enters the body through the nose; he subsequently demonstrated that human poliomyelitis is primarily an infection of the alimentary tract.

Sabin postulated that live, weakened (attenuated) virus, administered orally, would provide immunity over a longer period of time than killed, injected virus. By 1957 he had isolated strains of each of the three types of polio virus that were not strong enough to produce the disease itself but were capable of stimulating the production of antibodies. He then proceeded to conduct preliminary experiments in the oral administration of these attenuated strains. Cooperative studies were conducted with scientists from Mexico, Holland, and the Soviet Union, and finally, in extensive field trials on children, the effectiveness of the new vaccine was conclusively demonstrated. The Sabin oral polio vaccine was approved for use in the United States in 1960.

Sabin also isolated the B virus, conducted research that led to the development of vaccines for sandfly fever and dengue, studied how immunity to viruses is developed, investigated viruses that affect the nervous system, and studied the role of viruses in cancer.

Sabin became professor emeritus of Cincinnati in 1971 and, from 1974 to 1982 he was a research professor at the University of South Carolina, Charleston. He was also (since 1965) a member of the Board of Governors of the Weizmann Institute of Science in Reḥovot, Israel.

Sabin, Florence Rena (b. Nov. 9, 1871, Central City, Colo., U.S.—d. Oct. 3, 1953, Denver, Colo.), American anatomist and investigator of the lymphatic system who was considered to be one of the leading women scientists of the United States.

Sabin earned a B.S. from Smith College in Northampton, Mass., in 1893 and an M.D. from Johns Hopkins University, Baltimore, in 1896. There she won distinction by constructing a model of the brain that was published as *An Atlas of the Medulla and Mid-Brain* (1901); the work became a popular medical text. Sabin remained at the university, becoming a full professor in 1917. In 1925 she was elected the first woman member of the Rockefeller Institute of Medical Research in New York City; in that year she also became the first woman elected to life membership in the National Academy of Sciences.

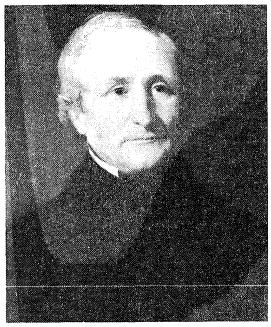
Sabin is best known for her study of blood cells and lymphatics—the vessels that transport lymph fluid. She demonstrated that lymphatics arise directly from the veins and not from peripheral tissues, as was earlier thought. She also investigated the development of blood vessels, developed a method of examining living cells, discovered the variability of the white corpuscle count in individuals, and contributed to significant research on the cellular aspects of immunity and on tuberculosis.

Sabine, Latin SABINUS, plural SABINI, member of an ancient Italic tribe located in the mountainous country east of the Tiber River. They were known for their religious practices and beliefs, and several Roman institutions were said to have derived from them. The story recounted by Plutarch that Romulus, the founder of Rome, invited the Sabines to a feast and then carried off (raped) their women, is legendary. Though there was a considerable Sabine infiltration into Rome, the view that the Sabines conquered the city in the first half of the 5th century BC is improbable; rather, the Romans had many skirmishes with the Sabines before their victory in 449. Nothing is known thereafter until in 290 the Sabines were

conquered and granted *civitas sine suffragio*; in 268 they received full Roman citizenship.

The Sabines probably spoke Oscan. No inscription has survived of their dialect, but a large number of single words are attributed to them by Latin writers. The tradition that the Sabines were the parent stock of the Samnite (*q.v.*) tribes is probably correct.

Sabine, Sir Edward (b. Oct. 14, 1788, Dublin—d. June 26, 1883, East Sheen, Surrey, Eng.), English astronomer and geodesist noted for his experiments in determining the



Edward Sabine, portrait by S. Pearce, 1851; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

shape of the Earth and for his studies of the Earth's magnetic field.

He served in the Royal Artillery and was appointed astronomer to the Arctic expeditions of Sir John Ross (1818) and Sir William Parry (1819) in search of the Northwest Passage. In 1821 he began experiments on the coasts of Africa and North America and in the Arctic to determine the Earth's shape more precisely by observing the motion of a pendulum. He published the first results of his work in 1825 and three years later continued his research in Paris and London.

Sabine superintended the establishment of magnetic observatories throughout the world. In 1852 he discovered that the periodic variation of sunspots correlates with certain changes in magnetic disturbances on Earth and thus was able to show a relation between these two phenomena. Sabine was president of the Royal Society of London from 1861 to 1871 and was made Knight Commander of the Order of the Bath in 1869.

Consult the INDEX *first*

Sabine, Wallace Clement (Ware) (b. June 13, 1868, Richwood, Ohio, U.S.—d. Jan 10, 1919, Cambridge, Mass.), U.S. physicist who founded the science of architectural acoustics.

After graduating from Ohio State University in 1886, Sabine did graduate work at Harvard University, where he later joined the faculty. A brilliant researcher, he enjoyed teaching and never bothered to get his doctorate; his papers were modest in number but exceptional in content. When Harvard opened the Fogg Art Museum in 1895, its auditorium revealed seriously defective acoustics caused by excessive reverberation. Sabine was asked to find a remedy. His discovery that the product of the reverberation time multiplied by the total absorptivity of the room is proportional to the volume of the room is known as Sabine's law, and a unit of sound-absorbing power, the sabin, was named after him. The first building designed in accordance with principles laid down by Sabine was the Boston Symphony Hall, which opened in 1900 and proved a great acoustical success.

Sabine served (1906–08) as dean of the Lawrence Scientific School and (1908–15) as dean of the Harvard Graduate School of Applied Science. During World War I he held an important civilian position in the U.S. War Department as an expert on aircraft instruments. His *Collected Papers on Acoustics* was published by Harvard University Press in 1922.

Sabine River, river in the southwestern United States, rising in northeastern Texas and flowing southeast and south, broadening near its mouth to form Sabine Lake, and continuing from Port Arthur through Sabine Pass, a dredged navigable channel, to the Gulf of Mexico after a course of 578 mi (930 km). It drains 10,400 sq mi (26,950 sq km), entirely in Texas and the Louisiana Coastal Plain. The Sabine has successively served as a boundary between the territories of France, Spain, the United States, and Mexico, and between Texas and Louisiana. The Sabine-Neches Waterway, a portion of the Gulf Intracoastal Waterway, provides 52 mi of deep waterway through Sabine Pass, along western Sabine Lake and the lower Neches River to Beaumont, Tex., and 44 mi of deep waterway to Orange, Tex., 10 mi north of the mouth of the Sabine. The river's original name, Sabinas, the Spanish name for the red cedars growing on its banks, was changed by French-speaking people to its present form.

Sabinian, Latin SABINIANUS (b. Tuscany—d. Feb. 22, 606, Rome), Italian pope from 604 to 606.

Under Pope Gregory I the Great, he served as papal ambassador at Constantinople, trying to reconcile the Roman Church with Patriarch John IV the Faster, whose claim to the title of ecumenical patriarch was regarded by Gregory to be a threat to Christian unity. Elected in 604 as Gregory's successor, Sabinian seems to have been markedly conservative. His cautious administration of the papal granaries during a winter famine probably explains the later untrustworthy legend of his parsimony. His brief pontificate was afflicted not only by famine but also by attacks from the Lombards, a Germanic people ruling northern Italy.

Sabinio, also called VOLCAN SABINYO, extinct volcano (11,500 ft [3,505 m]) in the Virunga Mountains of east central Africa. It lies northeast of Lake Kivu and south-southeast of Rutshuru, Zaire. Its summit marks the junction of the Zaire–Rwanda–Uganda borders. It forms part of the Virunga National Park, which is the home of the mountain gorilla.

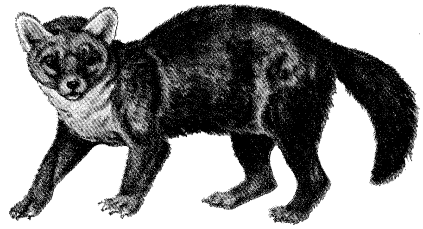
Sabinyo, Volcan (East Africa): *see* Sabinio.

Sab'īyah (Islāmic sect): *see* Ismā'īlīyah.

sabkhah, also spelled SEBKHA (Arabic), saline flat or salt-crusted depression, commonly found along the coasts of North Africa and Saudi Arabia. *Sabkhahs* are generally bordered by sand dunes and have soft, poorly cemented but impermeable floors, due to periodic flooding and evaporation. Concentration of seawater and capillary discharge of groundwater result in deposits of gypsum, calcite, and aragonite. Most *sabkhahs* are thought to have once been small sea inlets and are akin to basins in which evaporites formed in the geological past.

sable (*Martes zibellina*), graceful carnivore of the weasel family, Mustelidae, found in the forests of northern Asia and highly valued for its fine fur. The common name is sometimes also applied to related European and Asian species and to the American marten. The sable ranges from about 32 to 51 centimetres (13 to 20 inches) long, excluding the 13–18-cm tail, and weighs 0.9–1.8 kilograms (2–4 pounds). Its body colour varies from brown to almost black, sometimes with a throat patch from dusky to salmon.

The sable is solitary and arboreal in habits,



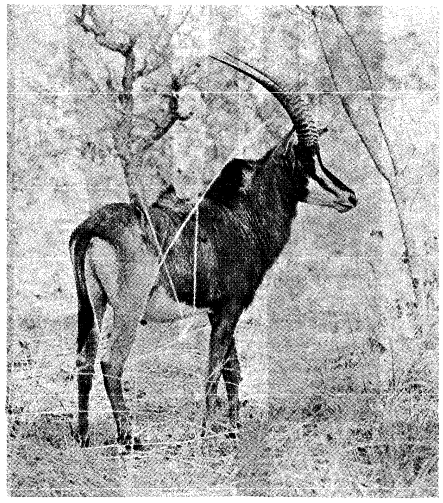
Sable (*Martes zibellina*)

Painting by Richard Ellis

feeding on small animals and eggs. The unusually long gestation of about 250 to 300 days is caused by delayed implantation of the fertilized egg in the wall of the uterus. The litter numbers from one to four.

Sable, Jean-Baptist-Point du: *see* Du Sable, Jean-Baptist-Point.

sable antelope (*Hippotragus niger*), handsome antelope, family Bovidae (order Artiodactyla), that lives in herds in forests of south-



Sable antelope (*Hippotragus niger*)

Leonard Lee Rue III

ern Africa. Like the related roan antelope (*H. equinus*), the sable antelope is a graceful animal with an erect mane, long ears, long hair on the throat, and long, parallel, sickle-shaped horns. It stands up to 137 centimetres (54 inches) at the shoulder. The male is shining black with a black and white face and white underparts; the female is similar, but reddish brown to black in colour.

Sable Island, gently curving sandbar in the Atlantic Ocean, off the coast of Nova Scotia, Canada, 110 mi (180 km) southeast of Cape Canso. It is treeless, about 20 mi long and 1 mi wide, and comprises the exposed portion of a vast shoal on the outer edge of the continental shelf. Gradually shrinking in size and shifting slowly eastward, the island, because of unexpected shallows, has been the scene of so many shipwrecks that it has been called "the graveyard of the Atlantic." The navigation hazards have been minimized since the Canadian government built two lighthouses and a coastguard station in 1873. In 1598 the marquis de la Roche unsuccessfully attempted to colonize the place with 50 French ex-convicts; only 11 survived and were removed in 1603. Now administratively a part of Nova Scotia, Sable (French: "sand") Island is inhabited by only a few families and a few hundred wild ponies.

sabora (Jewish scholar): *see* savora.

sabot, heavy work shoe worn by European peasants, especially in France and the Low Countries. There are two kinds of sabots: one is shaped and hollowed from a single piece



Men wearing sabots, detail from "Peasants Digging," etching by Jean-François Millet, *c.* 1855; in the Albertina, Vienna

By courtesy of Graphische Sammlung Albertina, Vienna

of wood (called *klompen* by the Dutch); the other is a heavy leather shoe with a wooden sole.

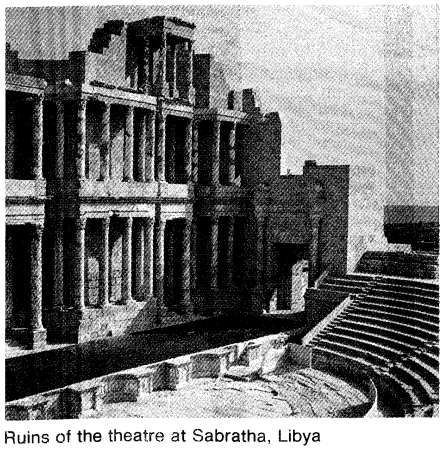
Variations of the sabot—wooden-soled shoes topped with a variety of materials such as leather and suede—became popular in the second half of the 20th century. The sabotine was a makeshift shoe of wood and leather that was worn during World War I.

sabotage, deliberate destruction of property or slowing down of work with the intention of damaging a business or economic system or weakening a government or nation in a time of national emergency. The word is said to date from a French railway strike of 1910 when workers destroyed the wooden shoes (*sabots*) that held the rails in place. A few years later sabotage was employed in the United States in the form of slowdowns, particularly in situations that made a strike untenable—such as by migratory workers whose employment was temporary.

During World War II anti-German resistance and partisan movements in Europe practiced effective sabotage against factories, military installations, railroads, bridges, etc., especially in Russia. After the war, sabotage became the basic weapon of the numerous insurgent groups associated with anticolonial, separatist, and Communist-backed movements.

Purely economic sabotage also has continued to be practiced, often unilaterally, by disgruntled employees. In some Communist countries, the willful withdrawal of efficiency and the active or passive resistance to plan fulfillment has been deemed economic sabotage, whether or not it is of counter-revolutionary intent.

Sabratha, also spelled SABRATA, western-most of the three cities of ancient Tripolis, located near the modern town of Ṣabrātah, west of Tripoli, in Libya. Founded by the Carthaginians as a trading post, it was first permanently settled in the 4th century BC. Sabratha had a modest natural harbour, later improved by the Romans, and together with Oea (Tripoli) it served as an outlet for the trans-Saharan caravan route through Ghadames (Ghudāmis). After a period of semi-independence following the fall of Carthage in 146 BC, it passed under Roman rule and thereafter enjoyed considerable prosperity. Rebuilt after a disastrous sack by the Austuriani (*c.* AD 365), it declined rapidly in the 5th century under Vandal misrule. A revival that followed under the Byzantines was on a greatly reduced scale, and soon after the Arab conquest (643) the city ceased to exist.



Ruins of the theatre at Sabratha, Libya

Ray Manley—Shostal/EB Inc.

Archaeological excavation has uncovered more than half the area of the ancient city, including the forum area, many of the harbourside installations, and a large 2nd-century residential quarter adjoining a theatre. Other Roman buildings include baths, temples, and fountains; Christian remains include a catacomb and four churches.

sabre, also spelled SABER, heavy military sword with a long cutting edge and, often, a curved blade, derived from a Hungarian cavalry sword introduced from the Orient in the 18th century; also a light fencing weapon developed in Italy in the 19th century for duelling. The military sabre had been relegated to a ceremonial role by the 20th century, while the fencing sabre had become one of the sport's standard weapons.

The modern fencing sabre is no heavier than a foil—up to 500 grams (about 17.5 ounces) in weight—but it is slightly shorter—105 centimetres (3 feet, 5 inches) overall and 880 millimetres (35 inches) in the blade. The blade is V-shaped, with cutting edges along its entire front and along about one-third of its back from the tip. It is rigid on its cutting edges but flexible on its flat sides. The handguard curves back to the pommel, protecting the knuckles.

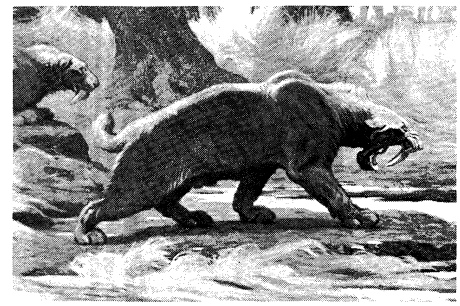
Rules are basically similar to fencing with the foil, except that the opponent's whole body above the waist is the target, and touches with the cutting edges as well as the point are scored. Scoring is done entirely by the judges, without use of electrical apparatus, and five touches decide the match. A retreat of more than 10 metres (about 33 feet) scores as a touch against the defender.

Sabre events, with their frequent leaping and running attacks and cutting and thrusting strokes, are probably the most spectacular in fencing. They are included in Olympic Games and other international fencing competitions. For world sabre champions, *see* Sporting Record: *Fencing. See also* Olympic Games.

sabre-toothed cat, any of the extinct carnivores forming the subfamily Machairodontinae of the cat family, Felidae. Sabre-toothed cats are named for the pair of elongated, bladelike canine teeth they possessed in the upper jaw. They are often called sabre-toothed tigers or sabre-toothed lions, although the lion and tiger are of a different subfamily of felids, the true cats (Felinae).

Sabre-toothed cats existed from the Oligocene through the Pleistocene epochs. They were present in North America and Europe throughout the Miocene and Pliocene epochs; by Pliocene times they had spread to Asia and Africa; and in the Pleistocene they were present in South America.

The most widely known of the sabre-toothed cats is the Pleistocene *Smilodon,* which represented the peak of sabre-tooth evolution. A large, short-limbed cat of North and South America, it was more massive than the modern lion. Its immense upper canine teeth, up to 20 centimetres (8 inches) long, probably were used for stabbing and slashing attacks, possibly on large herbivores such as the mastodon. Such a hunting technique is suggested by several physical adaptations of *Smilodon:* its skull



Sabre-toothed cat (*Smilodon*) from Rancho La Brea, California, detail of a painting by Charles R. Knight

By courtesy of the Field Museum of Natural History, Chicago

was modified to accommodate the attachment of strong neck muscles for bringing the head down; the lower canines were reduced; and the jaw could be opened to about a 90° angle to free the upper canines for action. The molar teeth formed shearing blades with no traces of grinding surfaces. The bones of many members of this genus have been recovered from the tar pits of Rancho La Brea, in Los Angeles, where the sabre-tooths were trapped in the tar, apparently as they preyed on large herbivores that had also become entrapped.

The basic sabre-tooth characters were present, but less fully developed, in a *Smilodon* ancestor, *Hoplophoneus,* a moderately sized felid of the North American Oligocene.

The pattern of extinction of the sabre-toothed cats closely followed that of the mastodons. As these large, elephant-like animals became extinct in the late Pliocene of the Old World, the sabre-tooths died out also. In North and South America, where mastodons persisted throughout the Pleistocene, sabre-tooths continued successfully to the end of the epoch.

The sabre-tooths were highly specialized felids forming an evolutionary line distinct from that of the modern cats at least since the Oligocene. Some early forms are of doubtful standing and have been classified as true sabre-tooths (Machairodontinae), false sabre-tooths (Nimravinae), or true cat (Felinae), depending on the authority. One such form, *Dinictis* of the North American Oligocene, had fairly well-developed, sabre-like teeth but in general lacked the other specialized features of the true sabre-tooths. It has been suggested that *Dinictis*-like animals were part of the evolutionary line leading to the true cat.

sabrebill (bird): *see* scythebill.

Sabzevārī, Hājjī Hādī (b. 1797/98, Sabzevār, Iran—d. 1878, Sabzevār), Iranian teacher and philosopher who advanced the *ḥikmah* (wisdom) school of Islāmic philosophy. His doctrines—composed of diverse elements of gnosis (esoteric spiritual knowledge), philosophy, and revelation—are an exposition and clarification of the philosophical concepts of Mullā Ṣadrā. But he differed to some extent by classifying knowledge as an essence, rather than an outward quality, of the human soul.

After spending his early childhood in Sabzevār, a centre for Shīʿī and Ṣūfī studies, Sabzevārī was educated in Meshed, and in Isfahan, where he was first influenced by the teachings of the *ḥikmat.* On completing his studies, he returned to his native city, where he founded a *madrasah* (school) that attracted students of philosophy from as far away as Arabia and India. During his lifetime more than a thousand students graduated from his school.

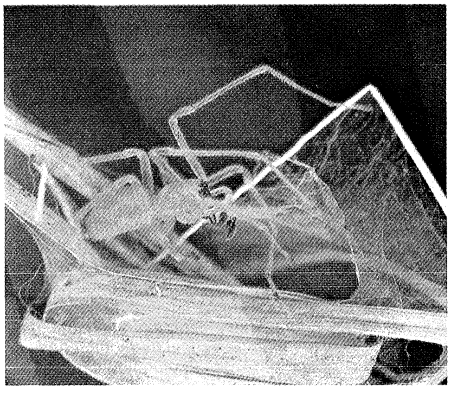
The fame of Sabzevārī was such that Nāṣer od-Dīn Shāh, the fourth Qājār king of Iran,

visited him in 1857/78. At the request of the Shāh, he wrote the *Asrār al-ḥikmah* ("The Secrets of Wisdom"), which, together with his Arabic treatise *Sharḥ manzumah* ("A Treatise on Logic in Verse"), remains a basic text for the study of *ḥikmat* doctrines in Iran. Not limited to philosophy, he also wrote poetry under the name of Asrār and completed a commentary on the *Māsnavī* of Jalāl ad-Dīn ar-Rūmī, the great mystic poet of Islām. Devout and pious, Sabzevāri led the ascetic life of a mystic. Miracles were attributed to him, and he is said to have cured the sick. On his death the Shāh ordered that a mausoleum be constructed for him in Meshed.

Sac (people): *see* Sauk.

sac fungus: *see* Ascomycetes.

sac spider, also called TWO-CLAWED HUNTING SPIDER, any member of the family Clubionidae (order Araneida), a relatively common, widespread group. The spiders range in body length from 3 to 15 millimetres (about 0.12 to 0.6 inch) and build silken tubes under stones, in leaves, or in grass. *Chiracanthium inclusum,* found throughout the United States,



Sac spider (*Clubiona pallens*)
Ann Moreton

is venomous to humans. The greenish-white body is about 8 millimetres (0.3 inch) long.

sac-winged bat: *see* sheath-tailed bat.

Sacajawea, also spelled SACAGAWEA, also called BIRD WOMAN (b. *c.* 1786, probably near present Lemhi, Idaho, U.S.—d. Dec. 12, 1812, Ft. Manuel on the Missouri River?, Dakota Territory), Shoshone Indian woman who, carrying her infant son on her back, travelled thousands of wilderness miles with the Lewis and Clark Expedition to the Pacific Northwest (1804–06).

Captured by an enemy tribe when she was about 12, Sacajawea was sold into slavery with the Missouri River Mandans, who, in turn, sold her to a French-Canadian fur trader, Toussaint Charbonneau. Capt. Meriwether Lewis and Capt. William Clark spent the winter of 1804–05 with the friendly Mandans near present Bismarck, N.D., and there met Charbonneau and Sacajawea. Charbonneau was hired to accompany the expedition as an interpreter, and his wife and their infant son, Jean-Baptiste, were allowed to go along.

In August near present Armsted, Mont., the expedition encountered a band of Shoshone led by Sacajawea's brother Cameahwait. The emotional climate created by their reunion had a salutary effect on negotiations for the horses and guides without which the expedition might well have ended almost on the spot. As the journey continued, the suspicions of other Indian tribes were allayed by the presence of a woman and child.

Sacajawea's fortitude in the face of hazards and deprivations became legendary. Many memorials have been raised in her honour, but historians have been hard put to separate the facts of her life from the body of folklore that made her a popular heroine. Her grave is located in Lander, Wyo.

Sacasa, Juan Bautista (b. Dec. 21, 1874, León, Nicaragua—d. April 17, 1946, Los Angeles), Nicaraguan statesman who served as his country's president in 1932–36.



Sacasa
By courtesy of the Library of Congress, Washington, D.C.

Sacasa studied in the United States from 1889 to 1901, earning an M.D. from Columbia University. In 1924 he was elected vice president of Nicaragua as leader of the Liberal Party in a coalition government. The following year a coup d'état installed Gen. Emiliano Chamorro Vargas as president and forced Sacasa into exile. When Chamorro was replaced by Adolfo Díaz in 1926, Sacasa returned to assert his claim to the presidency. In the wake of Sacasa's announcement, Mexico sided with Sacasa; the United States, involved in a dispute with Mexico and determined to prevent Mexico from gaining the prestige of backing a winning candidate, supported Díaz. In the unrest over the claims to the presidency, the U.S. government sent marines to maintain order in Nicaragua. On their arrival in April 1927, Sacasa reluctantly accepted a compromise offered by the United States, by which he withdrew his assertion. Sacasa was elected president in 1932 but was overshadowed by his subordinates César Augusto Sandino and Gen. Anastasio Somoza Garciá and was ousted in June 1936 by Somoza.

Sacatepéquez, department, southwestern Guatemala. The nation's smallest department, it is only 180 sq mi (465 sq km) in area. It is entirely in the central highlands; the volcanoes Agua ("water") and Fuego ("fire") are the highest peaks. It is part of the chief coffee-producing region of the nation. Other crops include corn (maize), beans, and hay; much land is used for the grazing of beef cattle. The departmental capital, Antigua Guatemala (*q.v.*), served as capital of the nation until its administrative functions were transferred in 1776 to Guatemala City because of Antigua Guatemala's frequent earthquakes. More than 1,500 persons were killed and many structures were damaged by the earthquake of 1976. Sacatepéquez is crossed by the Pan-American Highway and by several connecting roads. Pop. (1982 est.) 137,815.

saccharin, also called ORTHO-SULFOBENZOIC ACID IMIDE, organic compound employed as a sweetening agent, insoluble saccharin, or as the dihydrate of its sodium salt, soluble saccharin. For table use, saccharin is sold as 1/4-, 1/2-, or 1-grain pellets of the sodium salt. The commercial product has about 500 times the sweetening power of table sugar, a 1/4-grain pellet being the equivalent of a level teaspoon of sugar.

Saccharin was discovered by the chemists Ira Remsen and Constantin Fahlberg in 1879, while they were investigating the oxidation of *o*-toluenesulfonamide. Today, the substance is made by essentially the same method.

Insoluble saccharin is a white, crystalline powder, melting at 228.8°–229.7° C (443°–445.5° F); the sodium salt exists as white crystals, very soluble in water.

Saccharin has no food value; it is not metabolized by the body, and it is excreted unchanged. It is widely used by diabetics and others who must avoid sugar intake. It is extensively employed in the preparation of dietetic foods and pharmaceuticals in which the presence of sugar might lead to spoilage.

During the late 20th century, when the safety of many widely used food additives was a subject of debate in many countries, saccharin proved to be one of the most controversial of these substances. Tests to establish its carcinogenic effects were inconclusive, and the medical community insisted that saccharin's potential harm must be weighed against its usefulness to those on medically restricted diets.

Sacchetti, Franco (b. 1330–35, Florence or Ragusa—d. Aug. 15?, 1400, San Miniato, near Florence), Italian poet and storyteller whose work is typical of late 14th-century Florentine literature. He was born of a noble Florentine family. Both as merchant and as public official he travelled widely. In his letters, in some of his verses, and in the *Sposizioni di Vangeli* ("Expositions on the Gospels") he expressed his political and moral views. Although poetry was not his main interest, some of his poems, written to be set to music, are among the best of 14th-century minor poetry. He wrote 300 stories of which only 223 are known: they consist mainly of anecdotes and jokes derived from oral tradition and the author's direct observation of life. Their artistic value is to be found in the colourful and vivid description of people and places, and their best passages depict scenes from everyday life. M. Steegman's *Tales from Sacchetti* appeared in 1908.

Sacchi, Andrea (b. 1599, Nettuno, Papal States—d. June 21, 1661, Rome), Italian painter, the chief Italian representative of the Classical style in the 17th-century painting of Rome. He was trained under Francesco Albani at Bologna. After returning to Rome in 1621 he worked there until his death, except for short visits to northern Italy after 1635 and to Paris in 1640.

His Bolognese training gave him an initial bias toward Classicism and a taste for colour. But the direct influence of Raphael was already added to these qualities in the "Miracle of St. Gregory" (1625–27; Vatican Museum, Rome). This work brought Sacchi to the notice of the Sacchetti family, who employed him, with Pietro da Cortona, in the decoration of their villa at Castel Fusano in 1627–29. Both artists were next employed by Antonio Cardinal Barberini to decorate the Palazzo Barberini in Rome. Sacchi's ceiling fresco, "Allegory of Divine Wisdom" (1629–33), is a grave, static work, markedly Raphaelesque in conception and containing relatively few figures, in contrast with Cortona's full Baroque "Triumph of Divine Providence" in an adjoining room. Sacchi's two altarpieces in Sta. Maria della Concezione, Rome (1631–38), are likewise distinguished from the other pictures in the church by their Classicism. His most important work after the "Divine Wisdom" is the series of eight canvases illustrating the life of St. John the Baptist in the cupola of the Baptistery of St. John, Rome (1639–45). Sacchi painted a few portraits but concentrated mainly on religious works.

Sacco-Vanzetti case, controversial murder trial in Massachusetts, U.S., extending over seven years, 1920–27, and resulting in the execution of the defendants, Nicola Sacco and Bartolomeo Vanzetti.

The trial resulted from the murders in South Braintree, Mass., on April 15, 1920, of F.A. Parmenter, paymaster of a shoe factory, and Alessandro Berardelli, the guard accompanying him, in order to secure the payroll that they were carrying. On May 5 Sacco and Vanzetti, two Italian anarchists who had immigrated to the United States in 1908, one a shoemaker and the other a fish peddler, were arrested for the crime. On May 31, 1921, they were brought to trial before Judge Webster Thayer of the Massachusetts Superior Court, and on July 14 both were found guilty by verdict of the jury. Socialists and radicals protested the men's innocence. Many people felt that there had been less than a fair trial and that the defendants had been convicted for their radical, anarchist beliefs rather than for the crime for which they had been tried. All attempts for retrial on the ground of false identification failed. On Nov. 18, 1925, one Celestino Madeiros, then under a sentence for murder, confessed that he had participated in the crime with the Joe Morelli gang. The state Supreme Court refused to upset the verdict, because at that time the trial judge had the final power to reopen on the ground of additional evidence. The two men were sentenced to death on April 9, 1927.

A storm of protest arose with mass meetings throughout the nation. Governor Alvan T. Fuller appointed an independent advisory committee consisting of President A. Lawrence Lowell of Harvard University, President Samuel W. Stratton of the Massachusetts Institute of Technology, and Robert Grant, a former judge. On Aug. 3, 1927, the governor refused to exercise his power of clemency; his advisory committee agreed with this stand. Demonstrations proceeded in many cities throughout the world, and bombs were set off in New York City and Philadelphia. Sacco and Vanzetti, still maintaining their innocence, were executed Aug. 23, 1927.

Opinion has remained divided on whether Sacco and Vanzetti were guilty as charged or whether they were innocent victims of a prejudiced legal system and a mishandled trial. Some writers have claimed that Sacco was guilty but that Vanzetti was innocent. There is widespread agreement, however, that the two men should have been granted a second trial in view of their trial's significant defects.

BIBLIOGRAPHY. Katherine Anne Porter, *The Never-Ending Wrong* (1977), was written by an eyewitness. Roberta Strauss Feuerlicht, *Justice Crucified* (1977), examines the case in the context of the immigrant experience. Francis Russell, *Sacco & Vanzetti* (1986), concludes that Sacco, at least, was guilty. William Young and David E. Kaiser, *Postmortem: New Evidence in the Case of Sacco and Vanzetti* (1985), reasserts their innocence.

Saccopastore skulls, two hominid fossils found in 1929 and 1935 in a river deposit on the bank of a small tributary of the Tiber River outside Rome. The skulls, which represent an initial phase in the development of West European Neanderthal man, are between 70,000 and 100,000 years old.

The strong development of the brow ridges (responsible for the so-called beetle-browed look) and the low, flat crown, large jaw, and small teeth are all characteristic of Neanderthal man.

Other characteristics, however, mark these skulls as similar to modern man, thus establishing their position as transitional.

Sachalin Island (Russian S.F.S.R.): *see* Sakhalin Island.

Sacheverell, Henry (b. 1674?—d. June 5, 1724, London, Eng.), English preacher, a fanatical High Church Anglican whose impeachment by the Whigs enabled the Tories to win control of the government in 1710. Although he was an undistinguished, somewhat ludicrous figure, his cause was championed by a populace weary of the Whig-directed war against France (War of the Spanish Succession, 1701–14).

Early in the reign of Queen Anne (1702–14), Sacheverell, a fellow of Magdalen College, Oxford, began to preach sermons and issue pamphlets violently attacking Whigs, Dissenters, and moderate Tories. In a sermon delivered before the lord mayor and aldermen of London in November 1709, he assailed the powerful Whig minister Sidney Godolphin and condemned the principles of the Glorious Revolution of 1688. Godolphin had Sacheverell tried for sedition by the House of Lords, but Londoners rioted in sympathy with the defendant. He was convicted in March 1710 and suspended from preaching for three years. Invoking the name of their martyr, the Tories swept to victory in the parliamentary elections of October 1710. Upon the expiration of his sentence, Sacheverell was granted a wealthy parish in London by Queen Anne.

BIBLIOGRAPHY. Geoffrey Holmes, *The Trial of Doctor Sacheverell* (1973), places him in political and ecclesiastical context.

Sachs, Curt (b. June 29, 1881, Berlin, Ger.—d. Feb. 5, 1959, New York, N.Y., U.S.), eminent German musicologist, teacher, and authority on musical instruments.

In his youth Sachs took lessons in piano, theory, and composition. Later, at Berlin University—although he included music history in his studies—he took his doctorate in the history of art (1904). After several years as an art critic and historian, during which time he helped to edit the *Monatshefte für kunstwissenschaftliche Literatur* ("Monthly Journal for Art Historical Literature") and worked at the Arts and Crafts Museum in Berlin, Sachs decided to centre his career entirely on music. His plans were interrupted by military service during World War I, after which he returned to Berlin and in 1919 was appointed curator of the State Collection of Musical Instruments. He soon reorganized this outstanding collection, restoring many of its musical instruments to working order. He also commenced teaching at the Berlin University and by 1928 was made professor there as well as at the National Academy of Music.

In 1933, because he was a Jew, Sachs was dismissed from all his academic positions and was compelled to leave Germany. He went first to Paris, where he joined André Schaeffner at the ethnological museum (now the Musée de l'Homme) and was a visiting professor at the Sorbonne. The next year he began to make the series of recordings known as *L'Anthologie Sonore,* which served as an invaluable guide to the actual sound of early music. In 1937 he resettled in the United States, teaching at New York University (1937–53) and serving as consultant at the New York Public Library.

Sachs's last years were filled with recognition and acclaim. As one of the founders of modern organology (the study of the nature and history of musical instruments), he collaborated with Erich von Hornbostel to create the method of classification for musical instruments that is now a standard guide. Sachs's *Real-Lexikon der Musikinstrumente* (1913, reprinted 1962) is the definitive history of musical instruments. Sachs's other works include *World History of the Dance* (1937), *The Rise of Music in the Ancient World* (1943), and *The Commonwealth of Art: Style in the Fine Arts, Music and the Dance* (1946).

Sachs, Hans (b. Nov. 5, 1494, Nürnberg, Ger.—d. Jan. 19, 1576, Nürnberg), German burgher, meistersinger, and poet who was outstanding for his popularity, output, and aesthetic and religious influence. He is idealized in Richard Wagner's opera *Die Meistersinger von Nürnberg.*

Wagner's opera is partly a tribute to the common people—and Sachs was one of them. The son of a tailor, he was apprenticed to a shoemaker in 1509 after studying at a Latin school. He became a master cobbler in about 1519. Many guild workmen and tradesmen of that day practiced a type of singing based on elaborate rules; to become meistersingers ("master singers"), they had to prove themselves in a contest. Sachs became a master in the Nürnberg Singschule in about 1520, conducted a school of meistersingers at Munich, and headed the Nürnberg group in 1554.

Some of Sachs's 4,000 meisterlieder ("master songs"), which he began writing in 1514, are religious. An early champion of Martin Luther's cause, he wrote a verse allegory, *Die Wittembergisch Nachtigall* (1523; "The Nightingale of Wittenberg") that immediately became famous and advanced the Reformation in Nürnberg. His 2,000 other poetic works include 200 verse dramas, 85 of which are *Fastnachtsspiele,* or homely comedies written to entertain Shrovetide carnival crowds.

Sachs remained a cobbler while pursuing the arts. Grief came to him with the loss of his seven children and, in 1560, of his wife. After marrying again in 1561, when he was 66, he resumed his output of cheerful composition. Virtually forgotten after his death, Sachs was rediscovered two centuries later by J.W. von Goethe. Some of Sachs's plays, such as *Der farent Schüler im Paradeis* (1550; *The Wandering Scholar*), are performed today, and renewed interest in Renaissance music has resulted in a revival of his songs.

Sachs, (Ferdinand Gustav) Julius von (b. Oct. 2, 1832, Breslau, Ger. [now Wrocław, Pol.]—d. May 29, 1897, Würzburg, Ger.), German botanist whose work on nutrition, tropism, and transpiration of water greatly advanced the knowledge of plant physiology during the second half of the 19th century.



Julius von Sachs, *c.* 1880
Archiv fur Kunst und Geschichte, Berlin

Sachs became an assistant to the physiologist Jan Evangelista Purkinje at the University of Prague, where he received the Ph.D. in 1856. In 1859 he was appointed assistant in physiology at the Agricultural Academy of Tharandt in Saxony. Two years later he was made director of the Agricultural Academy at Poppelsdorf near Bonn. In 1867 he accepted the chair of botany at the University of Freiburg-im-Breisgau. The following year he became professor of botany at the University of Würzburg, where he remained for the rest of his life.

Sachs had a strong interest in the movement of water in plants. In his book on plant physiology, *Handbuch der Experimental Physiologie der Pflanzen* (1865), he discussed how root

hairs remove water from the soil and deliver it to other cells of the root. In 1874 he announced the first part of his imbibition theory stating that imbibed (absorbed) water moves in tubes in the walls of the plants without the cooperation of living cells and not within the cell cavities. In 1865 Sachs proved that chlorophyll was not generally diffused in all the tissues of a plant but instead was confined to special bodies within the cell, later named chloroplasts. In 1862 and 1864 he proved that the starch present in the chloroplasts results from the absorption of carbon dioxide, and he established that starch is the first visible product of photosynthesis.

Sachs also studied the formation of growth rings in trees, the importance of tissue tension in promoting organ growth, and the influence of light and gravity in determining the growth rings and symmetry of plants. For this study he invented the clinostat, an apparatus that measures the effects of such external agents as light and gravity on the movement of growing plants.

Many of Sachs's own investigations can be found in *Lehrbuch der Botanik* (1868; "Textbook of Botany"), which is also a summary of the botanical knowledge of the period. His *Geschichte der Botanik vom 16. Jahrhundert bis 1860* (1875; *History of Botany 1530–1860,* 1890) remains an indispensable guide to the history of botany and to the first stages in the emergence of plant physiology as a separate discipline.

Sachs, Nelly (Leonie) (b. Dec. 10, 1891, Berlin—d. May 12, 1970, Stockholm), German poet and dramatist who was transformed by the Nazi experience from a dilettante into a poignant spokesman for the grief and yearnings of her fellow Jews. When, with Shmuel



Nelly Sachs, 1966
UPI—EB Inc.

Yosef Agnon, she was awarded the 1966 Nobel Prize for Literature, she observed that Agnon represented Israel whereas "I represent the tragedy of the Jewish people."

Daughter of a prosperous manufacturer and inventor, she grew up in the fashionable Tiergarten section of Berlin. She dabbled at dancing and puppetry and began writing verse at age 17. Romantic and conventional, her poems of the 1920s appeared in newspapers but were mainly for her own entertainment.

As the advent of Nazism in Germany darkened her life, she sought comfort in ancient Jewish writings. In 1940, after learning that she was destined for a forced-labour camp, she escaped to Sweden with the help of the Swedish novelist Selma Lagerlöf, who had been her pen pal and who interceded with the Swedish royal family in her behalf. She lived with her mother in a one-room apartment, learned Swedish, and translated German poetry into Swedish.

Her lyrics in those years combine lean simplicity with imagery variously tender, searing, or mystical. Her famous "O die Schornsteine" ("O the Chimneys"), in which Israel's body drifts as smoke from the Nazi death camps, was selected as the title poem for a 1967 collection of her work in English translation.

Her best-known play, *Eli: Ein Mysterienspiel vom Leiden Israels* (1951; *Eli: A Mystery Play of the Sufferings of Israel,* included in the *O the Chimneys* collection), was performed on West German radio and the Dortmund stage. Before she won the Nobel Prize on her 75th birthday, she received the 1965 Peace Prize of German Publishers. In accepting the award from the land she had fled, she said (in the spirit of concord and forgiveness that are among the themes in her poems), "In spite of all the horrors of the past, I believe in you."

Sachsen (German territories): *see* Saxony.

Sachsenhausen, also called SACHSENHAUSEN-ORANIENBURG, one of the major German Nazi concentration camps, located near the village of Sachsenhausen, 2 miles (3 km) north of Oranienburg, northwest of Berlin. The camp was established in 1936 for north Germany as a part of the system that would include Buchenwald (for central Germany) and Dachau (for southern Germany). Its first great influx of prisoners began in 1938, after the November *Kristallnacht,* when 10,000 Jews were rounded up from Berlin, Hamburg, Mecklenburg, and Pomerania and shipped briefly to Sachsenhausen. The camp's inmate population rose to between 20,000 and 35,000 by the time of World War II. Of the total of some 200,000 prisoners who went through Sachsenhausen, 100,000 died, principally from disease, execution, and overwork in local armaments factories.

Sachsenspiegel, English SAXON MIRROR, most important of the medieval compilations of Saxon customary law. It was collected in the early 13th century by Eike von Repkow, a knight, and written in the vernacular. It showed little Roman influence, largely because Roman law had not penetrated German law and was still virtually unknown.

The *Sachsenspiegel* was divided into two sections. The first, *Landrecht,* or territorial law, corresponded to what is now called constitutional law; it also included criminal and civil law and procedure. The second part, *Lehnrecht,* was made up of feudal regulations.

The *Sachsenspiegel* was used by many towns as the model for their constitutions and codes. That of Magdeburg, known as the *Magdeburger Recht,* was copied by many towns in Germany and Eastern Europe.

Šacht'orsk (Ukrainian S.S.R.): *see* Shakhtyorsk.

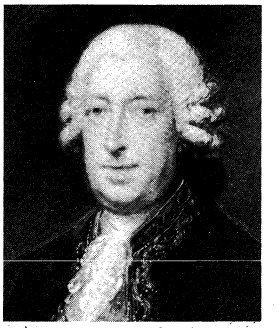
Šachty (Russian S.F.S.R.): *see* Shakhty.

sackbut (from Old French *saqueboute:* "pull-push"), early trombone, invented in the 15th century, probably in Burgundy. It has thicker walls than the modern trombone, imparting a softer tone, and its bell is narrower.

The sackbut answered the need for a lower-pitched trumpet that composers of the time sought. Its telescoping slide mechanism is retained in today's trombone.

Sackville, town, Westmorland county, southeastern New Brunswick, Canada, near the Nova Scotia border, 27 miles (43 km) southeast of Moncton. Three French villages occupied the site in about 1720, but these were destroyed with the capture of nearby Fort Beauséjour (Fort Cumberland) and the expulsion of the Acadians in 1755. Resettled in 1761 by New England immigrants, the community was named after George Germain, 1st Viscount Sackville, commander of the British forces. It developed as a marketing centre for the fertile farmlands reclaimed from the surrounding Tantramar Marshes. There has been light-industrial development, notably the manufacture of kitchen ranges, and the shortwave overseas transmitter of the Canadian Broadcasting Corporation is near the town. Sackville is the site of Mount Allison University (which originated in 1840 as a Wesleyan academy). Inc. 1903. Pop. (1981) 5,654.

Sackville (of Drayton), George Sackville-Germain, 1st Viscount, BARON BOLEBROKE, original name LORD GEORGE SACKVILLE, also called (from 1770) LORD GEORGE GERMAIN, OF SACKVILLE-GERMAIN (b. Jan. 26, 1716, London—d. Aug. 26, 1785, Stoneland Lodge, near Withyham, Sussex, Eng.), English soldier and politician. He was



George Sackville Germain, 1st Viscount Sackville, detail of a painting by Thomas Gainsborough, last quarter of the 18th century; in a private collection
By courtesy of Lord Sackville; photograph, Courtauld Institute of Art

dismissed from the British army for his failure to obey orders in the Battle of Minden (1759) during the Seven Years' War. As colonial secretary he was partly responsible for the British defeat at Saratoga (1777) in the American Revolutionary War.

The third son of the 1st Duke of Dorset, he was educated at Westminster School and at Trinity College, Dublin (B.A., 1733; M.A., 1734). Commissioned in 1737, he fought well in the War of the Austrian Succession, particularly in the Battle of Fontenoy (May 11, 1745), where he led his infantry regiment so deep into the French ranks that he was taken prisoner and his wounds were treated in Louis XV's own tent. Later, as a colonel of infantry, Sackville served in Scotland and Ireland.

Transferred to the cavalry, Sackville was promoted to major general in 1755. The badly managed attack on Saint-Malo (1758) during the Seven Years' War was his first defeat. From October 1758 he commanded a British contingent of the allied army in Germany. At Minden (Aug. 1, 1759), after the British and Hanoverian infantry had routed the cavalry forming the French centre, he disregarded repeated orders by the allied commander, Ferdinand, Duke of Brunswick, to exploit this success, and the French retreated unpursued. Temporarily disgraced by and court-martialed for this episode, he was restored to favour in 1765. In 1770, under the terms of the will of Lady Elizabeth Germain, he inherited the estate of Drayton, Northamptonshire, and took the name of Germain.

As colonial secretary (from 1775) in Lord North's government, Sackville was the minister responsible for the general conduct of the war against the American colonists, and as such he was largely to blame for the poor coordination of British operations from Canada and New York, ending in the surrender of General John Burgoyne's British army at Saratoga, N.Y. (Oct. 17, 1777). Following the surrender of Cornwallis at Yorktown (1781), Germain was the only Cabinet minister to favour continued fighting, but he was dismissed.

Created Baron Bolebroke and Viscount Sackville of Drayton in 1782, he retired from politics when North resigned that year. A biography, *Lord George Germain* (1962), was written by Alan Valentine.

Sackville, Thomas, 1ST EARL OF DORSET, also called (1567–1604) BARON BUCKHURST OF BUCKHURST (b. 1536, Buckhurst, Sussex, Eng.—d. April 19, 1608, London), English statesman, poet, and dramatist, remembered largely for his share in two achievements of significance in the development of Elizabethan poetry and drama: the collection *A Myrrour for Magistrates* (1563) and the tragedy *Gorboduc* (1561).

Sackville settled in London in 1553. In 1558 he became a barrister and entered Parliament. He began an extended visit to Itlay *c.* 1563 and returned upon his father's death in 1566. The next year he was created baron of Buckhurst. He continued to serve the government, becoming a member of the Privy Council in 1585; he conveyed the death sentence to Mary, Queen of Scots, in 1586. He served on several diplomatic missions to The Hague and became chancellor of the University of Oxford (1591) and lord high treasurer (1599; conferred for life in 1603). He was created a knight and a baron in 1567 and an earl of Dorset in 1604.

Sackville's "Induction," the most famous part of the *Myrrour,* describes the poet's visit to the infernal regions. Written with Thomas Norton, *The Tragedie of Gorboduc* is the earliest English drama in blank verse.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Sackville-West, V(ictoria Mary), married name VICTORIA MARY NICOLSON (b. March 9, 1892, Knole, Kent, Eng.—d. June 2, 1962, Sissinghurst Castle, Kent), English novelist and poet who wrote chiefly about the Kentish countryside, where she spent most of her life.

She was the daughter of the 3rd Baron Sackville and a granddaughter of Pepita, a Spanish dancer, whose story she told in *Pepita* (1937). In 1913 she married Harold Nicolson, a diplomat and author. Her poetic gift for evoking the beauty of the English countryside was recognized in her long poem *The Land* (1926). Apart from her many novels, of which the best known are *The Edwardians* (1930) and *All Passion Spent* (1931), she also wrote biographies and several gardening books. She was the chief model for the character Orlando in the novel of that title written by Virginia Woolf. In 1948 she was made a Companion of Honour.

Portrait of a Marriage (1973) by her son Nigel Nicolson is based on his mother's journal detailing her sexless friendship with her husband and her love affair with another woman. *Dearest Andrew: Letters from V. Sackville-West to Andrew Reiber, 1959–1962* (1979) reveals her life to a gardening friend.

Saco, city, York County, southwestern Maine, U.S., at the mouth of the Saco River opposite Biddeford. Founded with Biddeford (*q.v.*) in 1631 as a single plantation, it was the seat of Sir Ferdinando Gorges' government (1636–53) before passing to Massachusetts. It was called Saco until 1718 and Biddeford until it was separately incorporated (1762) as Pepperellboro Township. It developed a lumbering and seaport trade and in 1805 readopted its earlier name of Saco (probably Sawacatucke Indian) meaning "burnt pine." Ironworks (1811) and cotton mills (1826) formed the basis for its early economy. Textiles declined after 1957, and planned diversified manufactures now include automotive parts, shoes, industrial and medical gases, and electronic components. York Institute Museum displays colonial and Indian relics. Inc. city, 1867. Pop. (1980) 12,-921.

sacra rappresentazione (Italian: "holy performance"), in theatre, 15th-century Italian ecclesiastical drama similar to the mystery plays of France and England and the *auto sacramental* of Spain. Originating and flourishing in Florence, these religious dramas represented scenes from the Old and New Testaments, from pious legends, and from the lives of the saints. The plays were didactic, using dialogues drawn from the sacred Scriptures to instruct the audience in lessons of good conduct by dramatizing the punishment of vice and the reward of virtue.

The origin of the *sacra rappresentazione* can be traced to the Middle Ages, when the Italian theatre was inextricably linked to the Roman Catholic Church. The liturgical dramas were performed by priests as part of the worship service, and, unlike later *rappresentazioni*, were in Latin, not vernacular. The *sacra rappresentazione* also drew inspiration from sacred chants of the 13th century and from the Florentine festivals, which were more spectacle than drama. Although *rappresentazioni* were performed throughout Italy, the *sacra rappresentazione* of Florence was the only truly theatrical genre. The others were pantomimed, with only a few spoken words of explanation. *See also* mystery play.

sacrament, religious sign or symbol, especially associated with the Christian Church, in which a sacred or spiritual power is believed to be transmitted through material elements viewed as channels of divine grace.

A brief treatment of the concept of sacrament follows. For full treatment, *see* MACROPAEDIA: Rites and Ceremonies, Sacred.

In ancient societies, unseen divine or sacred powers were generally regarded as responsible for both the maintenance and the disruption of order in everyday life. Among early agriculturalists and herders, the fertility of the soil, beneficence of the weather, and succession of the seasons became the focuses of sacramental practices designed to ensure their continuation, such as the rites of spring and feasts of harvest. Inasmuch as the cycle of the individual life was seen to reflect the natural order, sacramental ceremonies were conducted to promote successful passage from one status to another.

Though the conception of the sacramental principle is ancient and widespread, it acquired in Christianity a unique significance. There it became the fundamental system and institution for the perpetuation of the union of God and man in the person of Jesus Christ through the visible organization and constitution of the church, which was viewed as the mystical body of Christ.

According to the New Testament, Jesus instituted and commanded various practices, among them baptism, a common meal, the washing of feet, anointing, and the casting out of demons. Some of these were continued by Christians; some were dropped; still others were adopted and attributed to the institution of Christ. Consideration of all these rites and ordinances led to the development of the concept "sacrament," but both the definition and the exact number remained fluid well beyond the end of the 1st millennium of church history.

As set forth by Peter Lombard, codified by Thomas Aquinas, and promulgated by the Council of Trent, the sacraments were said to be seven in number (baptism, confirmation, Eucharist, penance, anointing or extreme unction, holy orders or ordination, and matrimony) and to be efficacious signs of the grace of God instituted by Christ for permanent observance by the church. The Reformation questioned both the definition and the number of sacraments in scholastic theology, as well as the use of sacraments in medieval piety, liturgy, and churchmanship.

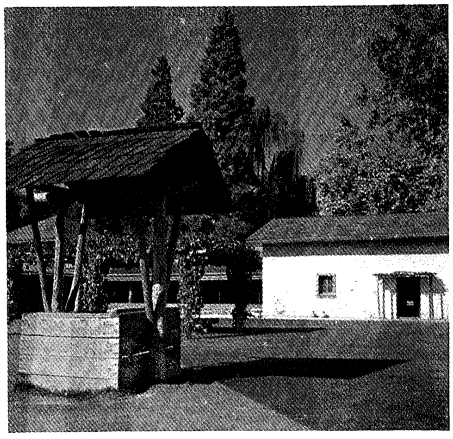
Sacraments as signs. Theologians in the Platonic tradition, for whom the entire external world of things is a "sign" or "symbol" of the spiritual world, have very little difficulty regarding baptism, Eucharist, etc., as signs of the efficacious presence of God; they have more difficulty extricating these signs from the welter of symbols all about them. For quite different reasons, radical Protestants, who object to traditional ideas of the sacraments as a means of grace, also face the issue of finding a qualitative distinction between the sacraments and other signs, as, for example, the cross. Augustine transcended his Neoplatonic propensities to develop a theory of signs and sacraments, defining the latter as "the visible form of an invisible grace"; even very radical Protestants treat baptism and the Eucharist with utmost seriousness; much of the history of Roman Catholic sacramental theology since the Reformation has been marked by the combination of the traditional stress upon the sacraments as means of grace with a further clarification of the difference between this stress and any "magical" interpretation of the effect of the sacraments. The differences among Christians on this issue remain profound and in many ways basic; no less significant, however, is the rapprochement between the Protestants who seek to avoid the rationalism of a theory of "mere symbols" and the Roman Catholics who seek to avoid the superstition of a theory of "efficacity apart from the disposition of the recipient."

Sacraments as institutions of Christ. Part of almost every definition of a sacrament is the requirement that it have been, in some sense, "instituted by Christ." Of the seven sacraments accepted by Eastern Orthodoxy and Roman Catholicism, such institution can be incontrovertibly documented from the New Testament for only two, baptism and the Eucharist. During the debates of the 16th and 17th centuries, the language of the New Testament was strained by both sides in an effort to prove that the historical Jesus really did, or really could not have, instituted marriage, ordination, etc., as sacraments.

Protestant biblical scholarship eventually came to recognize that even the accounts of the institution of the Eucharist by Christ are, in their present form at least, products of the recollection of the early Christian community rather than verbatim transcripts of the sayings of the historical Jesus. Roman Catholic theology likewise surrendered the effort to find explicit historical support for each of the seven sacraments in such sayings and concentrated instead on the implicit significance of the very establishment of the church: Christ instituted the sacraments in a theological sense, even though there is no way of proving that the historical Jesus instituted them in a historical sense.

Sacramento, city, capital of California, U.S., seat (1850) of Sacramento County, in the Central Valley, where the Sacramento and American rivers meet. John Augustus Sutter established the colony of New Helvetia in 1839 on the site, a Mexican land grant, and built Ft. Sutter, a palisaded trading post. His community, initially populated by fellow Swiss immigrants, prospered as an agricultural centre and as a refuge for American pioneers until the '49 gold rush. It was at Sutter's Mill, 35 mi (56 km) northeast on the American River, near Coloma, that Sutter's boss carpenter, James W. Marshall, found the first gold, Jan. 24, 1848. Hordes of prospectors pillaged Sutter's property, and, deeply in debt, he deeded his lands to his son who laid out the present city in 1848, naming it for the Sacramento River.

Profiting from the mining trade, it grew rapidly and was the scene of an armed squat-



Ft. Sutter, Sacramento, Calif.
Hans Hannau—Rapho/Photo Researchers

ter's riot to determine the legality of Sutter's grant. With a population of over 6,000 in 1854, it was chosen the state capital. Later it suffered several devastating floods and fires. A hub of river transportation since Sutter started a steamer service, it was the western terminus of the Pony Express and the terminus of the first California railroad (the Sacramento Valley Railroad to Folsom).

A modern ship canal, completed in 1963 to San Francisco Bay (88 mi southwest), made it a deepwater port with barge connections to inland distribution points. The city is the centre of extensive agricultural production: dairy products, beef cattle, fruit, wheat, rice, and vegetables. Food processing, printing, aerospace industries, and nearby military installations; *i.e.*; the Sacramento Army Depot, McClellan Air Force Base, are economic mainstays.

The Roman golden-domed Corinthian State Capitol (constructed 1869–74), in the heart of the city, is surrounded by 40 ac (16 ha) of parkland. California State University, Sacramento, was established in 1947, Sacramento City College in 1916, the American River College in 1955, and Cosumnes River College in 1970. Ft. Sutter has been restored within a state historic park. The California State Fair and Exposition and a Camellia Festival are held annually. The city of North Sacramento was annexed in 1965. Inc. city, 1850. Pop. (1980) city, 275,741; (1982 est.) metropolitan area (SMSA), 1,165,500.

Sacramento Mountains, segment of the southern Rockies, extending southward for 160 mi (260 km) from Ancho, in south central New Mexico, into Culberson County, western Texas, U.S. They include the Sierra Blanca and the Guadalupe and Jicarilla mountains, with heights averaging from 8,000 to 10,000 ft (2,400 to 3,000 m). The Sierra Blanca Peak (12,003 ft) is the highest in the group, and Guadalupe Peak (8,749 ft) is the highest in Texas. Features include the Carlsbad Caverns and Guadalupe Mountains national parks, the Lincoln National Forest, and the Mescalero Apache Indian Reservation. The mountain region, generally arid, is the site of ranching and mining activities.

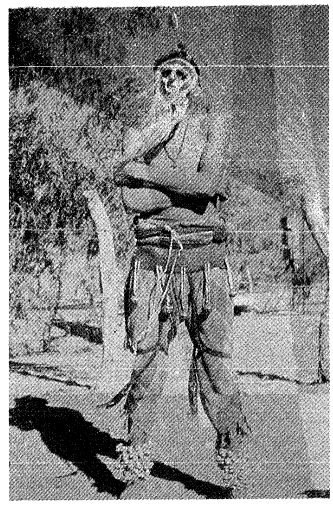
Sacramento River, river rising in the Klamath Mountains, near Mt. Shasta (in Siskiyou County), northern California, U.S., and flowing 382 mi (615 km) south-southwest between the Cascade and Sierra Nevada ranges, through the northern section (Sacramento Valley) of the Central Valley; it forms a common delta with the San Joaquin River before entering the north arm of San Francisco Bay. Its principal tributaries are the Pit, McCloud, Feather, and American rivers. Total drainage area is about 27,100 sq mi (70,189 sq km); average annual runoff 22,000,000 ac-ft (2.7×10^{10} cu m).

Shasta, Keswick, and Oroville dams are key features of the Central Valley and Feather River irrigation and power projects, which serve southern portions of the state. California's largest river, the Sacramento is navigable for 256 mi and accommodates oceangoing vessels as far as the city of Sacramento.

The name Sacramento was originally given to the Feather River by Gabriel Moraga in 1808; it was later applied to the main channel (originally called Rio de San Francisco). Scene of the Gold Rush of 1849, the river flows through one of the world's richest agricultural regions.

sacred baboon: *see* hamadryas.

sacred clown, ritual or ceremonial figure, in various preliterate and ancient cultures throughout the world, who represents a reversal of the normal order, an opening to the chaos that preceded creation, especially during



Yaqui masked dancer representing the sacred clown, Pascola, in Mexico
By courtesy of the Museo Nacional de Antropologia, Mexico City

New Year festivals. The reversal of normality that is the distinguishing mark of the clown relates him to the powerful world that existed before the present one.

In certain traditions clowning is an apotropaic (averting evil) ritual, a way of deflecting demonic attention from serious religious activities. In other contexts it serves as an initiatory ordeal in which the initiate must persevere through the jests and insults hurled at him.

Though some attempts have been made to discover the religious origins of secular clowns, fools, and jesters, it is the elaborate ritual roles of masked clown societies among such groups as the American Indians that have attracted most attention. The most famous of these are the Koyemshi, the dancing clowns of the Pueblo Indians. Their obscene and sacrilegious actions punctuate the most important religious ceremonies and serve as a sign of the presence of the powerful primordial beings and as a means of social control by their satire of the antisocial behaviour of particular individuals.

sacred cow, English-language formulation of the Hindu principle of the sanctity of all life, including animal life and especially that of the cow, which is accorded veneration. *See* cow, sanctity of the.

Sacred Heart, in the Roman Catholic Church, the physical heart of Jesus as an object of devotion. The use of Jesus' heart to symbolize his love for men is not found in the Bible but in the writings of some medieval mystics. The devotion was fostered by Carthusian and Jesuit priests and promoted by St. Francis de Sales and became popular following the disclosure of private revelations to a French Visitandine nun, St. Margaret Mary Alacoque, in the late 17th century. Assisted by Claude de la Colombière, she called for the establishment of a feast in honour of the Sacred Heart and for prayers of reparation for sins, especially for those directed against the Eucharist. In 1856 Pope Pius IX introduced the feast into the general calendar of the Roman Catholic Church. In addition to the feast, now celebrated on the Friday of the third week after Pentecost, devotion includes acts of consecration and honour given to the image of the Sacred Heart. Such images are often depicted with a wounded heart, encircled by a crown of thorns and radiating light.

Sacred Heart, Society of the (R.S.C.J.), a Roman Catholic religious congregation of women devoted to the education of girls, founded in France in 1800 by Madeleine Sophie Barat. Joseph Varin, a leader in the religious renewal in France following the French Revolution, was looking for a young woman to head an educational order modelled on the Jesuits and dedicated to the Sacred Heart of Jesus. He chose Mother Barat, and in Paris on Nov. 21, 1800, she and three companions pronounced their religious vows. In 1801 the first convent was opened at Amiens. The first school established was a free school for the children of the poor, and education of the poor has continued to be a concern of the order; but the Society of the Sacred Heart has been noted for its fine schools, academies, and colleges intended especially for the daughters of the wealthy and highly placed. By the time of the death of the foundress in 1865, the order had spread from France to 11 countries of Europe, Algeria, and North and South America. Its first missionary was Rose Philippine Duchesne, who brought the order to the United States in 1818.

sacred kingship, religio-political concept that views a ruler as an incarnation, manifestation, mediator, or agent of the sacred or holy (the transcendent or supernatural realm). Originating in prehistoric times, the concept of sacred kingship has exerted a recognizable influence up to the modern period.

A brief treatment of sacred kingship follows. For full treatment, *see* MACROPAEDIA: Sacred Offices and Orders: *Sacred Kingship.*

Various types of sacred kingship have prevailed in so-called primitive cultures as well as in the ancient Middle and Far East, Hellenistic and European cultures, and in pre-Columbian Meso-America and South America. While important features may be described as common to these traditions of sacred kingship in form, function, and ceremony, each individual variety can be properly understood only in its particular social, historical, and religious context.

There are three basic types of sacred kings: (1) the receptacle of supernatural or divine power; (2) the divine or semidivine ruler; and (3) the agent or mediator of the sacred. The first is more common among preliterate societies who view their rulers or chiefs as inheritors of the community's magical power. The ruler's power may be both malevolent and beneficial, and it is believed to be essential in all dimensions of communal life, particularly in agriculture where the ruler's influence over the weather and the land's fertility ensure the harvest necessary for survival. The supernatural powers of the chief may also protect the community from enemies and calamities and so maintain welfare and order. However, in this concept of sacred kingship, the ruler's supernatural power is supported by or identical to his own life-force, which declines over time, and the aging ruler must give way to a

younger successor for the good of the community.

In other societies, particularly those of ancient China, the Middle East, and South America, the ruler was identified with a particular god or as a god himself. The kings of ancient Egypt and Persia and the ruler of the Hittites were regarded as incarnations of the sun-god; the Egyptian king was also identified with the sky-god, as was the emperor of China. However, the god-king is usually considered an individual deity independent of all others, while another frequent type of divine king is one regarded as the son of a god, an idea found in the cultures of Japan, Peru (Incas), Mesopotamia, and the larger Greco-Roman world, among others. The queen mother may then be referred to as mother of god, though the future sacred king may be adopted, rather than begotten, by the reigning monarch. Finally, a king or ruler may become deified after his death, but this transformation appears more akin to ancestor worship than to sacred kingship in its fullest sense.

The third form of sacred kingship is that of the ruler as mediator or executive agent of a god. In this form it is the institution of kingship, more than an individual ruler, that bears the mark of the sacred. The deity remains the true lord, while the king seeks to do the will of this god in the community; the king is the link between god and man, the spiritual and the material.

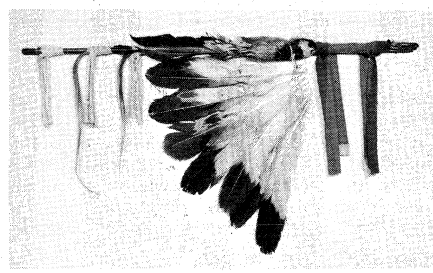
All types of sacred kingship share a number of basic functions that the king must fulfill to varying degrees depending on the society and culture. In preliterate cultures, the king's role as bearer of magical power and his influence over the weather, fertility, and health are stressed, while in many other cultures the king is regarded as the good shepherd who feeds and cares for his flock. Protecting the community from enemies is yet another crucial function of many sacred kings who, as warlords, attempt to use their divine knowledge and power to make strategic decisions and successfully carry out the proper course of action.

Religious duties are frequently connected with sacred kingship, and the king may often be a seer or priest as well. This priestly function is particularly important to communities who regard the king as a mediator or divine executive, and his oracles, dreams, or prophecies are believed to hold the divine commands. In many cultures, however, the priestly office and its ritual may be entrusted to a special priestly class, although the sacred king is rarely excluded from it. Because the king is believed to be in contact with the sacred, his judicial authority is generally recognized by the community. The ruler may mediate disputes and protect the individual's rights, establishing laws to ensure a stable balance of power in the community. The king's ability to maintain social order has sometimes been extended to the cosmic order, which is thought to be influenced by the sacred ruler's earthly actions; conversely, the king can be held responsible for disrupting the cosmos and so causing natural calamities and misfortune. Another ritual function of the sacred king is as the centre of a cult. This "ruler cult" may help a king to unify his people and so consolidate his power; such cults probably arose from political motivations. Ruler cults were known in ancient Egypt and were especially widespread throughout the Greco-Roman world.

Among the more important ceremonies of sacred kingship are those involving succession, legitimation, and coronation. A king may be selected on the basis of a number of criteria including birth, adoption, omens, and divination; the new king may take power before or after the death of his predecessor. A new king often legitimates his right to rule by pointing to his selection as king, by possessing such symbols of kingship as the crown and sceptre, and by ascending to the throne. Frequently, the new ruler chooses a royal or throne name and declares a new era. Sacred kings also participate in the religious rites of the community, particularly in the great festivals and cultic dramas, sometimes to atone for the sins of the community but more often to ensure fertility, harmony, and order in society and the cosmos.

Although the viability of sacred kingship diminishes in the contemporary, more secular world, its relics remain visible in existing monarchies and various church and state ceremonies.

sacred pipe, also called PEACE PIPE, or CALUMET, one of the central ceremonial objects of American Indian culture. Though smoked for relaxation, it was primarily an object of profound veneration and smoked on all ceremonial occasions. Because of both the narcotic effect of the tobacco and the general symbolism of the indrawn and ascending smoke, the pipe was revered and employed as a major means of communication between the spiritual world and man.



Calumet, a ceremonial peace pipe of the American Indian; in the Museum of the American Indian, Heye Foundation, New York

By courtesy of the Museum of the American Indian, Heye Foundation, New York

The pipe itself was considered a microcosm. Its parts, colours, and motifs used in its decoration and in the attached pendants of feathers or horsehair were believed to correspond to the essential parts of the universe. The pipe was smoked in personal prayer, as well as at collective rituals. Its smoke served as a means of conveying the thoughts of the smoker. Its most common use was in invocations to the six directions. Among some tribes (*e.g.,* the Pawnee, Omaha, Crow) complex pipe dances were developed that presented smoke offerings to the Great Spirit on behalf of the community.

sacred scripture: *see* scripture.

sacrifice, the act of offering objects to a god (or other supernatural being), thereby making them the property of the god and thus holy.

A brief treatment of sacrifice follows. For full treatment, *see* MACROPAEDIA: Rites and Ceremonies, Sacred.

In a sense, what is always offered in sacrifice is, in one form or another, life itself. Sacrifice is a celebration of life, a recognition of its divine and imperishable nature. In the sacrifice the consecrated life of an oblation is liberated as a sacred potency that establishes a bond between the sacrificer and the sacred. Through sacrifice, life is returned to its divine source, regenerating the power (*i.e.,* life) of that source; life is fed by life. Hence the word of the Roman sacrificer to his god: "Be thou increased by this offering." It is, however, an increase of sacred power that is ultimately beneficial to the sacrificer. In a sense, sacrifice is the impetus and guarantee of the reciprocal flow of the divine life force between its source and its manifestations.

Often, the act of sacrifice involves the destruction of the oblation, but this destruction—whether by burning, slaughter, or whatever means—is not in itself the sacrifice, the "making holy." The killing of an animal is the means by which its consecrated life is "liberated" and thus made available to the deity, and the destruction of a food offering in an altar's fire is the means by which the deity receives (by olfaction, rather than ingestion) the offering. Sacrifice as such, however, is the total act of offering and not merely the mode in which it is performed.

Sacrificial rites are known throughout the history of religions, and, although they have assumed a multitude of forms and intentions, the fundamental meaning is that of effecting a necessary and efficacious relationship with sacred power and of establishing man and his world in the sacred order.

As a manifestation of man's experience of sacred reality, sacrifice is rooted in the religious consciousness. Hence, any consideration of its possible origins, like that of the origins of religion itself, is more a matter of conjecture and speculation than of verifiable historical or phenomenological investigation. Attempts have been made (notably by E.B. Tylor, W. Robertson Smith, and J.G. Frazer) to discover the genesis of sacrifice, but these attempts, though helpful for a greater understanding of sacrifice, have not been conclusive.

Sacrifices may be broadly classified according to the material of the oblation, the mode in which the oblation is offered, the frequency of performance, and the specific intention of the rite. These categories, of course, often overlap.

sacrilege, originally, the theft of something sacred; as early as the 1st century BC, however, the Latin term for sacrilege came to mean any injury, violation, or profanation of sacred things. Legal punishment for such acts was already sanctioned, in the Levitical code of ancient Israel. The Israelites had extensive rules to safeguard what was holy or consecrated, violation of which (especially of temple laws) often led to mob violence.

In Greece sacrilege was closely connected with treason: a temple was regarded as the home of a protector of the state, and thievery of temple property was consequently a crime against the state. Roman cults were protected by taboos, and there was no precise term in Roman law equivalent to sacrilege. Early Christians most frequently used sacrilege in the restricted sense of theft of sacred things; but by the mid-4th century the broader meaning had been adopted. In the Theodosian Code (published AD 438) of the Eastern Roman Empire, the term sacrilege applied to apostasy (from Christianity), heresy, schism, Judaism, paganism, actions against the immunity of churches and clergy or the privileges of church courts, the desecration of sacraments, and the violation of the Sabbath. The Frankish synods of the Middle Ages emphasized the crime of seizing church property. The worst sacrilege of all was to defile the Host of the Eucharist, an act generally punishable by torture and death.

During the Protestant Reformation, sacrilege was a cause of great enmity between Roman Catholics and Protestants. Contemporary Protestants generally deny the inherent sacredness of objects and give little attention to the notion of sacrilege. In Roman Catholicism it is dealt with in the Code of Canon Law and extends to persons as well as to objects.

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sacristan, a sexton (*q.v.*) or, more commonly, the officer of the church in charge of the sacristy and its contents, such as the sacred vessels and vestments. The person may be either someone in holy orders, as is common in a cathedral, or a lay person.

sacristy, also called VESTRY, in architecture, room in a Christian church in which vestments

and sacred objects used in the services are stored and in which the clergy and sometimes the altar boys and the choir members put on their robes. In the early Christian Church, two rooms beside the apse, the diaconicon and the prothesis, were used for these purposes.

The specialized sacristy itself did not become part of church architecture until the 16th century, when it was often placed on the north side of the chancel, or choir, of a cruciform church (one in the shape of a cross). Later the position became less specific, the only requirement being that the room be accessible from both the sanctuary and the nave as well as from outside the church. In modern Protestant churches, in which it is generally called the vestry, its size and position vary greatly. Often it is situated between the residence of the clergy and the church itself.

sacroiliac, weight-bearing synovial joint that articulates, or connects, the hip bone with the the sacrum at the base of the spinal column. Strong ligaments around the joint help to stabilize it in supporting the weight of the upper body; the joint's motion is also limited by the irregular surfaces of the sacrum (the fused vertebrae of the lower spine), which closely articulate with the ilium (the uppermost of the three bones composing each half of the pelvis). The sacroiliac's movement is consequently very slight or none at all. The joint is in effect narrow vertical slits on the left and right side of the sacrum where it connects with the ilium bones. The space between the sacrum and the hip bone is occupied by a small cavity filled with synovial fluid (which cushions the joint against pressure) and by a fibrous mass of strong cartilage.

The most common diseases affecting the sacroiliac are degenerative processes such as arthritis or ankylosing spondylitis. Most adults, especially men, have some sacroiliac deterioration; with advanced age, the joint may be greatly reduced or nonexistent. Hormones produced during pregnancy soften and loosen the pelvic ligaments in women to allow stretching during childbirth and may delay the degeneration somewhat.

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sacrum, wedge-shaped triangular bone at the base of the vertebral column, above the caudal (tail) vertebrae, or coccyx, that articulates (connects) with the pelvic girdle. In humans it is usually composed of five vertebrae, which fuse in early adulthood. The top of the first (uppermost) sacral vertebra articulates with the last (lowest) lumbar vertebra. The transverse processes of the first three sacral vertebrae are fused to form wide lateral wings, or alae, and articulate with the centre-back portions of the blades of the ilia to complete the pelvic girdle. The sacrum is held in place in this joint, which is called the sacroiliac, by a complex mesh of ligaments. Between the fused transverse processes of the lower sacral vertebrae, on each side, are a series of four openings (sacral foramina); the sacral nerves and blood vessels pass through these openings. A sacral canal running down through the centre of the sacrum represents the end of the vertebral canal; the functional spinal cord ends at about the level of the first sacral vertebra, but its continuation, the filum terminale, can be traced through the sacrum to the first coccygeal vertebra. *See also* vertebral column.

For a depiction of the sacrum in human anatomy, shown in relation to other parts of the body, *see* the colour Trans-Vision in the PROPAEDIA: Part Four, Section 421.

Sa'd Zaghlūl Pasha ibn Ibrāhīm (Egyptian statesman): *see* Zaghlūl, Sa'd.

Ṣa'dah, also spelled SAADA, town, northern Yemen (Ṣan'ā'), in the mountainous Yemen Highlands. It was the original capital of the Zaydī dynasty of imams (religious-political leaders) of Yemen (AD 860–1962). The effective founder of Ṣa'dah as a base of Zaydī power was Imam Yaḥyā al-Hādī ilā al-Ḥāqq I (ruled 893–911). Under his successors the dynasty briefly extended its power to embrace most of eastern Arabia, from the Hejaz (al-Ḥijāz) to southern Yemen.

After the 17th-century move of the Zaydī capital to Ṣan'ā' (110 miles [175 km] south-southeast), Ṣa'dah declined in national importance, though it has long been an administrative centre of the northern part of the country. Traditional local industries have included the manufacture of leather goods and of stoneware vessels for food preservation. Pop. (1986) 11,709.

Sādāt, (Muḥammad) Anwar el-, el-Sādāt also spelled AS-SĀDĀT (b. Dec. 25, 1918, Mit Abū al-Kum, al-Minūfīyah governorate, Egypt—d. Oct. 6, 1981, Cairo), Egyptian army officer and politician who was president of Egypt from 1970 until his death.



Sādāt, 1974

© Rene Burri—Magnum

Sādāt graduated from the Cairo Military Academy in 1938. During World War II he plotted to expel the British from Egypt with the help of the Germans. The British arrested and imprisoned him in 1942, but he later escaped. In 1950 he joined Gamal Abdel Nasser's Free Officers organization; he participated in their armed coup against the Egyptian monarchy in 1952 and supported Nasser's election to the presidency in 1956. Sādāt held various high offices that led to his serving in the vice presidency (1964–66, 1969–70). He became acting president upon Nasser's death on Sept. 28, 1970, and was elected president in a plebiscite on October 15. Sādāt's domestic policies included decentralization and diversification of the economy and relaxation of Egypt's political structure.

It was in foreign affairs that Sādāt made his most dramatic efforts. Feeling that the Soviet Union gave him inadequate support in Egypt's continuing confrontation with Israel, he expelled thousands of Soviet technicians and advisers from the country in 1972. The following year he launched, with Syria, a joint invasion of Israel that began the Arab–Israeli war of October 1973. The Egyptian army achieved a tactical surprise in its attack on the Israeli-held Sinai Peninsula, and though Israel successfully counterattacked, Sādāt came out of the war with greatly enhanced prestige as the first Arab leader to actually retake some territory from Israel.

After the war, Sādāt began to work toward peace in the Middle East. He made a historic visit to Israel (Nov. 19–20, 1977), during which he traveled to Jerusalem to place his plan for a peace settlement before the Knesset (Israeli Parliament). This initiated a series of diplomatic efforts that Sādāt continued despite strong opposition from most of the Arab world and the Soviet Union. Together with Menachem Begin, prime minister of Israel, Sādāt was awarded the Nobel Prize for Peace in 1978; and their continued political negotiations resulted in the signing on March 26, 1979, of a treaty of peace between Egypt and Israel, the first between the latter and any Arab nation.

While Sādāt's popularity rose in the West, it fell dramatically in Egypt because of internal opposition to the treaty, a worsening economic crisis, and Sādāt's suppression of the resulting public dissent. He was assassinated by Muslim extremists while reviewing a military parade commemorating the Arab–Israeli war of October 1973.

Sādāt's autobiography, *In Search of Identity,* was published in 1978.

Sādāt, Madīnat as-, industrial city, in al-Buḥayrah *muḥāfaẓah* (governorate), between Wadi an-Naṭrūn and the western edge of the Nile Delta, Lower Egypt. Construction on Madīnat as-Sādāt (named for President Anwar el-Sādāt) began in the early 1980s, as part of the Egyptian government's program to shift population and industry away from Cairo and the agricultural land of the Nile Valley. The city is 58 miles (94 km) northwest of Cairo, in the desert, and covers an area of 19 square miles (48 square km). It is located near the main Cairo-to-Alexandria highway and also near a local road leading into the Nile Valley.

saddhā (Pāli: "faith"), Sanskrit ŚRADDHĀ, in Buddhism, the initial acceptance of the Buddha's teachings, prior to the acquisition of right understanding and right thought. Buddhism does not rely on supernatural authority or the word of the Buddha but claims rather that its teachings can all be experientially verified. The act of entering onto the Eightfold Path (the Buddhist system of spiritual progress) involves, however, a provisional acceptance, through faith, of the Buddha and his teachings which is later confirmed by direct experience and by the growth of right understanding. Some Buddhist commentators have analyzed three kinds of faith: affective (devotional), conative (involving effort), and cognitive (rational).

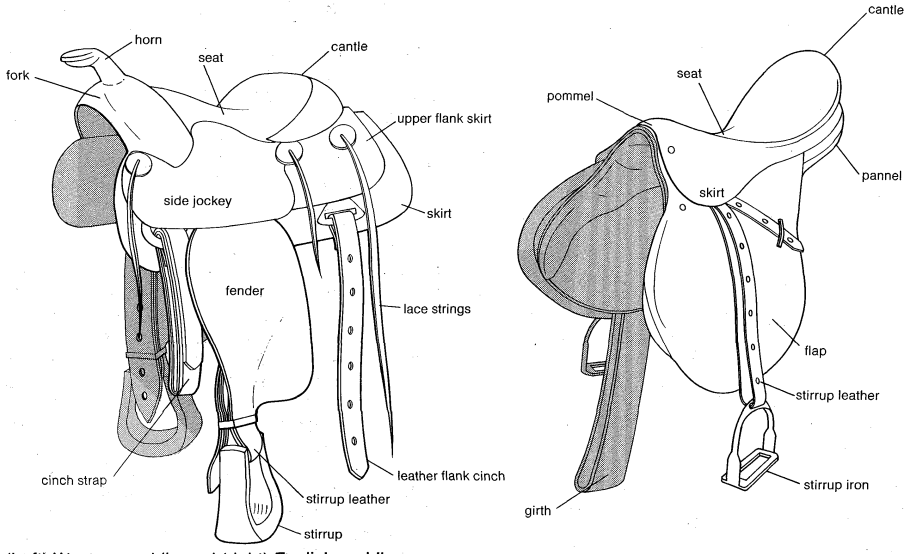
In the devotional sects of Mahāyāna Buddhism, faith is elevated to a dominant position, equal to wisdom, as being for most people the appropriate way of reaching salvation in this present unenlightened age. Among the Pure Land sects, for example, sincere invocation of the name of the Buddha Amitābha is sufficient to ensure rebirth of the faithful in his Western Paradise (the Pure Land).

sāddhu (holy man): *see* sādhu and swāmī.

saddle, seat for a rider on the back of an animal, most commonly a horse or pony. Horses were long ridden bareback or with simple cloths or blankets, but the development of the leather saddle in the period from the 3rd century BC to the 1st century AD greatly improved the horse's potential, especially for war, by making it easier for a rider to keep his seat on the moving horse. The saddle probably originated in the societies of the Asian steppes (which were also the site of origin of the stirrup and horse collar) and received a high degree of development in medieval Europe, especially in France, as an indispensable element in the knightly shock combat of the feudal age.

Camel saddles, also an ancient device, were contrived to accommodate the animal's hump or humps. Elephant saddles are proportionately large and resemble canopied pavilions. They are usually called howdahs (Hindi *hauda*).

Modern saddles for horses are broadly of two types. The Western, sometimes called the Moorish, saddle has a high horn on the pom-

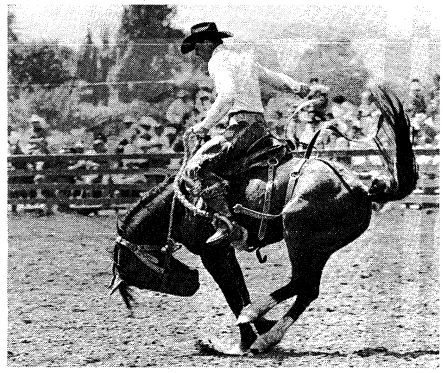


(Left) Western saddle and (right) English saddle

From D.W. Scheid, *How to Buy a Healthy Horse—and Keep Him That Way*; reproduced by permission of The Highsmith Co., Inc., Fort Atkinson, Wis.

mel, in front of the rider, which is useful for securing a lariat, and a large cantle, in back of the rider, to provide a firm seat for cattle-roping operations. The English, or Hungarian, saddle is lighter, flatter, and padded and was designed for sport and recreational uses.

saddle bronc-riding, rodeo event in which a cowboy tries to ride a bucking horse (bronco) for a specified time (usually 8 or 10 seconds). The horse is equipped with saddle, stirrups, and a rein that may be held with one hand



Saddle bronc-riding

E.W. Marugg Photography

only. The cowboy is disqualified if he falls, loses his stirrup or rein, winds the rein around his hand, or touches the horse or rein with his free hand. The cowboy is scored by judges for his skill and technique, and the horse is scored for difficulty. The two scores are combined, and the rider with the highest total is the winner.

saddle cheek chair: *see* wing chair.

saddle fungus: *see* cup fungus.

saddle oyster: *see* jingle shell.

saddleback: *see* harp seal.

saddleback, also called TIEKE (*Creadion,* sometimes *Philesturnus, carunculatus*), rare songbird of the family Callaeidae (*q.v.*; order Passeriformes), which survives on a few small islands off New Zealand. Its 25-centimetre (10-inch) body is black except for the reddish-brown back ("saddle"), and it has yellow or orange wattles at the corners of the mouth.

Sadducee, Hebrew TZEDOQ, plural TZEDOQIM, member of a Jewish priestly sect that flourished for about two centuries before the destruction of the Second Temple of Jerusalem in AD 70. Though not much is known with certainty of their origin and early history, their name and close association with the aristocracy may indicate a link with Zadok, high priest in the days of Solomon.

Sadducees and Pharisees were in constant conflict, not only over numerous details of ritual and the Law, but most importantly on the content and extent of God's revelation to the Jewish people. The Sadducees refused to go beyond the written Torah (first five books of the Bible) and thus, unlike the Pharisees, denied the immortality of the soul, bodily resurrection after death, and the existence of angelic spirits. For them, the Oral Law meant next to nothing. On the other side, the Pharisees equally revered the Torah but further claimed that oral tradition was part and parcel of Mosaic Law.

Though conservative in religious matters, their wealth, their haughty bearing, and their willingness to compromise with the Roman rulers aroused the hatred of the common people. As defenders of the status quo, the Sadducees viewed the rise of Christianity with considerable alarm and apparently played some role in the trial and death of Jesus. Their lives were so intimately bound up with Temple worship that after Roman legions destroyed Jerusalem (AD 70) mention of the Sadducees quickly disappeared from history.

Sade, Marquis de, byname of DONATIEN-ALPHONSE-FRANÇOIS, COMTE (count) DE SADE (b. June 2, 1740, Paris—d. Dec. 2, 1814, Charenton, near Paris), author of erotic writings that gave rise to the term sadism. De Sade's most famous novel, *Les Infortunes de la vertu* ("The Adversities of Virtue"), dates from 1787, followed by a collection of stories, *Les Crimes de l'amour* (*Crimes of Passion*), in 1788. Later works include *Justine* (1791) and *Juliette* (1798).

Heritage and youth. Related to the royal House of Condé, the Sade family numbered among its ancestors Laure de Noves, whom the 14th-century Italian poet Petrarch immortalized in verse. When the Marquis was born at the Condé mansion, his father was on a diplomatic mission at the court of the Elector of Cologne; his mother, Marie Elénore Maillé de Carman, was lady-in-waiting to the Princess de Condé. He inherited estates in France from the seigneury of Saumane, La Coste, and from the coseigneury of Mazan, as well as domains in the provinces of Bugey, Valromey, and Gex.

After early schooling with his uncle, Abbé de Sade of Ebreuil, he continued his studies at the Lycée Louis-le-Grand in Paris. His aristocratic background entitled him to various ranks in the king's regiments, and in 1754 he began a military career, which he abandoned in 1763 at the end of the Seven Years' War. In that year he married the daughter of a high-ranking bourgeois family *de robe* (of the magistracy), the Montreuils. His wife's father was president of the Parisian Parlement, a judicial and legislative body under the monarch. By her he had two sons, Louis-Marie and Donatien-Claude-Armand, and one daughter, Madeleine-Laure.

In the very first months of his marriage he began an affair with an actress, La Beauvoisin, who had had numerous previous protectors. He invited prostitutes to his "little house" at Arcueil and subjected them to various sexual abuses. For this he was imprisoned, on orders of the King, in the fortress of Vincennes. Freed several weeks later, he resumed his life of debauchery and went deeply into debt. In 1768 the first public scandal erupted: the Rose Keller affair.

Rose Keller was a young prostitute he had met on Easter Sunday in Paris. He took her to his house in Arcueil, where he locked her up and abused her sexually. She escaped and related the unnatural acts and brutality to persons in the neighbourhood, as well as showing them her wounds. Sade was sentenced to the fortress of Pierre-Encise, near Lyon.

After his release he retired to his château of La Coste. In June 1772 he went to Marseille to get some much-needed money. There he engaged his male servant Latour to find him some prostitutes, upon whom the Marquis committed his usual sexual excesses. (Meanwhile, at his bidding, Latour engaged in sodomy with him.) The young women helped themselves liberally to the Marquis' pillbox filled with candies that contained the aphrodisiac Spanish fly. When soon thereafter they suffered upset stomachs, they feared they had been poisoned. Sade and Latour fled to the estates of the King of Sardinia, who had them arrested. The Parlement at Aix sentenced them to death by default and, on Sept. 12, 1772, executed them in effigy. After escaping from the fortress of Miolans, Sade took refuge in his château at La Coste, rejoining his wife. She became his accomplice and shared his pleasures, until the parents of the neighbourhood boys and girls he had abducted complained to the crown prosecutor. Sade fled to Italy accompanied by his sister-in-law, the Canoness of Launay, who had become his mistress. He returned to La Coste on Nov. 4, 1776. One incident followed another in an atmosphere of continual scandal, and, on his return to Paris, the Marquis was arrested and sent to the dungeon of Vincennes on Feb. 13, 1777.

Conditions in this prison were harsh. During his detention Sade quarrelled with his jailer, with the prison director, and with a fellow prisoner, Victor Riqueti, the marquise Mirabeau, whom he had insulted. He tried to incite the other prisoners to revolt. Visits from his wife, who was eventually allowed to see him, were banned after an episode in which he fell into a fit of jealous rage precipitated by his suspicion that she was about to leave him and was plotting against him. The Marquise retired to a convent.

Writings. Sade overcame his boredom and anger in prison by writing sexually graphic novels and plays. In July 1782 he finished his *Dialogue entre un prêtre et un moribond* (*Dialogue Between a Priest and a Dying Man*), in which he declared himself an atheist. His letters to his lawyer as well as to his wife combine incisive wit with an implacable spirit of revolt. On Feb. 27, 1784, he was transferred to the Bastille in Paris. On a roll of paper some 12 metres (39 feet) long, he wrote *Les*

120 Journées de Sodome (*One Hundred and Twenty Days of Sodom*), in which he graphically describes numerous varieties of sexual perversion. In 1787 he wrote his most famous work, *Les Infortunes de la vertu,* and, in 1788, the novellas, tales, and short stories later published in the volume entitled *Les Crimes de l'amour.*

A few days before the French Revolutionaries stormed the Bastille on July 14, 1789, Sade had shouted through a window, "They are massacring the prisoners; you must come and free them." He was transferred to the insane asylum at Charenton, where he remained until April 2, 1790.

On his release, Sade offered several plays to the Comédie-Française as well as to other theatres. Though five of them were accepted, not all of them were performed. Separated from his wife, he lived now with a young actress, the widow Quesnet, and wrote his novels *Justine, ou les malheurs de la vertu* (*Justine; or, The Misfortunes of Virtue*) and *Juliette.* In 1792 he became secretary of the Revolutionary Section of Les Piques in Paris, was one of the delegates appointed to visit hospitals in Paris, and wrote several patriotic addresses. During the Reign of Terror he saved the life of his father-in-law, Montreuil, and that of the latter's wife, even though they had been responsible for his various imprisonments. He gave speeches on behalf of the Revolution but was nevertheless accused of *modérantisme* ("moderatism") and mistakenly inscribed on the list of émigrés. He escaped the guillotine by chance the day before the Revolutionary leader Robespierre was overthrown. At the time he was living with the widow Quesnet in conditions of abject poverty.

On March 6, 1801, he was arrested at his publisher's, where copies of *Justine* and *Juliette* were found with notes in his hand and several handwritten manuscripts. Again he was sent to Charenton, where he caused new scandals. His repeated protests had no effect on Napoleon, who saw to it personally that Sade was deprived of all freedom of movement. Nevertheless, he succeeded in having his plays put on at Charenton, with the inmates themselves as the actors. He began work on an ambitious 10-volume novel, at least two volumes of which were written: *Les Journées de Florbelle ou la nature dévoilée* ("The Days of Florbelle or Nature Unveiled"). After his death his elder son burned these writings, together with other manuscripts.

His remains were scattered. There is no portrait of him. In his will, drawn up in 1806, he asked that "the traces of my grave disappear from the face of the earth, as I flatter myself that my memory will be effaced from the mind of men."

Assessment. In the course of a life that scandalized his contemporaries, Sade lived out many examples of the sexual compulsion on which his works centred. His writings are still officially banned by the French courts. As an author, Sade is to some an incarnation of absolute evil who advocates the unleashing of instincts even to the point of crime. Others have looked upon him as a champion of man's total liberation through the satisfaction of his desires in all forms. Sade's works were widely read (mostly "underground") in the 19th century, especially by writers and artists. At the outset of the 20th century the French poet Guillaume Apollinaire helped to establish Sade's status in the domain of culture. Today Sade's writings can be more comfortably categorized; they belong to the history of ideas and mark an important moment in the history of literature—with Sade figuring as the first of the modern *écrivains maudits* ("damned writers"). (M.Na.)

MAJOR WORKS. *Justine, ou les malheurs de la vertu* (1791; *Justine; or, The Misfortunes of Virtue,* new trans. by Helen Weaver, 1966); *Les Infortunes de la vertu,* another version of *Justine* (1930 and 1946); *La Nouvelle Justine . . . suivie de l'histoire de Juliette sa soeur* (1797; *The Complete Justine, Philosophy in the Bedroom, and Other Writings,* comp. and trans. by Richard Seaver and Austryn Wainhouse, 1966); *Juliette, ou la suite de Justine* (published in the last 6 vol. of the 1797 *Nouvelle Justine* edition; Eng. trans. by Austryn Wainhouse, 1 vol., 1968); *Aline et Valcour, ou le roman philosophique. Écrit à la Bastille, un an avant la Révolution de France* (1793); *La Philosophie dans le boudoir* (1795; see Seaver-Wainhouse trans. above); *Les Crimes de l'amour, nouvelles héroïques et tragiques, précédées d'une idée sur les romans* (Year VIII, 1800; *Crimes of Passion,* ed. and trans. by Wade Baskin, 1965); *Historiettes, contes et fabliaux* (1926–27); *Les 120 Journées de Sodome, ou l'école du libertinage,* 3 vol. (1931–35; *The 120 Days of Sodom, and Other Writings,* comp. and trans. by Austryn Wainhouse and Richard Seaver, 1966); *Dialogue entre un prêtre et un moribond* (1926; *Dialogue Between a Priest and a Dying Man,* 1927); *Oxtiern, ou les malheurs du libertinage* (Year VIII, 1800); *Correspondance inédite du marquis de Sade,* ed. by Paul Bourdin (1929); *Lettres choisies,* ed. by Gilbert Lély (1963; *Selected Letters,* trans. by W.J. Strachan, ed. by Margaret Crosland, 1966).

BIBLIOGRAPHY. The *Oeuvres complètes* of the Marquis de Sade have been in the course of publication since 1962. Numerous recent editions of the major works of the Marquis exist, certain of which are tolerated by censorship, others whose publication always falls within the provisions of law. One man, above all, had linked his name to these publications—Maurice Heine, who died in 1940. He published the first version of *Justine,* under the title *Les Infortunes de la vertu* (1930); collected the stories which make up the volume *Historiettes, contes et fabliaux* (1926–27); published the manuscript of *Les 120 Journées de Sodome, ou l'école du libertinage,* 3 vol. (1931–35); revealed the existence of the *Dialogue entre un prêtre et un moribond* (1926); put together an anthology under the title *Oeuvres choisies et pages magistrales du Marquis de Sade* (1933); and undertook a biography that remained unfinished and was published in 1950 under the title *Le Marquis de Sade.* Other biographical studies are Gilbert Lely, *La Vie du Marquis de Sade,* 2 vol. (1952–57; Eng. trans. 1961); and Ronald Hayman, *De Sade: A Critical Biography* (1978).

The works of Sade have provoked studies and commentaries by several contemporary French writers. The most remarkable of these studies come as prefaces to the publication of the works: that of Georges Bataille for *Justine, ou les malheurs de la vertu* (1930); that of Jean Paulhan for *Les Infortunes de la vertu* (1946); and that of Maurice Nadeau for the most complete anthology to date: Marquis de Sade, *Oeuvres* (1948).

To make the best use of the Britannica, consult the INDEX *first*

Sadeddin, Hoca (b. 1536—d. 1599), Turkish historian, the author of the renowned *Tac üttevarih* ("Crown of Histories"), which covers the period from the origins of the Ottoman Empire to the end of the reign of Selim I (1520).

He was tutor to Prince Murad, governor of Manisa, and followed him to Constantinople when he became sultan as Murad III. Sadeddin was influential in the palace and later accompanied Murad's son Sultan Mehmed III on his campaign in Hungary, contributing to the victory at Erlau (1596). He was made *shaykh al-islām* in 1598.

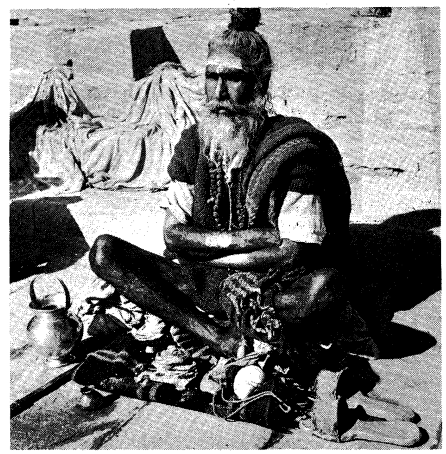
Sadeddin's *Tac üt-tevarih* is based on earlier works. Its reputation can be attributed partly to its rhetorical and ornate style, popular in the 16th century, and to the fact that the author's family were influential in the palace for nearly a century.

Ṣādeq-e Hedayat: *see* Hedāyat, Sadeq.

sādhana (Sanskrit: "realization"), in Hindu and Buddhist Tantrism, spiritual exercise by which the practitioner evokes a divinity, identifying and absorbing it into himself—the primary form of meditation in the Tantric Buddhism of Tibet. *Sādhana* involves the body in *mudrās* (sacred gestures), the voice in mantras (sacred utterances), and the mind in the vivid inner visualization of sacred designs and the figures of divinities. Detailed instructions on how the images are to be visualized and the appropriate mantra for each are contained in written *sādhana*s of most divinities. One such collection is the *Sādhanamālā* (Sanskrit: "Garland of Realization"), composed perhaps between the 5th and 11th centuries. This collection of some 300 *sādhana*s includes those designed for various practical results as well as those intended to further spiritual realization. The written *sādhana*s also serve to instruct sculptors and painters.

The mastery of visualizing the divinities in order of increasing complexity requires hours of practice each day for a period of years. In the resultant state of consciousness, such concepts as the illusory nature of phenomena and one's identity with the ultimate are said to become experiential realities.

sādhu and swāmī, also spelled SĀDDHU and SVĀMIN, in India, religious or holy men. *Sādhu* signifies any religious ascetic or holy man. The class of *sādhu*s includes not only genuine saints of many faiths but also men (and occasionally women) who have left their homes in order to concentrate on physical and spiritual disciplines, as well as hermits, magicians, and fortune-tellers, some of dubious religious intent. *Swāmī* usually refers to an ascetic who has been initiated into a specific religious order and, in recent years, has come to be applied particularly to monks of the Ramakrishna Mission. A Śaiva (follower of the god Śiva) *sādhu* is generally referred to as a *sannyāsin* (*q.v.*), or *daśnāmī sannyāsin,* while a Vaiṣṇava (follower of the god Vishnu) monk is often called a *vairāgin.* An ascetic who practices the established disciplines of yoga in order to achieve his spiritual goals is a yogin, or yogi. Jaina ascetics are most frequently referred to as *muni*s, while monks who follow the teachings of Buddha are *bhikkhu*s (*q.v.*).



A *sādhu*
J. Allan Cash

*Sādhu*s may live together in monasteries (*maṭha*s) that usually belong to a particular order, may wander throughout the country alone or in small groups, or may isolate themselves in small huts or caves. They generally take vows of poverty and celibacy and depend on the charity of householders for their food. Their dress and ornaments differ according to sectarian allegiances but they usually wear ochre-coloured (more rarely, white) robes. They shave their heads, or they allow their hair to lie matted on their shoulders or

twist it in a knot on top of their heads. They usually retain only the few possessions they carry with them: a staff (*daṇḍa*), a waterpot (*kamaṇḍalu*), an alms bowl, a rosary, perhaps an extra cloth or a fire tong.

Sādhus generally congregate on important religious occasions, such as lunar eclipses or *melās* (fairs), and throughout the year are found in large numbers in sacred cities such as Vārānasi (Benares) and Hardwār.

Sa'dī, byname of MUSHARRIF OD-DĪN MUṢLIH OD-DĪN (b. *c.* 1213, Shīrāz, Iran—d. Dec. 9, 1291, Shīrāz), Persian poet, one of the greatest figures in classical Persian literature.

He lost his father, Moṣleḥ od-Dīn, in early



Sa'dī, detail of a 17th-century miniature from a manuscript (1581) of the *Gulistān;* in the British Library (Royal Asiatic Society loan 5)

Reproduced by permission of the British Library

childhood; later he was sent to study in Baghdad at the renowned Neẓāmīyeh College, where he acquired the traditional learning of Islām. The unsettled conditions following the Mongol invasion of Persia led him to wander abroad through Anatolia, Syria, Egypt, and Iraq. He refers in his work to travels in India and Central Asia, but these cannot be confirmed. In North Africa he was held captive by the Franks and put to work in the trenches of the fortress of Tripoli. When he reappeared in his native Shīrāz he was an elderly man. He seems to have spent the rest of his life in Shīrāz.

Sa'di took his nom de plume from the name of the local Atabeg, or prince, Sa'd ibn Zangī. His best known works are the *Būstān* (1257; *The Orchard,* 1882) and the *Gulistān* (1258; *The Rose Garden,* 1964). The *Būstān* is entirely in verse (epic metre) and consists of stories aptly illustrating the standard virtues recommended to Muslims (justice, liberality, modesty, contentment) as well as of reflections on the behaviour of dervishes and their ecstatic practices. The *Gulistān* is mainly in prose and contains stories and personal anecdotes. The text is interspersed with a variety of short poems, containing aphorisms, advice, and humorous reflections. The morals preached in the *Gulistān* border on expediency—*e.g.*, a well-intended lie is admitted to be preferable to a seditious truth. Sa'dī demonstrates a profound awareness of the absurdity of human existence. The fate of those who depend on the changeable moods of kings is contrasted with the freedom of the dervishes.

For Western students the *Būstān* and *Gulistān* have a special attraction; but Sa'dī is also remembered as a great panegyrist and lyricist, the author of a number of masterly general odes portraying human experience, and also of particular odes such as the lament on the fall of Baghdad after the Mongol invasion in 1258. His lyrics are to be found in *Ghazalīyāt* ("Lyrics") and his odes in *Qaṣā'īd* ("Odes"). He is also known for a number of works in Arabic. The peculiar blend of human kindness and cynicism, humour, and resignation displayed in Sa'dī's works, together with a tendency to avoid the hard dilemma, make him, to many, the most typical and lovable writer in the world of Iranian culture.

sadism, psychosexual disorder in which sexual urges are gratified by the infliction of pain on another person. The term was coined by the late 19th-century German psychologist Richard von Krafft-Ebing in reference to the Marquis de Sade, an 18th-century French nobleman who chronicled his own such practices. Sadism is often linked to masochism (*q.v.*), in which sexual arousal results from receiving pain, and many individuals respond in either role. The sadist, however, often seeks a victim who is not a masochist, as some of the sexual excitement derives from the victim's unwillingness. The level and extent of sadistic violence may vary considerably, from infliction of mild pain in otherwise harmless love play to extreme brutality, sometimes leading to serious injury or death. The satisfaction of the sadist may result not from inflicting actual physical pain but rather from the mental suffering of the victim. Sexual urges may limit the level of violence, but in some cases the aggressive impulse becomes predominant and the sadist progresses to more extreme expressions of his violent tendencies. Sadism may be a factor in some violent crimes, particularly rape and murder.

The term sadism is occasionally used outside the sexual context, to describe individuals who are purposely cruel or who seem to derive pleasure from humiliating and dominating others in social situations. In this context, some milder forms of sadism are relatively more acceptable, such as the use of humiliating sarcasm as a conversational tool.

Sadji, Abdoulaye (b. 1910, Rufisque, Senegal—d. Dec. 25, 1961, Dakar), Senegalese writer and educationist who was one of the founders of African prose fiction in French. Sadji was the son of a marabout (Muslim holy man) and attended Qur'ānic school before entering the colonial school system. He was graduated from the William-Ponty teacher training college in 1929 and took a bachelor's degree three years later.

His early writings appeared locally in the 1940s. The story "Tounka," which dealt with the original migrations that had brought Sadji's people to the sea, later became the title story for a book of short stories, *Tounka, nouvelle africaine* (1965; "Tounka, African Stories"). A determination to preserve traditional oral lore was also at work in *La Belle Histoire de Leuk-le-Lièvre* (1953; "The Splendid History of Leuk-the-Hare"), which he co-authored with Léopold Senghor.

Sadji's two novels—*Maïmouna: petite fille noire* (1953; "Maimouna: Little Black Girl") and *Nini, mulâtresse du Sénégal* (1954; "Nini, Mulatress of Senegal")—focus on heroines who become victims of urban society. These works are filled with shrewd observations and warm compassion for the writer's fellow Africans.

Sadji's last piece of fiction, which many also regard as his best, is a 50-page story entitled "Modou-Fatim" (1960), in which he describes the plight of a peasant who has to leave his land during the dry season to work in Dakar.

Sadki Na grades (1454), rules of land tenure established in Thailand by King Trailok of Ayutthaya (1448–88) to regulate the amount of land a man could own.

Before Trailok's reform, the rulers of the Thai kingdoms did not exert effective control over the land extending beyond the immediate environs of the capital city. Beyond that perimeter, local chiefs held power and central authority was loosened. In many cases, only nominal homage was paid to the central ruler. Centralization of power and increased efficiency of government was desired by many rulers. Trailok's reforms left a lasting mark on Thai administrative and social history. These reforms remained the basis of administration until the 19th century.

Prior to the institution of the grades, the amount of land a man might own varied according to his status. Trailok's reform reorganized the system, established rules defining the various levels of status, and fixed the amount of land a man could own.

The Sadki Na grade, or the number of dignity marks a person had, determined his rank or importance. The highest Sadki Na grade ranged from 400 to 10,000 marks, enabling the highest officialdom to own from 1,000 to 4,000 acres (400 to 1,600 hectares) of land. In the middle range of 25 to 400 marks were officials appointed by the higher officers of state, who might own from 160 to 1,000 acres of land. The lowest grade, up to 25 marks, might own from 10 to 160 acres. In essence, the system provided the lowest class of the population with at least 10 acres of land.

The Sadki Na grades provided a framework for the society. A man was worth so much in accordance with his Sadki Na grade. Legal fines were determined by a man's grade. Compensation was similarly determined by grade. The 10 acres of land provided for each member of even the lowest class meant that no person need starve. Likewise, the gradations determined the income of government officials. Salaries were not introduced until the 19th century. Until that time, officials had been expected to live off the amount of land prescribed by the Sadki Na grade. In conjunction with other reforms, the Sadki Na institution provided Siam with a stable but open economic and social order.

Sadler, Sir Michael Ernest (b. July 3, 1861, Barnsley, Yorkshire, Eng.—d. Oct. 14, 1943, Oxford), world-renowned authority on secondary education and a champion of the English public school system.

Sadler was the first child of a physician. He was educated at Rugby and at Trinity College, Oxford, where he excelled in the classics. He served as secretary of the Oxford University Extension from 1885 to 1895 and steward of Christ Church, Oxford, from 1886 to 1895. Under his leadership the extension grew enormously, offering nearly 400 courses all over England.

But Sadler recognized that the university extension was handicapped by failings at the secondary level, and he persuaded Oxford to hold a conference on the subject of secondary education in 1893. Shortly thereafter, Sadler served on the Royal Commission appointed to investigate and report on secondary education.

In 1895 Sadler left Oxford to become Director of Special Inquiries and Reports in the Government's Education Department. At that post he built up an enormous literature on comparative education, almost singlehandedly creating a new branch of the study of education. He also greatly enhanced the Education Department's library and made his office a source of educational information to British and non-British alike. When he resigned in 1903, Sadler was internationally renowned as an expert on educational matters.

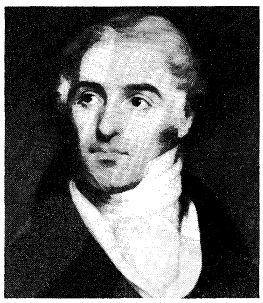
He spent the next eight years teaching and writing and seeking further to improve secondary education. In 1911 Sadler became vice chancellor of the University of Leeds, greatly increasing its faculty, students, and academic stature. After a two-year stint (1917–19) as president of the Calcutta University Commission, Sadler returned to Leeds, where he remained until 1923. He was knighted in 1919.

It was in 1923 that he accepted his final academic post, master of University College, Oxford. In 1934 he retired. Lecturing—often

on the essential function of education to produce an elite capable of administering government and business—and work on a history of English education filled his final years. Sadler was also known for his extensive art collection, containing works of both old masters and modern artists, and for his generous patronage of unknown artists.

Sadler, Michael Thomas (b. Jan. 3, 1780, Snelston, Derbyshire, Eng.—d. July 29, 1835, Belfast, Ulster, Ire.), radical politician, philanthropic businessman, and leader of the factory reform movement in England, who was a forerunner of the reformers from the working class whose activities (from the late 1830s) became known as Chartism.

An importer of Irish linens in Leeds, Yorkshire, Sadler served as a Tory member of the House of Commons in 1829–30 and again in 1831–32, and then, in December 1832, sought a new parliamentary seat created for Leeds. Although he received considerable working



Michael Thomas Sadler, detail of an oil painting by William Robinson; in the National Portrait Gallery, London

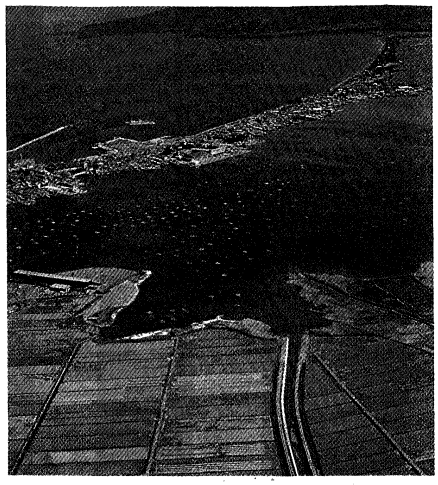
By courtesy of the National Portrait Gallery, London

class support, he was defeated by the historian Thomas Babington (later Baron) Macaulay, who had criticized Sadler's *Law of Population* (1830), a massive treatise attacking the pessimistic theories of the economist-demographer Thomas Robert Malthus.

Sadler attracted the votes of the Leeds labourers because he advocated government intervention to regulate factory conditions in general and children's working hours in particular. He led the movement in the House of Commons for a 10-hour daily limit on factory work by persons under 18. In 1831 he introduced a factory reform bill, inspired in part by the reformer Richard Oastler, and subsequently acted as chairman of the committee to which it was referred. This large group (37 members eventually) met more than 40 times and examined many witnesses. Among these were children who had been crippled in factory accidents; numerous adult workers, some of whom were discharged for having testified; and several noted physicians, all of whom favoured a shorter working day and other reforms. The Factory Act of 1833, passed after Sadler had left Parliament, restricted the working day in textile mills to 12 hours for persons aged 13 through 17, and 8 hours for those aged 9 through 12.

Sadler's health was fatally impaired by his strenuous work with the committee. His friend Anthony Ashley Cooper, Lord Ashley (afterward 7th earl of Shaftesbury), succeeded him as parliamentary leader of the labour reform movement.

Sado, island, Niigata Prefecture (*ken*), Japan, in the Sea of Japan, 32 mi (51 km) west of Honshu. It faces Niigata, the prefectural capital, across the Sado-kaikyō (Sado Strait). With an area of 331 sq mi (857 sq km), it is the fifth largest Japanese island. Sado is crowned by two parallel mountain chains;



Rice paddies facing the shores of Lake Kamō on Sado, Japan

Hirai—Shostal/EB Inc.

its topography includes dramatic precipices and ravines, mountain streams, and Kamō-ko (Lake Kamō).

Sado was long widely known as a place of exile. Among the statesmen and scholars banished there were the emperor Juntoku Tennō (1197–1242), after his revolt in 1220 against the *shikken* (regent) of the Kamakura shogunate, and the Buddhist priest and reformer Nichiren (1222–82).

The island's economy is based on rice cultivation and fishing. Tourists are attracted by Sado's romantic associations, mild climate, beautiful flowers (camellias, rhododendrons), and attractive landscape. The island is also known throughout Japan for its melancholy ballads and folk dance known as *okesa.* Once performed only by men sentenced to work in the island's gold mines, the dance is now also performed by women.

Ryōtsu, between the eastern shore and Kamō-ko, is the only city. The centre of fishing and administration, it serves as an outer port for Niigata. Aikawa is the largest town on the western coast. Aikawa experienced a gold rush during the Meiji period (1868–1912), and the population reached 100,000. In 1980 the town's population was 12,721. Pop. (1980) 63,694.

sadō: *see* tea ceremony.

Sadovsky, Prov, original name PROV MIKHAILOVICH YERMILOV (b. Oct. 23 [Oct. 11, old style], 1818, Livny, Oryol province, Russia—d. July 28 [July 16, O.S.], 1872, Moscow), Russian character actor and patriarch of a three-generation theatrical family. He is regarded as the greatest interpreter of Aleksandr Ostrovsky's plays and was responsible, in part, for securing Ostrovsky's reputation.

Sadovsky was reared and trained by his maternal uncles, who were provincial actors. He took their name, Sadovsky, as his own and made his debut on the stage in Tula at the age of 14. In 1839 he was invited by Mikhail Shchepkin to join the Maly (Little) Theatre in Moscow. Sadovsky's natural talent was perfectly suited to the realistic acting style used there, and although he had some success in other works, he was brilliant in Ostrovsky's plays. His promotion of them brought the playwright to national attention.

Sadovsky's son, Mikhail Sadovsky (1847–1910), joined the Maly in 1869 and was successful but never achieved his father's importance. Mikhail's wife, Olga Osipovna Sadovskaya (1850–1919), daughter Elizaveta (1870–1934), and son Prov (1874–1947) carried the family's connection with the Maly and reputation for skillful, realistic acting well into the 20th century.

Sadowa, Battle of: *see* Königgrätz, Battle of.

Ṣadr ad-Dīn ash-Shīrāzī (Iranian philosopher): *see* Mullā Ṣadrā.

Ṣadr Dīwānī ʿAdālat, in Mughal and British India, a high court of civil and revenue jurisdiction. It was instituted by Warren Hastings, the British governor general, in 1772. It sat in Calcutta and was the final court of appeal in civil matters; it consisted of the governor general and two members of his council.

When the Bengal government clashed with the Supreme Court of Calcutta, which administered English law, Hastings tried to solve the problem of conflicting jurisdiction by persuading the chief justice, Sir Elijah Impey, to become head of the Ṣadr Dīwānī ʿAdālat as well. But the East India Company vetoed the arrangement. This high civil court, like its counterpart for criminal jurisdiction—the Ṣadr Nizāmat ʿAdālat—was abolished after the Indian Mutiny of 1857–59, and its powers and jurisdiction were transferred to new high courts of judicature, set up by the Indian High Courts Act of 1861.

Šadrinsk (Russian S.F.S.R.): *see* Shadrinsk.

Sadulgarh (India): *see* Hanumāngarh.

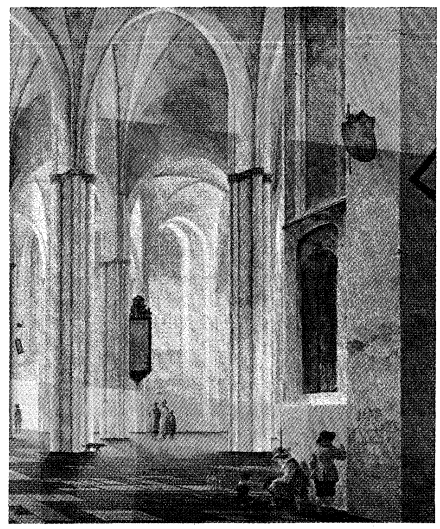
Saeberht (Anglo-Saxon ruler): *see* Saberht.

Saeki (Japan): *see* Saiki.

Saemundr FRODE SIGFÚSSON, Saemundr also spelled SAEMUND (b. 1056—d. 1133), Icelandic chieftain-priest and first chronicler of Iceland.

Saemundr was the first Icelander to study in France and to write in Latin. His Latin *History of the Kings of Norway* has been lost but is known through the chronicles of subsequent writers. He founded in Iceland the School of Oddi, a centre of learning whose aristocratic and critical traditions later fostered the development of Snorri Sturluson, author of the *Prose Edda.* The *Poetic Edda* is known as "Saemundr's Edda" because it was erroneously attributed to Saemundr by Bishop Brynjólfur Sveinsson (1605–75).

Saenredam, Pieter Jansz(oon), Saenredam also spelled ZAENREDAM (b. June 9, 1597, Assendelft, Neth.—buried May 31, 1665, Haarlem), painter, pioneer of the "church portrait," and the first Dutch artist to abandon the tradition of fanciful architectural painting in favour of a new realism in the rendering of specific buildings. His paintings of churches show a scrupulous neatness and precision, combined with subtle atmospheric light and tonal unity



"Interior of the Domkerk, Utrecht," oil painting by Pieter Saenredam; in the National Gallery, London

By courtesy of the trustees of the National Gallery, London; photograph, A.C. Cooper Ltd.

achieved through the use of silvery white and gray.

As the son of an engraver, Saenredam presumably began to draw and paint at an early age. While studying under Frans Pieterszoon de Grebber in Haarlem, Saenredam met the great Dutch architect Jacob van Campen, whose architectural drawings may have influenced the young painter. Fine examples of Saenredam's "church portraits" are the "View in the Nieuwe Kerk at Haarlem" (1652; Frans Halsmuseum, Haarlem) and "Interior of the St. Cunera Church at Rhenen" (1655; Mauritshuis, The Hague), which convey a majestic spaciousness and serene atmosphere characteristic of Saenredam's paintings.

Sáenz, Manuela, byname LA SÁENZ (b. Dec. 27, 1797, Quito, New Granada [Ecuador]—d. Nov. 23, 1856, Paita, Peru), mistress to the South American liberator Simón Bolívar, whose revolutionary activities she shared.

Sáenz was the illegitimate daughter of a Spanish gentleman, and the stigma of her birth caused many early hardships. On the death of her mother, Joaqina Aispuru, she was sent to live at the convent of Santa Catalina. She remained there until age 17, when she married James Thorne, a wealthy British merchant. Thorne took her to Lima, where Sáenz first came into contact with the movement for independence. She returned to her birthplace, Quito, in June 1822 and met Bolívar after his triumph in the area. They fell in love, and she united her life with his and with the cause for which he was fighting.

Sáenz shared both Bolívar's zenith and his decline. Her attempts to keep the Peruvians on his side were in vain. She was exiled from Lima and joined Bolívar in Bogotá, where on Sept. 25, 1828, she saved him from conspirators. When she learned of his death in 1830, she tried unsuccessfully to take her own life. In 1834 she was exiled from Bogotá and moved to the small Peruvian port of Paita, where she made a living as a vendor of sweets and tobacco. She died there during a diphtheria epidemic.

Sáenz Peña, Roque (b. March 19, 1851, Buenos Aires—d. Aug. 9, 1914, Buenos Aires), president of Argentina from 1910 until his death, an aristocratic conservative who wisely responded to popular demand for electoral reform. Universal and compulsory male suffrage from age 18 by secret ballot was established (1912) in Argentina by a statute that he compelled an oligarchical legislature to pass and that has since been known by his name.



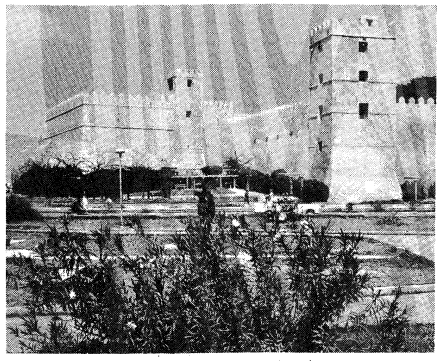
Sáenz Peña

By courtesy of the Library of Congress, Washington, D.C.

Sáenz Peña's father, Luis, served as president of Argentina from 1892 to 1895. Roque, who inherited his father's enemies, traveled in Europe before entering politics in the 1870s. He held the office of foreign minister, served as Argentine delegate to the first International Conference of American States (Washington, D.C., 1889–90), and was appointed ambassador to Spain (1901) and to Italy (1907). Intended in part to mollify Hipólito Irigoyen's Radical Party, Sáenz Peña's reforms made possible Irigoyen's election to the presidency in 1916.

Safad (Israel): *see* Ẕefat.

Ṣafāqis, also spelled SFAX, major port town, east-central Tunisia on the northern shore of the Gulf of Gabes. Built on the site of two small settlements of antiquity, Taparura and Thaenae, the town grew as an early Islāmic trading centre for nomads. Temporarily occupied in the 12th century by Sicilian Normans and in the 16th century by the Spanish, it later served as a stronghold of the Barbary pirates. The town was bombarded by the French in 1881 prior to their occupation of Tunisia and in World War II, when it was used as an Axis base until captured by the British in 1943. Construction of the modern port was begun in 1895.



Casbah (citadel) and ramparts, Ṣafāqis, Tunisia

P. Salou—Shostal/EB Inc.

Now a transportation hub and a market for the phosphates of the Qafṣah (Gafsa) region, with which it is connected by rail, Ṣafāqis is Tunisia's second largest city, main outlet for the country's central and southern regions, and a major fishing port with fish canneries. Exports besides phosphates include olive oil, esparto grass, and sponges. The old Arab quarter (medina), with its 10th-century mosque and Casbah (citadel), is surrounded by the original ramparts built in the 9th century. The town is surrounded by an important esparto-, vegetable-, and olive-growing region. In the hinterland there are oil fields and oil pipelines. Pop. (1984) 231,911.

Consult the INDEX *first*

Šafařík, Pavel Josef (b. May 13, 1795, Kobeliarov, Slovakia, Hung.—d. June 26, 1861, Prague), leading figure of the Czech national revival and a pioneer of Slavonic philology and archaeology.

Šafařík was director of the Serbian Orthodox grammar school at Novi Sad before settling in Prague in 1833. In 1841 he refused an invitation to occupy the chair of Slavonic philology at Berlin, preferring to remain a private scholar in his own country.

Erudition and scholarly integrity characterize a series of influential works on the history and languages of the Slavs: *Geschichte der slavischen Sprache und Literatur nach allen Mundarten* (1826; "History of the Slavic Languages and Literature in All Dialects"); *Slovanské starožitnosti* (1837; "Slavic Antiquities"), better known in the German translation *Slawische Altertümer* (1843); *Über den Ursprung und die Heimat des Glagolitismus* (1858; "Concerning the Origins and Provenance of the Glagolitic Alphabet"); *Geschichte der südslawischen Literatur* (1864; "History of South Slavic Literature").

Although his work on the origins and migrations of the Slavs has been superseded, it was of great value in its time. His philological works can still be read with profit: in his belief in the priority of the Glagolitic alphabet over the Cyrillic he was far ahead of his time.

Ṣafavid DYNASTY (1502–1736), Iranian dynasty whose establishment of Shīʿite Islām as the state religion of Iran was a major factor in the emergence of a unified national consciousness among the various ethnic and linguistic elements of the country. The Ṣafavids were descended from Sheykh Ṣafī od-Dīn (1253–1334) of Ardabīl, head of the Ṣūfī order of Ṣafavīyeh (Safawiyah), but about 1399 exchanged their Sunnite affiliation for Shīʿism.

The founder of the dynasty, Ismāʿīl I, as head of the Ṣūfīs of Ardabīl, won enough support from the local Turkmens and other disaffected heterodox tribes to enable him to capture Tabrīz from the Ak Koyunlu (Turkish: "White Sheep"), an Uzbek Turkmen confederation, and in July 1501 Ismāʿīl was enthroned as shah of Azerbaijan. By May of the next year he was shah of Iran. In the next 10 years he subjugated the greater part of Iran and annexed the Iraqi provinces of Baghdad and Mosul; despite the predominantly Sunnite character of this territory, he proclaimed Shīʿism the state religion.

In August 1514, Ismāʿīl was seriously defeated at Chāldirān by his Sunnite rival, the Ottoman sultan Selim I. Thereafter, the continuing struggle against the Sunnites—the Ottomans in the west and the Uzbeks in the northeast—cost the Ṣafavids Kurdistan, Diyarbakır, and Baghdad; the Ṣafavid capital had to be temporarily relocated at Eṣfahān—permanently by about the early 17th century.

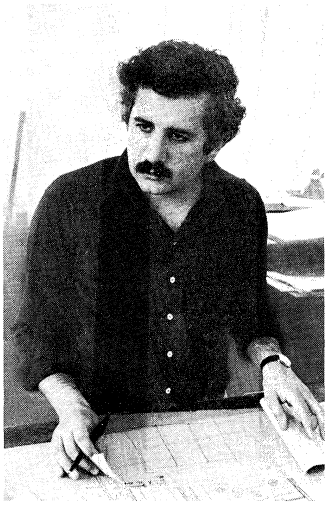
Iran weakened appreciably during the reign of Ismāʿīl's eldest son, Shah Ṭahmāsp I (1524–76), and persistent and unopposed Turkmen forays into the country increased under his incompetent successors. In 1588 ʿAbbās I was brought to the throne. Realizing the limits of his military strength, ʿAbbās made peace with the Ottomans on unfavourable terms in 1590 and directed his onslaughts against the Uzbeks. Meeting with little success, ʿAbbās engaged (1599) the English Sir Robert Sherley to direct a major army reform. Three bodies of troops were formed, all trained and armed in the European manner and paid out of the royal treasury: the *ghulāms* (slaves), the *tofangchīs* (musketeers), and the *topchīs* (artillerymen).

With his new army, ʿAbbās defeated the Turks in 1603, forcing them to relinquish all the territory they had seized, and captured Baghdad. He also expelled (1602, 1622) the Portuguese traders who had seized the island of Hormuz in the Persian Gulf early in the 16th century.

Shah ʿAbbās' remarkable reign, with its striking military successes and efficient administrative system, raised Iran to the status of a great power. Trade with the West and industry expanded, communications improved; the capital, Eṣfahān, became the centre of Ṣafavid architectural achievement, manifest in the mosques Masjid-i Shāh and the Masjid-i Sheykh Loṭfollāh; and other monuments including the ʿAlī Qāpū, the Chehel Sotūn, and the Meydān-i Shāh. Despite the Ṣafavid Shīʿite zeal, Christians were tolerated and several missions and churches were built.

After the death of Shah ʿAbbās I (1629) the Ṣafavid dynasty lasted for about a century, but, except for an interlude during the reign of Shah ʿAbbās II (1642–66), it was a period of decline. Eṣfahān fell to the Ghilzai Afghans of Qandahār in 1722; seven years later Shah Ṭahmāsp II recovered Eṣfahān and ascended the throne, only to be deposed in 1732 by his Afshārid lieutenant Nāder Qolī Beg (the future Nāder Shah).

Safdie, Moshe (b. July 14, 1938, Haifa, Palestine [now in Israel]), Canadian-Israeli architect who designed Habitat '67 at the site of Expo 67, a year-long international exhibition at Montreal. Habitat '67 was a prefabricated concrete housing complex comprising three clusters of individual apartment units arranged like irregularly stacked blocks along a zigzagged framework. This bold experiment in prefabricated housing using modular units aroused intense international interest at the time, though it failed to inaugurate a trend toward the mass production of such low-cost units.



Moshe Safdie, 1971

By courtesy of Moshe Safdie; photograph, Jerry Spearman

Educated at McGill University School of Architecture in Montreal, Safdie began his career (1962) in the offices of Philadelphia architect Louis I. Kahn. He subsequently opened his own architectural offices in Montreal, Jerusalem, and Boston. Later works by Safdie include Habitat Puerto Rico (1968–72), a modular-housing system in San Juan; Yeshivat Porat Joseph Rabbinical College, with dormitories, teaching facilities, library, and synagogue, in Jerusalem (1971–79); Coldspring New Town, commissioned by the city of Baltimore, a plan for a new town, including residences and related public and service buildings (1971); and Wailing Wall Plaza, in the Old City, Jerusalem (1974). Safdie became professor of urban design and director of the urban-design centre of the Harvard University Graduate School of Design in 1978.

safe-conduct, procedure by which a person is permitted to enter or leave a jurisdiction in which he would normally be subject to arrest, detention, or other deprivation. Historically, the habit of princes in granting safe-conducts to foreigners who, as aliens, did not ordinarily enjoy the full protection of the host-country's law developed into the system of diplomatic immunity. Similarly, the granting of safe-conducts to protect freedom of commerce was the forerunner of modern treaties of commerce. Whether in modern times the granting by the authorities of a safe-conduct—as, for example, to a person enjoying asylum in a foreign embassy—entails any legal obligation under international or municipal law depends on the circumstances of each case. *See also* asylum; exterritoriality.

Safed (Israel): *see* Zefat.

safety, those activities that seek either to minimize or to eliminate hazardous conditions that can cause bodily injury. Safety precautions fall under two principal headings, occupational safety and public safety. Occupational safety is concerned with risks encountered in areas where people work: offices, manufacturing plants, farms, construction sites, and commercial and retail facilities. Public safety involves hazards met in the home, in travel and recreation, and other situations not falling within the scope of occupational safety.

Safety was not considered to be a matter of public concern in ancient times, when accidents were regarded as inevitable or as the will of the gods. Modern notions of safety developed only in the 19th century as an outgrowth of the Industrial Revolution, when a terrible toll of factory accidents aroused humanitarian concern for their prevention. Today the concern for safety is worldwide and is the province of numerous governmental and private agencies at the local, national, and international levels.

The frequency and severity rates of accidents vary from country to country and from industry to industry. In the industrialized nations of the world, accidents now cause more deaths than all infectious diseases and more than any single illness except those related to heart disease and cancer. Accidents in the home, in public and private transportation, and on farms and in factories are by far the predominant cause of death in the population under 35 years of age in industrialized nations. In the United States each year, about six times as many persons receive nonfatal injuries in accidents in the home as in motor-vehicle accidents, and about twice as many at home as in industrial accidents. On a worldwide basis, motor-vehicle accidents tend to be the primary cause of accidental deaths, followed by those in industry and in the home.

Industrial accidents can occur because of improper contact with machinery, the lifting or other handling of bulk materials, and contact with electrical, chemical, or radiation hazards. The mining and lumbering industries are among those that have the highest rate of severe accidents. High-technology industries such as electronics have relatively low accident rates.

Several international organizations provide means by which national safety organizations can exchange information and pass on new ideas. Among the bodies serving in this capacity are the International Social Security Association (ISSA) and the International Labour Organisation (ILO). These two bodies have sponsored international safety congresses every three years since 1955. Every four years a congress is held by the Permanent International Association of Road Congresses, a body that is maintained by the transport ministries of its member countries and by groups representing the highway-construction industry. The World Touring and Automobile Organization (OTA) holds a safety congress every other year.

A number of organizations, including the ILO, ISSA, the World Health Organization, and the European Economic Community, maintain a joint information bureau in Geneva. The International Organization for Standardization, which is also based in Geneva, helps establish safety codes and standards for numerous areas of activity (such as nuclear energy) among the many nations that sponsor it.

National-level safety organizations tend to deal with safety questions most closely associated with the economic structure of the country concerned. Nations having limited industrial development tend to concentrate on road safety, for example. At the local level many groups exist that specialize in one aspect or another of safety. Much of their activity is conducted by professionals whose jobs relate closely to questions of safety, among them policemen, firemen, medical officers, and others concerned with health and with accident prevention. These groups seek to enlist the cooperation of educators, local governments and officials, industrial associations, and trade unions and to effect liaison with professional safety groups such as the American Society of Safety Engineers in the United States or the Institution of Industrial Safety Officers in the United Kingdom. In the United States, local safety councils may be accredited to the National Safety Council, the world's largest safety body. In the United Kingdom the Royal Society for the Prevention of Accidents performs a role comparable to that of the National Safety Council.

Among the chief activities of individuals and organizations concerned with safety are the collection of statistics on accidents and injuries and the publication of analyses of those statistics; the study of hazardous situations and environments and the development of safer designs, procedures, and materials; the development of educational programs for employers, workers, drivers, and other groups at risk; and the design, through safety engineering, of machines, workplaces, and safety equipment that minimize the risk of injury. In recent years much activity has centred on identifying and preventing risks posed by such hazards as ionizing radiation and a wide array of chemicals and hazardous industrial wastes. The greatest challenge in the field of safety is to keep legislation and public awareness in step with the rapid development of technology and with the fresh hazards that it constantly presents.

safety engineering, study of the causes and the prevention of accidental deaths and injuries. The field of safety engineering has not developed as a unified, specific discipline, and its practitioners have operated under a wide variety of position titles, job descriptions, responsibilities, and reporting levels in industry and in the loss-prevention activities of insurance companies. The general areas that have been identified as the major functions carried out by the professional safety engineer or safety professional are: the identification and appraisal of accident-producing conditions and practices and the evaluation of the severity of the accident problem; the development of accident and loss-control methods, procedures, and programs; the communication of accident and loss-control information to those directly involved; and the measurement and evaluation of the accident and loss-control systems and the modifications that are required to obtain optimum results.

The most recent trends in safety engineering include increased emphasis on prevention by the anticipation of hazard potentials; changing legal concepts with regard to product liability and negligent design or manufacture, as well as the developing emphasis on consumer protection; and the development of national and international legislation and controls, not only in the areas of transportation safety, product safety, and consumer protection but also in occupational health and environmental control.

safety glass, type of glass that, when struck, bulges or breaks into tiny, relatively harmless fragments rather than shattering into large, jagged pieces. Safety glass may be made in either of two ways. It may be constructed by laminating two sheets of ordinary glass together, with a thin interlayer of plastic, or it may be produced by strengthening glass sheets by heat treatment.

In 1909 the first successful patent for safety glass was taken out in France by an artist and chemist, Édouard Bénédictus, who used a sheet of celluloid bonded between two pieces of glass. Other plastics were also tried, but in 1936 polyvinyl butyral (PVB) was found to possess so many safety-desirable properties that its use became universal. Bulletproof glass is usually built up using several glass and plastic components.

In the heat-treatment method, glass sheets are tempered at about 650° C (1200° F), followed by sudden chilling. This treatment increases the strength of the glass sheets approximately sixfold. When such glass does break, it shatters into blunt granules.

safety lamp, lighting device used in places, such as mines, in which there is danger from the explosion of flammable gas or dust. In the late 18th century a demand arose in England for a miner's lamp that would not ignite the gas methane (firedamp), a common hazard of English coal mines. W. Reid Clanny, an Irish physician, invented a lamp about 1813 in which the oil-fuelled flame was separated from the atmosphere by water seals; it required continual pumping for operation. In 1815 the English engineer George Stephenson invented a lamp that kept explosive gases out by pressure of the flame's exhaust and held the flame in by drawing in air at high speed. In 1815 Sir Humphry Davy invented the lamp that bears his name. Davy used a two-layer metal gauze chimney to surround and confine the flame and to conduct the heat of the flame away.

Electric hand and cap lamps were introduced in mines in the early 1900s and by the middle of the 20th century were used almost exclusively in mines. A safety device in the headpiece of the electric lamps shuts off the current if a bulb is broken. Double-filament bulbs may be used, so the light can remain on when a filament fails.

The flame of a safety lamp elongates in the presence of firedamp, but electric lamps give no warning of noxious gases or lack of oxygen. Consequently, a flame safety lamp must be kept burning within easy view of the workers, or frequent inspections must be made, using a flame lamp or other form of warning device.

Safeway Stores, Inc., leading U.S. supermarket chain, with stores in the United States and abroad. Headquarters are in Oakland, Calif.

The company originated as a small grocery store started by S.M. Skaggs in American Falls, Idaho, in 1915. The store was dedicated to building sales volume by taking low profit margins, an operating philosophy still followed by the company. The eldest son of the family, M.B. Skaggs, expanded the original store into a western chain that by 1926 had 428 stores in 10 states under the name Skaggs United Stores.

The Skaggs company was incorporated in 1926 to buy the 322-store Safeway chain founded by Sam Seelig in southern California and subsequently assumed the Safeway name. Since then there have been numerous other acquisitions. By 1931 the company had reached its peak number of stores—3,527 in the United States and Canada—which averaged 1,000 square feet in size and carried about 700 items. Thereafter store numbers decreased, but the size increased, as Safeway became one of the first chains to establish giant supermarkets. In the 1980s, most of its 2,500 stores were in the United States west of the Mississippi River, but it also had stores in the eastern United States, Canada, Europe, and Australia.

Ṣaffārid DYNASTY (fl. 9th century AD), Iranian dynasty of lower class origins that ruled a large area in eastern Iran. The dynasty's founder, Ya'qūb ebn Leyṣ aṣ-Ṣaffār ("the coppersmith"), took control of his native province, Seistan, around 866. By 869 he had extended his control into northeastern India, adding the Kābul Valley, Sind, Tocharistan, Makran (Baluchistan), Kermān, and Fārs to his possessions; with the overthrow of the Ṭāhirids and the annexation of Khorāsān in 873 the Ṣaffārid Empire reached its greatest extent. Ya'qūb then ventured to march against Baghdad in 876, but was defeated by the forces of the caliph al-Mu'tamid at Dayr al-'Āqūl.

The Caliph then acknowledged Ya'qūb's brother and successor (879), 'Amr ebn Leyṣ, as governor of Khorāsān, Isfahan, Fārs, Seistan, and Sind. But the Ṣaffārid Empire collapsed when 'Amr, trying to wrest Transoxania from the Sāmānids, was defeated by Ismā'īl ibn Aḥmad near Balkh in 900. Thereafter few of the Ṣaffārids had any wide authority, though they maintained their position in Seistan intermittently at least until the 16th century, despite Sāmānid, Ghaznavid, and Mongol conquests.

Articles are alphabetized word by word, not letter by letter

safflower, flowering annual plant, *Carthamus tinctorius,* of the Asteraceae (or Compositae) family; native to parts of Asia and Africa, from central India through the Middle East to the upper reaches of the Nile River and into Ethiopia. The safflower plant grows from 0.3 to 1.2 metres (1 to 4 feet) high and has flowers that may be red, orange, yellow, or white. The dried flowers may be used to obtain carthamin, a red textile dye that was commercially important at one time but has since been replaced by synthetic aniline dyes, except in local areas of southwestern Asia. Safflower has been used as an adulterant of the condiment saffron.



Safflower (*Carthamus tinctorius*)
J.C. Allen and Son

Oil obtained from the seed is the chief modern use of the plant. Safflower oil does not yellow with age, making it useful in preparing varnish and paint. Most of the oil, however, is consumed in the form of soft margarines, salad oil, and cooking oil. It is highly valued for dietary reasons because of its high proportion of polyunsaturated fats. The meal, or cake residue, is used as a protein supplement for livestock. Safflower, grown chiefly in India, has been introduced as an oil crop into the United States, Australia, Israel, Turkey, and Canada.

saffron, purple-flowered saffron crocus, *Crocus sativus,* a bulbous perennial of the iris family (Iridaceae) treasured for its golden-coloured, pungent stigmas, which are dried and used to flavour and colour foods and as a dye. Saffron is named among the sweet-smelling herbs in Song of Solomon 4:14. It has a strong, exotic aroma and a bitter taste. It is used to colour and flavour many Mediterranean and Oriental dishes, particularly rice and fish, and English, Scandinavian, and Balkan breads. It is an important ingredient in bouillabaisse.



Saffron (*Crocus sativus*)
Emil Muench—Ostman Agency

A golden-coloured, water-soluble fabric dye was distilled from saffron stigmas in India in ancient times. Shortly after Buddha died, his priests made saffron the official colour for their robes. The dye has been used for royal garments in several cultures.

As a perfume, saffron was strewn in Greek and Roman halls, courts, theatres, and baths; it became especially associated with the hetaerae, a professional class of Greek courtesans. The streets of Rome were sprinkled with saffron when Nero made his entry into the city.

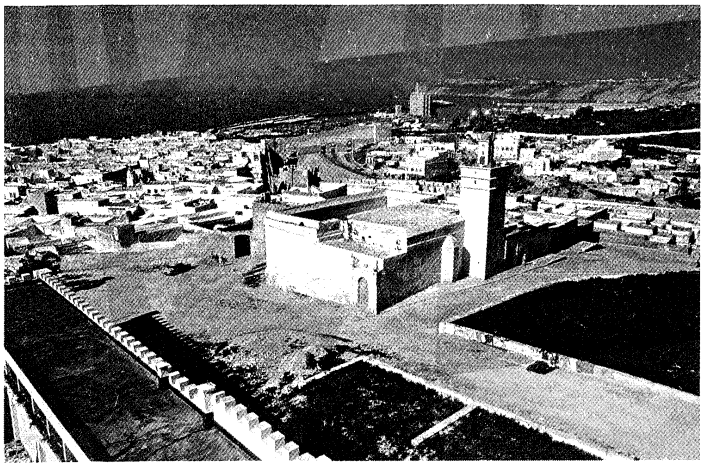
Believed native to the Mediterranean area, Asia Minor, and Iran, the saffron crocus has long been cultivated in Iran and Kashmir and is supposed to have been introduced into Cathay by the Mongol invasion. It is mentioned in the Chinese materia medica (*Pun tsaou,* 1552–78). In early times, however, the chief seat of cultivation was in Cilicia, in Asia Minor. It was cultivated by the Arabs in Spain about 961 and is mentioned in an English leechbook, or healing manual, of the 10th century but may have disappeared from western Europe until reintroduced by the crusaders. During various periods, saffron has been worth much more than its weight in gold; it is still the most expensive spice in the world.

Saffron is cultivated chiefly in Spain, France, Sicily, Italy (on the lower spurs of the Apennines Range), and in Iran, and Kashmir. The three stigmas are handpicked from each flower, spread on trays, and dried over charcoal fires for use as a food flavouring and colouring. A pound (0.45 kilogram) of saffron represents 75,000 blossoms. Saffron contains 0.5 to 1 percent essential oil, the principal component of which is picrocrocin. The colouring matter is crocin.

Saffron Walden, parish (town), Uttlesford district, in the northwest corner of the county of Essex, England. The settlement grew around a Norman castle and abbey in a district that was important for domestic weaving. In the mid-14th century, the saffron crocus was introduced to provide a yellow dye, and its name became attached to the place. The town today functions as a rural service centre with some light industries. Pop. (1981 prelim.) 12,515.

Safi, formerly ASFI, Atlantic port city, provincial capital, and province, Tensift region, western Morocco. Originally settled by the Canaanites, Safi city was, in turn, inhabited by Carthaginians (who named it Asfi), Romans, Jews, Goths, and finally by the Muslims in the 11th century. It was a *ribāṭ* (fortress of the "holy war") in the 13th century and was mentioned by the historian Ibn Khaldūn. The Portuguese occupied Safi (1508–41) and built a citadel, which now surrounds the 18th-century Keshla (Casbah). Safi reached its height of prosperity under the late 16th- and early 17th-century Sa'dīan sultans. Extending along the coast and climbing the inland plateau, the city is a mixture of medieval and modern architecture. Safi port (artificial harbour) serves Marrakech, 85 mi (140 km) to the southeast; exports phosphates from Youssoufia, with which it is connected by rail; is a major fishing port with sardine canneries; and produces textiles. The city has chemical (phosphate-based) and food-processing indus-

tries located nearby to the south and is known for its pottery. In the hinterland around Safi, cereals (primarily barley), olives, sheep, goats,



Safi, Mor., from the Keshla (Casbah)
Syndication International Ltd., London

and cattle are raised. Pop. (1982) mun., 197,-309.

Ṣafī od-Dīn (b. 1253, Ardabīl, Iran—d. Sept. 12, 1334, Ardabīl), mystic and founder of the Ṣafavid order of mystics.

Ṣafī od-Dīn, a descendant of a family of provincial administrators, obtained his early education in Ardabīl, where his family held dependencies as a land grant from the central government. Later, in Shīrāz, he was influenced by Ṣūfī (mystical) teachings. He then traveled to the province of Gilan (the Iranian Caspian province), where he spent 25 years as a murid (spiritual follower) of Sheikh Zāhid, whose daughter Bībī Fāṭimah he married. The other spiritual followers of Sheikh Zāhid, following his death, transferred their allegiance to Ṣafī od-Dīn, who then returned to Ardabīl, where he formed the Ṣafavid order.

The fame of Ṣafī od-Dīn increased as the new order gained recruits. The popularity of the order can be attributed in part to Ṣafī od-Dīn's policy of hospitality, especially to all who sought refuge. One of the sheikh's appellations was Khalīl-e ʿAjam (the Iranian Abraham, who is noted for hospitality in Iranian folklore). The order appears to have been a Sunnite (the traditionalists in Islām) order of mystics that made concessions to the followers of ʿAlī (the fourth caliph of Islām) without actually adhering to the doctrines of his party, that of the Shīʿites. The claim made by Ṣafavid court historians that Safī od-Dīn was a Shīʿite and a sayyid (descendant of ʿAlī) is false and misleading. Safī od-Dīn, himself, was a Sunnite of the Shāfiʿī school (one of the four schools of Sunnite law).

Safīd Mountain Range, also called MORGA RANGE, Pashto SELSELEH-YE SAFĪD KŪH, or SELSELEH-YE SPĪN GHAR, mountain range forming a natural frontier between Pakistan and Afghanistan, extending westward for 100 miles (160 km) from the Vale of Peshāwar (Pakistan) to the Lowrah Valley (Afghanistan). The boundary between the two countries runs along the summit of the range, which reaches a height of 15,600 feet (4,760 m) in the west at the point where the boundary turns southward. The range forms an almost unbroken 14,000-foot (4,300-metre) wall that towers above the surrounding hills. It separates the basin of the Kābul River (north, chiefly in Afghanistan) from the Kurram and Afridi Tīrāh regions (south, largely in Pakistan). Except for a narrow trough cut by the Kābul River, which breaks through the mountains to flow eastward into the Indus River, the range connects directly with the Shandūr offshoot of the Hindu Kush mountain system. The strategic and historic Khyber Pass (*q.v.*) lies in the eastern part of the mountains. The northern spurs of the range are extremely barren, but the intervening valleys support agriculture and gardens abounding in mulberries, pomegranates, and other fruits. The main range and the upper portions of the spurs are wooded with pine and deodar.

Safid River, Persian SEFĪD RŪD, also spelled SAFĪD RŪD, longest river of northern Iran, rising 920 feet (280 m) in elevation and breaking through the Elburz Mountains in an impressive gorge 23 miles (37 km) long to emerge on the plain of Gīlān, where it forms a delta and flows into the Caspian Sea. With its main tributary, the Qezel Owzan, the Safid River is approximately 600 miles (1,000 km) long and drains 21,700 square miles (56,200 square km). A dam at Manjīl at the upper end of the gorge is designed to prevent floods, improve and extend irrigation, and provide electric power.

Safiye Sultan (d. 1605/19), the favourite consort of the Ottoman sultan Murad III (reigned 1574–95) and the mother of his son Mehmed III (reigned 1595–1603); she exercised a strong influence on Ottoman affairs during the reigns of both sultans.

Safiye, whose name means "pure one," is said to have been a native of Rezi, a mountain town in Albania. Until the death in 1583 of Nur Banu, the *valide sultan* (mother of the sultan on the throne), Safiye's influence was limited. Thereafter, as *haseki sultan* (mother of the heir to the throne), and after 1595 as *valide sultan,* she wielded great influence at the Ottoman court. Among those who enjoyed her favour was the thrice grand vizier (chief minister) Ibrahim Paşa. During the years of her greatest influence, she is said to have been partial to the interests of Venice. She was sent into retirement after the death of Mehmed III.

A mosque at Cairo, the Malikah Ṣafīyah, bears her name. Another mosque, in Istanbul, the Yeni Valide Cami, was begun on her orders and completed under Sultan Mehmed IV (reigned 1648–87).

Sag Harbor, resort village, Suffolk county, southeastern New York, U.S., in Southampton Town (township), at the east end of Long Island on Gardiners Bay. Situated on the site of an Indian village (Wegwagonock), it was first recorded in 1707. In the 19th century it was an important whaling port, rivaling Salem and New Bedford, Mass. The Old Whalers' Church and the Suffolk County Whaling Museum contain relics of that industry. Sag Harbor was New York's first port of entry (1789), and its Custom House also served as Long Island's first post office (1794). Long Island's first newspaper, the *Herald* (1791), was published in Sag Harbor. Inc. 1846. Pop. (1984 est.) 2,698.

Saga, city and *ken* (prefecture), northern Kyushu, Japan. Saga was the castle town of the lord (daimyo) Nabeshima Kansō. Traces of feudal days remain in the town's thatched roofs and the lotus-covered castle moats. Saga, the prefectural capital, is now an industrial centre noted for its cotton textiles and ceramic wares. A university was founded there in 1949. The town of Arita continues to produce its characteristic china and pottery, called Imari ware, which was developed by Ri Sampei, a Korean potter, in the 16th and 17th centuries.

Saga *ken* faces the Sea of Japan (north) and the Ariake Sea (south). Its area of 939 square miles (2,433 square km) includes the Tsukushi Plain, which is dissected by a network of creeks used for irrigation and drainage. Advanced agricultural techniques have been developed, and mechanization is extensive for large-scale orange cultivation, dairy farming, and cattle raising. Saga Plain is a major rice-producing area of Japan. Coal was an important industry until the shift of industrial energy sources to petroleum. Saga *ken* is believed to be the point at which the earliest contact between Japan and the Asian continent was made. In the late Tokugawa period (1603–1867) it was influenced by European culture through the city of Nagasaki. Pop. (1987 est.) city, 169,-851; *ken,* 881,000.

saga, in medieval Icelandic literature, broadly, any kind of story or history in prose, irrespective of the nature of the narrative or the purposes for which it was written; more narrowly, legendary and historical fictions in which the author has attempted an imaginative reconstruction of the past and organized the subject matter according to certain aesthetic principles.

A brief treatment of the saga in the latter sense follows. For full treatment, *see* MACROPAEDIA: Literature, The Art of.

Modern scholars recognize several subdivisions of the genre, including the kings' sagas, recounting the lives of Scandinavian rulers; the legendary sagas, treating themes from myth and legend; and the sagas of Icelanders, sometimes called family sagas. The latter group, the best-known and most important in terms of literary merit, are fictionalized accounts of life in Iceland during the so-called saga age (about 930 to 1050) and were written down during the period from about 1190 to 1320.

In Icelandic, *saga* (related to *segja,* "to say") means "what is said, or told," and this derivation indicates the importance of oral tradition in the development of the form. Indeed, it used to be thought that the sagas of Icelanders were little more than collections of oral traditions, concerning real individuals, that had finally been given written form after generations of circulation among the people. This view has been largely discredited, and nowadays scholars are increasingly inclined to regard these works as something very much closer to the modern conception of a historical novel, in which characters and situations may be real or imaginary but in which artistic rather than historical considerations are paramount. Although this view tends to decrease their value as historical record, it does not undermine the importance of the sagas of Icelanders in helping modern readers to understand the ethos of a past civilization; and, if their factual information about the pagan period cannot always be accepted uncritically, it can sometimes be verified by ethnology and folklore.

Human tragedy is dominant in the sagas of Icelanders. Ideals of heroism and loyalty are important, and revenge—in particular, the blood feud—often plays a significant part in the unfolding of the narrative. Reflection is

eschewed in favour of action, so that the inner motivation of the protagonists and the point of view of the author obtrude far less than in most modern novels. Characterizations of surprising depth and subtlety are often achieved by this technique, and parallels have been drawn between this feature of saga writing and the works of some modern writers.

There are some 30 sagas of Icelanders in all, of which the best known are probably *Egils saga,* often attributed to Snorri Sturluson (1179–1241), the most illustrious of the known medieval Icelandic authors; *Gísla saga,* a great outlaw story; and *Njáls saga,* usually considered the greatest Icelandic saga of all, telling of the fortunes of the hero Gunnarr and of the wise Njáll and his sons. The period from about 1230 to 1290, during which these works appear to have been written, has been described as the golden age of saga writing.

The kings' sagas tell of the kings of Norway and reflect the continued interest of the Icelanders in their old homeland. The earliest collections of them appeared in the period from 1200 to 1235. These are the anonymous *Morkinskinna* and *Fagrskinna* and the monumental *Heimskringla* ("Orb of the World") by Snorri Sturluson.

As the 13th century wore on, legendary sagas became increasingly popular. These make no pretentions to historical truth and express a delight in the bizarre and the supernatural. They are concerned with the Scandinavian and Germanic past, before the settlement of Iceland, and their heroes are usually legendary or semilegendary figures. They are of considerable antiquarian interest. A well-known example of this type of work is *Völsunga saga* (*c.* 1270), a retelling of the legends of the Nibelungen cycle.

Sagaing, town, central upper Myanmar (Burma), on the Irrawaddy River. It lies opposite the historical site of Ava and 10 miles



King Win Mingyi pagoda, Sagaing, Myanmar
C. Hoffmann—Shostal/EB Inc.

(16 km) southwest of Mandalay. Once the capital of Myanmar (1760–64), it occupies the southern end of a north–south ridge dotted with white pagodas, including the round-domed Kaunghmudaw, built in 1636. The Irrawaddy parallels the ridge and turns westward at Sagaing, at which a bridge (3,940 feet [1,200 m]) crosses to Ava on the east bank; it is the only bridge across the Irrawaddy and carries the Mandalay–Myitkyinā railway and road traffic. Segaing is essentially a river port trading in cotton, sesame, salt, and fruit. It is also at the head of a rail line west to Monywa on the Chindwin River.

The surrounding area, above the Chindwin confluence, lies in the heart of Myanmar's dry zone and is part of a major irrigation scheme. Sesamum, millet, rice, peas, wheat, and cotton are grown. Pop. (latest est.) 17,002.

Sagamihara, city, Kanagawa *ken* (prefecture), Honshu, Japan, on the Sagamihara Plateau. In the late 1930s a Japanese army camp in the surrounding sericultural region helped to unite neighbouring towns into Sagamihara, contributing to the city's growth. Among industries developed since 1955 are those producing metal products, machinery, electrical appliances, and processed foods. Sagamihara is connected to the Tokyo–Yokohama Metropolitan Area by rail and serves as a residential suburb. The surrounding region produces rice, wheat, tobacco, dairy cattle, and hogs. Pop. (1987 est.) 501,126.

Sagan, Carl (Edward) (b. Nov. 9, 1934, Brooklyn, N.Y., U.S.), American astronomer who provided a valuable insight toward an understanding of the origin of life in Earth's primeval environment when he demonstrated the production of amino acids in a mixture of methane, ammonia, water, and hydrogen sulfide gas irradiated by a long-wavelength ultraviolet source.

After obtaining his Ph.D. (1960) from the University of Chicago, Sagan taught at the University of California at Berkeley and at Harvard University and was an astrophysicist at the Smithsonian Astrophysical Observatory (1962–68).

With James B. Pollack and Richard M. Goldstein, Sagan conducted radar studies (1966) that showed that on Mars there existed ridges with a possible elevation of 10 km (6.2 miles). With Pollack, he showed that a surface temperature of 700 kelvins (425° C, or 795° F) is consistent with the observed properties of Venus. Moving to Cornell University, he became director of the Laboratory of Planetary Studies (1968) and worked on several U.S. unmanned space missions to Venus and Mars. His publications include *Atmospheres of Mars and Venus* (1961), *Planetary Exploration* (1970), *The Dragons of Eden: Speculations on the Evolution of Human Intelligence* (1977), *Broca's Brain: Reflections on the Romance of Science* (1979), and *Contact* (1985). He was a coproducer, as well as narrator, of the television series "Cosmos" (1980).

Sāgar, also called SAUGOR, town, central Madhya Pradesh state, central India. Sāgar was founded by Udan Singh in 1660 and was constituted a municipality in 1867. It is situated around a lake (Hindī: *sāgar*). A major road and agricultural-trade centre, it has industries such as oil and flour milling, sawmilling, ghee (clarified butter) processing, handloom cotton weaving, *bidi* (cigarette) manufacture, and railway and engineering works. The old Marāṭhā fort now houses a police training school. The town also has an industrial school and a school of horsemanship and is the seat of the University of Saugar (1946) and several affiliated colleges.

Sāgar is set in an extensive plain broken by low, forested hills and watered by the Sonār River. Wheat, gram, jowar (sorghum), and oilseeds are the principal crops of the region; there is extensive cattle raising. Sandstone, limestone, iron-ore, and asbestos deposits are worked. The archaeological site at nearby Eran has revealed several Gupta inscriptions. Pop. (1981) town, 160,392; metropolitan area, 174,770.

Sāgar Island, westernmost island of the Ganges delta, West Bengal state, northeastern India. It lies at the mouth of the Hooghly River (*q.v.*), an arm of which separates it from the mainland to the east. Situated at a point where the Ganges once met the Bay of Bengal, it is held particularly sacred and is a noted Hindu pilgrimage centre. A three-day bathing festival and large fair are held annually. The island, subject to severe cyclones, has a lighthouse on the southwestern shore to guide traffic up the Hooghly.

Sagasta, Práxedes Mateo (b. July 21, 1825, Torrecilla en Cameros, Spain—Jan. 5, 1903, Madrid), seven-time prime minister of Spain (1871–72, 1874, 1881–83, 1885–90, 1892–95, 1897–99, 1901–02).

Born into a family of modest means, Sagasta became an engineer. He was exiled twice for opposing Queen Isabella II's rule but returned in 1868 to help in the revolution that overthrew her. From 1880 he led the new Liberal Party. His attempt to conciliate both the Cubans and the United States by a tardy offer of Cuban home rule, along with other concessions, did not avert the disastrous Spanish-American War, and Spaniards criticized him for the humiliating peace treaty.

Sagaunash (Potawatomi Indian leader): *see* Sauganash.

sage (*Salvia officinalis*), also called COMMON SAGE, or GARDEN SAGE, aromatic perennial herb of the family Lamiaceae (Labiatae) native to the Mediterranean region, cultivated for its leaves, which are used fresh or dried



Sage (*Salvia officinalis*)
Ingmar Holmasen

as a flavouring in many foods, particularly in stuffings for poultry and pork and in sausages. The bushes grow about 2 feet (60 cm) tall and have rough or wrinkled and downy, gray-green or whitish green oval leaves, and flowers are coloured according to the variety: purple, pink, white, or red. Sage has slightly stimulating properties; tea brewed from its leaves has been used as a spring tonic for centuries. In medieval Europe sage was thought to strengthen the memory and promote wisdom. The essential-oil content of sage varies up to about 2.5 percent; the principal components are thujone and borneol.

S. officinalis, which has many varieties, grows wild and is cultivated in many parts of the world. Dalmatian sage, held in high esteem, is warmly fragrant and slightly bitter. There are several other species of *Salvia* (*q.v.*) that are also known as sage.

Sage, Russell (b. Aug. 4, 1816, Shenandoah, N.Y., U.S.—d. July 22, 1906, Lawrence Beach, Long Island, N.Y.), American financier who played a part in organizing his country's railroad and telegraph systems.

Sage's first job was as an errand boy in a brother's grocery store in Troy, N.Y. In his spare time he studied bookkeeping and arithmetic, and he began trading on his own. When he was 21, he used his profits to buy out the store of his other brother, Elisha Montague Sage. He sold the grocery store to open a wholesale grocery business in Troy in 1839 and made enough money to start a Hudson River shipping trade in groceries, meat, grain, and horses.

As a delegate to the Whig Convention of 1848, he supported Henry Clay. He served two consecutive terms in Congress from 1853 to 1857.

Sage had lent some money to the La Crosse Railroad in Wisconsin. To save his loans, he advanced more money and, in 1857, he

became vice-president with a major share of the stock. When the railroad extended into the Chicago, Milwaukee and St. Paul system, Sage made a profit on his investment. In 1863, he moved to New York City and gave his attention to stock and railroads. He was responsible for building 5,000 miles of track and eventually held an interest in more than 40 railroads, serving as director or president of 20. He also helped organize the Atlantic & Pacific Telegraph Co.

In 1872, Sage originated stock market "puts and calls," options to buy or sell a set amount of stock at a set price and within a given time limit. By manipulating securities, he and his ally, Jay Gould, gained control of the New York City elevated lines in 1881. Sage lost on the stock market only once, in the panic of 1884. He lost $7,000,000 and never again dealt in puts and calls. Toward the end of his life, Sage was also a money lender with as much as $27,000,000 loaned on call at a time.

In 1891, a man named Henry Norcross threatened to explode dynamite in Sage's office if he was not paid $1,200,000. Sage refused and survived the explosion, which killed Norcross.

His fortune at his death was estimated at $70,000,000. The Russell Sage Foundation was established in 1907 by his widow (his second wife), Margaret Olivia Slocum Sage (1828–1918). She also founded the Emma Willard School and the Russell Sage College, both in Troy, New York.

sagebrush, any of various shrubby species of the genus *Artemisia* of the composite family (Asteraceae). They are native to semi-arid plains and mountain slopes of western North America.

The common sagebrush (*A. tridentata*) is a many-branched shrub, usually 1 to 2 metres (about 3 to 6.5 feet) high, with silvery gray, bitter-aromatic foliage. The small, wedge-shaped leaves usually have three teeth at the outer end.

Sager, Ruth (b. Feb. 7, 1918, Chicago), U.S. geneticist chiefly noted for recognizing the importance of nonchromosomal genes.

After receiving a Ph.D. from Columbia University (1948), Sager undertook genetic research at the Rockefeller Institute (now Rockefeller University), New York City; in 1955 she returned to Columbia as a research associate until 1966, when she was appointed professor of biology at Hunter College, New York City.

While at the Rockefeller Institute she began to question the traditional belief that chromosomal genes constitute the only apparatus for transmitting genetic information to a cell. In 1953 she discovered in the alga *Chlamydomonas* the existence of a second genetic-transmitting system: a gene not located on the chromosomes of the alga. This gene controls the cell's sensitivity to the antibiotic streptomycin. Both male and female *Chlamydomonas*, she observed, are capable of transmitting the nonchromosomal gene.

Saginaw, city, seat (1835) of Saginaw County, east central Michigan, U.S., at the head of navigation on the Saginaw River (leading to Saginaw Bay in Lake Huron), 96 mi (154 km) northwest of Detroit. Saginaw, an Ojibwa (Chippewa) Indian word meaning "land of the Sauks," developed around a fur-trading post (established in 1816). It consolidated with South Saginaw in 1873 and with Saginaw City in 1889 to form the present city. A former lumbering centre, it has turned to agriculture and diversified manufacturing (especially auto parts). Major salt, coal, and oil deposits are nearby, and sugar beets and beans are produced in the Saginaw Valley. Inc. village, 1855; city, 1857. Pop. (1980) city, 77,508; (1982 est.) Saginaw–Bay City–Midland metropolitan area (SMSA), 415,300.

Saginaw Bay, southwestern arm of Lake Huron in eastern Michigan, U.S., extending southwest for 51 mi (82 km) from its entrance between Au Sable Point (northwest) and Pointe Aux Barques (southeast) to the Saginaw River at the head of the bay. Varying in width from 13 to 26 mi, the bay forms the approach to the port of Bay City, which lies 3 mi inland on the Saginaw River. Commercial fishing and summer recreation are popular activities in the bay region.

Sagittarius (Latin: Archer), in astronomy, zodiacal constellation lying between Capricornus and Scorpius, at about 19 hours right ascension (the coordinate on the celestial sphere



Sagittarius, illumination from a Book of Hours, Italian, *c.* 1475; in the Pierpont Morgan Library, New York City (MS. G.14)

By courtesy of the Pierpont Morgan Library, New York, the Glazier Collection

analogous to longitude on the Earth) and 25° south declination (angular distance south of the celestial equator). The centre of the Galaxy lies in Sagittarius, with the densest star clouds of the Milky Way. Near the western border of Sagittarius is the winter solstice, the southernmost point reached by the Sun in its apparent annual journey among the stars. Sagittarius also contains the Trifid Nebula (M 20), the Lagoon Nebula (M 8), and numerous globular star clusters.

In astrology, Sagittarius is the ninth sign of the zodiac, considered as governing the period *c.* November 22–*c.* December 21. It is represented either by a centaur shooting a bow and arrow or by an arrow drawn across a bow. The identification of Sagittarius as a mounted archer was made by the Babylonians as early as the 11th century BC.

Sagittarius A, strongest source of cosmic radio waves from the direction of the constellation Sagittarius. The source has been identified as the central nucleus of the Milky Way Galaxy. Most of the radio radiation is from a synchrotron mechanism, indicating the presence of free electrons and magnetic fields. In addition, the region comprises an intense source of infrared radiation that is thought to be emitted partly by stars and partly by circumstellar dust. Observations indicate that there could be 1,000,000 or more rapidly moving stars in an inner region one light-year in radius. It is also speculated that the galactic nucleus contains collapsed gas in the form of a black hole with a mass equivalent to 10,000 to 1,000,000 Suns. These properties are suggestive of those of other galaxies with active nuclei (*e.g.*, Seyfert galaxies), but on a very much smaller scale.

sago, food starch prepared from carbohydrate material stored in the trunks of several palms, the main sources being *Metroxylon rumphii* and *M. sagu,* sago palms native to the Indonesian archipelago.

Sago palms grow in low marshy areas, usually reaching a height of nearly 30 feet (9 metres) and developing thick trunks. The plant matures in 15 years, producing an inflorescence, or flower spike, and the pith, or central portion, of the stem becomes gorged with starchy material. When fruit is allowed to form and ripen, it absorbs the starch, leaving the stem hollow, and the tree dies after the fruit ripens. Cultivated plants are cut down when the flower spike appears, and their stems are divided into sections and split open so that the starchy pith may be extracted. The extracted material is grated to make a powder, which is kneaded with water over a strainer, through which the starch passes into a trough below, leaving any woody fibre behind. After several washings the resulting sago meal is ready for local use. When prepared for export, sago meal is mixed with water to form a paste and rubbed through sieves of various sizes, producing grains sold as pearl or bullet sago, depending upon their size.

Sago is almost pure starch, being composed of 88 percent carbohydrate, 0.5 percent protein, and minute amounts of fat, and contains only a trace of B vitamins. It is a basic food of the southwest Pacific area, where it is used in meal form to prepare soups, cakes, and puddings. Elsewhere, its use in cookery is mainly as a pudding and sauce thickener. In industry, it is used as a textile stiffener.

In Indonesia, sago forests are especially extensive on the Island of Ceram. Borneo, producing much of the sago imported into Europe, has added new plantings as a result of increased demand. Other Indonesian palms that are sources of sago include the gomuti palm (*Arenga pinnata*), the kittul palm (*Caryota urens*), and the cabbage palm (*Corypha umbraculifera*). Two South American species yielding sago are *Mauritia flexuosa* and *Guilielma gasipaes.*

Sagoyewatha (Seneca Indian): *see* Red Jacket.

Sagua la Grande, city, north central Villa Clara province, central Cuba. Lying on the Río Sagua la Grande, 15 mi (24 km) from its mouth, the city is a major port and regional manufacturing and commercial centre. The area is known primarily for its sugarcane, but rice, black beans, and livestock also are economically significant. Foundries, distilleries, railroad shops, lumberyards, and industrial plants that manufacture caustic soda are located in the city. Its ocean port, La Isabela, lies at the mouth of the river, which is navigable as far upstream as Sagua la Grande. Pop. (1981 prelim.) 52,315.

saguaro, also spelled SAHUARO (*Cereus giganteus*), large cactus, family Cactaceae, native to Mexico and Arizona and California in the United States. By authorities who split the genus *Cereus* into smaller genera, the name is *Carnegiea gigantea.*

Ribbed and columnar when young, a saguaro usually develops five or six branches at a height of about 5 metres (16 feet). Slow growing at first—it reaches only 2 centimetres (less than 1 inch) in height during its first 10 years—it grows about 10 cm a year after attaining a height of 2 to 3 m. It blooms for the first time when 50 to 75 years old. Mature saguaros may reach 15 m in height. They may die at 150 to 200 years of age, most commonly by being uprooted by wind or washouts. The shallow, wide-ranging roots, adapted to gathering moisture from a large area of desert, must sometimes support up to 9,000 kilograms (10 tons) of top growth.

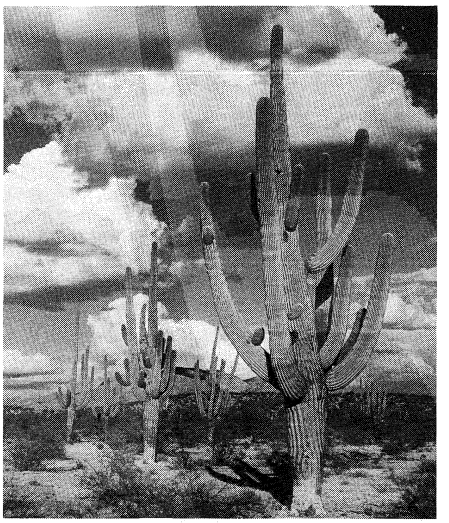
The white, night-blooming flowers, on top of trunk and branches, remain open part of the next day. The red fruits are an important food



Saguaro cactus (*Cereus giganteus*) in bloom
Willis Peterson

of Indians, who also use the woody saguaro skeletons.

Saguaro National Monument, mountain and desert region in southeastern Arizona, U.S., 16 mi (26 km) east of Tucson. Established in 1933, it comprises an area of 124 sq mi (321 sq km). It embraces forests of saguaro, a giant, candelabra-shaped cactus that may reach 50 ft (15 m) in height and live for 150 to 200 years. Vegetative features also include other succulent cacti (cholla, prickly pear, bisnaga) and paloverde, mesquite trees,



Saguaro (*Cereus giganteus*) growing in Saguaro National Monument, Arizona
Sunshine Climate Club

and ocotillo. Unique to southwestern United States and northwestern Mexico, the saguaro bears a white blossom (the Arizona state flower) and edible crimson fruit; it serves as a nesting place for wrens and other small birds.

Saguenay River, French RIVIÈRE SAGUENAY, river in Saguenay–Lac-Saint-Jean region, south central Quebec province, Canada, draining Lac-Saint-Jean into the St. Lawrence River at Tadoussac, about 120 mi (190 km) northeast of Quebec city. Flowing east-southeast, the Saguenay, in the first third of its 105-mi length, descends about 300 ft (90 m) in a turbulent stream. Below Chicoutimi, at the head of navigation, the valley is virtually a fjord through which the river, without shoals or obstructions (average depth, about 800 ft), continues between precipitous cliffs, which culminate in the majestic capes Trinity and Eternity, more than 1,600 ft high. The upper river and its tributaries are major sources of hydroelectric power; Shipshaw, Chute à Caron, and Isle-Maligne dams have a combined capacity of more than 1,500,000 kilowatts, most of which powers huge aluminum smelters at Jonquière and pulp and



The Saguenay River, Que.
Tourism Canada; photograph, P. Gaudard

paper mills at Chicoutimi, Jonquière, and La Baie (Port-Alfred). Ha Ha Bay, about 20 mi downstream from Chicoutimi, is a fjord-like arm of the Saguenay into which the Ha Ha River and Rivière à Mars empty near Port-Alfred.

Saguia el Hamra, northern region of the Western Sahara, West Africa. Stretching between Cabo (cape) Bojador and the de jure Moroccan border, its area is 31,660 sq mi (82,310 sq km). After Spain withdrew from the country in 1976, the region was under de facto administration of Morocco. The chief town is El Aaiún (*q.v.*). The climate is quite arid, rainfall being erratic and actually absent during many successive years. The indigenous population prior to 1976 was primarily nomadic and entirely Muslim; many are now refugees of the civil war at camps in Algeria. The chief Muslim town is Smara, which is connected by road to El Aaiún. Settled population (1982 est.) El Aaiún, 50,000; Smara, 7,280. Remaining population was nomadic and may have numbered about 40,000.

Sagunto, Latin SAGUNTUM, town, Valencia province, in the autonomous community (region) of Valencia, eastern Spain, at the foot of the Peñas de Pajarito, on the western bank of the Río Palancia, just north-northeast of Valencia city. Of Iberian origin, the town is the ancient Saguntum, which is thought to have been founded by Greek colonists from Zákinthos (Zante; whence its name). About 225 BC, the Romans, disquieted by the growth of Carthaginian power in Spain, concluded an alliance with the Carthaginian general Hasdrubal that guaranteed the independence of Saguntum and required his forces not to cross the Río Ebro. In 219 BC, however, the town was taken by Hannibal, the brother of Hasdrubal, after a heroic resistance. Rome complained to Carthage, demanding Hannibal's surrender; this demand was rejected, and the Second Punic War began. After the Romans recaptured Saguntum in 214, they restored its ancient importance; its inhabitants received Roman citizenship, and they enriched the town with the monuments of which the remains may still be seen. The Roman theatre built under the emperors Lucius Septimius Severus and Caracalla is the most notable building. There are also remains of different periods; the acropolis (fortresses on the curved crest of rock that dominates the city), the temples of the goddesses Diana and Venus, and the aqueduct (constructed in various structural types ranging from crude Iberian through Roman and Moorish). The Moors called the town Murbiter (from *muri veteres,* "old walls"), which perhaps gave rise to the name Murviedro, by which it was known until 1877.

Sagunto has light industrial development, and its port exports minerals and citrus fruits. It is a busy rail junction for the eastern Spanish seaboard. Pop. (1981) 54,759.

Saha, Meghnad N. (b. Oct. 6, 1893, Seoratali, near Dacca, India—d. Feb. 16, 1956, New Delhi), Indian astrophysicist noted for his development in 1920 of the thermal ionization equation, which, in the form perfected by the British astrophysicist Edward A. Milne, has remained fundamental in all work on stellar atmospheres. This equation has been widely applied to the interpretation of stellar spectra, which are characteristic of the chemical composition of the light source. The Saha equation links the composition and appearance of the spectrum with the temperature of the light source and can thus be used to determine either the temperature of the star or the relative abundance of the chemical elements investigated.

Saha became professor of physics at the University of Allāhābād in 1923 and was elected a fellow of the Royal Society in 1927. He went to the University of Calcutta in 1938, where he was instrumental in the creation of the Calcutta Institute of Nuclear Physics, of which he became honorary director.

In his later years Saha increasingly turned his attention to the social relation of science and founded the outspoken journal *Science and Culture* in 1935. In 1951 he was elected to the Indian Parliament as an independent. He co-authored *A Treatise on Heat* (4th ed., 1958) and *A Treatise on Modern Physics* (1934). One of his most important papers is "Ionization in the Solar Chromosphere," *Phil. Mag.* (vol. 40, 1920).

Ṣaḥābah (Islām): *see* Companions of the Prophet.

Sahak: *see* Isaac the Great, Saint.

Sahaptin, also spelled SHAHAPTIN, group of North American Indian tribes inhabiting what is now southeastern Washington, northeastern Oregon, and west central Idaho, in the basin of the Columbia River and its tributaries, and speaking related Sahaptian languages of Penutian stock. Major groups included the Cayuse, Molala, Palouse (or Palus), Nez Percé (*q.v.*), Tenino, Umatilla, Wallawalla, and Yakima (*q.v.*).

The Sahaptin were southern members of the so-called Plateau culture area, lying between the Rocky Mountains and the Cascade Range. A semi-arid region of sagebrush and grass, with only scattered pine, their lands were nevertheless cut by the world's greatest salmon-producing river, the Columbia, so that even groups in deserts had a regular food supply. They also hunted such game as deer and gathered berries and roots.

The western groups (Molala, Tenino, and Yakima) had only a vague sense of tribal unity, effective usually only for common defense; the primary political unit was the autonomous village composed of a band of related families. The eastern tribes (Nez Percé, Palouse, Cayuse, and Umatilla), influenced by the Plains culture over the Rockies, had superimposed on this village society a somewhat stronger tribal cohesion; there was a tribal chief and council, and families tended to marry intertribally. Moreover, whereas the western groups tended virtually toward pacifism, the eastern groups were warlike and adopted much of the Plains-type warfare, with its grading of war honours and bravery and its resort to such practices as scalping and war

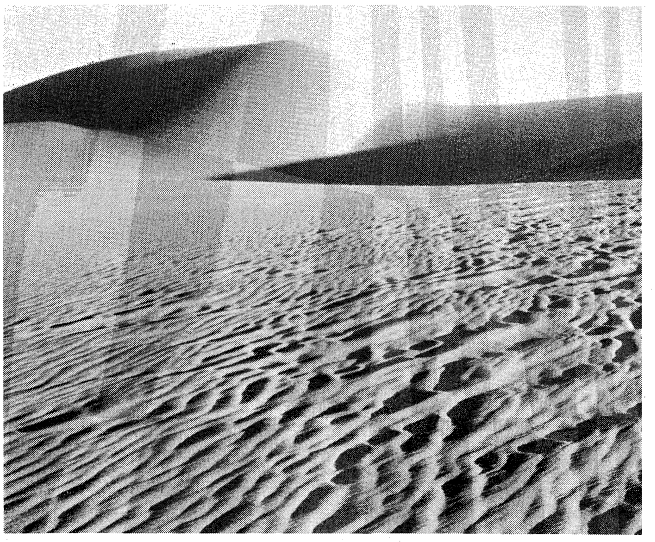
dances. The major foes of the Sahaptins were the Shoshoni and Paiute to the south.

Religious belief centred on guardian spirits, whose existence was revealed in visions. Shamans, or medicine men, were respected religious and social leaders.

From the middle of the 19th century onward, most of the Sahaptin, along with other Plateau tribes in the United States, were forced onto the large Nez Percé, Colville, Yakima, Umatilla, and Warm Springs reservations and other smaller reservations. Because peoples of different tribes were often collected indiscriminately, it is now often difficult to distinguish between their descendants.

Sahara (from Arabic *ṣaḥarā'*, "desert"), largest tropical and climatic desert in the world, encompassing almost all of northern Africa.

A brief treatment of the Sahara follows. For full treatment, *see* MACROPAEDIA: Africa.



Moving sands near al-Jadīdah, Egypt, in the Sahara
Georg Gerster—Photo Researchers

The Sahara is bordered by the Atlantic Ocean to the west, the Mediterranean Sea and the Atlas Mountains to the north, the Red Sea to the east, and the Sahel, a transitional zone of semidesert steppe and thorn scrub, to the south. The Sahara includes portions of 11 countries: Western Sahara, Morocco, Algeria, Tunisia, Libya, Egypt, Mauritania, Mali, Niger, Chad, and The Sudan.

The topography of the Sahara is dominated by the monotony of its plains. Even the escarpments, stretching for long distances, provide only slight variety. The most prominent feature is the Mid-Sahara Rise, a series of peneplains and plateaus formed by the Adrar des Iforas, Ahaggar, Tibesti, and Ennedi mountains. The rise encloses a depression, separated by the Aïr massif into two expanses of unequal size—the Jadal and Talak regions in the west, and the larger Ténéré region in the east. Networks of valleys extend over the mountains and plains; valley sands retain water that can be obtained from springs, ephemeral lakes, and water holes. Except for areas of absolutely smooth rock surfaces, the plains are covered with angular stone fragments of boulders, gravel, and sand. Ergs (areas of continuous sands) are often considered to be a typical feature of the desert, although they cover only about 20 percent of the Saharan surface. Within ergs, pyramid-shaped dunes are formed, mainly oriented in a southwesterly direction with many reaching heights from 325 to 750 feet (100 to 230 m). Erosional forces have produced fantastic rock formations in the sandstone regions, and on the plains petrified trees are found, half-buried in the sand.

The Sahara climate, controlled by the north–south shifting of the tradewind belt, exhibits many extremes. It has the highest evaporation rates in the world and contains the largest areas receiving no precipitation for years at a time. The temperatures may also reach extremes, with frost and ice appearing at high altitudes and some of the hottest recorded temperatures on Earth occuring at lower elevations. A great poverty of plant species prevails over large areas, especially in the drier eastern half of the Sahara.

The plants found most frequently in the various zones of the Sahara include grasses; members of the pea, goosefoot, and sunflower families; date and doum palms; and tamarisk and acacia trees. The characteristic animal of the plateau is the gazelle, while in the mountain regions the waddan (aoudad, a wild sheep) is predominant. Other animals occur only sporadically or in specialized locations. Huge areas of the Sahara are wholly empty, but wherever meagre vegetation or reliable water sources occur, scattered clusters of inhabitants survive in fragile ecological balance. The Sahara is rich in metallic minerals such as iron, copper, manganese, tin, nickel, chromium, zinc, lead, cobalt, silver, gold, platinum, thorium, and uranium. Inaccessibility, however, delays exploitation. Major oil and gas reserves and vast underground reserves of water have also been found. The principal transportation routes run from west to east with a network of recognized tracks emanating from them. Ground travel is supplemented by numerous international air services. Area 3,320,000 square miles (8,600,000 square km).

Consult the INDEX *first*

Saharan Atlas, French ATLAS SAHARIEN, part of the chain of Atlas Mountains, extending across northern Africa from Algeria into Tunisia. The principal ranges from west to east are the Ksour, Amour, Ouled-Naïl, Zab, Aurès, and Tebéssa, or Tabassah. Mount Chélia (7,638 feet [2,328 m]) is the highest point in northern Algeria, and ash-Sha'nabī (5,066 feet [1,544 m]) is the highest peak in Tunisia. Iron ore is mined near Mount Ouenza, and there are extensive phosphate deposits near the town of Tebéssa, both in Algeria.

Saharan languages, group of African languages spoken in Chad and northeastern Nigeria. They include Kanuri, which is the most important language of northeastern Nigeria; Teda, spoken in northern Chad; and Zaghawa, spoken in east-central Chad near the border with The Sudan. Linguists often consider the Saharan languages to be a branch of a much larger Nilo-Saharan language family, along with Songhai, Fur, the Koma languages, the Maba languages, and the Chari-Nile languages.

Sahāranpur, town, northwestern Uttar Pradesh state, northern India, at the junction of several roads and rail lines. Sahāranpur, founded about 1340, is named for Shah Haran Chishtī, a Muslim saint. Its industries include railway workshops, cotton and sugar processing, papermaking, and manufacturing. There is also an active trade in agricultural produce. The Central Fruit Research Institute, the Government Botanical Gardens, an aviation training centre, and several colleges are located in the town. Principal crops of the surrounding region are grains, cotton, and sugarcane. Pop. (1981) 295,355.

Saharsa, town, northeastern Bihār state, northeastern India. The town is a major rail and road hub and has an electric power station. It was constituted a municipality in 1961.

The surrounding region consists of fertile alluvial plains, irrigated by the Kosi River and its tributaries. Rice, corn (maize), oilseeds, and jute are the principal crops. Pop. (1981) 57,580.

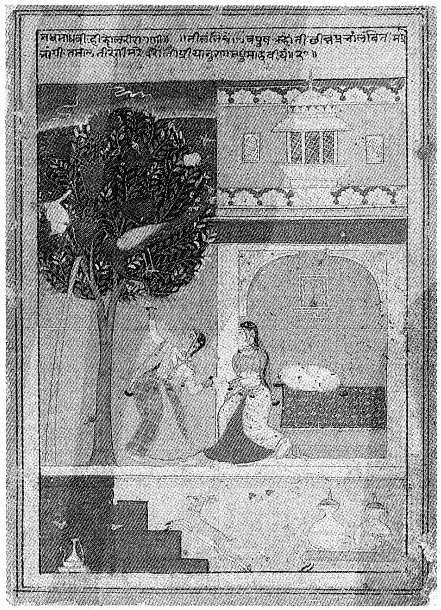
Sahdol (India): *see* Shahdol.

Sahel, Arabic SĀḤIL, semiarid region of western Africa extending from Senegal to The Sudan. It forms a transitional belt that borders the edges of the arid Sahara. It is also defined as the northern reaches of the Sudan, a vast tract of open savanna plains, which extends southward to tropical western Africa. The Sahel stretches from the Atlantic Ocean through northern Senegal, southern Mauritania, the great bend of the Niger River in Mali, Burkina Faso (formerly Upper Volta), southern Niger, northeastern Nigeria, south-central Chad, and The Sudan. It has natural pasture, with low-growing grass and tall, herbaceous perennials. Forage for animals (camel, pack ox, and grazing cattle and sheep) consists of such shrubs as thorns and such trees as the acacia and baobab. Thorns once formed a woodland, but the country is now more open and relatively traversable by motor vehicle. Trees are deciduous and have deep roots that hold the sand down. The terrain is chiefly of the savanna type, with little continuous cover and a dangerous tendency to merge into desert because of overstocking and overfarming. At least eight months of the year are dry, and rain, confined to a short season, averages 4–8 inches (100–200 mm), mostly in June, July, and August. There are also wide areas of pasturage watered by the flooding Niger and Sénégal rivers and by Lake Chad. Millet and peanuts (groundnuts) grow, grudgingly, even in the most unfavourable parts.

The fragile nature of agriculture and pastoralism in the Sahel was demonstrated in the early 1970s, when a long period of drought, beginning in 1968, led to the virtual extinction of the crops and the loss of 50 to 70 percent of cattle. In 1972 there was practically no rain at all, and by 1973 sections of the Sahara had advanced southward up to 60 miles (100 km). Loss of human life by starvation and disease was estimated in 1973 at 100,000, and although losses declined afterward through relief efforts, the consequences of malnutrition for those who survived, especially the children, were appalling. The drought finally broke in late August and early September 1974. Severe drought and famine again afflicted the Sahel in 1983–85.

In northern Africa the term Sahel is applied to the coastal band of hills in Algeria and to the steppelike eastern coastal plain of Tunisia.

Sāhibdīn (fl. 17th century, India), an outstanding Indian artist of the Mewār school of Rājasthanī painting (*see* Mewār painting). He is one of the few Rājasthanī artists whose name is known, and his work dominated the Mewār school during the first half of the 17th century. Though he was a Muslim, Sāhibdīn was fully at ease with Hindu themes and painted several series illustrating religious epics.



Rāginī Madhumādhavi, miniature from a rāgamālā series by Sāhibdīn, 1628; in the National Museum, New Delhi

Pramod Chandra

Sāhibdīn produced abstract compositions that are full of brilliant colour and are endowed with religious fervour. Among the important examples of his work that have survived are the *rāgamālā* (musical modes) series dated 1628, of which many paintings are now in the National Museum of India; a series on the scriptural text the *Bhāgavata-Purāṇa,* painted in 1648, now in the Bhandarkar Oriental Research Institute, Pune; and the sixth book (*Yuddha-kāṇḍa*) of the Hindu epic the *Rāmāyaṇa,* painted in 1652, now located in the British Museum, London.

Sāḥil, as-, Latin BYZACIUM, coastal plain in the eastern Mediterranean littoral of Tunisia, comprising a sandy coast with large bays and lagoons of the Mediterranean and situated between the sea and the steppe country of central Tunisia. The region extends from the town of an-Nafīdah on the central coast of al-Ḥammāmāt Gulf in the north to the town of Qābis on the Gulf of Gabes (Khalīj Qābis) in the south, but as-Sāḥil (Arabic: "Shore") in particular designates the stretch of land between the towns of Sūsah and Ṣafāqis. The islands of Jarbah and ash-Sharqī are also considered a part of as-Sāḥil. The region has adequate rainfall for irrigation brought by the *chergui* (eastern) wind.

As-Sāḥil was first inhabited by the Phoenicians in the 9th century BC. Cereal growing is traditional, especially wheat and barley; Hannibal introduced the cultivation of olive trees in about 203 BC. In AD 1091 Muslim refugees from Sicily settled in the region.

The chief industries are based on the pressing of olive oil and the manufacture of soaps. Pottery making, weaving, and fishing are also economically important. As-Sāḥil is densely populated and characterized by closely spaced villages. The inhabitants are referred to as either Sāḥilī, in Arabic, designating persons "from the coastal region," or Afaqi, a local term designating "sedentary villagers." The main towns include Sūsah, locally referred to as the pearl of as-Sāḥil; al-Munastīr, the birthplace of the first Tunisian president, Habib Bourguiba; al-Mahdīyah, the marketplace of the villagers; and Ṣafāqis, an important port and a trading centre.

Sāhiwāl, formerly MONTGOMERY, city, east-central Punjab province, east-central Pakistan. The city was founded in 1865 and named for Sir Robert Montgomery, then lieutenant governor of the Punjab. It is connected by rail and road with Lahore and is an important cotton centre, with ginning factories and carpet production. It was constituted a municipality in 1867. Institutions include a hospital and two colleges affiliated with the University of the Punjab.

The city lies in the densely populated region between the Sutlej and Rāvi rivers. Irrigation in the region is provided by the Bāri Doāb Canal system. The principal crops are wheat, cotton, tobacco, legumes, and oilseeds. Cotton goods and lacquered woodwork are manufactured. Southwest of Sāhiwāl is Harappā, the site of the earliest-known urban culture of the Indian subcontinent. About 28 miles (45 km) west of Sāhiwāl, at Kamālia, is the site of a Malli city captured by Alexander the Great in 325 BC. Pop. (1981) city, 150,954.

Sahle Miriam (Ethiopian emperor): *see* Menelik II.

Sahle Selassie (b. 1795 or 1801—d. 1847), ruler (1813–47) of the kingdom of Shewa (Shoa), Ethiopia, grandfather of Emperor Menelik II (reigned 1889–1913) and great-grandfather of Emperor Haile Selassie I. His name means "Clemency of the Trinity."

A member of the Amhara royal family, Sahle Selassie ruled the feudal, semi-independent kingdom of Shewa after his father's assassination and a brief period of anarchy. A strong but kindly ruler, he expanded and consolidated Shewa, attempting to extend his rule over the Galla peoples in the south. He was interested in Western technology and signed trade and friendship treaties with France and Great Britain.

Saho, also spelled SAO, SHAHO, SHOHO, or SHIHO, also called AFAR-SAHO, a language spoken by several peoples, most of whom inhabit the coastal plains of the southern Eritrea region of northern Ethiopia. Saho is generally classified as an Eastern Cushitic branch of the Hamito-Semitic (or Afro-Asiatic) language family. The Saho-speaking peoples are bordered on the north by the Tigre, on the west by the Amhara, and on the south and east by the Afar, with whose language their own forms a single group.

Most of the Saho speakers are Muslims who practice Ṣūfism, or Islāmic mysticism. They are almost all nomadic shepherds, migrating in the winter to the coastal plains with their herds of camels, sheep, and goats.

The largest single unit of Saho speakers is the Asaorta, who practice intensive cultivation, having adopted their methods from the neighbouring Amhara; the Asaorta are Muslims. The Minifere of southern Eritrea comprise a mixture of Christians and Muslims and are said to constitute a buffer zone that prevents northern expansion by the Afar. The Irob are Saho-speaking Christians living within Amhara territory and assimilated into the Amhara culture and language. The northernmost Saho group is the Teroa, who are unique among the Saho pastoralists in possessing large herds of oxen.

Other groups include the Hazu, nomads living in perpetual feud with the Afar; the Debri-Mela, composed of Saho-speaking Muslims and Ethiopic Christians who speak both Saho and Tigré; and small Arab clans that have an important influence in the Islāmization of the whole region.

Sahpo Muxika (Indian chief): *see* Crowfoot.

Sahsarām (India): *see* Sasarām.

sahuaro (cactus): *see* saguaro.

Sahuayo, in full SAHUAYO DE DÍAZ, city, northwestern Michoacán state, west-central Mexico, on the central plateau, at 5,085 feet (1,550 m) above sea level. Although the climate is temperate, rainfall is only moderate. Irrigation has opened up land for the cultivation of corn (maize), beans, wheat, chickpeas, and tomatoes. The livestock industry is also significant, and dairying is widespread. Coal deposits are found nearby. The Heroica Nogales–Guadalajara–Mexico City highway passes through Sahuayo, linking it with Morelia. A road also leads to La Barca (Jalisco state), on the Lerma River. Pop. (1970) 28,-727.

Sahul Shelf, submarine stable structural shelf or platform of the ocean floor, extending from the north coast of Australia to the island of New Guinea. A continental shelf, it was once above sea level, and its surface still bears erosional features formed when streams crossed it to the oceans. The shelf was slowly warped downward by crustal forces. This subsidence is evidenced in coral atolls along its edge (2,000 feet [600 m] deep), composed of coral that grew as the land sank. The shelf's main divisions are the shallow 360,000-square-mile (930,000-square-kilometre) Arafura Shelf, covered by the Arafura Sea and Gulf of Carpentaria; the Sahul Shelf (120,000 square miles [310,800 square km]) under the Timor Sea; and the Rowley Shelf (120,000 square miles) underlying a part of the northwest Indian Ocean extending to North West Cape, Western Australia. To the north lie the deeper Timor Trough and the volcanic Lesser Sunda Islands, separating the Sahul from the Sunda Shelf. The shelf's existence was suggested as early as 1845 by G.W. Earl.

Sai Ong Hue, also called SETTHATHIRAT II, or ONG LO (d. 1735), ruler (1700?–35) of the Lao kingdom of Lan Xang which, during his reign, was divided into two rival kingdoms at Vientiane and Luang Prabang.

Sai Ong Hue was a grandson of the great ruler Suliyavongsa. He spent most of his early years as a prince of the royal house in exile at Hue (now in Vietnam) while a usurper sat on the throne of Lan Xang. In 1698 he attacked Vientiane, the capital of Lan Xang, and with the aid of Vietnamese forces ousted the pretender and secured the city. In 1700 he declared himself king, and in 1705 he moved the Prabang Buddha, sacred religious statue and symbol of royalty, from Luang Prabang to Vientiane. His rival, Kingkitsarat, succeeded in capturing Luang Prabang from Sai Ong Hue in 1707. The two enemies immediately appealed to the larger, more powerful surrounding states to maintain their kingdoms. Sai Ong Hue turned to Vietnam and Siam, becoming vassal to both and initiating conditions of dependence, disunity, and outside interference that were to plague Laos for the next three centuries.

Saianogorsk (Russian S.F.S.R.): *see* Sayanogorsk.

Ṣā'ib, in full MĪRZĀ MUḤAMMAD ʿALĪ ṢĀ'IB, also called ṢĀ'IB OF TABRIZ, or ṢĀ'IB OF EṢFAHĀN (b. 1601/02, Tabriz—d. *c.* 1677), Persian poet, one of the greatest masters of a form of classical Arabic and Persian lyric poetry characterized by rhymed couplets and known as the ghazel.

Ṣā'ib was educated in Eṣfahān, and in about 1626/27 he traveled to India, where he was

received into the court of Shāh Jahān. He stayed for a time in Kabul and in Kashmir, returning home after several years abroad. After his return Shāh 'Abbas II bestowed upon him the title King of Poets.

Ṣā'ib's reputation is based primarily on some 300,000 couplets, including his epic poem *Qandahār-nāma* ("The Campaign Against Qandahār"). His "Indian style" verses reveal an elegant wit, a gift for the aphorism and the proverb, and a keen appreciation of philosophical and intellectual exercise. In addition to his remarkable output of Persian verse, Ṣā'ib wrote poetry in Turkish.

Saichō, posthumous name DENGYŌ DAISHI (b. 767, Ōmi province, Japan—d. 822, Hiei-zan), monk who established the Tendai sect of Buddhism in Japan.

A priest at the age of 13, Saichō was sent to China to study in 804 and returned with the highly eclectic Tendai (T'ien-t'ai in Chinese) teachings. Unlike other Buddhist sects then in existence in Japan, the Tendai sect taught that there could be meaning and value in the external material world and that the teachings of the Buddha are accessible to all, not just to a select few.

Saichō built his monastery on Hiei-zan near Kyōto. He soon became a favourite of the emperor and received the court's generous patronage, which made his monastery one of the most powerful centres of Buddhist learning. While the monks of the older Buddhist sects lived in the cities, Saichō required his monks to spend 12 years in seclusion under strict discipline on Hiei-zan. He foreshadowed later Japanese Buddhist trends in his reverence for the Shintō deities and his emphasis on the patriotic mission of Buddhism. Frequently engaged in polemics with other Buddhist leaders, Saichō was more significant as a leader and organizer than as a religious thinker.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Ṣa'īd, aṣ- (Egypt): *see* Upper Egypt.

Sa'īd ibn Sulṭān, in full SA'ĪD IBN SULṬĀN IBN AḤMAD IBN SA'ĪD AL-BŪSA 'IDĪ, also called SA'ĪD IMĀM, or SA'ĪD SAYYID (b. 1791, Oman—d. Oct. 19, 1856, at sea), ruler of Muscat and Oman and of Zanzibar (1806–56), who made Zanzibar the principal power in East Africa and the commercial capital of the western Indian Ocean.

Early years. Born in 1791, Sa'īd succeeded his father jointly with his brother Salīm in 1804, but their cousin Badr immediately usurped the throne. In 1806 Sa'īd assassinated Badr and became virtual sole ruler, though Salīm, a nonentity, had titular status until his death in 1821. Although Europeans frequently called him imam and sultan, Sa'īd himself used the style sayyid. He was never elected to the purely religious office of imam that all his predecessors held.

His earlier years were complicated by family and tribal quarrels, by Anglo-French rivalry in the Indian Ocean, by the expansion of the Wahhābī Muslim puritan movement in Arabia, and by the incessant depredations of the Qawāsim pirates. He developed a small army and a fleet that also served mercantile purposes. His pilgrimage to Mecca in 1824 demonstrated that he had overcome both internal and external enemies and could risk absence from his own land.

Rise to power. At this time the eastern African coast was divided into numerous small states owing allegiance to Oman because Oman had expelled the Portuguese from them in 1698. At Sa'īd's accession Omani weakness made this allegiance little more than nominal, for at Mombasa the Mazar'i family had set up a virtually independent dynasty. In 1822 Sa'īd sent an expedition that drove them from Pemba Island. A British naval force occupied Mombasa irregularly from 1824 to 1826, when the action was repudiated by the British government. In 1827 Sa'īd went to assert his authority in person: one effect was greatly to increase the revenues remitted. There ensued a struggle between Sa'īd and the Mazar'i for Mombasa that ended only in 1837 when, by a ruse, he took some 30 of the enemy captive. All were deported and some were killed. If he preferred peaceable settlements, Sa'īd could show himself as ruthless as any Mamlūk.

Sa'īd first visited Zanzibar in 1828; he shortly acquired the only two properties on which cloves were then grown. He lived to make the islands of Zanzibar and Pemba the largest clove producers in the world. By 1834 it was believed that he intended to transfer his capital from Muscat to Zanzibar, but, until the 1840s, he divided his time more or less equally between them. His interest in East Africa was not simply to gain increased tax revenue: it was primarily commercial. From the 1820s caravans from Zanzibar reversed the immemorial system of trade by which African products had been brought to the coast by African caravans. Now the Zanzibar caravans, Sa'īd's among them at latest by 1839, actively sought ivory, slaves, and other products, and a wholly new commercial system was created reaching beyond Lake Tanganyika and into modern Uganda. At a formal level the transfer of his court and other changes are marked by the establishment in Zanzibar of foreign consulates: United States (1837), Britain (1841), France (1844). These countries, with Germany, became the principal buyers, but Sa'īd also exported goods in his own ships to Arabia and India and, occasionally, to Europe and to the United States. By the 1840s he had made Zanzibar the principal power in eastern Africa and the commercial capital of the western Indian Ocean. There was no false modesty in his remark, "I am nothing but a merchant." Trade was his predominant interest.

Throughout his reign he was under British pressure to end the slave trade. He told a captain of the Royal Navy that "to put down the slave trade with the Muslims, that is a stone too heavy for me to lift without some strong hand to help me." By a treaty of collaboration with Britain concluded in 1822, he agreed to forbid his subjects to sell slaves to the subjects of Christian powers. By 1842 the average annual import of slaves was reported as approximately 15,000, some doubtless necessitated by the development of the clove plantations. In 1845 he signed a further treaty with Britain, prohibiting both the export and import of slaves from or into his African dominions. His domestic slaves may have numbered more than 1,000. On his death, his will freed them but not his plantation slaves.

Assessment. Sa'īd's commercial empire had no developed system of administration. His government was essentially personal and patriarchal, and he sat daily in public to settle cases and complaints. He depended heavily in his commercial ventures on Indian merchants, whose immigration he encouraged. His naval force was commanded by officers who also traded on his behalf. Sa'īd belonged to the Ibāḍī sect of Islām, which, if puritanical, is notably tolerant of others. A majority of his subjects were Sunnite Muslims, and for them he appointed a special judge.

His daughter Salamah's *Memoirs of an Arabian Princess* (1886) gives an intimate portrait of his private life. He left no children by his legal wives, but he maintained some 70 *surias*, or concubines, chiefly Circassians or Ethiopians, by whom he had 25 sons and an unknown number of daughters. Strict in his habits, lavish in his generosity, he was an affectionate father, taking great pleasure in elaborate family gatherings. He had a patriarchal relationship with his many slaves, whose weddings he sometimes attended. He was a keen horseman and practical seaman. He died at sea in 1856 and was greatly mourned by his subjects. His will divided his dominions between his sons Mājid, who became ruler of Zanzibar, and Thuwayn, who received Muscat and Oman. Sa'īd, wrote the British consul, was "most truly every man's friend: he wishes to do good to all." (G.S.P.F.-G.)

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Sa'īd ibn Yūsuf al-Fayyūmī (Jewish philosopher): *see* Sa'adia ben Joseph.

Sa'īd Pasha (b. 1822, Cairo—d. Jan. 18, 1863, Alexandria), Ottoman viceroy of Egypt (1854–63) whose administrative policies fostered the development of individual landownership and reduced the influence of the sheikhs (village headmen).

Sa'īd, the fourth son of the viceroy Muḥammad 'Alī Pasha, was educated in Paris and, in 1854, succeeded 'Abbās I as viceroy of Egypt. He was influenced by Western forms of landownership, and, under pressure from Western financiers to change Egypt's traditional system of land tenure, he enacted, in 1855, a law that permitted the male descendants of a peasant to inherit his land. Three years later Sa'īd passed another law limiting land inheritance to Muslims, thus considerably reducing the circle of relatives entitled to an inheritance. Few peasants owned land, however, and these provisions had limited applicability. To correct the situation, an article in the second law provided that a peasant who held a plot of land for five consecutive years and paid the taxes on it would acquire irrevocable ownership and the right to sell, mortgage, or exchange his land.

This increase in the property rights of peasants was accompanied by a corresponding decrease in the authority of the sheikhs, who lost the right to distribute land among the peasants, either on the death of a peasant or at periodic intervals. Sa'īd abolished the collective responsibility of a village for payment of taxes, a practice that had permitted the sheikhs to divide the village tax burden among the peasants, and he levied taxes directly on individual cultivators. He also confiscated some of the land held by the sheikhs and drafted their sons, who had hitherto been exempt, into the army.

Sa'īd attempted innovations in other areas. In 1861 he established a commission to work out a municipal code for Egyptian cities; nothing came of this initiative, largely because of the opposition of foreign powers. Sa'īd also unsuccessfully attempted to end the flourishing slave trade by banning the importation of slaves from the Sudan. One of his most momentous acts was to grant a concession to a French company in 1856 for the construction of the Suez Canal. By 1859 both Sa'īd and the Ottoman sultan had come to oppose the plan, and for the rest of Sa'īd's reign work continued on the canal without official permission.

Saïda, town, northwestern Algeria, on the southern slopes of the Tell Atlas and the northern fringe of the Hauts (high) Plateaux. The city's site has been of military importance since the construction there of a Roman fort. Saïda was a stronghold of Abdelkader, the Algerian national leader who burned the town upon the approach of French forces in

1844. Modern Saïda was founded as a French military outpost in 1854 and once housed a regiment of the French Foreign Legion. Its growth was stimulated by the arrival of the Oran–Bēchar railway, and it was incorporated in 1862.

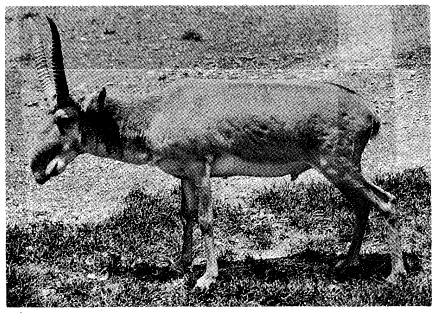
The town lies along the right bank of the Wadi Saïda, protected by the Abd el-Krim (3,966 feet [1,209 m]), wooded mountains on the opposite shore that rise steeply from the valley floor. The surrounding region is fertile and well-watered, and cereals (mainly wheat), olives, and grapes are grown to the north. Esparto grass and cereals are grown and goats and sheep are herded in the dry steppelike Hauts Plateaux and in the Saharan Atlas. These resources combine to make Saïda a trade centre for sheep, wool, and cereals. It is also noted for fine leatherwork and especially for its mineral waters (bottled and sold nationally). Pop. (1977) mun., 61,698.

Saida (Lebanon): *see* Sidon.

Saidpur, town, northwestern Bangladesh. A jute-processing and export centre, it is a major railway terminus containing large railway workshops. It has a college affiliated with the University of Rājshāhi. Pop. (1981 prelim.) 128,085.

Saifganj (India): *see* Katihār.

saiga (*Saiga tatarica*), medium-sized hoofed mammal, family Bovidae (order Artiodactyla), that lives in herds in treeless steppe country. Once common from Poland to western Mongolia, it was greatly reduced by hunting and no longer exists in Eastern Europe. It was given complete protection by the Russian government in 1919 and since then has increased in numbers in Siberia.



Saiga (*Saiga tatarica*)
Cy LaTour at the Dallas Zoo

The most outstanding feature of the saiga is its swollen snout with downward-directed nostrils. The snout may serve to warm and moisten inhaled air, or it may be related to the animal's keen sense of smell. The adult saiga stands about 76 cm (30 inches) at the shoulder. Its coat is short and pale brown in summer, thick and whitish in winter. The male bears ridged, amber-yellow horns that are somewhat lyre shaped. These horns were highly valued in Chinese medicine and were the main reason the saiga was so widely hunted.

Saigō Takamori, original name KICHIBĒ, or KICHINOSUKE, literary name NANSHŪ (b. Dec. 7, 1827, Kagoshima, Kyushu, Japan—d. Sept. 24, 1877, Kagoshima), a leader in the overthrow of the Tokugawa shogunate who later rebelled against the weaknesses he saw in the Imperial government that he had helped to restore. Although his participation in the restoration made him a legendary hero, it also, to his mortification, relegated his samurai class to impotence.

Early life. Saigō was born in 1828 at Kagoshima. His family were samurai of a low but honourable rank whose traditional responsibility was that of serving in the feudal lord's bodyguard.

From boyhood Saigō was distinguished by his unusual size and physique; as an adult he was almost six feet tall, weighing some 200 pounds. A giant among his contemporaries, he appeared frightening at first glance, with his large, piercing eyes and bushy eyebrows, but he was friendly and unassuming in manner.



Saigō Takamori, crayon on paper by Edoardo Chiossone, 1883; in a private collection, Tokyo
By courtesy of the International Society for Educational Information, Tokyo, Inc.

Possessing all the samurai virtues—bravery, generosity, and excellent swordsmanship—he attracted friends and followers in great numbers. He was impatient with details, making decisions quickly and preferring action over argument; his natural disposition was probably reinforced by his education, which included training in Zen Buddhism and the Neo-Confucianism of the Chinese philosopher Wang Yang-ming, who espoused sincere convictions and forthright action. Saigō's personal motto was *Kei-ten; ai-jin* ("Revere Heaven; love man").

Role in the Meiji Restoration. Before reaching the age of 40, Saigō had achieved prominence as commander of the forces of Satsuma *han* (fief) stationed in Kyōto, the Imperial capital. One of the inner group of decision makers in his own *han,* he also had wide contacts among the Imperial loyalist element throughout the country that was soon to overthrow the shogunate government. He was experienced in the complicated internal diplomacy of the time, having arranged the surrender of the fief of Chōshū to the authority of the shogunate in 1864–65, and was one of the small group who negotiated the secret alliance of Satsuma and Chōshū in 1866. He also worked secretly to force the shogun's resignation, which occurred Nov. 8, 1867.

But the events that made Saigō a national hero began immediately after this, when the loyalists, dissatisfied with the administrative stalemate resulting from the shogun's resignation, plotted the coup d'état that was to become known as the Meiji Restoration. Before dawn on Jan. 3, 1868, troops under Saigō's command seized control of the palace gates. A council of notables was summoned to which the young emperor read the Imperial rescript that was to inaugurate a new era for Japan.

A brief war ensued between the shogunate and troops, now called the Imperial army, supplied mainly by the fiefs of Satsuma and Chōshū. Saigō as chief of staff successfully arranged for the surrender of Edo (the shogunal administrative centre; modern Tokyo) in May; he then directed a campaign against supporters of the shogunate in the north that lasted until November 1868.

Saigō had completed the task as he saw it: that of ensuring the supremacy of the Imperial court over the nation. Then, instead of participating in the difficult problems of organizing a new administration or even merely basking in the adoration of his countrymen, Saigō entered into retirement in Satsuma. In 1869, when the emperor awarded honours to those who had brought about the restoration, Saigō's were the highest granted; but he still refused to take part in the new government.

In 1871 Saigō was at last persuaded to join the government and was given command of the newly created Imperial Guard, consisting of some 10,000 troops. With a reliable military force under their control for the first time, the leaders of the restoration were able to take a vital step, which they considered the most daring taken so far: the abolition of the *han* and their replacement by prefectures. To further strengthen the government at this juncture, Saigō was appointed to the Council of State (Dajōkan) and assumed joint responsibility (with Kido Takayoshi) for carrying out the new program. The change went smoothly and was followed by the disbandment of all *han* troops. Thus, by the end of 1871, the government had eliminated all potential military opposition, and, in the summer of 1872, Saigō was promoted to the new rank of full general.

During this period, however, serious differences were developing over the question of introducing conscription. Some members of the government, influenced by a study of European army organization, insisted that universal military training was a necessity. Others felt that it was unwise to deprive the samurai class of their ancient monopoly on warfare. While the debate raged, Saigō, the leading military figure in the nation, declined to commit himself publicly. It is known that he privately supported the plan, and there is general agreement that without his encouragement, conscription probably would not have been adopted by the government. The question remains, however, as to why he could not bring himself to support it openly. Saigō's inability to take a stand on conscription was perhaps an indication of a deeper malaise: fearful that Japan was losing the samurai spirit, he was beginning to regret his part in having started an apparently irreversible process. During the summer of 1873, these emotions boiled over in connection with the problem of Korea.

This "Hermit Kingdom" had refused to recognize the Meiji government, and it rebuffed three successive missions from Japan. Like many others, Saigō felt Korea's attitude was insulting and that Korea deserved chastisement. From his particular viewpoint, a war would also have the advantage of reinvigorating the samurai, many of whom were sulking or rebellious over the trend toward modernization that had set in with the restoration but who felt especially aggrieved by the conscription act.

In order to realize these objectives, Saigō argued in the Council of State for a unique plan: he would go to Korea as a special envoy, ostensibly to settle outstanding issues. While there he would contrive to behave in such a way as to provoke his own murder, thus affording Japan unquestionable justification for a declaration of war. Saigō replied to all objections that offering up his life for his country was his dearest desire. After continued entreaties, he succeeded in having his proposal approved by the emperor on August 18, shortly before government leaders returned from a lengthy foreign trip. Appalled at the decision, these men argued the priority of internal development over foreign adventure and were eventually able to have the plan canceled.

Furious at this reversal, Saigō resigned as state councillor and commander of the Imperial Guard and returned once more to his old home; several other high-ranking officials tendered their resignations also, while at a lower level, more than 100 officers of the Imperial Guard shared Saigō's retirement. Thus, his intransigence had irreparably split the leadership of the nation. That Saigō felt impelled to

take such a drastic step indicates the depth of his feeling.

A few months after returning to Kagoshima, Saigō opened his own private school, with emphasis on military science and physical training. Disaffected former samurai from all parts of Japan flocked to study under him. It was estimated that by 1877 the students numbered about 20,000. To Saigō, this was a simple private school that trained young men for public service. To the government in Tokyo, however, it was a cause for concern: the administration of the prefecture from the governor down was in the hands of Saigō's supporters, and graduates of his school were being preferred for new appointments. With samurai rebellions occurring in other parts of the country during 1876, there was real fear that Kagoshima might become the centre of a serious insurrection. In an attempt to assert authority, the government took some ill-advised steps that only inflamed the already tense atmosphere, and on Jan. 29, 1877, a group of Saigō's disciples attacked the Kagoshima arsenal and navy yard.

Rebellion against the Imperial government. Saigō, who was in the mountains on a hunting trip, hastily returned. By the time he reached Kagoshima his supporters were operating the arsenal themselves to provide supplies for further military action, and Saigō reluctantly agreed to become the leader of their rebellion.

Plans were made to march on Tokyo with the vague idea of presenting grievances to the government, and on February 15, Saigō's army started out. Government forces blocked his advance at Kumamoto, and full-scale war ensued for the next six months. Saigō's old friend Yamagata Aritomo (1838–1922), now minister of war, became the field commander against him. By May, Saigō was on the defensive; during the summer he suffered a series of disastrous defeats, and by September the situation was hopeless. With a few hundred men, he returned to Kagoshima to make his last stand on a hill overlooking the city. On Sept. 24, 1877, the government troops launched the final attack; Saigō was critically wounded and as previously had been arranged one of his faithful lieutenants took his life by beheading him. Of the 40,000 troops he had led in February, only some 200 remained to surrender. Losses on both sides were estimated at about 12,000 dead and 20,000 wounded.

In the narrow sense, the failure of Saigō's rebellion meant the end of what he had lived for. The conscript army had defeated the samurai; never again would the government fear local uprisings or samurai threats. If the great Saigō could not win, no one else would be foolhardy enough to try. But in a broader sense, Saigō probably emerged the victor. To the Japanese people, he became the apotheosis of the national character, one more exemplification of the *giri-ninjō* conflict ("duty" versus "sentiment," or "compassion") that is such a well-loved theme of Japanese tale and drama. He became a legend: as late as the 1890s, some still believed that he had not really died but was in retirement waiting to emerge once more at the proper time.

Assessment. Such a complex character must necessarily have had detractors as well as admirers. His critics have called him changeable, because he joined a government he did not believe in and then left it; insincere, because he proposed offering negotiation to Korea although he was hoping for war; and undignified, in seriously proposing to have himself murdered by the Koreans. Possibly the most serious criticism is that, if Saigō had truly regarded the rebellion as unwise, he could certainly have prevented it. Yet there are few who would call him a rebel: the government itself gave him a posthumous pardon and raised his son, Toratarō, to the nobility. His contemporary Fukuzawa Yukichi, Japan's great modernizer and one of its most independent thinkers, in a detailed analysis of the rebellion pointed out that Saigō could not be called a rebel against the Emperor, since there was never the slightest doubt of his loyalty, and that the government with its increasing authoritarianism, suppression of criticism, and lack of interest in consulting public opinion, was as much at fault as Saigō.

In attempting to summarize this argument objectively, it is probably fair to say that Saigō's real weakness lay in his inability to think things through logically to their conclusion; that he was ruled more by intuition than by reason. To say this is to say that he was a tragic figure, possessed of undeniable talent, who, although he had had much to do with bringing a new age to birth, could not make a complete adjustment to it in his own mind, and finally sought escape in the only way that seemed honourable to him: self-destruction.

(D.M.Ea.)

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Saigon (Vietnam): *see* Ho Chi Minh City.

Saigon, Treaty of (June 1862), agreement by which France gained its first foothold on the Indochinese Peninsula. It was signed by the last precolonial emperor of Vietnam, Tu Duc, and was ratified by him in April 1863.

Under the terms of the agreement, the French received Saigon and three of the southern provinces of Cochinchina, the opening of three ports to trade, freedom of missionary activity, a vague protectorate over Vietnam's foreign relations, and a large cash indemnity; five years later France annexed the rest of Cochinchina.

Saigon River, Vietnamese SONG SAI GON, southern Vietnam, river that rises near Phum Daung, southeastern Kampuchea (Cambodia), and flowing south and south-southeast about 140 mi (225 km) through Tay Ninh and Song Be provinces, embracing Ho Chi Minh City (formerly Saigon) on the east and forming an estuary at the head of the Vung Ganh Rai (Ganh Rai Bay), an outlying part of the Mekong Delta. The Saigon is joined 18 miles northeast of Ho Chi Minh City by the Song Dong Nai (*see* Dong Nai River), an important stream of the central highlands, and just above Ho Chi Minh City it is joined by the Rach Ben Cat (Ben Cat River). At Cho Lon, the former Chinese southern sector of Ho Chi Minh City, it is joined by two ship channels, the Kinh Tau Hu and the Kinh Te. Ten miles below Ho Chi Minh City is the oil harbour of Nha Be. Although 45 mi from the mouth of the river, the port of Ho Chi Minh City is the most important in Southeast Asia and is navigable to ships with drafts of up to 30 ft (9 m).

Saigyō, also called SATO NORIKIYO (b. 1118, Japan—d. March 23, 1190, Ōsaka), Japanese Buddhist priest-poet, one of the greatest masters of the tanka (a traditional Japanese poetic form), whose life and works became the subject matter of many narratives, plays, and puppet dramas. He originally followed his father in a military career, but, like others of his day, he was oppressed by the sense of disaster that overwhelmed Japan as the brilliant court life of the Heian era passed into a period of civil wars in the latter half of the 12th century.

At the age of 23 he became a priest. His life was spent in travel throughout Japan, punctuated by periodic returns to the capital at Kyōto to participate in Imperial ceremonies. Saigyō's poetry is largely concerned with a love of nature and devotion to Buddhism. Among his many works are the anthology *Sankashū* and the *Mimosusogawa utaawase* ("Poetry Contest at Mimosusu River")—a poetic masterpiece in which he pitted his own poems against each other. Many of his poems are included in the Imperial anthology *Shin kokin-shū.* Saigyō's influence was reflected in poets of later ages, particularly the haiku master Matsuo Bashō.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Saijō, city, Ehime Prefecture (*ken*), Shikoku, Japan, in the Kamo-gawa (Kamo River) delta. A castle town in the 17th century, it served later as a local administrative and commercial centre. The construction of two large power plants was followed rapidly by the establishment of pulp and paper mills and textile factories. The city, one of the core cities of the East Ehime Industrial City Program during the early 1980s, is also a distribution centre for agricultural products.

Saijō is the base for pilgrimages to the Ishizuchi Shrine, which stands on the slopes of Ishizuchi-san (Mt. Ishizuchi), to the south. The mountain lies within Ishizuchi Quasi-national Park and is the highest peak on Shikoku, reaching an elevation of 6,499 ft (1,981 m). Pop. (1980) 54,082.

Saikaku: *see* Ihara Saikaku.

Saiki, also spelled SAEKI, city, Ōita Prefecture (*ken*), Kyushu, Japan, facing Saiki-wan (Saiki Bay). It developed as a castle town on the small delta of the Banjō-gawa (Banjō River) during the Muromachi era (1338–1573) and came into the possession of the Mori daimyo family in 1601. Because of its good harbour, Saiki was selected for a base of the Imperial Japanese Navy in 1933. After World War II most of the military facilities were converted to industrial use; ships, pulp, and cement are produced. The port has been engaged in foreign trade since the 1950s. Pop. (1980) 54,306.

sail, an extent of fabric (as canvas) by means of which wind is used to propel a ship through water.

A brief treatment of sails follows. For full treatment, *see* MACROPAEDIA: Transportation.

The first sails were most likely animal skins that were used to harness windpower for rafts or boats consisting of a single log. The next probable step was the use of woven reed mats stretched between poles. Depictions of cloth sails appear in predynastic (*c.* 3300 BC) Egyptian art, and ships from other early Mediterranean civilizations were equipped with sails.

Sailcloth was woven from flax fibre during the period when England, France, and Spain were striving for supremacy of the seas. Fibre flax is still used for sails, although cotton has replaced it for better quality canvas. Cotton sails became popular in Europe after the U.S. racing yacht "America," using cotton sails, decisively defeated a fleet of British yachts in 1851. Cotton sailcloth has the advantage over flax, hemp, ramie, jute, and combinations of these materials as a fabric in that it can be woven more closely, and therefore will not stretch out of shape as easily nor lose as much wind through the pores of the material. Sails made of cotton, however, are very stiff, which makes them difficult to handle.

The chief modern users of quality sailcloth are yachtsmen, who generally prefer the polyester fibre Dacron (or Terylene, its British equivalent). These synthetic fabrics were first introduced in 1950, and they proved much superior to any type of cotton or other synthetic materials. Sails made of Dacron maintain just

the correct amount of stretch and so require no "breaking in" period. The greater strength of the fabric permits the use of lighter-weight sails, which maintain their original shape for years. Because this fabric is heat-treated by pressing it between hot rollers of metal, its fibres are flattened and interlocked, giving it a smooth, almost frictionless surface and very little porosity. The stitches, however, do not mesh with the fabric but protrude above the surface of the sail, causing the sail twine to become abraded more rapidly than with other sailcloth.

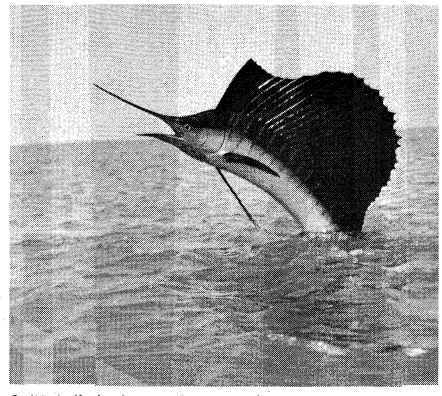
The basic steps in manufacturing a sail may be outlined as follows: (1) The sailmaker studies the sail plan or measures the vessel's rig. (2) The stretch and the amount of draft (*i.e.,* the curvature of the surface) are calculated. (3) The actual plan of the sail is chalked out to full scale on the floor of the sail loft. (4) The cloths are laid down over this plan, and their actual length and shape are marked on each individual cloth. (5) The cloths are numbered and then cut to the dimensions outlined by the markings. (6) The cloths are sewn together. A special sail twine is used as thread, and after the needle is threaded the twine is waxed so it will hold the right-hand twist then given to it. This twist helps the thread to mesh with the fabric. (7) After all the cloths are sewn together, patches are attached to the corners, and tabling (hems on the edges) is sewn on the luff (forward edge) and the foot—the places where the greatest strain develops. (8) The finishing touches are applied. The luff rope is sewn inside the leading edge of the sail to prevent the sail from being stretched out of shape. Strong ropes (boltropes) are sewn to the luff and foot, and various fittings, such as metal slides, grommets, reef points, cringles, etc., are attached to the sail.

The two major categories of sails are square sails and fore-and-aft sails. The first type is generally set in a position across the longitudinal axis of the ship; the second type of sail is set along this axis. Square sails drive the craft forward by the pressure of the wind on the afterside of the sail only; with fore-and-aft sails, both sides may be used for forward propulsion.

Sails are divided further into groups of primary and secondary sails. Primary sails are those that supply the chief propelling force in ordinary weather; secondary sails are those that aid the primary sails either by helping to balance the ship or by providing additional driving power. There are six classes of primary sales: square sails, gaff sails, jib-headed sails (Bermuda or Marconi), spritsails, lugsails, and lateen sails. Secondary sails are variations of these basic types. In addition, sails are often grouped according to their function, usually as cruising sails for ordinary weather, summer sails for tropical weather, storm sails for extremely heavy weather, and racing sails.

The name of a sail is frequently derived from the name of the piece of rigging on which it is set or from its location with reference to a nearby piece of gear. The nearest mast is often the primary reference point; therefore, the names of the masts and their location are important. Starting at the bow in a two-masted vessel the masts are termed the foremast and the mainmast; when the after mast is considerably smaller they are named the mainmast and the mizzenmast. In all three-masted vessels the names of the masts are foremast, mainmast and mizzenmast.

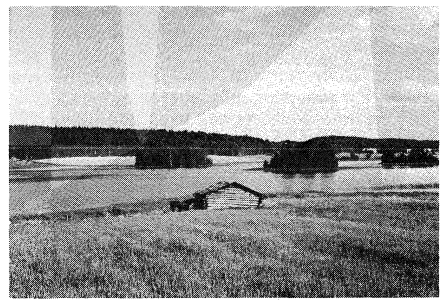
sailfish (genus *Istiophorus*), valued food and game fish of the family Istiophoridae (order Perciformes) found in warm and temperate waters around the world. The sailfish has a long, rounded spear extending from its snout but is distinguished from related species, such as marlins, by its slimmer form, long pelvic fins, and, most especially, its large, saillike dorsal fin. It is a deep blue fish, silvery below, with a bright blue, spotted dorsal fin. Size ranges to about 3.4 m (11 feet) and 90 kg (200 pounds) or more. It feeds mainly on other fishes. The classification of the sailfish is uncertain, and one (*I. platypterus*) to several species may be recognized.



Sailfish (*Istiophorus platypterus*)
D. Corson—Shostal/EB Inc.

sailing, the sport or pastime of cruising or racing in a sailboat or, more generally, in any large craft propelled by either sail or motor. *See* yacht.

Saimaa, Lake, lake in southeastern Finland, near the U.S.S.R. border northeast of Helsinki. Covering parts of the *läänit* (provinces) of Mikkeli and Kymi, it has an area of 443 square miles (1,147 square km) and is the primary lake in the Great Saimaa (Iso Saimaa) lake system (1,700 square miles [4,400 square km]), the largest system in Finland. Its two branches extend northward about 220 miles (350 km) from Lappeenranta on Lake Saimaa proper to Iisalmi on its western branch and Nurmes on its eastern branch. About 120 lakes and numerous rivers and streams in the system drain most of southeastern Finland through Lake Saimaa, the Vuoksi River, and the Saimaa Canal (built in 1856) to the Gulf of Finland. Lumbering and pulp and paper manufacturing are the basis of the regional economy. The lake system provides essential transportation links among the major towns of the region. Large hydroelectric-power stations are located in the southern part of the system, especially at Imatra in Kymi province on the border with the Soviet Union. The region's scenic forests attract many tourists.



Lake Saimaa, near Mikkeli, Fin.
Art Resource—EB Inc.

Sain Shanda (Mongolia): *see* Saynshand.

saint, a person believed to be connected in a special manner with what is viewed as sacred reality, such as God, gods and goddesses, spiritual powers, mythical realms, and other aspects of the sacred or holy (the transcendent realm).

A brief treatment of sainthood follows. For full treatment, *see* MACROPAEDIA: Doctrines and Dogmas, Religious.

Throughout history and in many religions of the world, various types of religious personages have been recognized as saints both by popular acclaim and by official pronouncement, and their influence on the broad spectrum of religious believers has been of considerable significance.

In Confucianism, founded in China by Confucius in the 6th century BC, saintliness was a state of ethical perfection best exemplified in the lives of certain ideal "holy rulers of primal times." Taoism, also founded in 6th-century-BC China, posits a more mystical sainthood, characterized by a passionless acceptance of the Way (Tao) of nature. Shintōists, followers of the indigenous religion of Japan, venerate a number of mythical saints but regard all members of the human community, whether good or evil, as attaining a supernatural existence after death.

In Theravāda Buddhism, all disciples of the Buddha, specifically monks, who have attained nirvana are recognized as arhats (*see* arhat; roughly equivalent to "saint"). Mahāyāna Buddhism, by contrast, views all people as capable of buddhahood and, thus, of sainthood. Those who postpone their own enlightenment in order to further the spiritual progress of others are known as bodhisattvas ("buddhas-to-be") and are also regarded as saints. Tantric Buddhism of Tibet enlarges the range further still with the inclusion of numerous reincarnations of past saints.

The Jains of India venerate the founder of Jainism, Mahāvīra ("Great Hero"), as the 24th in a line of saintly prophets. Hinduism, the predominant religion of India, abounds in figures regarded as sadhus ("good ones") and avatars (incarnations of divine being in human form), including saints of other religions.

In the West the ancient heroes of Greek religion are in many ways analogous to saints. Zoroastrianism and Parsiism recognize numerous Fravashis, or preexistent souls that are good by nature. The term saint is applied in the Hebrew Old Testament to any Israelite as one of the chosen people of God. In the New Testament it was used of any member of the Christian churches. It was not until about the 6th century that the word became a title of honour specially given to the dead whose cult was publicly celebrated in the churches (*see also* canonization). Although the theology of Islām explicitly rejects the concept of sainthood, there have arisen at various times popular cults of certain holy men, or "friends" (*walī*) of God, to whom miraculous deeds and divine efficacy are often ascribed.

Saint ———: as a title with a personal name, *see under* personal name (*e.g.,* Cyprian, Saint). As a part of a place-name or other proper name, *see under* Saint as below or under its foreign-language equivalent:

Saint

	masculine	feminine
Danish	sankt	sankt
Dutch	sint	sint
French	saint	sainte
German	sankt	sankt
Hungarian	szent	szent
Italian	san, santo, sant'	santa, sant'
Portuguese	são, santo	santa
Romanian	sfintu	sfinta
Spanish	san, santo	santa
Swedish	sankt	sankta

Saint Abb's Head, promontory on the North Sea in the Borders region, southeastern Scotland. It is located about 12 miles (19 km) northwest of Berwick-upon-Tweed, Northumberland, England. St. Abb's is a sheer headland with cliffs some 300 feet (90 m) high. It is a National Nature Reserve administered by the National Trust for Scotland and the Scottish Wildlife Trust and serves as a reserve for nesting and migrating seabirds.

St. Abb's Head was the site of a 7th-century convent founded by Ebba, a Northumbrian princess who escaped shipwreck there. The convent was burned by Norsemen in the 9th century. About 1098, King Edgar established a priory in the village of St. Abb's; its remains still stand. With neighbouring Coldingham and West Loch, St. Abb's, now a fishing village, forms part of a summer resort area.

Saint-Acheul, locality near Amiens in the Somme River valley, Somme *département,* Picardie region, northern France. Saint-Acheul is the type locality at which a number of distinctive early Paleolithic hand axes were found. These axes characteristically are large, bifacially flaked, ovoid stone tools and are widely assumed to have been manufactured mostly by *Homo erectus,* though they are only rarely associated with *Homo erectus* fossils. Following their early discovery at Saint-Acheul, a number of Acheulian (Acheulean) hand axes were identified in England (notably Swanscombe) and other parts of Europe, Africa (especially at Olduvai Gorge in Tanzania and Swartkrans in South Africa), and Asia.

Saint-Affrique, town, Aveyron *département,* Midi-Pyrénées region, southern France. The town is situated about 60 miles (96 km) northwest of Béziers on the southeastern coast and about 6 miles (10 km) from the town of Roquefort-sur-Soulzon, which is noted for its production of ewes'-milk cheese.

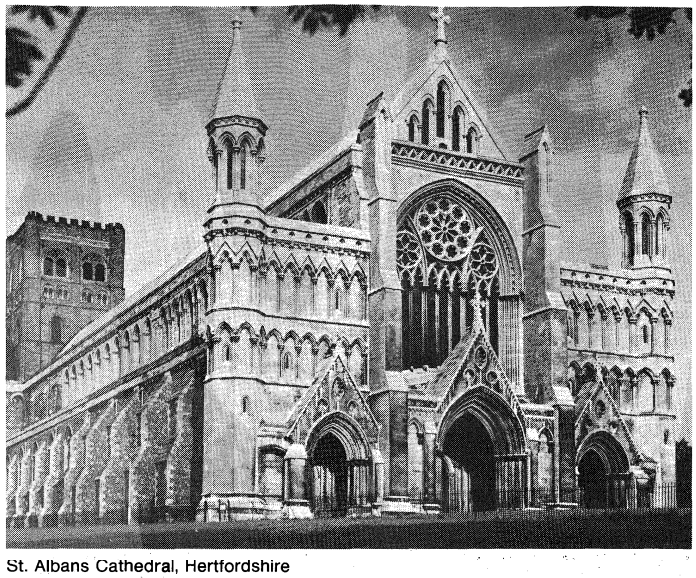
Saint-Affrique grew up in the 6th century around the tomb of St. Africain, bishop of Comminges. The town contains a 15th-century bridge, and some megaliths in the environs—especially the dolmen at Tiergue—are notable. Tanning is carried out in Saint-Affrique, and gloves, woolens, and chemicals are manufactured. The town is also involved in the Roquefort cheese trade. Pop. (1982) 8,475.

Saint Aignan (Papua New Guinea): *see* Misima Island.

Saint Alban, Francis Bacon, Viscount: *see* Bacon, Francis (1561–1626).

Saint Albans, district (city), county of Hertfordshire, England, in the valley of the River Ver, about 20 miles (32 km) northwest of London. The district covers an area of 62 square miles (161 square km).

A British town was established on the west bank of the Ver in the 1st century BC, and subsequently the Romans built their town of Verulamium on the site. In AD 61 the town was sacked by Queen Boudicca. Sections of the town wall dating from the 2nd century AD are still extant, and the town has been extensively excavated. About 304 a Roman named Alban, who had converted to Christianity, was taken from the town and killed on the east bank of the Ver. An abbey was later founded on the alleged site of his martyrdom, and the town of St. Albans grew up around the abbey. Offa of Mercia about 793 founded a Saxon abbey church on the site of the earlier church, and St. Albans Church (designated a cathedral in 1877) was built in 1077 on the site of the church that Offa built, using Roman bricks from the ruins of Verulamium. The most celebrated Saxon abbot was Ulsinus, who, in 948, founded three churches—St. Stephen's, St. Michael's, and St. Peter's—planned and laid out the town of St. Albans, and founded the market, which is still held. The school (not a monastic school) was already flourishing by 1100, and an early headmaster was Alexander Neckam, a well-known schoolmaster and the foster brother of Richard I. Nicholas Breakspear (later Pope Adrian IV) was the son of an abbey tenant.



St. Albans Cathedral, Hertfordshire
Doreen Wright—Bruce Coleman Inc./EB Inc.

St. Albans and its abbey have played a prominent part in English history. As their power grew, the abbots obtained the right to destroy the Saxon royal borough of Kingsbury, on a neighbouring hilltop, and it finally disappeared in the reign of Stephen. The constant visits of kings and nobles, English and foreign, led to the development of a famous school of history, under the authority first of Roger of Wendover and later of Matthew Paris. In 1213 the first draft of Magna Carta was read to a gathering of clergy and noblemen in the abbey. In 1381 John Ball, a celebrated preacher and one of the leaders of the Peasants' Revolt, was tried and hanged at St. Albans. During the Wars of the Roses, two battles were fought at St. Albans: in 1455 it was the scene of Lancastrian defeat; in 1461, of Yorkist defeat.

Like many other abbeys, St. Albans declined in wealth and importance during the late 15th and early 16th centuries. In 1539 the abbey was dissolved, and St. Albans became a borough, its first charter being dated 1553. The abbey lands finally came into the hands of the Bacon family, and Francis Bacon, Viscount St. Albans, is commemorated by a statue in St. Michael's Church. During the English Civil Wars of the mid-17th century, the town was the headquarters of the Parliamentary army of the Earl of Essex.

Many fine old buildings can be seen in present-day St. Albans. The most important industry in the town is printing. One of the earliest presses was set up in the town by the "Scolemaster Printer," who operated there from 1479 until 1486. One of his books, *The Boke of St. Albans,* contains the earliest example of colour printing in England. Printing continues to be significant, together with other light industries such as electrical engineering and the manufacture of musical instruments. Pop. (1987 est.) city, 60,000; district, 128,600.

Saint Albans, city, seat of Franklin county, northwestern Vermont, U.S., 24 miles (39 km) north of Burlington. St. Albans Town (township), surrounding the city, is on St. Albans Bay of Lake Champlain. The area was part of the French seigniory of La Douville from 1664 to 1763. The town was chartered in 1763 and organized in 1788. St. Albans village, set off and incorporated in 1859, became a city in 1897. Its location near the Canadian border made it popular with smugglers, who used it as a base between 1807 and 1812. It was also a station on the Underground Railroad. On Oct. 19, 1864, in the northernmost engagement of the American Civil War, about 25 Confederate soldiers staged a raid on the town and looted the banks (*see* Saint Albans Raid). In 1866 the Fenians, an Irish nationalist secret society, pledged to invade Canada and made St. Albans their headquarters prior



Tapping maple trees for syrup near St. Albans, Vt.
Robert Holland—Shostal/EB Inc.

to an abortive raid across the border. Maple-sugar production is the major industry. Dairying is also important. Pop. (1986 est.) 7,380.

Saint Albans, DUKES, EARLS, AND VISCOUNTS OF, titled English nobility of several creations, grouped below chronologically and indicated by the symbol •.

• **Saint Albans, Francis Bacon, Viscount:** *see* Bacon, Francis (1561–1626).

• **Saint Albans, Henry Jermyn, Earl of,** 1ST BARON JERMYN OF SAINT EDMUNDSBURY (b. *c.* 1604—d. Jan. 2, 1684, London), courtier, favourite of Henrietta Maria, queen of Charles I of England. It was rumoured, probably falsely, that he became her husband after the king's execution (1649).

He entered Parliament in 1625. In Henrietta Maria's household he was made vice chamberlain (1628), master of horse (1639), and lord chamberlain (1645), and he was raised to the peerage in 1643. He was implicated in the army plot of 1641, in which certain Royalists planned to intimidate Parliament by a show of force. Early in the English Civil Wars he fought for the king. As the king's governor of Jersey (from January 1645), he took little interest in the island and later proposed the sale of the Channel Islands to France in return for military assistance for Charles I. He was created an earl just before the Restoration (April 27, 1660) and afterward received many government posts. He helped Charles II negotiate the secret Treaty of Dover (June 1, 1670) for a general coordination of policy between Charles II and Louis XIV of France.

In 1665 he obtained land near St. James's Palace, Westminster, where Jermyn and St. Albans streets preserve his name. St. Albans was well-known as a gambler and a glutton; in the poem "Last Instructions to a Painter," Andrew Marvell describes him as "full of soup and gold." He died unmarried; the earldom became extinct, and the barony devolved on a nephew.

• Saint Albans, Charles Beauclerk, 1st Duke of, BARON HEDDINGTON, EARL OF BURFORD (b. May 8, 1670, London—d. May 10, 1726, Bath, Avon, Eng.), illegitimate son of Charles II, the eldest of two illegitimate sons born to Nell Gwyn, an English actress.

Charles Beauclerk was created Baron Heddington and Earl of Burford in 1676 and Duke of St. Albans in 1684. The latter creation took place shortly after the death of Henry Jermyn, the Earl of St. Albans. He served as a colonel in the regiment of horse of Queen Anne of Denmark and served in the imperial army of Leopold I, being present at the siege of Belgrade in 1688. After the battle of Landen in 1693, William III made him captain of the gentlemen pensioners, and four years later lord of the bedchamber (1697–1702). Granted the position of ambassador extraordinary to Louis XIV on the occasion of the marriage of the Duke of Burgundy, he was reported to have made a very bad impression, failing to make presents to the "introducers," borrowing money, and leaving unpaid bills. His Whig leanings prevented his advancement under Anne, but he was restored to favour at the accession of George I. St. Albans was buried in Westminster Abbey. His wife Diana, daughter and heiress of Aubrey de Vere, last Earl of Oxford, was a well-known beauty and served as lady of the bedchamber to Caroline, Princess of Wales.

Saint Albans, battles of (May 22, 1455, and Feb. 17, 1461), battles during the English Wars of the Roses. The town of St. Albans, situated on the old Roman Watling Street and lying 20 miles (32 km) northwest of London, dominated the northern approaches to the capital.

The battle of 1455 was the first in the wars. Richard, Duke of York and King Henry VI's cousin, had a better right to the throne, by primogeniture, than the king himself. The battle occurred because York became convinced that his destruction was being planned by Henry's forceful queen, Margaret of Anjou, and Henry's Lancastrian cousin, Edmund Beaufort, Duke of Somerset. The encounter ended in less than an hour, with the death of Somerset, and York's capture of the king. His victory ensured York's ascendancy for more than a year, but Queen Margaret regained her influence in 1456, and war broke out again in 1459.

The second battle at St. Albans occurred some six years after the death of Richard, Duke of York, when Queen Margaret, with Lancastrian forces, and York's son Edward each sought to gain possession of London. Queen Margaret was met at St. Albans by the forces of Richard Neville, Earl of Warwick, who was at that time on the Yorkist side. In posting his troops, however, Warwick misjudged the direction from which the queen would arrive, and as a result his flank was turned at the beginning of the engagement. Kentishmen serving with him deserted to the queen's army, and he retreated from the town, leaving King Henry, who had been virtually his prisoner, to the Lancastrians. Margaret then allowed her victorious army to pillage the town and the Abbey of St. Albans; hearing of this, the City of London sent to say that she would not be admitted unless she could guarantee her troops' good behaviour. While she hesitated, Edward and Warwick entered London, where Edward was hailed as King Edward IV.

Saint Albans Raid (Oct. 19, 1864), in the American Civil War, a Confederate raid from Canada into Union territory; the incident put an additional strain on what were already tense relations between the United States and Canada.

On Oct. 19, 1864, about 25 Confederate soldiers based in Canada raided the town of St. Albans, Vt., killed one man, robbed three banks, and then retreated to Canadian territory. A U.S. posse pursued the raiders and captured several of them, but it was forced to surrender them to the Canadian authorities. On October 21 about half the Confederates were arrested by the Canadians, but they were released again on December 13, and the $200,000 they had stolen was returned.

Although the Canadian government reimbursed the plundered banks, the release of the raiders led to strong protests in the United States. Consequently, five of the raiders were rearrested and remained in custody for a time for violating Canadian neutrality. In 1872 a claims commission established under the Anglo-American Treaty of Washington (1871) ruled against further American claims to compensation.

Saint Albert, town, central Alberta, Canada, immediately northwest of Edmonton, on the Sturgeon River, in a mixed-farming district. The settlement developed around a mission that was built in 1861 by Father Albert Lacombe, a heroic religious figure, who named it after his patron saint. Lacombe's original log church is preserved within a brick structure. Most of the early settlers were métis (of mixed French and Indian blood). Inc. 1904. Pop. (1986) 36,710.

Saint Aldwyn, Michael Edward Hicks Beach, 1st Earl: *see* Hicks Beach, Sir Michael Edward.

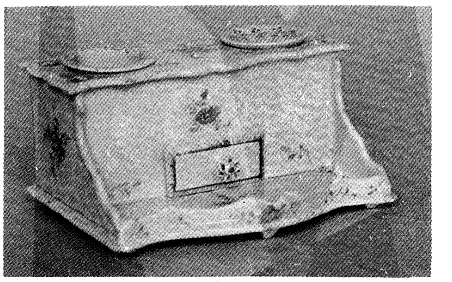
Saint-Amand-les-Eaux, also called SAINT-AMAND, town and spa, Nord *département,* northern France, at the junction of the Elnon River with the canalized Scarpe River. It is situated 22 miles (35 km) southeast of Lille and 8 miles (13 km) northwest of Valenciennes, near the Belgian border.

Saint-Amand-les-Eaux was named for St. Amand, bishop of Tongres, who founded a Benedictine abbey in the area in 647; the second part of the name reflects the presence of the mineral waters and mud baths for which the town is still celebrated. The abbey was laid waste by the Normans in 882 and by the count of Hainaut in 1340.

The town was captured by Mary of Burgundy in 1477, by the count of Ligne, Charles V's lieutenant, in 1521, and finally in 1667 by the French. The discovery of Roman statues and coins in the baths indicates that at least the Romans, and perhaps earlier people, believed the town's mud baths to have restorative effects. A museum in the town holds relics of the once-famous Benedictine abbey, at which Hucbald (*c.* 840–930), musical theorist and scholar, was abbot. The town also has an early 17th-century Baroque tower some 270 feet (82 m) high.

Saint-Amand-les-Eaux is an industrial centre, chiefly and widely known for its faience works. It also has hosiery mills, ironworks (manufacturing cables, chains, and anchors), and plumbing-fixture factories. The baths are located on the edge of the Raismes Forest. Pop. (1982) 16,199.

Saint-Amand-les-Eaux ware, tin-glazed earthenware and porcelain made in the French town of that name in the 18th and 19th centuries. The factory was begun in 1718 by Pierre-Joseph Fauquez of nearby Tournai and was continued by P.-F.-J. Fauquez after 1741 and by Jean-Baptiste Fauquez from 1771 to 1778. From 1818 the de Bettignies family (also of Tournai) directed it. The faience ranges in tone from delicate bluish white to pale duck-egg blue to grayish blue and bluish purple. The technique of painting in white overglaze pigment on the blue-white glaze, called *bianco sopra bianco* ("white on white"), was effectively employed; purple and blue were also used in decoration, which mostly took the



Saint-Amand-les-Eaux ware, a faience *encrier* with *bianco sopra bianco* decoration, *c.* 1765; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London; photograph, EB Inc.

form of sketchy flowers, figures, and scrollwork, sometimes in the "Chinese" style. Soft-paste porcelain was made from 1771 under Jean-Baptiste Fauquez and later under the de Bettignies family; among the latter's products were forgeries of both French and English porcelain.

Saint-Amand-Montrond, also spelled SAINT-AMAND-MONT-ROND, town, Cher *département,* central France. The town, which is situated some 25 miles (40 km) southeast of Bourges, grew up around a monastery founded by St. Amand, a follower of St. Columban, in the 7th century.

The town is of historical significance, but its castle and fortifications were razed following the siege of 1652. The remains of the castle are on the forested butte of Montrond. Other remains include a well-preserved 13th–15th century Cistercian cloister and many Roman ruins. St.-Amand-Montrond was a centre of the French Resistance and as such was subject to brutal reprisals before liberation. It is now a dairying centre with some light manufacturing. Pop. (1982) 12,451.

Saint-Amant, (Marc-) Antoine Girard, sieur de (sire of) (b. *c.* Sept. 30, 1594, Rouen, Fr.—d. Dec. 29, 1661, Paris), one of the most original and interesting of French early 17th-century poets and one of the first members of the French Academy.

The early poems of Saint-Amant are realistic and hilarious descriptions of the pleasures of the table and the tavern. A reflection of the long journeys abroad that he undertook with his patron, the Count d'Harcourt, is seen, for example, in *Albion* (1643). This mock-heroic poem contains a disenchanted account of a visit to England and includes an informative description of the London theatres. His *Rome ridicule* (1649) started the fashion for burlesque poems that was to be developed later by Paul Scarron. Saint-Amant was a Protestant until later life, when he was converted to Roman Catholicism. His biblical epic, *Moïse sauvé* (1653; "Moses Rescued"), though uneven, contains passages of great force and vividness.

After enjoying a favourable reputation during his lifetime, he was ridiculed by the influential critic Nicolas Boileau, and his work was neglected for more than two centuries. Present-day scholars see in Saint-Amant one of the most accomplished representatives of the school of irregular poets who flourished in the first half of the 17th century.

Saint-André, André Jeanbon (b. Feb. 25, 1749, Montauban, Fr.—d. Dec. 10, 1813, Mainz, Mont-Tonnerre, French em-

pire), French Protestant clergyman who became a member of the Committee of Public Safety that ruled France during the period of the Jacobin dictatorship (1793–94).

The son of a Huguenot businessman named Jeanbon, André was a captain in the French merchant marine before he became a Huguenot pastor at Montauban in 1788. About that time he adopted the additional surname of Saint-André. He welcomed the outbreak of the Revolution in 1789 with the hope that French Protestants might once again be allowed to enter public life. Elected a deputy to the revolutionary National Convention, which convened in September 1792, he sat with the deputies from the Club of the Jacobins. The Jacobins seized control of the government on June 2, 1793, and on July 10 the National Convention elected Saint-André to the Committee of Public Safety.

In October Saint-André was sent to Brest to prepare the French fleet for service in the war against Great Britain. He instilled revolutionary fervour in the sailors, instituted strict discipline, and created a corps of talented officers. At the same time, he organized the construction of warships and the manufacture of naval supplies. As a result, French ships were soon raiding British commerce, and in May–June 1794 the French fleet convoyed a large flotilla loaded with food supplies through the British blockade.

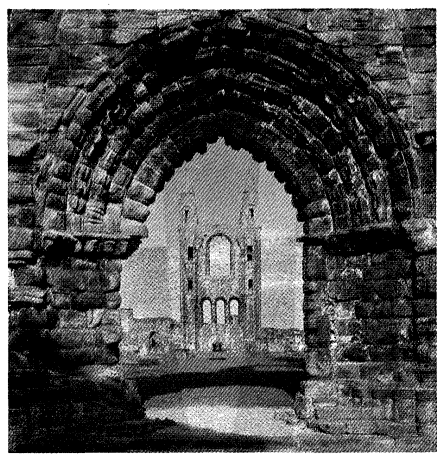
Since Saint-André admired Robespierre, the chief spokesman of the Committee for Public Safety, he played no part in the events leading to Robespierre's downfall in July 1794. Saint-André survived the ensuing Thermidorian reaction against the Jacobin regime, and in 1798 he was made consul to Algiers. He was captured by the Turks in 1799 and held for three years. Appointed prefect of Mainz by Napoleon in 1802, Saint-André again proved to be one of the ablest administrators in the French government. He died of cholera.

Saint-André, Jacques d'Albon, seigneur de (lord of) (b. *c.* 1505—d. Dec. 19, 1562, Dreux, Fr.), favourite of King Henry II of France, who made him successively member of the royal council, marshal of France, premier gentleman of the chamber, governor of Lyonnais, and ambassador to England.

After the death of Francis II in 1560, he joined with Anne, duke de Montmorency (the constable of France), and François de Lorraine, duke de Guise, and formed what was called the *triumvirat,* an alliance against the Protestants and the vacillating queen mother, Catherine de Médicis. At the Battle of Dreux (1562), however, he was taken prisoner by the Huguenots and subsequently assassinated by a disgruntled Roman Catholic whose property he had confiscated.

Saint Andrews, city, royal burgh (1160), university town, golfing mecca, and former fishing port of Fife region, Scotland. It is on a bay of the North Sea, 13 miles (20 km) southeast of Dundee. It occupies a plateau of sandstone rock about 50 feet (15 m) high, breaking off on the north in precipitous cliffs. The Eden River enters St. Andrews Bay northwest of the golf links, which rank among the finest in the world.

St. Andrews was once the ecclesiastical capital of Scotland: its religious traditions began in the 6th century, when St. Kenneth is believed to have formed a Celtic ecclesiastical community. In the 8th century the king of the Picts established a new church dedicated to St. Andrew, who was adopted as the patron saint of the Picts and thereafter of Scotland. Relics of the saint were brought there and acquired such celebrity that the place, first called Mucross ("Headland of the Wild Boar") and then Kilrymont ("Cell of the King's Mount"), came to be known as St. Andrews. About 908 the bishop of the Scots transferred his seat there from Dunkeld. In the early 12th century the bishopric of St. Andrews was regarded as the most important in the kingdom, and it was in due course raised to the dignity of an archbishopric in 1472, when its holder was recognized as primate of Scotland.



The West Port of the precinct wall and, within, the ruins of the cathedral, Saint Andrews, Scot.
Kenneth Scowen

The medieval cathedral and priory began with a foundation of Augustinian canons established between 1127 and 1144 by Bishop Robert, who was prior of the Augustinian house at Scone, in association with the church of St. Regulus. In 1160 a larger cathedral and priory church was begun by Bishop Arnold and eventually consecrated in 1318. Built partly in the Norman and partly in the early Gothic style, it was by far the largest church in Scotland, with an internal length of 357 feet (109 m). The cathedral and priory were enclosed by an elaborate precinct wall, much of which survives. In addition to the Augustinians, St. Andrews in the Middle Ages contained communities of Dominicans (*c.* 1275), and Observantine Franciscans (*c.* 1450). The castle, ruins of which remain on a rocky headland near the cathedral, was erected about 1200 as an episcopal residence that was commissioned by Bishop Roger. An organized municipality was founded about 1140; it was granted most of the privileges of a royal burgh by King Malcolm IV about 1160 and grew into one of the largest towns in medieval Scotland. In 1411 the university, the oldest in Scotland, was founded as St. Mary's College. St. Salvator's (1450) and St. Leonard's (1512) were added and were subsequently united after the Reformation.

As Scotland's ecclesiastical capital, St. Andrews was the centre of many of the most important episodes in the Scottish Reformation. After the triumph of the Reformers, the cathedral and priory were abandoned and fell into ruins. Nevertheless the town remained a place of considerable importance until the close of the 17th century. In the 18th century it underwent a serious decline from which it was eventually rescued, largely through the efforts and civic leadership of Provost Hugh Lyon Playfair (1840–61), who revitalized the town, restoring its reputation as a university centre and developing it as a holiday and golfing resort.

The Royal and Ancient Golf Club, the ultimate authority in the golfing world, was founded in 1754; some believe that golfers had been active as early as the 15th century. There are four main golf courses, the most famous of which is Old Course.

Of the buildings of the medieval city comparatively little remains. The cathedral largely vanished apart from the east and west gables and part of the south wall, but the priory precinct wall was preserved throughout virtually the entire length. The north transept (1525) of the Dominican church and a great part of the castle still stand. Holy Trinity church, after undergoing considerable alteration in 1799, was well restored in the early 1900s and is one of the most impressive churches in Scotland. The town is notable for its wide, handsome streets and interesting 16th- and 17th-century domestic buildings, many of which have been protected by the local Preservation Trust, a conservationist body. Pop. (1981) 11,368.

Saint Andrews, University of, oldest university in Scotland, founded in 1411, located in Fife region. The university buildings, many of which date from the Middle Ages, include St. Salvator's College (1450), St. Leonard's College (1512), and the University Library, refounded by James VI in 1612. A third college, St. Mary's (1537), has been limited (since 1579) to the teaching of theology. In 1747 St. Salvator's and St. Leonard's were merged. Among the famous teachers associated with St. Andrews in the 20th century was the zoologist Sir D'Arcy Thompson.

University College (1881) in Dundee was affiliated with the University of St. Andrews in 1897 and in 1954, as Queen's College, joined with the University Advanced Medical School and Dental School; in 1967 Queen's College was granted a royal charter and became the University of Dundee.

Saint-Andrew's-cross (*Ascyrum hypericoides*), plant, of the family Hypericaceae, native to southeastern North America and Central America, sometimes cultivated for its four-petaled yellow flowers. It reaches 75 cm (2.5 feet) and has many branches, two-angled



St.-Andrew's-cross (*Ascyrum hypericoides*)
B.M. Shaub

stems, oblong to narrow leaves, and 1.5-centimetre- (0.6-inch-) wide, golden-yellow flowers at the stem tips. A similar but shorter species is St.-Peter's-wort (*A. stans*), native to southeastern North America. It has larger flowers and leaves that clasp the stem.

Saint Anthony, town, north of the entrance to Hare Bay, on the northern peninsula of Newfoundland, Canada, 306 miles (492 km) northeast of Corner Brook. An old fishing settlement with dry docks and cold-storage plants, it has a hospital run by the International Grenfell Association (a charity organization established in 1912 by Sir Wilfred Grenfell, the medical missionary) and ship-repair yards. Near L'Anse-aux-Meadow, 16 miles (17.5 km) north, on Épaves Bay, remains of an 11th-century Norse settlement were discovered and excavated (1961–68) by Helge and Anne Stine Ingstad, Norwegian archaeologists; in 1978 the site was approved by the World Heritage

Council of the United Nations as worthy of special preservation. Situated in L'Anse-aux-Meadow National Historic Park, the site was honoured in 1980 by UNESCO as the only Norse settlement site found in North America. Inc. 1945. Pop. (1986) 3,182.

Saint-Arnaud, Armand-Jacques Leroy de (b. Aug. 20, 1798, Paris—d. Sept. 29, 1854, at sea en route to France), army officer and later marshal of France who was minister of war under Napoleon III and commander in chief of the French forces in the Crimean War.

In March 1833 he became aide-de-camp to General Bugeaud de la Piconnerie. He later joined the Foreign Legion and went to Algiers (January 1837), where he rose rapidly in rank.

In Paris at the outbreak of revolution in 1848, Saint-Arnaud tried vainly to save the monarchy. He returned to Algeria in 1851 as a major general, was appointed commander of the province of Constantine, and, in autumn 1851, became minister of war. He then played a decisive part in the coup d'état of Dec. 2, 1851. Napoleon III rewarded him by creating him a senator and a marshal of France. In 1854 he resigned his ministerial post and, although seriously ill, accepted command of the French forces in the Crimea. Saint-Arnaud



Saint-Arnaud; detail from a lithograph by Antoine Maurin

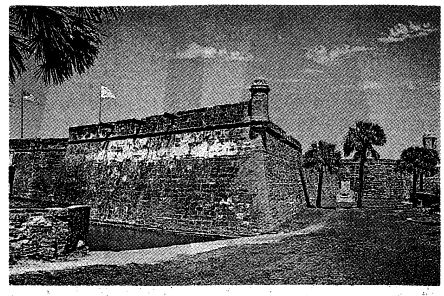
Giraudon—Art Resource/EB Inc.

planned the landing at Evpatoria (September 14); and, with the assistance of the British forces under Lord Raglan, he won the Battle of Alma (September 20).

Saint Asaph, Welsh LLANELWY, cathedral village, Rhuddlan district, Clwyd county, Wales. Its Welsh name is derived from the River Elwy, between which and the Clwyd it stands. Asaph, the Celtic ecclesiastic to whom the cathedral is dedicated, was bishop there in the 6th century. The original wooden structure, destroyed by the English in the 13th century, was rebuilt but subsequently extensively damaged about 1402 by the army of the Welsh rebel Owen Glendower during his insurrection. The present cathedral was begun about 1480, completed by 1770, and restored in the 19th century. It is plain and cruciform with a square tower. Its library of almost 2,000 volumes, some rare, contains the Welsh translation of the Bible by Bishop William Morgan.

The small, irregularly built village also has the remains of a Perpendicular Gothic chapel near St. Mary's Well and some almshouses founded in 1678. The bishop of St. Asaph in 1920 was enthroned in his cathedral as the first archbishop of the disestablished Church in Wales. Pop. (1981) 3,401.

Saint Augustine, oldest continuously settled city in the United States, seat (1821) of St. Johns county, northeastern Florida, 38 miles (61 km) southeast of Jacksonville; it is a port of entry on the Atlantic Intracoastal Waterway, lying between two saltwater rivers, San Sebastian (west) and Matanzas (east). Ponce de León, in search of the legendary Fountain of Youth, landed there in 1513 and took possession of the territory for Spain. In



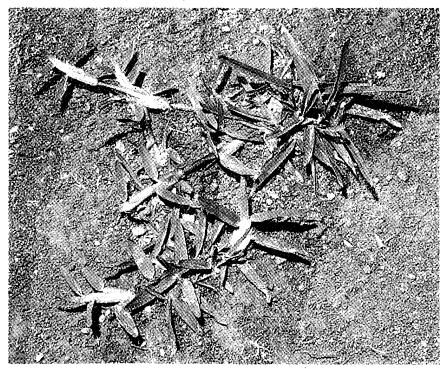
Castillo de San Marcos, St. Augustine, Fla.

Ray Atkeson—EB Inc.

1564 France established Fort Caroline near the mouth of the St. Johns River, 25 miles (40 km) north. A year later, in order to maintain Spanish sovereignty over Florida, Admiral Pedro Menéndez de Avilés destroyed the French colony and founded the city, which he named for St. Augustine, bishop of Hippo, upon whose feast day he had sighted the coast. Except for the 20 years (1763–83) that Florida belonged to England, throughout the following 256 years it was the northernmost outpost of the Spanish colonial empire. Since 1821 it has been a part of the United States. A symbol of Spanish power is the grim, massive Castillo de San Marcos, built in 1672; the oldest fort standing in the United States, it is now a national monument. The city was plundered by the English sea raider Sir Francis Drake and besieged by the British general and leader of the Georgia Colony, James Oglethorpe; it became a refuge for Loyalists during the American Revolution and during the Indian wars provided a prison for captured Seminole Indians, including Osceola. Union troops occupied it the last three years of the American Civil War.

Many Spanish colonial buildings and sites have been restored, including the cathedral, Oldest House, and San Augustín Antiguo (a re-creation of the old Spanish city). The economy is based on tourism (first promoted in the 1880s by the financier-railroad magnate Henry M. Flagler, a pioneer in Florida development), commercial fishing, and some industry. The Florida East Coast Railroad has its headquarters and shops there. The city is the seat of Flagler College (1967). Pop. (1987 est.) 12,626.

Saint Augustine grass (*Stenotaphrum secundatum*), low, mat-forming perennial grass of the family Poaceae, native to central and southeastern North America and Central America and naturalized along many seacoasts of the world. It is a coarse-textured, vigorous warm-season grass that roots readily along its prostrate stems.



Saint Augustine grass (*Stenotaphrum secundatum*)

G.R. Roberts

Saint Augustine grass is cultivated as a lawn grass in some areas of Australia and in southern North America. A variety *S. s. variegatum,* which has white-striped leaves, is grown as an ornamental.

Saint Austell, locality in Restormel district, county of Cornwall, southwestern England. St. Austell was originally called Trenance and takes its present name from a hermit named St. Austol. England's most important kaolin (china clay) deposits are dug in the area, then processed at St. Austell, and shipped from the nearby port of Fowey. Many people are employed in the industry, exports being made to the regional potteries and to Lancashire and abroad. The landscape is unpleasantly affected by the slag heaps created by the industry. The church at St. Austell has a Perpendicular Gothic tower that is decorated with statues and a Norman font. Carthew, just north of Saint Austell, has a museum devoted to the kaolin industry, and many attractive fishing ports are nearby. Pop. (1981) 20,585.

Saint-Barthélemy, also called SAINT BART'S, island at the northern end of the Windward group of the Lesser Antilles in the Caribbean Sea. It constitutes a *commune* and, together with Saint Martin, forms an *arrondissement* of Guadeloupe, an overseas *département* of France. The island is 120 miles (200 km) north of Guadeloupe island. It is 11 miles (17.5 km) long and 2.5 miles (4 km) wide, with an area of 8 square miles (21 square km). The island is both mountainous, with a maximum height of 1,000 feet (300 m), and fertile, despite relatively poor rainfall. The capital and only town is Gustavia, which stands on a well-sheltered harbour. Saint-Barthélemy was occupied by the French in 1648; it was sold to Sweden in 1784 but was returned to France in 1877 after a plebiscite. Tropical fruits, cotton, salt, and livestock are produced, and there is some fishing. There are minor lead and zinc deposits. Because its rocky, arid soil never supported slave plantations, the population of the island is mostly of European extraction (Swedish and French), and the spoken language is a 17th-century dialect of Normandy. Pop. (1982) 3,059.

Saint Bartholomew (Vanuatu): *see* Malo.

Saint Bartholomew's Day, Massacre of (August 24/25, 1572), massacre of French Huguenots (Protestants) in Paris plotted by Catherine de Médicis and carried out by Roman Catholic nobles and other citizens. It was one event in the series of civil wars between Roman Catholics and Huguenots that beset France in the late 16th century.

The Massacre of St. Bartholomew's Day had for its background the political and religious rivalries of the court of France. Admiral Gaspard II de Coligny, a Huguenot leader, supported a war in the Low Countries against Spain as a means to prevent a resumption of civil war, a plan that the French king, Charles IX, was coming to approve in the summer of 1572. Catherine de Médicis, the mother of Charles, feared Admiral Coligny's growing influence over her son. She accordingly gave her approval to a plot that the Roman Catholic house of Guise had been hatching to assassinate Coligny, whom it held responsible for the murder of François de Guise in 1563.

On Aug. 18, 1572, Catherine's daughter, Margaret of France (Marguerite de Valois), was married to the Huguenot Henry of Navarre (the future Henry IV of France), and a large part of the Huguenot nobility came to Paris for the wedding. The attempt on Admiral Coligny's life four days later failed; he was only wounded. To placate the angry Huguenots, the government agreed to investigate the assassination attempt. Fearing discovery of her complicity, Catherine met secretly with a group of nobles at the Tuileries Palace to plot the complete extermination of the Huguenot leaders, who were still in Paris for the wedding festivities. Charles was persuaded to approve

of the scheme, and, on the night of August 23, members of the Paris municipality were called to the Louvre and given their orders. Shortly before dawn on August 24 the bell of Saint-Germain-l'Auxerrois began to toll and the massacre began. One of the first victims was Coligny, who was killed under the supervision of Henry de Guise himself. Even within the Louvre, Navarre's attendants were slaughtered, though Navarre and Henry I de Bourbon, 2nd prince de Conde, were spared. The homes and shops of Huguenots were pillaged, and their occupants brutally murdered; many bodies were thrown into the Seine. Bloodshed continued in Paris even after a royal order of August 25 to stop the killing, and it spread to the provinces. Huguenots in Rouen, Lyons, Bourges, Orléans, and Bordeaux were among the victims. Estimates of the number that perished in the disturbances, which lasted to the beginning of October, have varied from 2,000 by a Roman Catholic apologist to 70,000 by the contemporary Huguenot Duke de Sully, who himself barely escaped death. Modern writers put the number at 3,000 in Paris alone.

The news of the massacre was welcomed by Philip II of Spain, and Pope Gregory XIII had a medal struck to celebrate the event. Protestant nations were horrified. To explain the massacre, Charles, assuming responsibility for it, claimed that there had been a Huguenot plot against the crown.

Instead of crippling the Huguenot party as Catherine had hoped it would do, the massacre revived hatred between Roman Catholics and Huguenots and helped provoke a renewal of hostilities. Thenceforth the Huguenots abandoned John Calvin's principle of obedience to the civil magistrate, that is, to the royal authority, and adopted the view that rebellion and tyrannicide were justifiable under certain circumstances.

Saint Bartholomew's Lake (Germany): *see* Königssee.

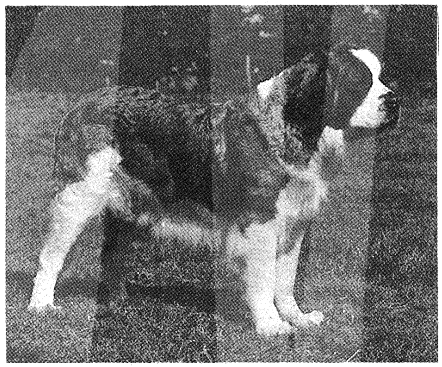
Saint Basil the Blessed, also called POKROVSKY CATHEDRAL, Russian SVYATOY VASILY BLAZHENNY, or POKROVSKY SOBOR, church constructed on Red Square in Moscow between 1554 and 1560 by Tsar Ivan IV the Terrible, as a votive offering for his military victories over the khanates of Kazan and Astrakhan. The church was dedicated to the protection and intercession of the Virgin, but it came to be known as the Cathedral of Vasily Blazhenny (St. Basil the Beatified) after Basil, the Russian holy fool who was "idiotic for Christ's sake" and who was buried in the church vaults during the reign (1584–98) of Tsar Fyodor I.

The church was designed by two Russian architects, Posnik and Barma (who may in fact have been one person). According to popular legend, however, it was built by an Italian architect who was blinded so that he could never create anything that was similar or equal.

Saint-Benoît-sur-Loire, village, Loiret *département,* north-central France, on the right bank of the Loire River, 25 miles (40 km) east of Orléans by road. The splendid Romanesque basilica is the only survival of the Benedictine abbey of Fleury, founded about 651. The abbey acquired renown when the relics of St. Benedict were brought there from Montecassino in Italy about 672, and Fleury then became known by its present name. The basilica is entered through a two-storied narthex surmounted by a square belfry, with pillars crowned by Romanesque, Corinthian, and symbolically carved capitals. The choir contains the tomb of Philip I of France (d. 1108). The carved northern portal (early 13th century) has a lintel representing the transfer of St. Benedict's relics to Fleury. The relics are contained within the massive axial pillar of the crypt (1067), below the choir.

In ancient times, Fleury was reputed to be frequented by the druidic priests of ancient Gaul. The abbey, famous in the Middle Ages for its school and manuscripts, was pillaged by the Huguenots in 1562. It was restored by the cardinal de Richelieu but destroyed in 1760–1800. The abbey church, which was spared, was carefully restored from 1836 to 1923, and the abbey was rebuilt by Benedictine monks after World War II. Pop. (1982) 500.

Saint Bernard, working dog credited with saving the lives of some 2,500 people in 300 years of service as pathfinder and rescue dog at the hospice founded by St. Bernard of Montjoux in Great St. Bernard Pass in the



Saint Bernard
Sally Anne Thompson—EB Inc.

Pennine Alps. Probably descended from mastifflike dogs that were introduced from Asia to Europe by the Romans, the St. Bernard appears to have been brought to the hospice in the late 17th century. The most famous of the hospice dogs was Barry, who reportedly saved more than 40 people before his death in the early 1800s.

A powerfully built, muscular dog with a massive head and drooping ears, the St. Bernard stands a minimum of 25 inches (65 cm) and weighs 140 to 170 pounds (64 to 77 kg). Its coat is red-brown and white or brindle and white and may be either short and dense or medium long. The long-haired variety of St. Bernard was produced by crosses with the Newfoundland dog in the early 19th century.

Saint Bernard Pass (Switzerland, Italy, France): *see* Great Saint Bernard Pass; Little Saint Bernard Pass.

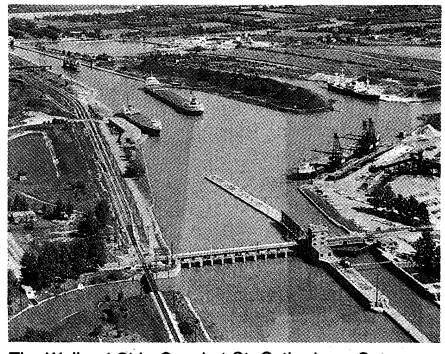
Saint Boniface, historic district of Winnipeg, southern Manitoba, Canada, at the confluence of the Seine and Red rivers. It was founded in 1818 by a group of French missionaries led by Bishop Joseph Norbert Provencher upon the site of an earlier, unsuccessful settlement by Swiss mercenaries; a chapel was built there under the patronage of St. Boniface. Since then, St. Boniface, with its famous cathedral (1908), has become an important French-Canadian Roman Catholic cultural and religious centre. The grave of Louis Riel (1844–85), rebellious leader of the métis (French-Canadians of mixed French and Indian blood), is in the cathedral churchyard. St. Boniface College (1818) is an affiliate of the University of Manitoba. Grain elevators, stockyards, and railway marshaling yards are characteristic of the area. In 1972 St. Boniface, a city that had been incorporated in 1908, was absorbed into the city of Winnipeg along with other municipalities that formed the Metropolitan Corporation of Greater Winnipeg.

Saint-Brieuc, town, capital of Côtes-du-Nord *département,* Brittany region, northwestern France. It is situated on a promontory between the ravines of the Gouët River and its tributary the Gouëdic, near Saint-Brieuc Bay on the English Channel. Saint-Brieuc is named after a Welsh monk, St. Briocus, who evangelized the region in the 6th century and established an oratory there. In 1375 the town was defended against the duke of Brittany by Olivier de Clisson, who in 1394 attacked it himself; in both sieges the massive fortified cathedral of Saint-Étienne (which dates from the 13th century) was much-damaged. It has been reconstructed several times. In 1592 Saint-Brieuc was pillaged by the Spaniards and in 1601 ravaged by the plague.

A panoramic view of the Gouët estuary and valley is obtained from the Tertre Aubé, a hillock in the north of the town. The town has pleasant parks and gardens; points of vantage on the boulevards bordering the ravines overlook its commercial and fishing port, Le Légué, in the Gouët estuary, the ruined 14th-century tower that dominates the estuary mouth, and Saint-Brieuc Bay. There are many picturesque old houses in the town. The town hall houses a museum and art gallery.

Saint-Brieuc, which is a centre of tourism for northern Brittany, is also an important market town. Its industries include metallurgy and brush manufacture. Pop. (1982) 48,563.

Saint Catharines, city, Regional Municipality of Niagara, southeastern Ontario, Canada, on the south shore of Lake Ontario, at the entrance to the Welland Ship Canal. Named after the first wife of Robert Hamilton, member of the first legislative council of Upper Canada, it has grown from a small settlement established in 1790 to become the centre of the Niagara fruit belt and the largest city on the canal. In 1961 St. Catharines annexed the neighbouring towns of Merritton and Port Dalhousie, more than doubling its population and stretching its boundaries from the Niagara Escarpment (south) to Lake Ontario (north) and eastward to the canal. In the late 19th century it was famed for its mineral springs. St. Catharines is now known as the Garden City



The Welland Ship Canal at St. Catharines, Ont.
Horizons Photograph

and is the site of the annual Royal Canadian Henley Regatta. It is also an industrial centre, producing automotive parts, heavy electrical appliances, structural-engineering goods, hardware, textiles, hosiery, paper and wood products, and canned fruits and vegetables. Inc. town, 1845; city, 1876. Pop. (1986) city, 123,455; St. Catharines–Niagara metropolitan area, 343,253.

Saint Catherine's, Greek Orthodox monastery situated on Mount Sinai more than 5,000 feet (1,500 m) above sea level in a narrow valley north of Mount Mūsā in the Sinai peninsula. Often incorrectly called the Sinai Independent Greek Orthodox Church, the monastic foundation is the smallest of the autonomous churches that together compose the Eastern Orthodox Church. The abbot of the monastery, who is also the archbishop of Sinai, Paran, and Raithu, is elected by the brotherhood and consecrated by the Greek Orthodox patriarch of Jerusalem. One of its early abbots was St. John Climacus. The monastery was at first under the jurisdiction of

the Jerusalem patriarch; its independence was recognized by Constantinople in 1575. The number of monks is limited to 36; this figure includes those living in annexes (*metochia*) elsewhere, which today are chiefly at Cairo and Suez in Egypt. The laity of the Church of Sinai are some Christian Arabs employed by the monastery and fishermen on the Red Sea coast at aṭ-Ṭūr (Tor, formerly Raithu). The Muslim Bedouin Arabs who live near the monastery have always acted as its guards and have in turn been supported by it.

Founded in 527 by the Byzantine emperor Justinian I, the building of the monastery dates from AD 530, when Justinian, after complaints of robber incursions from the hermit monks who had settled there, fortified the traditional site of the burning bush observed by Moses on the lower slopes of Mount Sinai. During the 7th century the monastery provided a centre of refuge for scattered communities of Christians threatened by the rise of Islām. Spared by the Muslims, the monks, according to tradition, conciliated the invaders by erecting the small mosque within the walls where local Bedouin Arabs still worship. The monastery was a pilgrimage centre during the Middle Ages. St. Catherine's still retains much of its original appearance and has had an unbroken history since the 6th century. The original gray granite walls (280 by 250 feet [85 by 76 m]) still stand, and so does the church dedicated to the Virgin Mary, which was built at the same time. In the apse is a restored mosaic of the Transfiguration, also dating from the early Byzantine period.

The monastery's greatest treasures are its icons, some of which were painted before the 8th century, and its manuscripts. These, housed in a library built in 1945, are mainly Greek and Arabic. In 1949–50 most of the manuscripts were microfilmed by the American Foundation for the Study of Man, acting on behalf of the Library of Congress in Washington, D.C., and with the assistance of the University of Alexandria. The manuscript collection includes the Codex Syriacus, a Syriac text of the Gospels written about 400. A nearly complete Codex Sinaiticus, a Greek manuscript of the Bible dating from the 4th century that formerly belonged to St. Catherine's, is now in the British Museum in London. In 1975 workmen accidentally penetrated a wall and discovered behind it a trove of some 3,000 additional manuscripts, including ancient biblical texts and other documents known but long lost, along with assorted works of art. Among the find were missing parts of the Codex Sinaiticus, some 50 other incomplete codexes and 10 nearly complete ones, and other Greek texts in uncial script that shed new light on the history of Greek writing. Even more numerous documents were found in various Semitic, Hamito-Semitic, and Indo-European languages, dating from the 6th century and earlier.

Saint Charles, city, seat of St. Charles county, eastern Missouri, U.S., on bluffs overlooking the Missouri River, there bridged to St. Louis, 22 miles (35 km) southeast. One of the earliest white settlements on the Missouri, it was founded in 1769 by Louis Blanchette as Les Petites Côtes ("The Little Hills"). The site, transferred to Spain in 1770, was dedicated in 1771 as the village of San Carlos Borromeo after a church of that name was built there. In May 1804 Meriwether Lewis and William Clark began their westward expedition from San Carlos, Anglicized upon their return in 1806 to St. Charles. It was the state's first capital (1821–26), and the First Missouri State Capitol building is preserved.

A trade and shipping centre for farm produce (primarily wheat, corn, oats), Saint Charles also has diversified manufactures (electronic equipment, clothing, beer, and aluminum). It is the seat of Lindenwood Colleges (four coordinated colleges originating in 1827 with the first women's college west of the Mississippi), and of the Convent of the Sacred Heart (1818; likewise the first free school). Fort Zumwalt State Historic Site and Daniel Boone's last home are nearby. Inc. village, 1809; city, 1849. Pop. (1987 est.) 42,297.

Saint Christopher and Nevis: *see* Saint Kitts and Nevis.

Saint Clair, Lake, lake in west-central Tasmania, Australia, lying at the southern boundary of Cradle Mountain–Lake St. Clair National Park at the terminus of a 53-mile [85-kilometre] walking track from the mountain. It has an area of 11 square miles (28 square km), measures 9 miles by 1 mile (14.5 by 1.6 km), and lies at an elevation of 2,417 feet (737 m) on Tasmania's Central Plateau. It fills a valley once deepened by a glacier and then dammed with a moraine (glacial debris). The maximum depth approaches 700 feet (215 m) on the west, making St. Clair Australia's deepest lake. It is the source of the Derwent River's west arm, and its water is used by the Tarraleah hydroelectric-power station. Probably explored by W.S. Sharland, a surveyor, in 1832, it was named in 1835 by the surveyor general George Frankland to honour the St. Clair family of Scotland's Loch Lomond. The lake is accessible via the Lyell Highway, through Derwent Bridge, from Hobart, 108 miles (174 km) southeast.

Saint Clair, Lake, expansive shallow basin, forming part of the boundary between Michigan, U.S., and Ontario, Can. Roughly circular, with a surface area of 467 square miles (1,210 square km), it connects with the St. Clair River and Lake Huron (north) and with the Detroit River and Lake Erie (south). It is 26 miles (42 km) long (north to south), and 24 miles (39 km) wide (east to west) and has a mean surface altitude of 573 feet (175 m). The lake's drainage basin covers an area of 7,420 square miles (19,220 square km). Its northeastern shoreline is marked by the large delta of the St. Clair River, with seven channels. St. Lawrence Seaway shipping is afforded a minimum channel depth of 27 feet (8 m), and the lake region forms a popular summer recreation area. Suburbs of Detroit lie on the western shore, but there are no important ports on the lake.

The French explorer Louis Jolliet was believed to be the first European to visit the lake area (1669); but some credit the discovery to two French missionaries (1670). The lake and the St. Clair River were named by the French explorers Robert Cavelier, sieur de La Salle, and Father Louis Hennepin, who arrived on St. Clair's Day in 1679.

Saint Clair River, outlet for Lake Huron, forming part of the boundary between Michigan, U.S. (west), and Ontario, Can. (east). Flowing southward into Lake Saint Clair, with a fall of 5.7 feet (1.7 m) in 39 miles (63 km), the river discharges through a sevenmouth delta, with the South Channel (27-foot [8-metre] minimum depth) used for deep-drafted vessels. The islands in the delta form popular summer resorts, the largest being Harsens Island, Mich., and Walpole, Ont. The river is an important link in the St. Lawrence Seaway, and the main ports are Port Huron, Mich., and Sarnia, Ont.

Saint Clair's Defeat (Nov. 4, 1791), one of the worst defeats ever suffered by U.S. forces in Indian warfare, precipitated by British-Indian confrontation with settlers and militia in the Northwest Territory following the U.S. War of Independence. Despite specific provisions in the Treaty of 1783 for the evacuation of its forts on the northwestern border, Britain had failed to yield these lucrative fur-trading posts. In hopes of reclaiming lost hunting grounds with British support, a Northwest Indian Confederation was gradually molded between 1785 and 1787, consisting mainly of Shawnee, Delaware, Ottawa, Iroquois, Chippewa, Miami, and Potawatomi. Kentucky frontiersmen reacted to this threat by initiating raiding parties on native villages as early as 1788, and Indian warfare flared up the following year.

The first punitive expedition, led by General Josiah Harmar in 1790, was ambushed. In 1791 a second force of 3,000 men under General Arthur St. Clair carelessly pitched camp south of the Maumee River with few guards the night of November 3. Confederation warriors silently infiltrated the sleeping camp and mounted a surprise attack the next morning, killing more than 600 militiamen.

Indian morale was temporarily strengthened by St. Clair's Defeat, and white settlement of Ohio was retarded while frontiersmen clung to the protection of nearby U.S. forts. The tide was reversed three years later, however, at the Battle of Fallen Timbers. *See also* Fallen Timbers, Battle of.

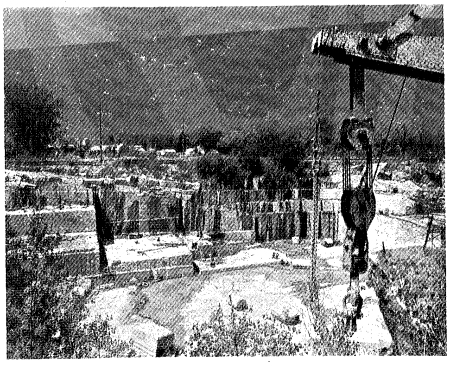
Saint Clement's Island, also called BLAKISTONE ISLAND, islet (40 acres [16 hectares]) in the Potomac River, St. Mary's county, southern Maryland, U.S., just off Colton Point. The first Maryland settlers under the Calverts (Lords Baltimore) landed there from the ships *Ark* and *Dove* on March 25, 1634. A large cross (erected 1934) marks the site of the first formal pronouncement granting freedom of religion to these Roman Catholic colonists and of the celebration of their first mass prior to their founding of Saint Marys City. Mementos are in the St. Clement's and Potomac River Museum. The area has been designated a state historic district. Pop. (1980) 326.

Saint-Cloud, city, Hauts-de-Seine *département,* Paris region, western residential suburb of Paris, France, on the left bank of the Seine River. The northern part is separated from Paris by Longchamps racecourse and by the Bois de Boulogne; the southern part by the suburb of Boulogne. It is located on the slopes of the riverbank and on the plateau beyond.

In the south are the Parc de Saint-Cloud, with its famous artificial cascade, and the outbuildings of the former royal château of Saint-Cloud destroyed in 1870 during the Franco-Prussian War. The motorway from Paris to Normandy passes through a tunnel under the park. The town is named after Clodoald, or Cloud (522–560), grandson of Clovis, who founded a monastery on the site, originally called Novigentum. Henry III of France was assassinated there after setting up camp at Saint-Cloud with Henry of Navarre (later Henry IV of France) for the siege of Paris, which was then held by the Holy League. Although predominantly a residential centre, Saint-Cloud has developed in recent years a large tertiary service sector, now containing the offices of many social enterprises and a number of industrial enterprises (machinery, aeronautical equipment, automobile accessories, and cosmetics). The city is also the headquarters of the International Bureau of Weights and Measures and of Interpol, the International Criminal Police Organization. Pop. (1982) 28,561.

Saint Cloud, city, seat of Stearns county, central Minnesota, U.S., at the junction of the Mississippi and Sauk rivers, in a dairy-farming and grain region, 67 miles (108 km) northwest of Minneapolis. It extends eastward across the Mississippi to include parts of Benton and Sherburne counties. Originally a fur-trading post, it was laid out in 1854 and named for the French city. During the Sioux uprising of 1862 the settlement served as a refuge for fleeing homesteaders. It is the seat of St. Cloud State University (1869) and the

Minnesota State Reformatory (1887). Nearby are St. John's Abbey and University (1857) at Collegeville and the College of St. Benedict (1913) at St. Joseph. St. Cloud is known as the "Granite City," and its quarries have been worked since 1870. Its diverse economy includes building and repairing of railroad cars



Granite quarry at St. Cloud, Minn.
Milt and Joan Mann from CameraMann

and the manufacture of refrigeration equipment, building stone and monuments, paper, and metal products. Inc. village, 1856; city, 1868. Pop. (1980) city, 42,566; (1982 est.) metropolitan area (SMSA), 168,000.

Saint-Cloud porcelain, soft-paste porcelain made in the town of Saint-Cloud, Fr., from the last quarter of the 17th century until 1766. Pierre Chicaneau began the manufacture, which passed by marriage to the family of Henri Trou (*c.* 1722 onward). Much of the porcelain, which was yellowish, or creamy off-



Saint-Cloud soft-paste porcelain cane handle decorated in the Chinese manner, *c.* 1740; in the Victoria and Albert Museum, London
By courtesy of the Victoria and Albert Museum, London

white, in tone, was influenced by blanc de chine, or late Ming Chinese white porcelain; hence the plum-blossom decoration molded in low relief and the figurines in the Chinese manner. There was also decoration in high relief and painting in blue and in other colours on white. The influence of the late 17th-century Japanese Kakiemon ware can be seen in some of the decoration painted in overglaze colours.

Saint Croix, largest island of the U.S. Virgin Islands, in the Caribbean Sea, some 65 mi (105 km) southeast of Puerto Rico and 40 mi south of St. Thomas. It has an area of 80 sq mi (207 sq km). In the west some hills run parallel to the coast, culminating in Mt. Eagle (1,165 ft [355 m]). It is the only island of the group with an extensive plain, most of which is cultivated; it formerly was called the "garden of the Danish West Indies." A meagre growth of secondary scrub has replaced former seasonal forests, which were sacrificed for sugarcane plantations. Christiansted on the northern coast is the capital, but Frederiksted on the western coast is commercially more significant.

Visited by Christopher Columbus, who named it Santa Cruz, St. Croix (both names mean Holy Cross) was colonized by both the English and Dutch in 1643, though the latter were driven out after quarrels. As sugar production became more profitable, St. Croix increased in attraction, and in 1650 the English themselves were expelled by the Spanish, who in turn succumbed to French conquest. In 1651 the Knights of Malta acquired St. Croix but resold it to the French West India Company in 1665. It became a French colony in 1674 but during 1696–1733 was uninhabited. In 1733 the King of Denmark bought it; subsequently it shared the general history of the Virgin Islands.

The tourist industry is the keystone of the economy, and unreliable power and water supplies hamper the government's efforts to diversify with new industries. The supply of potable water from wells is supplemented by distilled seawater. The island's only real natural resource, the sea, is beginning to be exploited by game and commercial fishing and as a resource for oceanographic laboratory studies. New industries include an alumina reduction plant and an oil refinery. Rum—all that remains of a once extensive sugar industry—is distilled and exported along with other foodstuffs. Pop. (1980) 49,725.

Saint Croix River, tributary of the Mississippi River, rising in Douglas County, Wis., U.S., in the northwestern part of the state. It flows 164 mi (264 km) southwestward into the Mississippi at Prescott, Wis., about 20 mi south of St. Paul, Minn. For 130 mi upstream from its mouth, it forms the boundary between Wisconsin and Minnesota. At Taylors Falls, Minn., and at St. Croix Falls, Wis., the river cuts through Interstate Park; parts of the river are designated a national scenic waterway. A hydroelectric plant at St. Croix Falls furnishes power for St. Paul and Minneapolis.

Saint Croix River, river, rising as an outlet of the Chiputneticook Lakes, Maine, U.S., and flowing south-southeast into Passamaquoddy Bay, an inlet of the Bay of Fundy; its entire 129-mi (208-km) length forms the international boundary between Maine and New Brunswick (Canada). Navigation upriver is possible only for 10 mi because of power dams at Calais–Milltown. The river is important economically for lumbering. Named by Jacques Cartier, who saw it Sept. 14, 1535 (St. Croix [Holy Cross] Day), it was visited in 1604 by other French explorers, Pierre du Guast (the sieur de Monts) and Samuel de Champlain, who founded the ill-fated colony of St. Croix Island at its mouth.

Saint-Cyr, in full ÉCOLE SPÉCIALE MILITAIRE DE SAINT-CYR, French national military academy at Coëtquidam, founded in Fontainebleau in the early 1800s by Napoleon Bonaparte. In 1808 Napoleon moved it to Saint-Cyr-l'École near Versailles, on the site of a famous convent school founded in the 17th century by Madame de Maintenon, wife of Louis XIV. During World War II the school operated at Aix-en-Provence and Cherchell, Alg. The buildings at St.-Cyr-l'École were destroyed in 1944, and after the war the academy was transferred to Coëtquidam, in Brittany. The popular name was retained.

Saint-Cyr trains officers for the French Army through a two-year course for graduates who have earned a *baccalauréat* and a one-year course for former noncommissioned officers. Henri Philippe Petain (1856–1951), premier of France, and Henri Honoré Giraud (1879–1949), French general, were trained at Saint-Cyr. Charles de Gaulle, who graduated with honours in 1911, taught military history there after World War II.

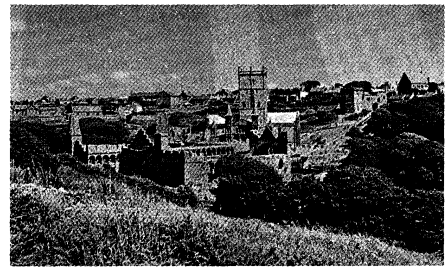
Saint-Cyran, Abbé de: *see* Duvergier de Hauranne, Jean.

Saint Cyres, Stafford Henry Northcote, Viscount: *see* Northcote, Sir Stafford Henry.

Saint David, Fort, British stronghold near the town of Cuddalore, about 100 miles (160 kilometres) south of Madras on the east coast of India. The fort was sold by the Marāthās to the English East India Company in 1690. Its territory was determined by a "random shott of a great gun," the villages thus covered being called "cannonball villages." It was named for the patron saint of Wales because the governor of Madras at the time, Elihu Yale, was Welsh. It was purchased because of increasing political instability in southern India, which made a second fortified trading station (besides that in Madras) desirable.

In the 18th century the fort became a second centre of British power in southern India. In 1747–48, aided by the presence of a British fleet, it withstood a French attack after the fall of Madras. In 1758 it was taken by the French but was abandoned when the French city of Pondicherry was attacked by the British. It was taken again by the French in 1782 but was restored to the British in 1785, and, with the end of the French threat, it was abandoned and fell into ruins.

Saint David's, Welsh TYDDEWI, cathedral village, Preseli district, Dyfed county, Wales, in the Alun Valley. Situated in an area important for Celtic Christianity, the cathedral

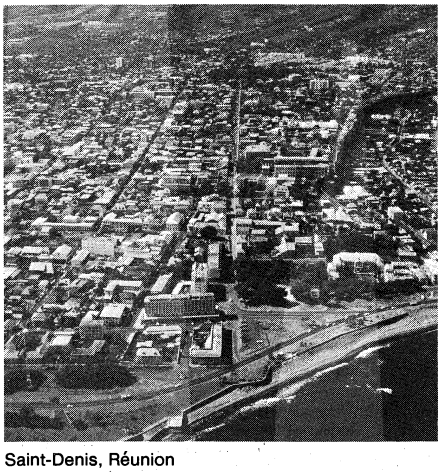


The cathedral and the ruins of the bishop's palace at St. David's, Dyfed
S. Monro—De Wys Inc.

was a medieval pilgrimage centre of considerable significance. Most of the present structure dates from the late 12th century, but many additions were made over the next 350 years, and periodic repairs were necessitated following damage during the Reformation and the English Civil War (1640s); extensive restoration of the building was undertaken in the 19th century. Nearby are the ruins of the College of St. Mary (founded *c.* 1377) and of the early 14th-century bishop's palace. The cathedral close was formerly surrounded by a wall, only traces of which survive.

St. David's village (called locally "the City") consists of four streets meeting in Cross Square, the ancient marketplace, with its market cross (restored 1873). Pop. (1971) 1,638.

Saint-Denis, town, capital of the French overseas *département* of Réunion in the western Indian Ocean. The town lies in a basin at the mouth of the Saint-Denis River on the north coast of the island, wedged between the ocean and a mountain rising abruptly behind it. It was originally the main port of Réunion, but an artificial harbour at Le Port, on the northwest coast, replaced it in the 1880s, because of unpredictable winds and tides at Saint-Denis. The two are connected by 12 mi (20 km) of scenic highway along the coast. Saint-Denis is primarily an administrative town, with commerce largely in the hands of an Arab minority. An international airport, several libraries, a natural history museum, and a university



Saint-Denis, Réunion
Editions HOA-QUI

for the study of law, economics, and political science are located there. Pop. (1982) 109,068.

Saint-Denis, city, Seine-Saint-Denis *département,* Paris region, France. The city is a northern suburb of Paris and lies on the right bank of the Seine. Until the mid-19th century, when industries developed there, it was only a small township centred on its famous abbey church, which had been the burial place of the kings of France. The church is of major importance in the history of architecture, being the first major edifice marking the transition from the Romanesque to the Gothic style and serving as a model for most of the late 12th-century French Gothic cathedrals, including those at Chartres and Senlis. The city also has a reputation for its fairs and traditional celebrations, such as those of Lendit (a medieval fair of the Paris region).

King Dagobert I founded the abbey in the 7th century and built it over the tomb of St. Denis, the patron saint of France. The town gradually grew up around the abbey. Abbot Suger (1136–47) built a new basilica for the abbey that incorporated and adapted part of an earlier church built during the Carolingian Empire (751–987). Suger's church was to transform Western architecture; the Gothic stylistic elements that mark it as a transitional structure can best be seen in the chancel and the ambulatory with its famous stained-glass windows. The west facade (1137–40) was much restored during the 19th century by Eugène-Emmanuel Viollet-le-Duc. The choir, apse, and nave were rebuilt in the Gothic style under Louis IX (1214–70).

For 12 centuries, except for a few kings of the Merovingian (500–751) and Capetian (987–1328) dynasties, all the French kings—from Dagobert I (reigned 629–39) to Louis XVIII (reigned 1814–24)—as well as their close relatives and a number of their outstanding subjects, were buried in the basilica. During the French Revolution, their tombs were desecrated and removed, but they were later reassembled in the church and now constitute a remarkable collection of French funerary sculpture. The monuments on all the tombs of the predecessors of Louis IX (St. Louis; reigned 1226–70) were carved under his orders and are of little interest except for that of Dagobert, which has lively sculptures. After Philip III (d. 1285), the recumbent statues had faces copied from death masks; most of them are striking portraits. During the Renaissance, the mausoleums were elaborate and highly decorated. They are mostly on two levels; on the upper level the monarchs are represented kneeling in court dress, while on the lower level, they are shown lying naked in the rigidity of death. The most remarkable Renaissance tombs include those of Louis XII (1498–1515), Anne of Brittany, Francis I (1515–47), Claude of France, Henry II (1547–59), and Catherine de Médicis. The crypt, which Suger built around the foundations of the Carolingian church, contains some Merovingian sarcophagi.

Several monastic buildings were added to the abbey complex in the 18th century. These were transformed by Napoleon I into a school for daughters of members of the Legion of Honour (Légion d'Honneur), which they remain.

Situated on the main railway line north of Paris and traversed by the Saint-Denis Canal, the suburb has become a very important industrial centre. To the small heavy industrial and machinery assembly operations in existence for some years (railway equipment, agricultural machinery, and automobiles) have been added electronics, chemical, pharmaceutical, and food-processing industries. The Municipal Museum has a section devoted to the 20th-century poet Paul Éluard, who was born at Saint-Denis. Pop. (1982) 91,275.

Saint-Denis, Charles de Marguetel de: *see* Saint-Évremond, Charles de Marguetel de Saint-Denis, seigneur de.

Saint-Denis, Louis Juchereau de, Saint-Denis also spelled SAINT-DENYS (b. Sept. 17, 1676, Beauport, Quebec—d. June 11, 1744, Natchitoches, Louisiana Territory [now in U.S.]), French-Canadian explorer and soldier, leader of a 1714 expedition from French-held Natchitoches, in the Louisiana Territory, to the Spanish town of San Juan Bautista (modern Villahermosa) on the Rio Grande.

Saint-Denis sought to establish trade relations with the Spanish. He helped the Spaniards found four missions and establish a garrison in what is now Texas. Distrusted by his countrymen, who regarded him as too pro-Spanish, and by the Spaniards, who saw him as a threat, he was imprisoned in Mexico City for several months in 1715. He made a second journey to the Rio Grande in 1717, but his goods were seized. On arriving in Mexico City to protest the confiscation of his goods, he was imprisoned again for several more months. He returned to Natchitoches in 1719, fought in the defense of Mobile and at Pensacola, and took command of the Natchitoches area until France and Spain ended hostilities in 1721.

Saint-Denis is known in history as one of the French explorers who sought to make friends with local Indian tribes as well as with the Spanish in Mexico and Texas, but his work was short-lived. Many of the Spanish settlements he founded in Texas could not be maintained, and Spain and France continued to compete on the North American continent.

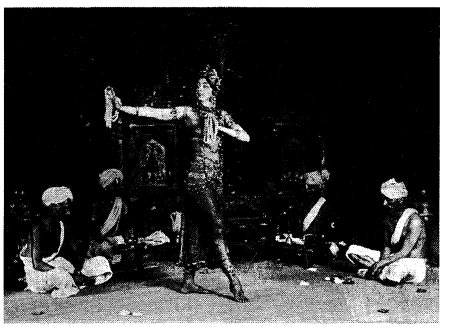
Saint-Denis, Michel, byname JACQUES DUCHESNE (b. Sept. 13, 1897, Beauvais, Fr.—d. July 31, 1971, London) French director, producer, teacher, and theatrical innovator who was influential in the development of the British theatre for 40 years.

Nephew of the famed French theatrical pioneer actor-director Jacques Copeau, Saint-Denis worked with Copeau for 10 years at the Théâtre du Vieux-Colombier in Paris and later in Burgundy, where they founded the theatre workshop Les Copiaux. Saint-Denis organized an outgrowth of that company, La Compagnie des Quinze, which reopened the Vieux-Colombier with André Obey's *Noé* ("Noah") in 1931 and went on to produce several other highly acclaimed productions that eventually toured England.

John Gielgud, Sir Bronson Albery, and Tyrone Guthrie convinced him to establish an English training school, the London Theatre Studio (1935), which was active until the beginning of World War II. During the same period, he directed *The Witch of Edmonton, Macbeth* with Laurence Olivier, and *The Three Sisters,* all commended for their style and teamwork. His work was interrupted by World War II, during which he served in France and England as a liaison officer. He broadcast for the British Broadcasting Company (BBC) (1940–44) and was appointed director of the BBC's French section. Saint-Denis became general director of the Old Vic Theatre Centre and School in 1945 and produced that company's *Oedipus Rex,* starring Laurence Olivier and Ralph Richardson.

In 1951 he resigned from the Old Vic and returned to France to head the Centre Dramatique de l'Est. After 1957 he became active as a consultant, first to the Lincoln Center Repertory Company and the Juilliard School of Music's drama division (New York City, 1959) and then to the Canadian National School of Dramatic Art (1960). After serving as codirector of the Royal Shakespeare Company with Peter Hall from 1961 to 1966, he served as consultant-director until his death at age 73. His *Theatre; The Rediscovery of Style* was published in 1960.

Saint Denis, Ruth, original name RUTH DENNIS (b. Jan. 20, 1877, Newark, N.J., U.S.—d. July 21, 1968, Los Angeles), American contemporary dance innovator who influenced



Ruth Saint Denis as Radha, 1908
Culver Pictures

almost every phase of American dance, particularly through the Denishawn school and company that she founded in 1915 with her husband, Ted Shawn. (*See* Denishawn School of Dancing and Related Arts.)

Initially a vaudeville and musical-comedy dancer and actress, St. Denis was inspired in 1904 by a cigarette poster of an Egyptian goddess to investigate Oriental dance. After studying Hindu philosophy and art, she choreographed *Radha* (1906) and related solos that used theatricalized Oriental dance forms and costumes. Around this time she changed her name to St. Denis. She performed in New York City and then left on a successful European tour from 1906 to 1909. Later productions, many of which had religious themes, included *Egypta* (1910) and *O-mika* (1913), a Japanese dance drama.

During what became known as the Denishawn era, St. Denis' choreographic style broadened to include group numbers occasionally derived from Occidental, as well as Oriental, sources. Among her choreographic innovations were "music visualization"—a concept that called for movement equivalents to the timbres, dynamics, and structural shapes of music in addition to its rhythmic base—and a related choreographic form that she called "synchoric orchestra"—a technique, comparable to the eurythmics of Jaques-Dalcroze, that assigned one dancer to interpret the rhythms of each instrument of the orchestra.

St. Denis and Shawn separated, both professionally and maritally, in 1931, though they never divorced. After a brief semiretirement, St. Denis resumed solo performances. She also founded the Society of Spiritual Arts and devoted much of the rest of her life to promoting the use of dance in religion. Often called the "First Lady of American Dance," she re-

mained active into the 1960s, when many of her better known solos were recorded on film.

Prompted by a belief that dance should be spiritual instead of simply entertaining or technically skillful, St. Denis brought to American dance a new emphasis on meaning and communication of ideas by using themes previously considered too philosophical for theatrical dance. Although she was never concerned with technique for its own sake, her extensive use of Oriental forms and abstract "music visualizations" encouraged her students to develop other nonballetic movements that became known as modern dance. Her autobiography, *Ruth St. Denis: An Unfinished Life*, was published in 1939.

Saint-Denis-du-Sig (Algeria): *see* Sig.

Saint-Dié, town, Vosges *département,* Lorraine region, northeastern France, on the Meurthe River, southeast of Nancy. A bishop's see, it grew up around the monastery of Saint-Deodatus, or Dieudonné (7th century), from which its name is derived. It has a printing industry dating from the 16th century and was the place where Martin Waldseemüller printed his geographical pamphlet "Cosmographiae introductio" (1507), in which the name America appeared in print for the first time. Its 12th-century Romanesque Notre-Dame church survived the heavy destruction of World War II, but its medieval cathedral was destroyed.

Saint-Dié was the birthplace (1832) of the French statesman Jules Ferry. Pop. (1982) 23,279.

Saint-Dizier, town, Haute-Marne *département,* Champagne-Ardennes region, northeastern France, on the Marne River and the Canal de la Marne à la Saône, northeast of Troyes. On the site of the Roman Desiderii Fanum, its Gigny and Saint-Martin churches date from the 13th century. The church of Notre-Dame was reconstructed after a fire (1775). A monument commemorates the heroic resistance of Francis I to the forces of Emperor Charles V in 1544. An iron- and bronze-founding town, it has other heavy industry as well as textile manufacturing and food processing. Pop. (1982) 34,074.

Saint Domingo apricot: *see* mammee apple.

Saint Edmundsbury, district (borough), county of Suffolk, England, with its headquarters at Bury Saint Edmunds. Its area of 254 sq mi (657 sq km) stretches across the whole breadth of the county from the Essex border (south) to that of Norfolk (north), a distance of 32 mi (52 km). The area is overwhelmingly agricultural, but in the northwest it includes a section of the distinctive heath and woodland area known as the Breckland. Pop. (1983 est.) 89,000.

Saint Edward's Crown, coronation crown of the kings and queens of England that consists of a gold- and jewel-encrusted base surmounted by a cross. The crown's appellation was first used in the 13th century, after Henry III had transferred the body of Edward the Confessor to its present shrine in Westminster Abbey and equipped it with new funeral ornaments (the old ones were preserved in the Abbey as relics of the saint).

The actual crown seems to have been used for the coronation of all English sovereigns from Edward I to Charles I except the boy Edward V, who was never crowned at all. It was broken up in 1649 by order of Parliament, but the present crown, designed for Charles II (reigned 1660–85), apparently was made from the fragments.

Saint Edward's sapphire, rose-cut gem with a fine blue colour set in the finial cross of the Imperial state crown of England. Reported to date from Edward the Confessor's coronet in 1042, it is one of the oldest gems in the British regalia.

Saint Elias, Mount, second highest peak (18,008 ft [5,489 m]) of the St. Elias Mountains, on the Canada–United States (Alaska) border, 70 mi (110 km) northwest of Yakutat, Alaska. The mountain rises north of Malaspina Glacier. Vitus Bering became the first official European discoverer of northwestern America when he sighted the peak from his ship, the "St. Peter," on July 16, 1741. The first ascent was made by a party led by the Duke of Abruzzi on July 31, 1897.

Saint Elias Mountains, segment of the Pacific Coast Ranges, extending southeastward for about 250 mi (400 km) from the Wrangell Mountains to Cross Sound along the Canada–United States (Alaska) border. Many peaks exceed 17,000 ft (5,200 m), including Mts. St. Elias, Logan (second only in height in North America to Mt. McKinley and the highest in Canada), King, and Lucania. The Wrangell, Chugach, and Kenai mountains (northwest) and the Fairweather Range (south) are sometimes considered part of the group. The St. Elias Mountains hold the world's most extensive ice fields outside the polar ice caps, extending south and east for 235 mi from the eastern part of the Chugach Mountains to the Alsek River and including the Malaspina, Guyat, Seward, Bering, and Hubbard glaciers. The southern end of the range forms part of the Glacier Bay National Monument.

Saint Elmo's fire, the glow accompanying the brushlike discharges of atmospheric electricity that usually appears as a tip of light on the extremities of such pointed objects as church towers or the masts of ships during stormy weather. It is commonly accompanied by a crackling or fizzing noise.

St. Elmo's fire, or corona discharge, is commonly observed on the periphery of propellers, along the wing tips, windshield, and nose of aircraft flying in dry snow, ice crystals, or in the vicinity of thunderstorms. Various flight procedures, in addition to mechanical and electrical devices designed to reduce the charge accumulation, are utilized as safeguards in preventing or minimizing discharges.

The name St. Elmo is an Italian corruption, through Sant' Ermo, of St. Erasmus, the patron saint of Mediterranean sailors, who regard St. Elmo's fire as the visible sign of his guardianship over them.

Saint-Étienne, city, capital of Loire *département,* Rhône-Alpes region, on the northeast border of the Massif Central, east central France. From its beginning as a small community in a coal basin, huddled around the church from which it takes its name, it has developed as the nucleus of an industrial community including Saint-Chamond, Le Chambon-Feugerolles, and Firminy, strung out along the Ordaine and Gier valleys to the southwest and northwest. The blacksmiths of the village of Saint-Étienne appear to have used surface coal as early as the 12th century.

The locality began to expand industrially in the 15th century, and with the advent of King Francis I of France the state firearms manufactory and an important silk industry were established there. In 1828 engines on the first French railway line began transporting coal from Saint-Étienne to Andrézieux on the Loire, 10 mi (16 km) away. The line was soon extended to Lyon. The first steel mill in France, imported from England, was installed at Le Chambon shortly after the Napoleonic Wars. Saint-Étienne now specializes in steel for arms and armour plating. It continues to manufacture bicycles, introduced from England in 1886, and is the chief French centre for the production of ribbons, scarves, and ties. Other industries include woodwork, glasswork, and dyeing. This region is constantly adapting to new forms of industry. Saint-Étienne is, among other things, the home of the largest French commercial company, the chain of "Casino" stores. The city is closely connected with the Lyon agglomeration, and the two form a two-headed metropolitan area for the Rhône-Alpes economic region. Pop (1982) 193,938.

Saint Eulalia, Knights of (Christian order): *see* Mercedarian.

Saint-Eustache, town, Montréal region, southern Quebec province, Canada, on the Rivière des Mille-Îles, opposite Laval (Île Jésus). Settled in the 18th century, it was the site of the final battle of the 1837 uprisings, in which the militia, under Gen. John Colborne, defeated the insurgent *patriotes* and killed their leader, Jean O. Chénier. The town church, built in 1783 and heavily damaged during the battle, serves as a war memorial. Saint-Eustache is now a popular resort, 15 mi (24 km) west of Montreal city, in an agricultural area. Industries include dairying and vegetable canning. Pop. (1981) 29,716.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Saint Eustatius (Netherlands Antilles): *see* Sint Eustatius.

Saint-Évremond, Charles de Marguetel de Saint-Denis, seigneur de (lord of) (b. 1613/14, Saint-Denis-le-Gast, Fr.—d. Sept. 20, 1703, London), French gentleman of letters and amateur moralist who stands as a transitional figure between Michel de Montaigne



Saint-Évremond, engraving by Gerard Edelinck, 1697
By courtesy of the Bibliotheque Nationale, Paris

(died 1592) and the 18th-century Philosophes of the Enlightenment.

Pursuing a military career in his early life, he won promotion for loyalty to King Louis XIV's minister Cardinal Mazarin during the civil wars of the Fronde (1648–53). In 1661, however, a facetious letter of Saint-Évremond's deriding the late Mazarin's Treaty of the Pyrenees (1659) was accidentally brought to light, and he fled from France to escape arrest. Welcomed to London by King Charles II, he spent the rest of his life there except for an interval in Holland (1665–70).

Saint-Évremond wrote for his friends, not for publication; but a few of his pieces were leaked to the press in his lifetime. The 1705 edition of his works is largely superseded by a modern collection of his prose works and letters, published in 1962. His poems, mainly occasional pieces, are negligible; but *Les Académiciens* (1643), a comedy in verse, is still amusing, as is his prose comedy "in the English style," *Sir Politick Would-Be* (*c.* 1664).

Saint-Évremond's prose consists of letters and discourses ranging from hilarious satire

(*Retraite de M. le duc de Longueville,* 1649; *Conversation du Maréchal d'Hoquincourt avec le Père Canaye, c.* 1663) to literary criticism, distinguished by antidogmatic common sense, on the various genres. It also includes a series of ethical writings, which plead for a prudently moderated hedonism and for religious toleration.

Saint-Exupéry, Antoine (-Marie-Roger) de (b. June 29, 1900, Lyon—d. July 31, 1944, in flight over the Mediterranean), French aviator and writer whose works are the unique testimony of a pilot and a warrior who looked at adventure and danger with a poet's eyes.



Saint-Exupéry

By courtesy of the Bibliotheque Nationale, Paris; photograph, J.P. Ziolo

He came from an impoverished aristocratic family. A poor student, he failed the entrance examination to the École Navale. In the course of his military service, he obtained his pilot's license (1922). In 1926 he joined the Compagnie Latécoère in Toulouse and helped establish airmail routes over northwest Africa, the South Atlantic, and South America. In the 1930s he worked as a test pilot, a publicity attaché for Air-France, and a reporter for *Paris-Soir.* In 1939, despite permanent disabilities resulting from serious flying accidents, he became a military reconnaissance pilot; after the fall of France (1940) he escaped to the U.S. In 1943 he rejoined the Air Force in North Africa and was shot down on a reconnaissance mission.

Saint-Exupéry found in aviation both a source for heroic action and a new literary theme. His works exalt perilous adventures at the cost of life as the highest realization of man's vocation. In his first book, *Courrier-Sud* (1929; *Southern Mail,* 1933), his new man of the skies, airmail pilot Jacques Bernis, dies in the desert of Rio de Oro. His second novel, *Vol de nuit* (1931; *Night Flight,* 1932), was dedicated to the glory of the first airline pilots and their mystical exaltation as they faced death in the rigorous performance of their duty. His own flying adventures are recorded in *Terre des hommes* (1939; *Wind, Sand and Stars,* 1939). He used his plane as an instrument to explore the world and to discover human solidarity in the fraternal efforts of men to accomplish their tasks. His language is lyrical and moving, with a simple nobility. *Pilote de Guerre* (1942; *Flight to Arras,* 1942) is a personal reminiscence of a reconnaissance sortie in May 1940 accomplished in a spirit of sacrifice against desperate odds. While in America he wrote *Lettre à un otage* (1943; *Letter to a Hostage,* 1950), a call to unity among Frenchmen, and *Le Petit Prince* (1943; *The Little Prince,* 1943), a child's fable for adults, with a gentle and grave reminder that the best things in life are still the simplest ones and that real wealth is giving to others.

The growing sadness and pessimism in Saint-Exupéry's view of man appears in *Citadelle* (1948; *The Wisdom of the Sands,* 1952), a posthumous volume of reflections that show Saint-Exupéry's persistent belief that man's only lasting reason for living is as repository of the values of civilization.

Saint Fergus, gas pipeline terminal on the northeastern coast of Scotland in the district of Banff and Buchan, Grampian region. Situated 5 mi (8 km) north of Peterhead, Saint Fergus is the major Scottish landfall terminal for North Sea gas. Gas arriving by deepwater pipeline from the Frigg field is treated to remove water and natural gas liquids and transferred to the national pipeline grid. Further expansion of the terminal will enable it to receive gas from the Brent field and to remove natural gas liquids that could form the feedstock for a new chemical industry, whose scale probably would be restricted by the limited harbour capacity of nearby Peterhead. Pop. (1981) 611.

Saint Francis River, river rising in the St. Francois Mountains, southeastern Missouri, U.S., and flowing south to the edge of the Ozark Plateau at Wappapello, Mo. It continues across the Mississippi alluvial plain to enter the Mississippi River just above Helena, Ark., after a course of 425 mi (684 km). For 40 mi the river forms part of the Missouri–Arkansas boundary. In Wayne County, Mo., the river is impounded by Wappapello Dam (built in 1941). Heavy rainfall in the Ozarks, which make up 70 percent of the river's drainage basin of 8,400 sq mi (21,800 sq km), runs off rapidly and despite the dam still causes floods in the lower basin. In 1960, as part of a U.S. Army Corps of Engineers project, levees and ditches were constructed and channels realigned between Wappapello and the river's mouth.

Saint-Gall (Switzerland): *see* Sankt Gallen.

Saint-Gaudens, Augustus (b. March 1, 1848, Dublin—d. Aug. 3, 1907, Cornish, N.H., U.S.), generally acknowledged to be the foremost U.S. sculptor of the late 19th century, noted for his imaginatively evocative



Saint-Gaudens, oil painting by Kenyon Cox, 1908, after a portrait by an unknown artist, 1887; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York, gift of friends of the sculptor, 1908

memorial statues and the subtle modelling of his low reliefs.

His father was French, his mother Irish. Saint-Gaudens was taken to New York City in infancy and at the age of 13 was apprenticed to a cameo cutter. By this craft he earned his living, while studying at night at Cooper Union (1861–65) and the National Academy of Design (1865–66) in New York City. In 1867 he went to Paris and was admitted to the École des Beaux-Arts. Late in 1870 he set out for Rome, where, still supporting himself by cameo cutting, he worked for two years copying famous antique statues on commission and starting his first imaginative compositions.

After 1875 Saint-Gaudens became settled in New York and was a recognized sculptor. With an unusual capacity for friendship, he became acquainted and collaborated with a group of men who formed a nucleus for an American artistic renascence. The group included the architects Henry Hobson Richardson, Stanford White, Charles Follen McKim, and the painter John La Farge. The most important work of Saint-Gaudens' early maturity was the monument to Admiral Farragut (1880, Madison Square Garden, New York City), the base of which was designed by White.

During his middle period (1880–97) Saint-Gaudens executed most of the well-known works that gained him his great reputation and many honours. Working with La Farge, in 1881 he did two caryatids for a fireplace (now in the Metropolitan Museum of Art, New York City) in Cornelius Vanderbilt's residence. In 1887 came the "Amor Caritas," which, with variations, long preoccupied him, and also the standing Abraham Lincoln in Lincoln Park, Chicago. The memorial to Mrs. Henry Adams (1891) in Rock Creek Cemetery, Washington, D.C., is frequently considered Saint-Gaudens' greatest work. The mysterious figure, with its shadowed face, is often called "Grief," but the sculptor had no such intention; "peace" or "nirvana" better conveys the meaning. In Boston a monument to Robert G. Shaw, colonel of a Negro regiment in the Civil War, was completed in 1897 and is remarkable for its expression of movement.

Saint-Gaudens also did many medallions, undertaken originally as diversion from more serious tasks, which show the influence of Renaissance medals and his early cameo cutting. Among these are designs for U.S. coins (the $20 gold piece of 1907 and the head on the $10 gold piece) and a considerable number of portraits.

Saint George, town and parish, southern coast of St. George's Island, northern Bermuda. One of the oldest English settlements in the Western Hemisphere, St. George was founded in 1612 by colonists in the service of the Virginia Company of London, the same company that had sponsored the Jamestown settlement in Virginia. It served as Bermuda's capital until 1815 and was a centre of Confederate blockade-running activities during the U.S. Civil War. Of architectural interest are St. Peter's Church, established in 1612, and the State House, built in 1619. Pop. (1980) town, 1,647; parish, 4,587.

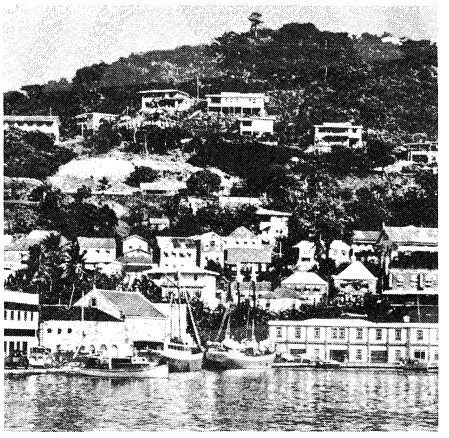
Saint George, city, seat of Washington County, southwestern Utah, U.S., on the Virgin River, near the Arizona line. Settled in the 1860s as a cotton centre by a Mormon group, it was named for George A. Smith, a counsellor to Brigham Young. The first Mormon temple to be erected in the state (completed 1877) is in St. George. It is the centre of Utah's "Dixie," a region noted for poultry raising and fruit and vegetable growing. Its proximity to Dixie National Forest and Zion National Park (*q.v.*) make tourism an important economic factor. The Brigham Young Winter Home (1873, part of Dixie State Park) is in the city. Dixie College was founded there in 1911. Inc. 1863. Pop. (1980) 11,350.

Saint George, Fort, citadel built by the English East India Company in Madras, India, later becoming the British capital in South India. The fort, named in honour of Britain's patron saint, is well preserved by the state of Tamil Nadu (formerly Madras).

The English East India Company's original trading station in South India was at Masulipatam, established in 1611. It was moved to Madras, where permission to build a fort was obtained from the Raja of Chandragiri in 1639, mainly because it was nearer the weaving centres from which the company obtained goods for export to Persia and the East Indies. It became the headquarters of the company in South India in 1641, and it was the first company settlement in India to be fortified.

In 1746 it was captured briefly by the French; on recovery, in 1748, it was largely rebuilt, enabling the British to defend it successfully against the French in 1758–59. The fort was twice threatened by Hyder Ali (1769 and 1780). Thereafter it was largely remodeled to become the centre of the British South Indian administration.

Saint George's, town and capital of Grenada, an island in the eastern Caribbean Sea. The town is situated on the island's southwestern coast, on a small peninsula with a shallow exterior bay and a deep, inner landlocked harbour. French settlers founded Saint George's as a settlement in 1650, and it served as the capital (1885–1958) of the former British Windward Islands. It is now a tourist resort and exports cacao, nutmeg, mace, and bananas. Sugar processing and rum distilling are local industries. Notable landmarks include the Roman Catholic, Anglican, and Presbyterian churches, on the central ridge; Fort George, at the promontory's tip; and Government House, on a slope overlooking the town. Carenage, the inner harbour, and Grand Etang Lake, located in the island's centre, both occupy volcanic calderas. Pop. (1986 est.) 7,500.

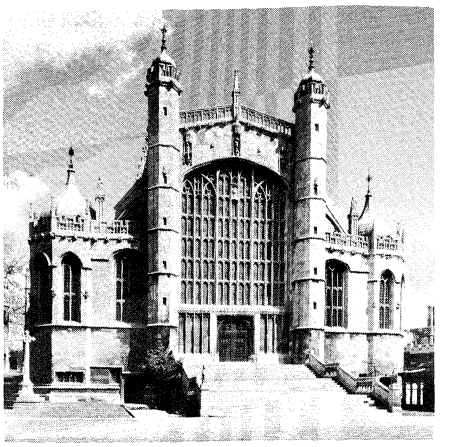


St. George's on Grenada viewed from its harbour
Harrison Forman

Saint George's Cay, islet in the Caribbean Sea, 9 miles (14 km) northeast of Belize City, Belize, of which it is considered a part. Offshore, in 1798, the British defeated a Spanish armada of 2,500 men and 31 vessels to end Spanish claims to British Honduras (Belize). During the 19th century, the islet served briefly as the administrative capital. Its main population centre is Spanish Wells village. Tomatoes, coconuts, pineapple, and fish support a subsistence economy. From February to May and during August, there is a thriving beach-resort business. Pop. (latest census) 34.

Saint George's Channel, wide passage extending for 100 miles (160 km) between the Irish Sea and the North Atlantic Ocean. It has a minimum width of 47 miles (76 km) between Carnsore Point (near Rosslare, Ire.) and historic St. David's Head (Wales). The name derives from a late form of the legend of St. George, patron saint of England, which had him traveling to England by sea, approaching it from the west.

Saint George's Chapel, part of Windsor Castle in the town of New Windsor, Berkshire, Eng. This chapel was designed for the Order of the Garter and was begun by Edward IV. It is one of the finest examples of the Perpendicular style of Gothic architecture in England. The chapel was built in two stages, the choir and its aisles being completed and roofed by 1483 and the nave by 1496; but the stone vaulting was not finished until 1528. Above the choir stalls hang the insignia of the Knights of the Garter, their swords, helmets, and banners; to the backs of the stalls are affixed their heraldic stall plates, forming a notable assemblage of heraldry from medieval times. The large west window with its late 15th-century stained glass and the painted roof bosses are among other remarkable features of the chapel.



West facade of Saint George's Chapel, Windsor Castle, *c.* 1475–1500
A.F. Kersting

St. George's chapel ranks next to Westminster Abbey as a royal mausoleum, and it became customary for royal funerals to take place there. Among the royalty buried within the chapel are Edward IV, Henry VI, Henry VIII and Jane Seymour, Charles I, Edward VII and Queen Alexandra, and George V and Queen Mary.

Saint-Germain, Claude-Louis, comte de (count of) (b. April 15, 1707, Château de Vertamboz, Fr.—d. Jan. 15, 1778, Paris), French general who sought reforms in the French armies.

Saint-Germain entered the army but left France, apparently because of a duel, and fought in the armies of the elector palatine and the elector of Bavaria. Then, after a brief service under Frederick II the Great of Prussia, he joined Marshal Saxe in the Netherlands and was created a field marshal of the French army. On the outbreak of the Seven Years' War (1756) he was appointed lieutenant general, but he fell a victim to court intrigues and professional jealousy. He resigned his commission in 1760 and accepted an appointment as field marshal from Frederick V of Denmark, being charged in 1762 with the reorganization of the Danish army. On the death of Frederick in 1766 he returned to France, bought a small estate in Alsace near Lauterbach, and devoted his time to religion and farming. In October 1775 he was appointed minister of war by Louis XVI, but his efforts to effect economies and to introduce Prussian discipline in the French army met such opposition that he resigned in September 1777. He died in his apartment at the arsenal the next January.

Saint-Germain, comte de (count of) (b. *c.* 1710—d. Feb. 27, 1784?, Eckernförde, Schleswig?), celebrated 18th-century adventurer, known as *der Wundermann* ("the Wonderman").

Of his real name or parentage and place of birth, nothing is definitely known; the common version is that he was a Portuguese Jew. He knew nearly all the European languages. He was a musical composer and a capable violinist. His knowledge of history was comprehensive, and his accomplishments as a chemist, on which he based his reputation, were in many ways real and considerable. He pretended to have a secret for removing flaws from diamonds and to be able to transmute metals.

Saint-Germain is mentioned in a letter of Horace Walpole's as being in London about 1743 and as being arrested as a Jacobite spy and released. At the French court, where he appeared about 1748, he exercised for a time extraordinary influence and was employed on secret missions by Louis XV; but, having interfered in the dispute between Austria and France, he was compelled in June 1760, owing to the hostility of the Duke de Choiseul, to remove to England. He appears to have resided in London for one or two years, but he was at St. Petersburg in Russia in 1762 and is asserted to have played an important part in the conspiracy against Tsar Peter III in July of that year, a plot that placed Catherine II on the Russian throne. He then went to Germany, where, according to the *Mémoires authentiques* of the adventurer the Count di Cagliostro, he was the founder of freemasonry and initiated Cagliostro into that rite. He was again in Paris from 1770 to 1774, and, after frequenting several of the German courts, he took up his residence in Schleswig-Holstein, where he and the landgrave Charles of Hesse pursued together the study of the "secret" sciences. He died, probably in Schleswig, in 1784, although he is said to have been seen in Paris in 1789.

Saint-Germain-en-Laye, town, Yvelines *département,* Paris region, western suburb of Paris, France. It is on the left bank of the Seine River, adjoining the Forest of Saint-Germain and just north of the Forest of Marly. The château of Saint-Germain and its park are next to a famous 17th-century terrace overlooking the Seine, built for Louis XIV in 1673. The 16th-century Château Vieux, built on the site of the original old castle, has been restored and houses the Museum of National Antiquities. The Château Neuf, built above the Seine in the 16th century, was the birthplace of Louis XIV. Most of it was destroyed in the late 18th century. The town is a terminus of the regional express rail service that connects the area to Paris. Pop. (1982) 36,585.

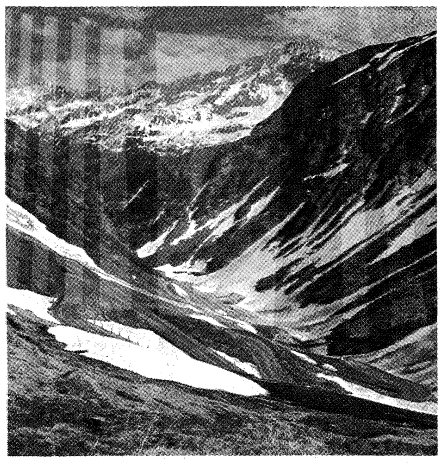
Saint-Gobain-Pont-à-Mousson, Compagnie de, major French manufacturer of glass and other building materials. Headquarters are in Paris.

The company was formed in 1970 by the merger of Compagnie de Saint-Gobain and Compagnie de Pont-à-Mousson. Saint-Gobain traces its origins to 1665, when the Manufacture Royale de Glace ("Royal Factory of Mirror Glass") was founded under Louis XIV. The company became the royal glass manufacturer in 1692. Besides glass manufacturing, the company was important in developing the chemical fertilizer and alkali industries in France, as well as in developing other chemical processes involving soda and chlorine.

Pont-à-Mousson grew out of the establishment of a factory at Pont-à-Mousson in 1856 to produce pig iron and iron castings. By the time of the merger, Pont-à-Mousson had become a leader in metallurgy and the building trade.

The merged company is a holding company that operates through local companies in 20 countries and exports its products throughout the world. It manufactures primarily building materials, including glass, glass fibre products, insulating materials, and asbestos-cement products. In the 1980s the company entered the field of business information systems by acquiring a controlling interest in Compagnie des Machines Bull, a major French computer maker, and a significant stake in Olivetti & Co., SpA, an Italian producer of office machines. It also manufactures such products as pipes, tubes, castings, valves, machine tools, plastic-processing machinery, and packaging materials and engages in construction and civil engineering. (Briefly, in the mid-1980s, the company was state-owned under the Socialist government.)

Saint Gotthard Pass, Italian PASSO DEL SAN GOTTARDO, German SANKT GOTTHARD-PASS, mountain pass in the Lepontine Alps of southern Switzerland, an important motor and railway route between central Europe and



St. Gotthard Pass through the Lepontine Alps, Switzerland
Keystone

Italy. The pass lies at an elevation of 6,916 feet (2,108 m) and is 16 miles (26 km) long. Although the pass was known to the Romans, it was not generally used as a cross-Alpine route until the early 13th century. The name of the pass, initially mentioned early in the 14th century, is believed to be derived from a hospice built at the summit by the dukes of Bavaria in honour of St. Godehard, or Gotthard, an 11th-century bishop of Hildesheim (now in Germany). A modern hotel now stands at the summit.

A long, winding motorway leads across the St. Gotthard Pass. Beneath the pass the St. Gotthard Tunnel (constructed 1872–80) extends for more than 9 miles (14 km) and reaches a maximum altitude of 3,773 feet (1,150 m). The railway (opened 1882) through the tunnel connects Luzern, Switz., with Milan. This route includes several spiral tunnels in the Reuss and Ticino river valleys. In 1980 the St. Gotthard Road Tunnel, 10 miles (16 km) in length, and able to accommodate more than 1,500 automotive vehicles per hour, was opened between Göschenen and Airolo.

Saint Helena, island and British colony in the South Atlantic Ocean, 1,200 miles (1,950 km) from the southwestern coast of Africa. St. Helena has an area of 47 square miles

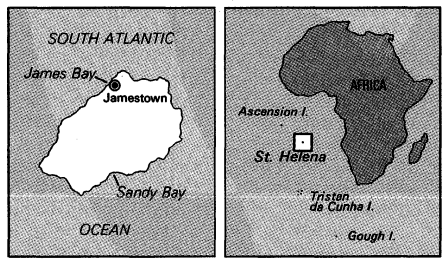


Mount Actaeon, part of an extinct volcanic ridge, St. Helena
Picturepoint, London

(122 square km), an extreme length (southwest–northeast) of 10.5 miles (17 km), and an extreme breadth of 6.5 miles (10 km). The capital and port is Jamestown. The islands of Ascension and Tristan da Cunha (*qq.v.*) are dependencies of St. Helena. The population of St. Helena in 1986 was estimated at 6,200.

The land. Although St. Helena is of volcanic origin, volcanic activity on the island is extinct. Perpendicular cliffs rise 1,600 to 2,300 feet (490 to 700 m) on the eastern, northern, and western sides of the island, and mountains, culminating in Mount Actaeon (2,690 feet [820 m]) and Diana's Peak (2,717 feet), form a semicircular rim north of Sandy Bay. South of the mountains, water-cut gorges are dispersed, becoming deep valleys near the sea. Springs are numerous. There is much volcanic ash and many conspicuous rock features. The only practicable landing place is on the island's northwestern side at James Bay, from which a narrow valley extends 1.5 miles (2.4 km) inland. In this valley is nestled the town and port of Jamestown.

Because of cool South Atlantic trade winds, St. Helena's climate is healthful and temperate with warm summers and only slightly cooler winters. Annual rainfall is 8 inches (200 mm) at sea level and more than 30 inches (760 mm) at the island's centre. St. Helena's vegetation can be divided into three zones: a rocky, barren coastal zone, extending inland for about 1 mile (1.6 km); a middle zone, extending another 0.25 to 1 mile inland and supporting grassy hillslopes and gorse, willows, poplars, and Scotch pines; and the central zone, about 3 miles (5 km) long and 2 miles (3 km) wide,



Saint Helena

which is the home of the island's indigenous vegetation, including cabbage (palm) trees, cedars, eucalypti, and bamboo, and banana plants, as well as oak trees.

The people. The island's population is largely of mixed European (mostly British), Asian, and African descent. English is the only language spoken, and the majority of the population are of the Anglican denomination. Jamestown, the only town on St. Helena, had a population in 1986 estimated at 1,350.

The economy. Less than one-third of the island is suitable for farming or forestry. Principal crops are corn (maize), potatoes, and green vegetables, and cattle, sheep, pigs, and goats are raised. There are no minerals and virtually no industry, but some locally grown timber is used for construction purposes and to produce fancy woodwork and furniture. Fish, primarily tuna, are caught in the waters around St. Helena; a significant amount is frozen at a cold-storage facility in the vicinity, and the remainder is dried and salted on the island. Virtually the entire output is exported. About two-thirds of the colony's budget is provided by the United Kingdom in the form of a subsidy; the remainder is raised from the sale of postage stamps and from customs duties and wharf fees. Imports include foodstuffs, fuels, motor vehicles, electrical equipment, machinery, clothing, and cement. United Kingdom currency is legal tender.

The only port, Jamestown, has a good anchorage for ships, and there is passenger and cargo service by sea to the United Kingdom and South Africa. The island has a system of roads but no airport or airfield.

Administrative and social conditions. St. Helena is administered by a governor who is also president of the Legislative Council. The governor, the government secretary and the treasurer (as ex-officio members), and 12 elected members constitute the Legislative Council. The Executive Council includes the governor, the government secretary and the treasurer, and the chairmen of the council committees (who are members of the Legislative Council and oversee departments of the government). The judiciary consists of a chief justice, a magistrate, and justices of the peace. Several medical officers and a dentist provide medical care; the island has a small hospital. Education is compulsory and free for children between 5 and 15 years old.

History. The island was discovered on May 21, 1502 (in the Eastern church, the feast day of St. Helena, mother of the Roman emperor Constantine), by João da Nova Castella, a Portuguese navigator. The existence of the island was known only to the Portuguese until 1588, when the English navigator Captain Thomas Cavendish visited St. Helena on his return from a voyage around the world. The island soon became a port of call for ships en route between Europe and the East Indies. The Dutch may have occupied St. Helena in about 1645–51, but in 1659 the English East India Company took possession of the island. After a brief Dutch occupation in 1673, the East India Company was confirmed in its ownership. In 1673 nearly half the inhabitants were imported slaves. Between 1826 and 1836 all slaves were freed. The remoteness of St. Helena made it attractive to the powers of Europe as a place of exile for Napoleon, and he was confined at Longwood on the island from October 1815 until his death in May 1821. During that period the island was placed under the jurisdiction of the British crown. Subsequently, the East India Company resumed control until 1834, when the authority of the crown was restored. St. Helena remained reasonably prosperous as a busy port of call until about 1870; then steam started replacing sail, and the opening of the Suez Canal (1869) changed the pattern of sea routes. The island was of strategic importance in World War II. In the early 1960s the development of a telecommunications centre on the island dependency of Ascension and employment there of workers from St. Helena somewhat restored prosperity. St. Helena was given some measure of self-rule through an Order in Council and Royal Instructions in 1966 (effective January 1967) that provided for local executive and legislative councils.

Saint Helens, district (borough), metropolitan county of Merseyside, England. It lies in the industrial belt between Liverpool and Manchester. Coal pits were exploited in the locality in the 16th century, and local sand deposits led to the introduction of glassmaking in 1773. Glassmaking long dominated the borough's industrial structure, but there has been some diversification. The district's area is 51 square miles (133 square km). Pop. (1986 est.) 187,900.

Saint Helens, Mount, volcanic peak in the Cascade Range, southwestern Washington, U.S., that erupted on May 18, 1980, in one of the greatest volcanic explosions ever recorded in North America.

Mount St. Helens had been dormant since 1857. An explosive steam eruption on March 27, 1980, was followed by alternating periods of quiescence and minor eruption. Pressure from rising magma within the volcano caused extensive fissures and the growth of a bulge on the north flank of the peak. On the morning of May 18 an earthquake with a 5.1 Richter magnitude triggered a gigantic landslide on the mountain's north face. The north slope fell away in an avalanche that was followed

and overtaken by a lateral air blast, which carried a high-velocity cloud of superheated ash and stone outward more than 12 miles (20 km) from Mount St. Helens' summit. The avalanche and lateral blast were followed by mudflows, pyroclastic flows, and floods that buried the river valleys east of Mount St. Helens in deep layers of mud and debris for as far away as 17 miles (27 km). Meanwhile, simultaneously with the avalanche, a vertical eruption of gas and ash formed a column more than 12 miles high which produced ash falls as far east as central Montana.

Sixty people and thousands of animals were killed in the May 18 event, and 10 million trees were blown down by the lateral air blast. At the event's end Mount St. Helens' volcanic cone had been completely blasted away; in place of its 9,680-foot (2,950-metre) peak was a horseshoe-shaped crater with a rim reaching elevations of about 8,000 feet (2,400 m). Further eruptions have occurred since the May 18 explosion, and a dome of lava has grown intermittently in the crater.

Saint Helier, chief town, resort, parish, and the capital of Jersey (*q.v.*), in the Channel Islands. The town lies along St. Aubin's Bay opposite a tidal island known as L'Islet (accessible by causeway at low tide), on the south side of Jersey Island. The town is named for St. Helier, a Frankish missionary who was reputedly martyred there in 555. The saint's memory is preserved in the Hermitage, a small 12th-century oratory on L'Islet, as well as in the Abbey (later Priory) of St. Helier, founded in the mid-12th century by Robert FitzHamon, of Gloucester. The town originated as a fishing village that grew up beside the parish church, where from the 13th century the king's courts usually met and where markets were held. St. Helier became the seat of island government after Elizabeth Castle was built (1551–90) on L'Islet. This castle was the refuge (1646–48) of Lord Clarendon, who there began his *History of the Rebellion,* and of the fugitive Charles II in 1646 and 1649. Harbour works were begun in 1700, and the modern harbour dates from 1841. The marketplace (now Royal Square) was the scene of the French defeat at the Battle of Jersey (1781). The marketplace is dominated by the Court House, La Salle des Etats (States House), and the Public Library (founded 1736) and is overlooked (south) by Fort Regent (1806). Victoria College dates from 1852. Nearly one-third of Jersey's population lives in St. Helier, which is the focus of island transport, commerce, government, and cultural activity. Pop. (1986) 26,231.

Saint-Hubert, municipality, Luxembourg province, southeastern Belgium. It lies in the Ardennes Forest, northwest of Arlon. An abbey founded there in the early years of the 8th century preceded a much longer-lived Benedictine abbey (817), which was occupied until 1796 and which is named after St. Hubert, the patron saint of huntsmen, who was buried there. His vision of a stag with a crucifix between its antlers is said to have occurred in the nearby Forest of Freyr in 683. His coffin, hidden by the abbey's monks during an invasion (1616), has never been found. The Abbey of Saint-Hubert was rebuilt in 1729 and was used as a penitentiary until 1954. The town of Saint-Hubert that grew up around the abbey is the object of an annual pilgrimage to the Church of St. Hubert (1526–68), which contains relics of the saint. The town is a tourist resort and a market for hogs. Pop. (1983 est.) mun., 5,490.

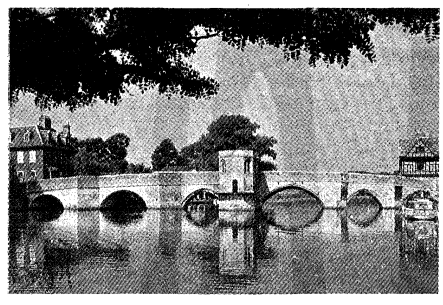
Saint-Hubert, city, Montréal region, Quebec province, Canada, on the east side of the St. Lawrence River. The city is mainly a residential suburb of Montreal city, but it has two industrial parks—Pilon and Litchfield. Saint-Hubert was the site of the first transatlantic airport in Canada. An anchoring mast for dirigibles was installed in 1930. After the opening of the international airport at Dorval, the Saint-Hubert facilities were taken over by the Royal Canadian Air Force. Inc. city, 1958. Pop. (1986) 66,218.

Saint-Hyacinthe, city, seat of Les Maskoutains *municipalité régionale de comté* (regional county), Montréal region, southern Quebec province, Canada. It lies along the Yamaska River. Founded in 1760, it was named after Hyacinthe de Lorme, who bought the territory in 1753. The city, which lies along the Canadian National Railway and Trans-Canada Highway, 30 miles (48 km) east of Montreal, is the commercial, cultural, and administrative centre of the nearby agricultural area. Its manufactures include textiles, organs, clothing, railway car wheels, boilers, paper products, chocolate, and shoes. Saint-Hyacinthe is the seat of a Roman Catholic bishopric and site of a classical college, dairy school, agricultural school, and school of veterinary medicine. Inc. town, 1849; city, 1857. Pop. (1986) 38,603.

Saint Ignace, city, seat (1882) of Mackinac county, southeastern Upper Peninsula of Michigan, U.S. It lies on the Straits of Mackinac opposite Mackinaw City, with which it is linked southward by the 5-mile (8-kilometre) Mackinac Bridge. One of Michigan's oldest cities, it was founded in 1671 when Jacques Marquette established a mission there named for St. Ignatius Loyola, founder of the Jesuits. The missionary activities were protected by a French garrison, Fort de Buade (1681), also known as Fort Michilimackinac (a name later applied to forts at Mackinaw City and on Mackinac Island). Fur traders and fishermen then settled the site, and railroad service across the straits was inaugurated in 1881. Iron smelting and lumbering industries developed in the locality but declined by the turn of the century. The city's economy is now sustained by dairying, truck and fruit farming, fisheries, and the summer tourist trade (which includes frequent ferry service to Mackinac Island). Marquette is buried in Saint Ignace, and Straits State Park and the Chippewa Totem Village are nearby. Inc. village, 1882; city, 1883. Pop. (1986 est.) 2,700.

Saint Isaac's Cathedral, Russian ISAKIEVSKY SOBOR, iron-domed cathedral in Leningrad that was designed in Russian Empire style by Auguste de Montferrand. Covering two and one-half acres (one hectare), it was completed in 1858 after four decades of construction. The granite and marble building is cruciform, and its great dome is one of the earliest examples of the use of iron as a structural material. The interior is decorated in a florid imitation of medieval ornamentation.

Saint Ives, parish (town), Huntingdonshire district, county of Cambridgeshire, England. It was originally a village called Slepe on the north bank of the River Ouse. St. Ives was granted an eight-day fair by Henry I in 1110 and developed in consequence until the fair was suspended during the Black Death (1349). A six-arched bridge (*c.* 1415), with a chapel over the central pier, spans the Ouse. Pop. (1981) 12,331.



Medieval chapel bridge over the River Ouse at St. Ives, Cambridgeshire

A.F. Kersting

Saint Ives, parish (town), Penwith district, county of Cornwall, England. In 1497 the pretender Perkin Warbeck was proclaimed king when he anchored in St. Ives harbour. Clustered around the harbour is the old town of winding streets and colour-washed stone cottages housing fishermen, artists, and potters. Fishing and tin mining were important until the late 19th century; since then the mild climate and sandy beaches have attracted vacationers, and tourism has become the economic base. The name St. Ives has been given to a style of pottery established there by Edward Leach in 1920. Pop. (1981) 11,065.

Saint-Jacques, Cap (Vietnam): *see* Vung Tau.

Saint-Jean, Lac, English LAKE SAINT JOHN, lake in Saguenay–Lac-Saint-Jean region, south-central Quebec province, Canada. A shallow lake, occupying 387 square miles (1,003 square km) of a large graben (a down-faulted basin), it receives the drainage of a 30,000-square-mile (78,000-square-kilometre) area and discharges it through two outlets into the Saguenay River. Discovered in 1647 by a Jesuit missionary, Father Jean De Quen, after whom it is named, Lac Saint-Jean was often frequented by fur traders and missionaries. Agricultural settlement of the lakeshore began in 1849 and, facilitated by the arrival of a railroad from Quebec city, soon developed to the point that the region became known as the granary of Quebec. In the 20th century, logging operations on its feeder streams, which include the Péribonca, Mistassini, Chamouchouane, and Ouwatchouane rivers, led to the establishment of large paper mills on the lake. Since 1926 the lake's seasonal fluctuations have been controlled by the completion of two hydroelectric dams, Grande and Petite Décharge, at its outlets. Most recently Lac Saint-Jean has become known as a tourist resort centre, famous for its salmon fishing. Alma, Roberval, Dolbeau, and Saint-Félicien are the largest communities in the region.

Saint-Jean-de-Luz, town on Bay of Biscay, Pyrénées-Atlantiques *département,* Aquitaine region, southern France. It lies on the right bank of the Nivelle River, near the Spanish frontier. The town's restored 13th-century Church of St. John the Baptist, in which Louis XIV was married to Marie-Thérèse of Austria in 1660, has a single nave in Basque style surrounded by galleries. With its numerous good hotels, casino, promenade, and extensive sands, the town is a fashionable summer and winter resort. It also has a picturesque fishing port with an ancient maritime tradition. Its vessels were the first (1520) to fish off Newfoundland. It is today the most important French tuna fishing port. Pop. (1982) 12,124.

Saint-Jean-de-Maurienne, Agreement of (April 1917), pact concluded at Saint-Jean-de-Maurienne, on the French–Italian border, between Great Britain, France, and Italy to reconcile conflicting claims of France and Italy over southwestern Anatolia in the event of dismemberment of the Ottoman Empire at the end of World War I, then in progress.

Under its terms France would be allotted the Adana region, while Italy would receive the remainder of southwestern Anatolia, including Izmir (Smyrna). The agreement was endorsed (Aug. 18–Sept. 26, 1917) by the three powers, subject to the assent of Russia, which, because of the collapse of the tsarist regime, was not represented at Saint-Jean-de-Maurienne.

In 1919 the Greek prime minister Eleuthérios Venizélos, by obtaining the permission

of the Paris Peace Conference for Greece to occupy Izmir, overrode the provisions of the agreement despite Italian opposition.

Saint-Jean-sur-Richelieu, also called SAINT-JEAN, city, Montréal region, southern Quebec province, Canada, on the west bank of the Richelieu River, opposite Iberville. Its site, 20 mi (32 km) southeast of Montreal city, was first occupied by Fort-Saint-Jean, built in 1666 and reconstructed in 1748 and 1775. The city became a trading centre on major roads, the Chambly Canal (linking Lake Champlain with the St. Lawrence River), and Canada's first railroad (1836), which joined it with Laprairie near Montreal. Manufactures include sewing machines, ribbons, wooden articles, bricks, textiles and clothing, and metallurgical products. The city is the seat of a Roman Catholic diocese and site of a bilingual military school and Saint-Jean Seminary. Pop. (1981) 35,640.

Saint-Jérôme, city, seat of La Rivière-du-Nord regional county (*municipalité régionale de comté*) Montréal region, southern Quebec province, Canada, on the Nord (North) River. Settled in 1834, it was originally called Dumontville. Situated 24 mi (39 km) northwest of Montreal city, it experienced rapid growth



Monument to Curé Antoine Labelle, Saint-Jérôme, Que.

By courtesy of the Department of Tourism, Fish and Game, Quebec

after the arrival in 1868 of Curé Antoine Labelle, whose leadership as deputy minister of colonization helped make Saint-Jérôme an important distribution centre for new colonization districts, the tourist industry, and forest exploitation. Other industries include the manufacture of textiles, shoes, paper, and knitted goods. Linked to Montreal by rail, highway, and the Montreal-Laurentian Autoroute (toll road), it serves as a gateway to the Laurentian Uplands, one of eastern Canada's most popular resort regions. Inc. village, 1856; town, 1881; city, 1950. Pop. (1981) 25,123.

Saint John, seat (1785) of Saint John County, largest city in New Brunswick, Canada, on the Bay of Fundy, at the mouth of the St. John River. The site, visited by the French explorer Samuel de Champlain in 1604 and fortified by Charles La Tour (1631–35), was occupied by the British in 1758 and refortified as Ft. Frederick. The latter was destroyed by American revolutionaries in 1775 but was replaced by Ft. Howe (1777–78), whose blockhouse has since been reconstructed. The settlement developed after 1783, when United Empire Loyalists established Parr Town and Carleton around the harbour. In 1785 the two communities amalgamated as St. John (after the river) to become Canada's first incorporated city. Benedict Arnold, the American Revolutionary traitor, lived there (1787–91). During the War of 1812, Martello Tower was built on Lancaster Heights for harbour defense; it is now a national historic site.

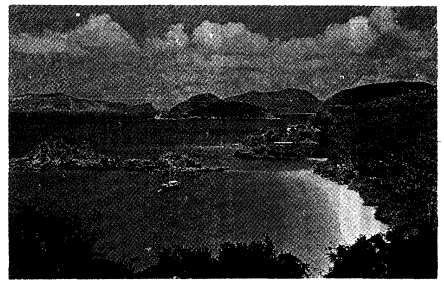
A year-round ice-free harbour fostered shipping, shipbuilding, and fishing; but economic growth was checked by a disastrous fire (1877) and a declining lumber trade. St. John recovered, absorbed the city of Portland in 1889, the city and parish of Lancaster and part of Simonds parish in 1966, and became the province's commercial, manufacturing, and transportation centre, with shipping facilities and one of the world's longest (1,050 ft [320 m]) dry docks. Its primacy, however, is being challenged by Moncton. Industries include lumbering, sugar and oil refining, and pulp, paper, and textile milling; fisheries are important.

The New Brunswick Museum displays colonial relics and has a notable collection of ship models. The St. John Campus of the University of New Brunswick opened in 1964. A local phenomenon is the "reversing falls" at the river's mouth, where strong tidal fluctuations of nearly 30 ft (9 m) reverse the river flow for several miles upstream twice daily. Pop. (1981) city, 80,521; metropolitan area, 114,048.

Saint John, administrative district and smallest of the U.S. Virgin Islands, just east of St. Thomas, and 80 mi (130 km) east of San Juan, P.R. With a total area of 20 sq mi (50 sq km), St. John is 9 mi long and 5 mi wide. Its irregular coastline is indented with picturesque harbours and coves, including Trunk Bay. Bordeaux Mountain rises to 1,286 ft (392 m). The population is predominantly black and is concentrated in the two settlements—Cruz Bay, the capital, and Coral Bay (the best harbour refuge in the West Indies) at the western and southeastern ends of the island, respectively.

St. John was visited by Christopher Columbus on Nov. 17, 1493. The fierce aboriginal Carib Indian inhabitants were exterminated, but the island was not settled until 1717 by planters from St. Thomas. Within less than 20 years all land was taken with sugar and cotton plantations, and the population consisted of 208 whites and 1,087 slaves. Although there was in 1733 a massive slave revolt lasting eight months, slavery was not abolished for more than 100 years.

The island's economy is centred on cattle raising, bay leaves, which are gathered from



Trunk Bay, St. John island, U.S. Virgin Islands

Arthur Griffin—EB Inc.

a very old forest and shipped to St. Thomas for processing into bay rum, and tourism. Eighty-five percent of the island is covered with tropical vegetation and second-growth trees; two-thirds of the island was declared the Virgin Islands National Park in 1956. Pop. (1980) 2,472.

Saint John, Henry: *see* Bolingbroke, Henry Saint John, 1st Viscount.

Saint John, J. Hector: *see* Crèvecoeur, Michel-Guillaume-Jean de.

Saint John, John (Pierce) (b. Feb. 25, 1833, Brookville, Ind., U.S.—d. Aug. 31, 1916, Olathe, Kan.), U.S. politician, governor of Kansas and a leading prohibitionist.

After service in the Civil War, St. John, a lawyer, practiced in Independence, Mo., and from 1869 in Olathe, Kansas. He served as a Republican in the state senate (1873–74).

The son of an alcoholic, St. John was an early advocate of prohibition and on that issue was elected governor of Kansas in 1878. He secured passage of a prohibition amendment to the state constitution (1880), the first such constitutional ban in history. After reelection in 1880, he was denied a third term in 1882. St. John then extended his campaign for prohibition to the national level and, in 1884, was nominated as the presidential candidate of the National Prohibition Party. It is thought that his campaign in New York, where he made his strongest effort, drew sufficient votes away from Republican candidate James G. Blaine to tip the state—and with it the election—to Grover Cleveland.

To make the best use of the Britannica, consult the INDEX *first*

Saint John, Lake (Canada): *see* Saint-Jean, Lac.

Saint John, Oliver (b. *c.* 1598—d. Dec. 31, 1673), English politician and one of the leaders of the Parliamentary opposition to King Charles I of England.

Born into a family of Bedfordshire gentry, he was educated at Queens' College, Cambridge, and was called to the bar at Lincoln's Inn in 1626. He was brought before the Star Chamber in 1630, together with the Earl of Bedford, charged with the publication of a seditious libel, but the case was dismissed. He was a member of the company formed to colonize Providence Island (now Providencia) in the Caribbean Sea in 1630. In 1638 his marriage to his second wife, Elizabeth Cromwell, a cousin of Oliver Cromwell, led to an intimate friendship with Cromwell.

A member of Parliament for Totnes, Devon, in both the Short and the Long Parliaments, St. John was closely allied with Bedford, John Pym, and Hampden and led the attack on ship money, an old tax deviously revived by Charles I. In an attempt to win St. John's support, Charles I appointed him solicitor general in January 1641. St. John's political views, however, remained unchanged, and in the same year he took an active and savage part in promoting the impeachment and attainder of Thomas Wentworth, earl of Strafford, and helped in preparing other bills, such as the Militia Bill, for the opposition.

During the Civil War St. John became a recognized leader of the Independents and supported the Army in its quarrel with Parliament in 1647. He was appointed chief justice of the Court of Common Pleas in October 1648. Although he retained his seat for Totnes, his legal office debarred him from sitting in the Commons, and he took no part in the debates and refused to act as a commissioner at the King's trial (1649). In 1652 he was one of the commissioners responsible for bringing about the union between England and Scotland, and he was among those who pressed Cromwell to take the title of king in 1657.

After the Restoration of Charles II, he published in 1660 a defense of his past conduct, *The Case of Oliver St. John,* and his only punishment was exclusion from holding public office. He retired to Northamptonshire until 1662, when he went to the Continent. The place of his death is not known.

Saint-John Perse, pseudonym of MARIE-RENÉ-AUGUSTE-ALÉXIS SAINT-LÉGER LÉGER (b. May 31, 1887, Saint-Léger-les-Feuilles, Guadeloupe—d. Sept. 20, 1975, Presqu'île-

de-Giens, Fr.), French poet and diplomat who was awarded the Nobel Prize for Literature



Saint-John Perse
Harlingue—H. Roger-Viollet

in 1960 "for the soaring flight and evocative imagery of his poetry."

He studied at the universities of Bordeaux and Paris and in 1914 entered the diplomatic service. He went to China and was successively consul at Shanghai and secretary at Peking. In 1921 he attended the Washington disarmament conference as an expert on East Asian affairs. He was later secretary (1921–32) to the French statesman Aristide Briand. In 1933 he was appointed secretary general at the Foreign Ministry, with the rank of ambassador. Dismissed from office in 1940 and deprived of French citizenship by the Vichy government, he went to the United States, where he worked as consultant on French literature in the Library of Congress. He returned to France in 1957.

His early poetry, published before his diplomatic career began in earnest, includes *Éloges* (1911; *Éloges, and Other Poems*), which shows the influence of Symbolism; he later developed a more personal style. The language of his poetry, admired especially by poets for its precision and purity, is difficult, and he made little appeal to the general public. His poetry has been compared to that of Rimbaud. His hypnotic vision is conveyed by a liturgical metre and exotic words. The best-known early work is the long poem *Anabase* (1924; *Anabasis*, translated by T.S. Eliot). In the poems written in exile—*Exile* (1942; *Exile, and Other Poems*), *Vents* (1946; *Winds*), *Amers* (1957; *Seamarks*), *Chronique* (1960), and *Oiseaux* (1962; *Birds*)—he achieved a deeply personal note. For some, Saint-John Perse is the embodiment of the French national spirit: intellectual yet passionate, deeply conscious of the tragedy of life, a man of affairs with an artist's feeling for perfection and symmetry. Among his better known poems translated into English are "I have halted my horse by the tree of the doves," "And you, Seas," and "Under the bronze leaves a colt was foaled."

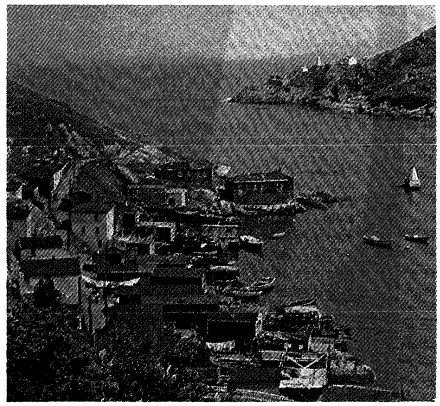
Saint John River, river rising in Guinea, West Africa. Its source is northwest of the Nimba Range, and with its upper reach (the Mani River) it forms part of the Guinea–Liberia border. Entering north-central Liberia it very nearly bisects the country, discharging into the Atlantic at Edina, where the Benson and Mechlin rivers empty into its estuary. The Saint John River's southwesterly course of 175 miles (282 km) is interrupted intermittently by rapids. The river (whose basin drains 6,650 square miles [17,220 square km] in Liberia and Guinea) is so named because it was discovered on the feast day of St. John by 15th-century Portuguese navigators.

Saint John River, large river rising in Somerset County in northwestern Maine, U.S., and flowing northeast to the Canadian border, where it gradually turns southeast to form the international boundary for 80 miles (130 km). Just above Grand Falls, the river enters Canada and flows through New Brunswick into the Bay of Fundy at Saint John. At Grand Falls the river drops 75 feet (23 m), and at its mouth are the "reversing falls" rapids, caused by the strong tides of the bay, which at high tide force the river to reverse its flow. The river, discovered by the French explorers the Sieur de Monts and Samuel de Champlain in 1604 and named for St. John the Baptist, is 418 miles long and drains 21,000 square miles (54,000 square km), 14,000 square miles of which are in New Brunswick and Quebec. The lower 81 miles are tidal and navigable as far as Fredericton. There are hydroelectric power developments at Grand Falls, Beechwood, and Mactaquac on the St. John, as well as on its tributaries, the Tobique, Aroostook, and Madawaska rivers.



The "reversing falls" on the St. John River, Saint John, N.B.
Tourism Canada

Saint John's, capital and largest city of Newfoundland, Canada, at the eastern end of the Avalon Peninsula. It stands on the steep, western slope of an excellent landlocked harbour that opens suddenly to the Atlantic. The entrance, known as the Narrows, guarded by Signal Hill (500 feet [150 m]) and South Side Hills (620 feet), is about 1,400 feet wide, narrowing to 600 feet between Pancake and Chain rocks. It was probably visited in 1497 by John Cabot on the Feast Day of St. John the Baptist and was early used as a haven for fishing vessels. In 1583 a marker was placed on the shore by Sir Humphrey Gilbert claiming possession of Newfoundland for England, but permanent settlement was not made until the early 17th century. St. John's prospered as a fishing port, despite frequent attacks by the French and disastrous fires in 1816–17, 1846, and 1892.



The entrance to the harbour at St. John's, Nfd.
Tourism Canada; photograph, M. Timmerman

The city, one of the oldest and the most easterly in North America, now dominates the economic and cultural life of the province. It is Newfoundland's commercial and industrial centre, a major ocean port, and the base for the provincial fishing fleet; it is also the easternmost terminal for the Canadian National Railway, the Trans-Canada Highway, and several national airlines. Among its varied industries are shipbuilding, fish processing and cod liver and seal oil refining, brewing, tanning and the manufacture of clothing, hardware, marine engines, paint, and furniture.

The city's two cathedrals (both dedicated to St. John the Baptist) are the ornate Latin cross-shaped basilica (1841; Roman Catholic) and the ecclesiastical-Gothic Anglican cathedral (originating in 1816 and rebuilt after the great fire of 1892). The Confederation Building (1850) replaced the Colonial Building (1860) as provincial headquarters and houses a military and naval museum. St. John's is the home of Memorial University (1925) and Queen's College (1841; Anglican), and its Newfoundland Museum displays relics of the extinct Beothuck tribe (Newfoundland's original inhabitants). Signal Hill Historic Park, once a location for signaling the approach of ships, memorializes several events including John Cabot's presumed landfall (commemorated by a tower [1897]); the French–English struggle for Newfoundland that ended in 1762 with the last shot fired on the hill (remnants of the fortifications, notably the Queen's Battery, remain); and the reception atop the hill at the Cabot Tower by Guglielmo Marconi of the first transatlantic wireless message in 1901 from Europe. From the city's Lester's Field, the aviators Captain (later Sir) John Alcock and Lieutenant Arthur Brown took off in 1919 to make the first nonstop transatlantic flight to Clifden, Ire. The Quidi Vidi Battery, which once guarded the entrance to a small fishing harbour east of Signal Hill leading to a small lake, has been restored to its 1812 appearance; the annual (August) regatta, held since 1828 on the lake, is one of the oldest organized sports events in North America. Inc. 1888. Pop. (1981) city, 83,770; (1985 est.) metropolitan area, 160,700.

Saint John's, city and capital of Antigua and Barbuda. It lies on the northwestern coast and is a resort and the island's main port (handling sugar, cotton, foodstuffs, machinery, and lumber). Before 1968 the sheltered harbour was limited to boats drawing only 6 feet (2 m), but because of a major dredging project the port accommodates ships drawing 35 feet. Coolidge Airport is 6 miles (10 km) northeast. Attractions include an Anglican cathedral, the Government House, a botanic station, and nearby Fort James and Goat Hill. Fort St. John's was severely damaged by earthquakes (1690, 1843), a fire (1769), and a hurricane (1847). Pop. (1982 est.) 30,000.

Saint John's College, private coeducational institution of higher education at Annapolis, Md., U.S., which bases its study of the liberal arts on the Great Books of the Western World. Founded by the Episcopal Church in 1784, St. John's traces its history to King William School (1696). It offered a conventional liberal arts education until 1937 when it adopted a revised curriculum following proposals of Robert M. Hutchins, president of the University of Chicago. Hutchins became chairman of the college's board in 1938. The college offers no electives, and the Great Books, on philosophy, mathematics, literature, political theory, theology, science, and history, are studied in seminars with tutors. Language and laboratory study are also part of the program, which includes visiting lecturers. There is also a campus in Santa Fe, N.M.

Saint Johns River, navigable stream of northeastern Florida, U.S., which rises in

swamps in Brevard County in the east central part of the state and flows north parallel to the coast until it turns at Jacksonville to empty into the Atlantic Ocean, 15 mi (24 km) to the east, after a course of 285 mi. The river forms several large lakes; its principal tributary is the Oklawaha River. The St. Johns has been dredged from Sanford to its mouth, a distance of 200 mi. North of Palatka, where it is part of the Atlantic Intracoastal Waterway, the river is a broad estuary; east of Jacksonville, where it has its deepest channel at 30 ft (9 m), the river is a swamp. The St. Johns River drains an area of limestone with many swamps and lakes, a region of orange and pine groves as well as farm- and pastureland. The river is important both for shipping and for recreation, especially fishing.

Saint-John's-wort, common name for the family Hypericaceae, in the tea order (Theales), which contains 8 genera and 350 species of herbs or low shrubs. Some authorities consider this family to be part of the family Guttiferae. Members of the family Hypericaceae have opposite or whorled, gland-dotted,



St.-John's-wort (*Hypericum elatum*)
G.E. Hyde from the Natural History Photographic Agency—EB Inc.

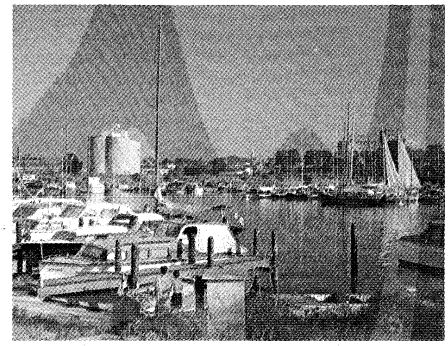
simple, usually smooth-margined leaves and mostly five-petalled, mainly yellow, flowers with many stamens, which are often united in bundles.

About 300 species, both temperate and tropical, belong to the genus *Hypericum.* Aaron's-beard (*H. calycinum*), sometimes known as rose of Sharon, and *H. patulum* are both shrubby, East Asian species. Aaron's-beard bears pale-yellow flowers with orange stamens, on 30-centimetre- (1-foot-) tall plants. The shrubby *H. patulum* has slightly smaller, deep-yellow flowers with darker stamens. *H. elatum,* from the Canary Islands, has egg-shaped, scarlet fruits. St.-Andrew's-cross (*Ascyrum hypericoides*) is cultivated as an ornamental shrub for its yellow flowers. The genus *Cratoxylum,* with 12 tropical Asian species, contains one garden plant, *C. polyanthum.* It is an aromatic shrub with pink flowers, papery oblong leaves, and winged seeds. *H. perforatum* has become a serious weed problem in southern Australia. *See also* Saint-Andrew's-cross.

Saint Johnsbury, town (township), seat (1856) of Caledonia County, northeastern Vermont, U.S., on Passumpsic and Moose rivers. It includes St. Johnsbury Village. The site was settled in 1786 by Jonathan Arnold from Rhode Island and was named after Revolutionary War hero Ethan Allen's French friend Michel-Guillaume Jean de Crèvecoeur, who wrote *Letters from an American Farmer* (1782) under the pseudonym J. Hector St. John. The community's growth began with Thaddeus Fairbanks' invention (1830) of the platform scale; its development and manufacture became a leading enterprise. Other industries include the production of maple sugar, dairy processing, and the manufacture of modular homes, tools, machinery, gloves, and wood products.

The Fairbanks Museum of Natural Science features a collection of American birds and African and Asian arts. The Maple Grove Museum has exhibits showing how maple sugar products are made. The St. Johnsbury Athenaeum Art Gallery (1871) displays 19th-century paintings and sculptures with emphasis on Hudson River subjects. Inc. 1853. Pop. (1980) 7,938.

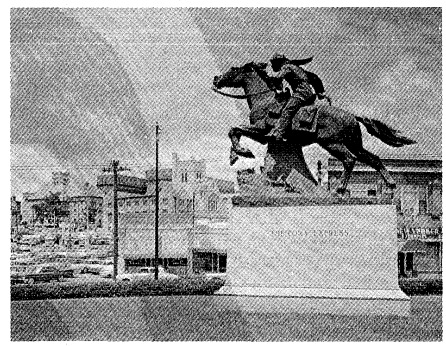
Saint Joseph, city, seat (1894) of Berrien County, southwestern Michigan, U.S.; it is a port on Lake Michigan, at the mouth of the St. Joseph River, opposite Benton Harbor. La Salle established Ft. Miami there in 1679, using it as an exploration base (commemorated



Harbour at St. Joseph, Mich.
J. Penrod—Shostal/EB Inc.

by a historic site). Later known as Saranac and Newburyport, it was renamed (1833) for the river. It developed after 1836 with improved harbour facilities and the opening of the Territorial Road from Detroit. Its northeastern portion was separately incorporated as Benton Harbor (1869). Industries (including the manufacture of auto parts, rubber goods, and home equipment), fruit processing, and tourism (beaches and mineral springs) support the economy. Inc. village, 1834; city, 1891. Pop. (1980) 9,622.

Saint Joseph, byname SAINT JOE, city, seat (1846) of Buchanan County, northwestern Missouri, U.S., on the Missouri River (there bridged to Elwood, Kan.), 28 mi (45 km) north of Kansas City. A trading post was established (1826) on the site by Joseph Robidoux, a



"The Pony Express," statue, St. Joseph, Mo.
Jack Zehrt

French-Canadian trapper from St. Louis. The Platte Purchase (1836), adding about 2,000,000 ac (800,000 ha) of Indian land to the state territory, resulted in an influx of settlers. Robidoux laid out the town in 1843 and named it for his patron saint. During the California gold rush (1849), St. Joseph boomed as a steamboat base and supply depot for wagon trains westward. The western terminus of the Hannibal and St. Joseph Railroad (completed 1859), it became the eastern terminus of the Pony Express, launched from St. Joseph on April 3, 1860. During the Civil War the city became a point for guerrilla operations and was frequented by border outlaws such as W.C. Quantrill and Jesse James; the latter was killed (1882) in his home there (which has been preserved).

In the 1890s St. Joseph became an important meat-packing centre but was eclipsed by Omaha, Neb., and Kansas City when transcontinental railroads bypassed it. It has survived as one of the great livestock–grain markets of the central west and is the trade centre of an extensive agricultural region. Manufactures are diversified and include structural steel, chemicals, machinery, and clothing.

"Lover's Lane, Saint Jo," by Eugene Field, expresses the poet's nostalgic remembrance of the St. Joseph street where he courted his wife. Patee House comprises the reconstructed headquarters of the Railroad and Pony Express offices. The site of the Pony Express Stables Museum was the starting point for the rides west to Sacramento, Calif., and the St. Joseph Museum houses a notable American Indian collection. Pigeon Hill Wildlife Area and the Lewis and Clark State Park are nearby. The city is the seat of Missouri Western State College (1915). Inc. 1851. Pop. (1980) 76,691; metropolitan area (SMSA), (1982 est.) 86,800.

Saint Joseph River, north central U.S., river rising near Hillsdale in south central Michigan, and flowing generally west but swinging south into northern Indiana, past Elkhart and South Bend, before reentering Michigan to empty into Lake Michigan at St. Joseph and Benton Harbor. The St. Joseph River, 210 mi (340 km) long, has been dammed at Union City, Mich., for hydroelectric development and is an important source of urban and industrial water supply.

The river is not to be confused with another St. Joseph River, which also rises near Hillsdale and flows generally south for 100 mi through Michigan and Ohio to form the Maumee River in Indiana.

Saint-Just, Charles de Biencourt, baron de: *see* Biencourt, Charles de.

Saint-Just, Louis(-Antoine-Léon) de (b. Aug. 25, 1767, Decize, Fr.—d. July 28, 1794, Paris), controversial ideologue of the French Revolution, one of the most zealous advocates of the Reign of Terror (1793–94), who was arrested and guillotined in the Thermidorian Reaction.

Early years. Louis-Antoine-Léon de Saint-Just was born in central France, the son of a cavalry captain. His mother, the daughter of a wealthy local notary and a woman of egalitarian notions, wished to reduce the nobility to the level of the middle class. The family eventually moved to Blérancourt, a rural town in Picardy, the native province of his father, who died there in 1777.

After attending the College of the Oratorians in nearby Soissons, he returned to Blérancourt, a small town offering few distractions. In 1785 Saint-Just became attached to the daughter of one of the town's notaries. Her forced marriage to the son of the other notary in July 1786 marked the beginning of a crisis for Saint-Just. Hurt and angry, he fled to Paris one night in September, taking with him a few family valuables. Lodging near the Palais Royal, then the centre of a brilliant and dissolute society, he soon ran out of money.

His adventure came to a sudden end when his mother, advised of the situation, had him put into a reformatory. He remained there from October 1786 to April 1787. Sobered by his experience, he decided, like so many young men of the middle class, to establish himself and enter upon a career. He became

a clerk to the public prosecutor of Soissons, studied at Reims, and took his law degree in April 1788.

France at that time was shaken by the effects of a poor harvest and a hard winter, which



Louis de Saint-Just, portrait after a red chalk drawing by Christophe Guérin, 1793

By courtesy of the Bibliotheque Nationale, Paris

coincided with pre-Revolutionary tremors. In 1789, Saint-Just anonymously published his first book, an epic poem, *Organt*. It was ignored by the public. A long satirical and licentious poem strewn with political allusions, it was reminiscent of Voltaire's "La Pucelle" ("The Maiden"), but it lacked the force and spirit needed for public acclaim. Perhaps Saint-Just was trying to set his own mind free rather than to achieve fame. *Organt* sometimes suggests the misadventures of Saint-Just, with his violent enthusiasms and resentments, but the eroticism is heavy, and few of the themes of his later work appear. Saint-Just's friends scarcely mentioned it, and his enemies derided it. The book was seized by the authorities in June 1789, and, although it had been issued anonymously, Saint-Just was prudent enough to hide at a friend's home in Paris.

In the midst of the Revolutionary upheaval, Saint-Just, eager to participate, found himself ignored. Neither a Parisian nor a popular orator nor a leader of men, he was also not inclined to approve of slaughter. He did not speak of the storming of the Bastille, which he had witnessed, until a year later, when his attitude seemed reminiscent of that of the British politician Edmund Burke, who opposed the French Revolution. Saint-Just returned to his hometown at the end of July. The provinces, like Paris, were in full revolt. Militia or national guard units were spontaneously forming everywhere, and Saint-Just became commander of the second unit organized in Blérancourt.

But first he had to overcome the handicap of his youth and the opposition of local cliques. As a militia commander he went to Paris for the Fête de la Fédération on July 14, 1790. He did not linger there and later spoke of it in tones of disillusionment.

Saint-Just realized that he could play the role to which he aspired in the Revolution only by election to a key post as an administrator or, preferably, as a deputy. He had, however, not reached the legally required age of 25. For most men the political clubs provided the necessary stepping-stone but not for Saint-Just, who was never a club man, doubtless because he was too overbearing. Instead, he became the municipal corporation counsel of Blérancourt, championed communal welfare and free trade, and set himself up as a spokesman for the voters. At the same time, however, he resumed his friendship with the woman whom he had been unable to marry and, in defiance of gossip, met her publicly.

He succeeded in establishing his reputation beyond Blérancourt in the district, where he was considered an energetic and able candidate for the next National Assembly. To further his candidacy, he wrote letters to politicians shamelessly flattering their self-esteem and even managed to receive the congratulations of the National Assembly after publicly burning a counterrevolutionary pamphlet.

Publication of Esprit de la Révolution. Though he was driven by ambition, his ambition was to serve the cause of the poor and the peasants, and, if he turned toward Robespierre, the most pitiless of the Revolutionaries, it was from conviction. Saint-Just now proposed directing the Revolution beyond benevolent and patriotic activity toward the making of a new society. In 1791 he finally published *Esprit de la Révolution et de la Constitution de France.* The exposition was bold, vigorous, and lofty. The brief, forceful, and elliptical formulations characterized the author. According to him, the constitution framed by the Assembly was acceptable as a first step, but the French were not yet free. Nor were they sovereign, but sovereignty of the people was acceptable only if the people were just and rational. "Law should yield nothing to opinion and everything to ethics," Saint-Just maintained. He confided to his publisher that the boldness of his exposition attracted readers and rightly added that his work, because it was based on less extensive reading than he might have wished, had the originality of a solitary thinker.

At that time Saint-Just believed himself to be on the eve of a political career, and his elimination from the Assembly as a result of his age provoked a serious crisis. "I am a slave of my adolescence!" he cried revealingly.

He then continued his reflections on the great task of building a society based on nature in which men would live together rather than merely side by side. Taking his region as a model, he observed the village communal traditions. This sojourn in the provinces directed his thinking while straining his energies.

The National Convention. His election to the National Convention in September 1792, shortly after he became 25, finally gave him a task cut to his measure. The new Assembly had to untangle the crisis created by the fall of the King and the invasion of France and to undertake the vast task of reconstruction. "The people have looked only for oracles and for their happiness," he said. He was the oracle, self-assured and bold, personifying the uncompromising republican virtues. With unshakable authority he tackled financial and economic problems and, finally, military questions. His thought and style made him, with Robespierre, one of the leaders of the extreme left.

When sent on a mission to the armies, he revealed himself also as a man of action. His dreaded decisiveness was accompanied by a solicitude for the soldiers: "True happiness is found only in the comforting of the unhappy." A terror to the generals, he exercised his role of benificent dispenser of justice throughout a series of missions to the armies that gave rise to the romanticized concept of Saint-Just.

He rose by degrees in the Convention, and beginning in May 1793 he joined the Committee of Public Safety, the small group that governed France. After playing a considerable part in eliminating both left and right deviationists, he finally supplanted the less audacious Robespierre.

The year II of the French Republican calendar (1793–94), in which Saint-Just, elected president of the Convention, passed the Ventôse (March) Decrees and led the victorious attack against the Austrians at Fleurus in the Austrian Netherlands (modern Belgium) on June 26, 1794, marked the high point of his career. The Ventôse Decrees, by which the property of enemies of the Revolution was confiscated for the benefit of poverty-stricken patriots, were the most revolutionary act of the French Revolution, because they expropriated from one class for the benefit of another. During the same period Saint-Just drafted *Fragmens sur les institutions républicaines,* far more radical proposals than the constitutions he had helped to frame; this work laid the theoretical groundwork for a communal and egalitarian society.

But his rise to power had wrought a remarkable change in Saint-Just's public personality. He became a cold, almost inhuman fanatic, bloodthirsty as even his "god" Robespierre, a man of many human weaknesses, was not. "The vessel of the Revolution can arrive in port only on a sea reddened with torrents of blood," Saint-Just once declared to the Convention. He, rather than Robespierre, showed himself to be the forerunner of the totalitarian rulers of the 20th century when he said on another occasion, "We must not only punish traitors, but all people who are not enthusiastic. There are only two kinds of citizens: the good and the bad. The Republic owes to the good its protection. To the bad it owes only death."

Dreaded, almost totally isolated, and detested, he was arrested on 9 Thermidor (July 27, 1794). Like Robespierre, he did not try to incite the Parisian sansculottes to rise against the Convention in his defense and was guillotined the next day.

Assessment. Saint-Just has, by turns, been lauded as the archangel of the Revolution or abhorred as the terrorist par excellence. Recent scholarly research has made it possible to draw the line between man and myth. Undoubtedly the Revolution changed the unruly, self-indulgent youth into a principled and decisive, though ruthless, leader. To friends he was also kind, helping them in securing positions. Yet, it is doubtful whether he had friends in the true sense, for those whom he helped attached themselves to him without becoming his equals.

Many of his contemporaries acknowledged his ability but considered him a monster of pride and cruelty. Others, particularly in later generations, have viewed him as an incorruptible patriot who paid with his life for his allegiance to democracy. Some have seen in him the prototype of the rebel. These contradictions arise in part from Saint-Just's complex character and in part from an imperfect knowledge of his childhood and adolescence.

Women admired his attractive appearance, and he could be very engaging when he wished. Nonetheless, he had to make notes on the conduct required "to be fortunate with women." He measured out doses of eagerness and indifference, affection and restraint, so as to make a love affair last. Yet, he could be genuinely affectionate and display real family feeling. This other Saint-Just appears in the famous portraits of Jean-Baptiste Greuze, Jacques-Louis David, and other painters.

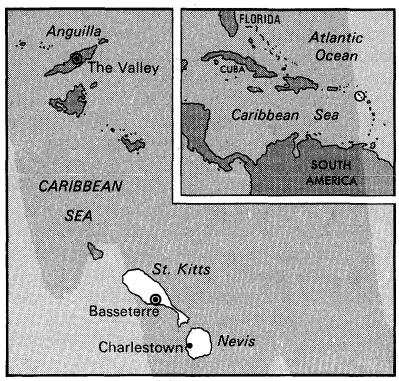
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Saint Kilda, cluster of three small Atlantic islands in the Outer Hebrides group, Western Isles, Islands Area, Scotland, situated 110

miles (180 km) from the mainland. The islands escaped glaciation during the Ice Age and present a bare rocky interior and sea cliffs rising to 1,300 feet (400 m) that support the world's largest population of gannets. The 35 people who lived on Hirta, the largest of the islands, were evacuated in 1930, thus ending settlement on the island that had been continuous since prehistoric times. The islands now constitute a nature reserve under the authority of the National Trust for Scotland and are well known for their distinctive species of sheep, wrens, and mice. Pop. (1981) 46.

Saint Kitts and Nevis, officially FEDERATION OF SAINT KITTS AND NEVIS, also called SAINT CHRISTOPHER AND NEVIS, sovereign democratic state composed of two islands of the Lesser Antilles in the eastern Caribbean Sea. The islands were formerly an associated state of the United Kingdom. Their combined



Saint Kitts and Nevis

area is 104 square miles (269 square km). Basseterre on Saint Kitts is the capital. Saint Kitts and Nevis lie between Anguilla to the north, Antigua to the east, and Montserrat to the south. The population in 1990 was estimated at 43,000.

A brief treatment of Saint Kitts and Nevis follows. For information about regional aspects of Saint Kitts and Nevis, *see* MACROPAEDIA: West Indies.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. Saint Kitts and Nevis are related physiographically by a volcanic mountain chain that dominates the central core of both islands. Saint Kitts (23 miles [37 km] long and 5 miles [8 km] wide) is roughly oval in shape except for a long, narrow peninsula to the southeast. On the northern half of the island the mountains rise to their highest point at Mount Liamuiga (3,792 feet [1,156 m]), which has a lake in its forested crater. A 2-mile- (3-kilometre-) wide channel, The Narrows, separates Saint Kitts from Nevis to the southeast. The circularly shaped Nevis, surrounded by coral reefs, covers an area of about 36 square miles (93 square km). The island is almost entirely a single mountain, Nevis Peak (3,232 feet [985 m]), which is flanked by Round Hill (1,014 feet [309 m]) northward and Saddle Hill (1,850 feet [564 m]) southward. Its shores also are rimmed by long stretches of sandy beach. Saint Kitts and Nevis are both well drained by rivers.

Lying in the path of the trade winds, these tropical islands have a moderate climate. The mean annual temperature is 80° F (27° C), with occasional extremes of less than 70° F (21° C) and more than 90° F (32° C). The annual rainfall averages about 55 inches (1,397 mm) on Saint Kitts and about 48 inches (1,219 mm) on Nevis. Rainfall, however, varies with location and elevation. Saint Kitts and Nevis lie in the path of Caribbean hurricanes, which at times have severely damaged the islands.

Heavy vegetation covers much of the mountainous interior, the kind and extent varying with elevation. At higher elevations there is only grass cover, and grazing is common. The grassy slopes descend into tree growth that thickens in places into rain forest. At the lower elevations much natural vegetation has been replaced by cultivated plants.

The people. The Carib Indians, who had driven the more peaceable Arawak Indians from the islands, were themselves driven from the islands by French and British colonists. Most of the 43,000 people who now live on the islands are the descendants of black Africans brought to Saint Kitts and Nevis as slaves. A small percentage are of mixed European and black African blood, and there are lesser populations of Europeans and Asians. Protestant groups, including Anglicans and Methodists, are the predominant religious denominations, and there are also some Moravians, Roman Catholics, and Bahā'īs. The official language is English. The main population centres are the capital, Basseterre, with a population of 18,500 (1985 est.), and Charlestown on Nevis, with a population of 1,700 (1985 est.). The population growth rate has declined sharply (less than zero) in recent years. With high infant-mortality, death, and emigration rates, the annual rate of population increase has remained low for the region.

The economy. Saint Kitts and Nevis continues to be an agricultural society despite encouragement of manufacturing by the government. Sugar has been the mainstay of the economy since colonial times, and the country's economic condition reacts strongly to fluctuations in the sugar market. Nevis grows chiefly cotton, vegetables, and coconuts. Fruit and vegetable growing and livestock raising are principal farming activities. Tourism, although seasonal, is economically important.

The principal manufacturing industries, in addition to sugar refining, are building construction, electronics, clothing, and beverages. Sugar is by far the main export item, accounting for more than one-half of export revenue in recent years. Other exports include molasses, clothing and footwear, electrical machinery, and beverages. Imports include foods, fuels, chemical products, machinery, metal products, and building materials. International trade is carried on chiefly with the United States, the United Kingdom, Trinidad and Tobago, Puerto Rico, the Netherlands Antilles, and Canada. The gross national product (GNP) is growing more rapidly than the population; the GNP per capita, however, is low for a Caribbean country.

Transportation on the islands has been fairly well developed, largely in the interests of the sugar trade and tourism. About two-fifths of the roads are paved. The nation is served by two airports, the Golden Rock airport near Basseterre and the smaller Newcastle airport on Nevis. Imports, exports, and tourism centre on Basseterre, the main port, which was improved with the addition of a deepwater harbour in 1981. Rail traffic is confined to about 36 miles (58 km) of track operated by the sugar industry.

Government and social conditions. The Federation of Saint Kitts and Nevis is a constitutional monarchy and a member of the Commonwealth. The British monarch is the head of state and is represented in the country by a governor-general, who is appointed. The head of government is the prime minister, who, along with other ministers, is a member of the Cabinet. The monarch and the National Assembly constitute the Parliament, some of whose members are appointed. Nevis is entitled to no less than one-third of the seats in the National Assembly. The minimum age for voters is 18. The island of Nevis, while represented in the National Assembly, also has its own legislature and enjoys a certain amount of autonomy within the federal structure. The national constitution includes provisions for Nevis to secede from the federation.

Since the time of emancipation (1838), the labourers on Saint Kitts have had little opportunity to improve themselves. The sugar-plantation owners continue to own most of the land. Periodic unemployment and inadequate housing are chronic problems in the young nation. On Nevis the steeper terrain made sugarcane less profitable, and after 1838 sharecropping of Sea Island cotton prevailed; but by the 1970s much land had reverted to scrub secondary growth. The government provides health facilities for the people, and tropical diseases have been virtually eliminated. Education is compulsory for children from 5 to 16 years of age. About 90 percent of the adult population is literate.

A government-owned radio and television service operates on Saint Kitts, and modern telecommunications serve the islands. The public library in Basseterre has a notable collection of rare books on West Indian culture and includes a number of antiquities dating from the Carib culture on the island.

History. When Christopher Columbus visited the islands in 1493, they were occupied by the warlike, cannibalistic Caribs. Columbus gave the island the name Saint Christopher, after his patron saint, but the name was shortened to Saint Kitts by settlers who, arriving from England in 1623, established the first successful English colony in the West Indies at Old Road on the western coast. The name Nevis derives from Columbus' likening that island's cloud-topped peak to *las nieves,* or "the snows," when he visited there in 1493. Nevis was settled by the English in 1628.

The French settled on Saint Kitts in 1627, and an Anglo-French rivalry grew in the 17th century, lasting more than 100 years. After a decisive British victory over the French at Brimstone Hill in 1782, control of Saint Kitts was no longer contested. By the Treaty of Versailles (1783), both Saint Kitts and Nevis had become wholly British possessions.

The islands, including nearby Anguilla, were united in 1882. They joined the West Indies Federation (1958) and remained in that association until it was dissolved in 1967. Saint Christopher-Nevis-Anguilla became an associated state of the United Kingdom on Feb. 27, 1967. The islands as a group were granted full internal self-government with the United Kingdom retaining responsibility for defense and foreign affairs. Anguillans complained of domination by the Saint Christopher administration, and in July 1967 they proclaimed independence. The British intervened, however, and the Anguilla Act of July 1971 placed Anguilla directly under British control. Anguilla's union with Saint Christopher and Nevis was formally severed in 1980. A constitutional conference was held in London in 1982, and, despite controversy over special provisions for Nevis, the islands became independent on Sept. 19, 1983, formally adopting the name Federation of Saint Christopher and Nevis. In 1988 the name was officially changed to Federation of Saint Kitts and Nevis.

Saint-Lambert, city, Montréal region, southern Quebec province, Canada, on the St. Lawrence River, opposite Montreal Island, with which it is connected by Victoria Bridge. Founded in 1647 as a freehold of the Jesuits, the community was long an agricultural centre and developed in the late 19th century with the coming of the railway. It was named for Lambert Closse—soldier, Indian fighter, and associate of Paul de Chomedy, founder of Montreal. Saint-Lambert, a suburb of Montreal, is the site of the easternmost lock of the St. Lawrence Seaway, which enables ships to bypass the Lachine Rapids. Electrical machinery, millwork, metal products, sashes and doors, and fountain pens are among its var-

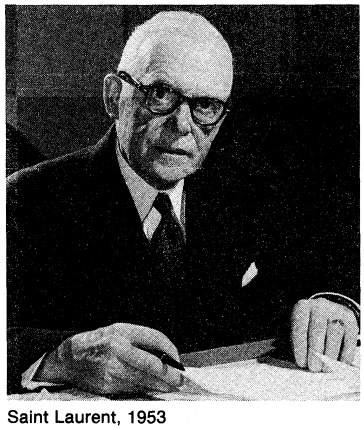
ied manufactures. Inc. city, 1921. Pop. (1981) 20,557.

Saint-Laurent, city, Montréal region, southern Quebec province, Canada; it is a western suburb of Montreal city, in the centre of Montreal Island in the St. Lawrence River. Founded in 1845 on the site of a mission that dated to 1720, it developed with the growth of Montreal. After ceding part of its eastern section to Montreal in 1952, the city annexed Saint-Laurent parish in 1954, quadrupling its area. In 1959 it joined the newly established Montreal Metropolitan Corporation. Industries in Saint-Laurent manufacture aircraft, railway cars, and foundry and other products. Two airports, both national transcontinental railways, and several freeways serve the city. Inc. town, 1893; city, 1955. Pop. (1986) 67,002.

Saint Laurent, Louis (Stephen) (b. Feb. 1, 1882, Compton, Que., Can.—d. July 25, 1973, Quebec), Canadian statesman and jurist who, as Liberal prime minister in 1948–57, helped to maintain Canadian unity and to bring about reforms.

Saint Laurent was called to the bar in 1905 and in 1914 was appointed professor of law at Laval University in Quebec. In 1941 he was asked by Prime Minister W.L. Mackenzie King to enter public life.

As a member of the Liberal Party, Saint Laurent was elected to the Canadian House of Commons from Quebec East in 1942 and was reelected in all subsequent elections until his retirement. King appointed him minister



Saint Laurent, 1953
National Film Board of Canada, Phototheque

of justice and attorney general and later secretary of state for external affairs (acting in 1945, regular 1946). Saint Laurent was deputy chairman of the Canadian delegation to the United Nations Conference on International Organization in San Francisco in 1945 and served as leader of the delegations at the UN General Assembly sessions in London and New York City in 1946–47.

He was persuaded to accept the leadership of the Liberal Party in 1948 and succeeded King as prime minister. Under Saint Laurent's leadership Newfoundland became a part of the dominion; his government supported UN intervention in Korea (1950–53) and in Suez (1956); and Canada helped to keep India and Pakistan as members of the Commonwealth. He endeavoured to unify and develop the country by equalizing provincial revenues, by expanding social security and university education, and by establishing a council for promoting arts and letters. He led his party to great victories in the general elections of 1949 and 1953, but the Liberals were narrowly defeated in 1957. Although personally reelected, he announced his retirement and was succeeded in 1958 as the leader of the opposition by Lester B. Pearson. He withdrew from public life in 1960 and resumed his law practice.

Saint Laurent, Yves, byname of YVES-HENRI-DONAT-MATHIEU SAINT LAURENT (b. Aug. 1, 1936, Oran, Alg.), French fashion designer noted for his use of leather and fur and his popularization of women's trousers for all occasions.

Saint Laurent, the son of a successful French lawyer, stayed in school long enough to complete a secondary education, then left for Paris to pursue a career in designing theatrical costumes and women's fashions. He attended fashion school for a short time and won first prize in an international design contest. When a *Vogue* magazine executive showed Christian Dior some of Saint Laurent's sketches, he was hired immediately as Dior's assistant. He was 17 at the time.

As Dior's protégé, Saint Laurent was named the head of the House of Dior at Dior's death in 1957. Following the "little-girl look" and the A-line silhouette, he introduced more sophisticated, longer skirts and, in 1959, drastically shortened skirts. In 1960 he introduced the "chic beatnik" look of turtlenecks and black leather jackets edged with fur.

After induction into the French army in 1960, Saint Laurent suffered a nervous collapse and was replaced at the House of Dior by designer Marc Bohan. In 1962, however, Saint Laurent opened his own fashion house and quickly emerged as one of the most influential designers in Paris. He popularized trousers for women for both city and country wear. Metallic and transparent fabrics were prominent in his late '60s collections. During the 1970s his enterprises expanded to include ready-to-wear licenses, accessories, household linens, fragrances, and men's clothes in addition to his couture business.

Saint-Laurent-du-Maroni, port, northwest French Guiana, on the east bank of the Maroni River opposite Albina, Suriname. It was formerly headquarters of the country's penal colonies and the site of the largest prison, closed in 1944. Apart from its port facilities, local economic activities include sawmilling, boat repairing, and sugarcane cultivation. Pop. (1982) mun., 6,971.

Saint Lawrence, Gulf of, body of water covering about 60,000 square miles (155,000 square km) at the mouth of the St. Lawrence River. It fringes the shores of half the provinces of Canada and is a gateway to the interior of the entire North American continent. Its name is not entirely accurate, for in a hydrological context the gulf has to be considered more as a sea bordering the North American continent than as a simple river mouth. Its boundaries may be taken as the maritime estuary at the mouth of the St. Lawrence River, in the vicinity of Anticosti Island, on the west; the Strait of Belle Isle between Newfoundland and the mainland, to the north; and the Cabot Strait, separating Newfoundland from the Nova Scotian peninsula, on the south.

The gulf is also a relief phenomenon, for the underlying topography is in fact made up of submerged portions of the northern end of the Appalachian mountain range, as well as of the southern periphery of the vast, ancient rock mass known as the Canadian Shield. The topography of the floor of the gulf can be subdivided into several sections. First of all, there are the deepest zones: the St. Lawrence Channel and the Mingan Passage, whose orientation is toward the southeast, and the Eskimo Channel running to the southwest. Together, these channels occupy approximately one-quarter of the total area of the gulf. Then there are the submarine platforms, often less than 165 feet (50 m) in depth, of which the most important, known as the Acadian Platform, occupies a large semicircle between the Gaspé Peninsula and Cape Breton. The relief of this area is not at all uniform because it includes such depressions as the Chaleurs Trough, shelves like the Bradelle Bank, the Northumberland Strait, and above-water sections such as Prince Edward Island. On the far side of the axial St. Lawrence Trough are three northern elongated platforms: the Anticosti Platform, near to the island of the same name; one which skirts the low northern coast of the gulf; and finally, one lying between the Eskimo Channel and Newfoundland. The reefs on these surfaces, coupled with the hazards of fog and ice, have caused a large number of shipwrecks.

The body of water constituting the gulf is replenished not only by the local rainfall (35.5 inches [902 mm] annually at Cap-aux-Meules in the Magdalen Islands) but also from three great "gateways." The first of these, the maritime estuary, pours in approximately 495,000 cubic feet (14,000 cubic m) per second of cool, soft water, and at ebb tide, a considerably larger volume of seawater, together with a formidable quantity of ice in the winter months. In the Strait of Belle Isle, which forms the second entry, the oceanographic situation is very complex. No less than seven types of water have been distinguished there, with temperatures varying from 29° F (−2° C) to 52° F (11° C), and a salinity fluctuating from 27 to 34.5 parts per thousand. The third gateway, Cabot Strait, is by far the most important; through it the Atlantic and Arctic waters enter (having already passed Newfoundland to the east), and it is through here that the major proportion of water and ice leaves the gulf.

The principal current consists of a peripheral counterclockwise circulation, which hugs the platforms of the northeast and then enters the estuary. This penetrates as far inland as the Pointe des Monts and even reaches as far as the entry of the Saguenay River into the St. Lawrence just over a hundred miles from the city of Quebec. This current continues under the name of the Gaspé Current, having three branches between the Honguedo and Cabot straits.

This circulation, as well as a weak tide, tends to mix the waters of the gulf, but they remain stratified. In the centre of the gulf are three superimposed levels: the deep stratum (38° F [3.5° C] and 33.5 parts per thousand salinity), the intermediate stratum with a depth of 165 feet (50 m) (33° F [0.5° C] and 32.5 parts per thousand salinity), and the surface stratum, which is less salty and undergoes strong seasonal thermal variations.

Ice floes constitute one of the most prominent characteristics of the gulf. Ice formation is delayed because of the salinity, the latent heat of the mass of water, and the slow passage of upstream ice; thus ice is not abundant in the gulf before mid-February. The thaw, often late, permits the Cabot Strait to have normal maritime traffic at least a month before the Strait of Belle Isle.

Saint Lawrence Islands National Park, area of mainland, islands, and islets, southeastern Ontario, Canada, on the St. Lawrence River between Kingston and Brockville. The small mainland reservation, called Mallorytown Landing, is 12 miles (19 km) west of Brockville. There are 18 heavily forested islands and 80 rocky islets, all part of the Thousand Islands region, also included in the park. Established in 1904, the park has a total area of 1,013 acres (410 hectares).

Saint Lawrence River, river of eastern North America, major section of the great hydrographic system stretching 2,700 miles (4,345 km) across the United States and Canada from the source of the St. Louis River in Minnesota through the Great Lakes to the Cabot Strait between Newfoundland and the Canadian mainland. The third longest river in Canada, the St. Lawrence proper extends 800 miles (1,287 km) from the eastern exit of Lake

Ontario through the heartland of the nation to the estuarine island of Anticosti in the Gulf of St. Lawrence. The upper course of the river from Lake Ontario to the city of Cornwall forms the border between the United States and Canada.

A brief treatment of the St. Lawrence River follows. For full treatment, *see* MACROPAEDIA: North America.

Flowing in a broad tectonic depression, the river is estuarine over much of its length. In its upper and middle courses, the average width is about 1.2 miles (1.9 km), in the lower course about 10 miles (16 km), and at its mouth the river is 90 miles (145 km) wide. The mean discharge rate is about 500,000 cubic feet per second (14,000 cubic m per sec). The basin of the St. Lawrence, which covers some 550,000 square miles (1,424,000 square km), can be divided into six regions: the St. Lawrence of the international rapids, Quebec Basses Terres, the upper estuary, the middle estuary, the lower estuary, and the maritime estuary. The major tributaries of the system include the Ottawa, Saguenay, Richelieu, and Manicouagan rivers, all in Canada.

The vegetation in the St. Lawrence basin consists of birch, elm, hemlock, maple, oak, and spruce trees; sandbank grasses are found along the freshwater river section, and plants with high salt tolerance thrive along the estuarine sections. The St. Lawrence Valley is one of Canada's major agricultural and industrial regions and is noted for dairy products, paper mills, grains, fruits, and timber. A network of hydroelectric-power plants on the river has further accelerated economic growth of the region. The river links the Atlantic Ocean with the Great Lakes through the St. Lawrence Seaway. The major cities on the river are Quebec, Montreal, and Kingston in Canada, and Ogdensburg in the United States.

Saint Lawrence Seaway, vast U.S.-Canadian navigational project from the Atlantic Ocean to the western end of the Great Lakes. Construction of the seaway began in August 1954 and was completed in April 1959. The seaway is a complex of natural waterways, deepened channels, locks, and canals stretching across 2,342 miles (3,769 km). Together with the Great Lakes, the St. Lawrence system provides 9,500 miles (15,285 km) of navigable waterways.

A brief treatment of the St. Lawrence Seaway follows. For full treatment, *see* MACROPAEDIA: North America.

The seaway is considered a great engineering feat. The total seaway overcomes a 602-foot (183-metre) drop from Lake Superior to the Atlantic Ocean. Its limitations of a draft of 25 feet 9 inches (7.8 m), length of 730 feet (223 m), and beam of 75 feet 6 inches (23 m) restrict use to vessels carrying no more than about 27,000 tons of cargo. There are a total of 12 ports in Canada and 66 in the United States that service the seaway. The largest bulk commodity moved is grain, followed by iron ore and coal. Bulk commodities account for a large part of annual cargo tonnage, but vessels of more than 30 nations also use the seaway to deliver or pick up general cargoes. Direct commerce between the Great Lakes ports and overseas areas accounts for approximately one-fourth of the seaway's cargo tonnage. The seaway route to western Europe from some Great Lakes ports is shorter than the transatlantic routes from the United States. The navigation season of the seaway continues from early April to mid-December, or approximately 250 days.

Saint Leger, one of the English Triple Crown races and, with the Derby, the Two Thousand Guineas, the One Thousand Guineas, and the Oaks, one of the Classic horse races. Established by Colonel Barry Saint Leger in 1776, it was named for him in 1778. An event for three-year-old colts and fillies, it is run annually in September at Doncaster, Yorkshire. The Saint Leger was a 2-mile (3.2-kilometre) race until 1813 but was subsequently reduced to its present length of about 1.75 miles (2,800 m). For winners of the Saint Leger, *see* Sporting Record: *Horse racing.*

Saint Leger, Sir Anthony, Saint Leger also spelled SENTLEGER (b. *c.* 1496—d. March 16, 1559, Ulcombe, Kent, Eng.), English lord deputy of Ireland from 1540 to 1546 and from 1553 to 1556. Considered by many historians to be the most able 16th-century English viceroy of Ireland, he maintained peace in that country by upholding the feudal privileges of the powerful native chieftains.

Saint Leger was sent to Ireland in 1537 to intimidate the Irish Parliament into passing measures that were in accord with King Henry VIII's antipapal policies (*e.g.,* the confiscation of monasteries). Returning to England in 1538, St. Leger became a gentleman of the king's privy chamber and in 1539 was knighted. Appointed lord deputy of Ireland in July 1540, St. Leger continued the conciliatory policy of his predecessor, Lord Leonard Grey. (Grey, who had been recalled and executed, had basically followed the policy that Henry VIII had advised 20 years earlier.)

St. Leger, probably the most able English viceroy in Tudor Ireland, secured peace for the succeeding eight years. The Geraldine League broke up after the young Gerald Fitzgerald, 11th Earl of Kildare, was smuggled (1540) to safety on the European continent. Thenceforth, public submissions to Henry VIII and renunciations of the pope were made by various prominent chiefs. On St. Leger's advice they were given titles to lands formerly held in defiance of English law. This has been called the policy of surrender and re-grant.

He was recalled early in King Edward VI's reign, but, after his successor's aggressive policies failed, he was briefly restored as lord deputy in 1550–51. The final period of his moderate rule in Ireland (1553–56) ended when Queen Mary Tudor, a Roman Catholic, appointed a new viceroy to expedite her plans to reconcile the Irish church with the pope and to plant English colonies on Irish soil.

Saint-Léon, Arthur, in full CHARLES-VICTOR-ARTHUR MICHEL SAINT-LÉON (b. Sept. 17, 1821, Paris—d. Sept. 2, 1870, Paris),



Saint-Léon in *La Esmeralda,* lithograph by J. Brandard, 1844

By courtesy of the Victoria and Albert Museum, London

French dancer, choreographer, and violinist, acclaimed for the choreography of the ballet classic *Coppélia.*

A dancer and violinist at 14, Saint-Léon made his early reputation on an extended European tour (1838–59), dancing with such ballerinas as Marie Taglioni, Carlotta Grisi, Lucile Grahn, and Fanny Cerrito, whom he married in 1845. For Cerrito's debut at the Paris Opéra, Saint-Léon choreographed his first ballet, *La Fille de marbre* (1847). Its success encouraged the Opéra to produce many more of his works, including *Le Violon du diable,* in which Saint-Léon danced and played the violin. As ballet master (1859–69) at the Imperial Theatre in St. Petersburg, Russia, and then in Moscow, Saint-Léon danced, played the violin, and created the dances for the first ballet based on Russian folklore, *The Humpbacked Horse* (1864; revised 1960), which remains in the Soviet repertory. He staged ballets throughout Europe, then returned to Paris as ballet master at the Opéra, where he staged his most famous ballet, *Coppélia* (1870).

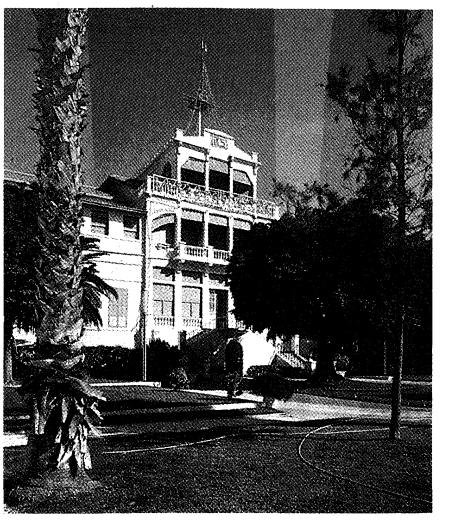
Saint-Léon also wrote *La Sténochorégraphie* (1852), a book in which he developed a system of dance notation. This dance script system was separately decoded in the 1970s by Pierre Lacotte of the Paris Opéra Ballet and Ann Hutchinson, world-famous dance notation authority, thereby allowing for accurate restaging of early Saint-Léon and Cerrito ballets, including the dances from *La Vivandière.*

Saint Leonards, city northeast of and contiguous with Launceston, northeastern Tasmania, Australia. St. Leonards is situated in the upper Tamar Valley south of the Tasman Highway on the North Esk River. Regional economic pursuits include agricultural, pastoral, and dairying activities as well as manufacturing and forestry. Two national parks and an airport are nearby. Pop. (1981) 20,343.

Saint-Leu, Louis Bonaparte, comte de (count of): *see* Bonaparte, Louis.

Saint-Lô, town, capital of Manche *département,* Basse-Normandie region, northwestern France, on a promontory dominating the Vire River valley. Called Briovera in Gallo-Roman times, the town was renamed for St. Lô, 6th-century bishop of Coutances. In the Middle Ages it was an important fortress and noted for its weaving. In 1796 Saint-Lô replaced Coutances as capital of the *département.* The town, a vital communications centre because of its location at a major crossroads, was almost completely destroyed in World War II after the Allied landings in June 1944, being taken by U.S. forces on July 18. Its reconstruction, begun in 1948, included restoration of medieval ramparts (revealed by the bombardment) overlooking the Vire valley. The town's Gothic Church of Notre-Dame (14th–17th century) has also been restored. Saint-Lô is a market town with some light industry, including household appliances. Local agricultural produce is processed, and a large horse-breeding farm is nearby. Pop. (1982) 23,212.

Saint-Louis, Wolof NDAR, island city and seaport near the mouth of the Sénégal River,

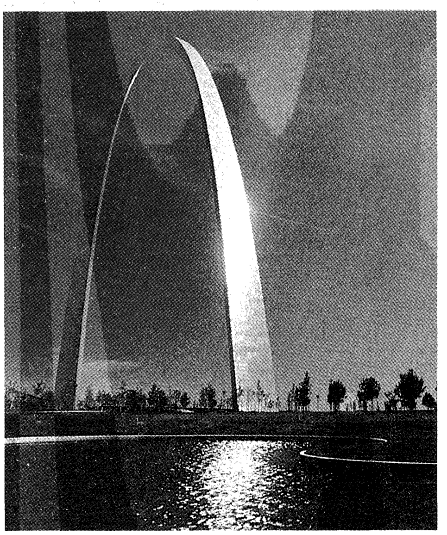


Former residence of the governors, Saint-Louis, Senegal

A.F. Kersting

and rail terminus north-northeast of Dakar, Senegal, western Africa. The island and city are connected to the mainland by a land bridge. Saint-Louis, founded in 1659, is the oldest colonial city on the western African coast and was the administrative capital of the French West African territories of Mauritania and Senegal. Saint-Louis has participated in French politics since 1848. The establishment of Dakar (with a better port), the building of the railroad linking the two cities, the creation of a French West Africa headquarters at Dakar, and the completion of the Dakar–Niger railroad led to the decline of Saint-Louis. It is now merely a fishing centre and river–rail transfer point for the trade of the Sénégal valley. Pop. (1986 est.) 127,313.

Saint Louis, city, adjacent to but independent of St. Louis county, east-central Missouri, U.S., on the Mississippi River (bridged there at seven points) opposite East St. Louis,



The Gateway Arch in the Jefferson National Expansion Memorial, Saint Louis, Mo.
© Robert Lee II 1983

Ill., 10 miles (16 km) below its confluence with the Missouri. It is the state's largest city, its boundaries not having been changed since 1876, when it became administratively independent. Its metropolitan statistical area comprises some 5,340 square miles (13,830 square km).

Founded in 1764 by Pierre Laclède Liguest of New Orleans as a fur-trading post, it was organized as a village by Auguste Chouteau and named for the canonized Louis IX of France. Transferred to Spain (1770), St. Louis was later retroceded to France; and following the Louisiana Purchase (1803) it became part of the United States. The city was the seat of government for the Territory of Louisiana (1805) and the Territory of Missouri (1812). It was the site of the first Missouri constitutional convention (1820), but it ceased to serve as capital when statehood was attained (1821). It became the crossroads of westward expansion in the United States and an outfitting point for exploring parties, fur-trading expeditions, and pioneers traveling the Santa Fe, California, and Oregon trails. The Mexican War of 1846 brought a brisk trade with the Southwest. During the American Civil War, St. Louis was kept under martial law while remaining a Union base.

Since the steamboat era (1817–70) and arrival of the railroads in the 1850s, the city has been a major transportation hub. A port of entry, it is the centre of the Great Lakes to the Gulf Waterway with large markets for livestock, grain, wool, and lumber. A widely diversified economy benefits from local raw materials including iron, lead, zinc, copper, aluminum, and magnesium. Highly diversified industries include brewing, food processing, and the manufacture of aircraft, automobiles, shoes, chemicals, railway cars, textiles, and electronic components.

Several universities, colleges, seminaries, and Bible and trade schools are in the metropolitan area. St. Louis University (1818) maintains the Pius XII Library, built to preserve microfilms of Vatican Library treasures. Washington University (1853) was founded by William Greenleaf Eliot, grandfather of the poet T.S. Eliot, and St. Louis College of Pharmacy dates from 1864. The University of Missouri–St. Louis (1963) is just north of the city. Colleges include Lindenwood (1827), Maryville (1872), Webster (1915), Fontbonne (1917), and Harris-Stowe (1857).

The St. Louis Symphony Orchestra (1880) is one of the oldest in the United States. Forest Park was the site of the Louisiana Purchase Exposition (St. Louis World's Fair) of 1904, which brought international fame to the city. The Jefferson National Expansion Memorial, built on the original village plat, is dominated by the 629.5-foot (191.9-metre) stainless-steel Gateway Arch, designed by Eero Saarinen to commemorate St. Louis' historic role as "Gateway to the West." The Old Cathedral of St. Louis of France (Byzantine-style; 1831–34) was granted a special indulgence by Pope Gregory XVI. The Old Courthouse (1839–64) was the scene of the Dred Scott slavery case and contains frescoes by Carl Wimar. In Aloe Plaza stands Carl Milles' fountain symbolizing the convergence of the Mississippi and Missouri rivers. The poet Eugene Field's boyhood home has a children's museum. A theatre is housed in the Spanish International Pavilion, moved to St. Louis from the New York World's Fair of 1964–65. Eads Bridge (1874), world's first steel-truss span, has been designated a national historic landmark. Jefferson Barracks Historical Park is located 12 miles (19 km) south of the city. St. Louis is the home of the Cardinals baseball team, and a number of athletic events are held in Busch Memorial Stadium. The St. Louis Gateway Convention Center was completed in 1978. Inc. town, 1821; city, 1823. Pop. (1987 est.) city, 429,414; metropolitan statistical area (SMSA), 2,458,000.

Saint Louis Post-Dispatch, morning daily newspaper published in St. Louis, Mo., one of the most prestigious newspapers in the United States and a dominant voice of the lower Middle West.

It was founded in 1878 when Joseph Pulitzer purchased the 15-year-old, bankrupt *St. Louis Dispatch* and merged it with the 3-year-old *St. Louis Post* of John A. Dillon to form the *St. Louis Post and Dispatch,* shortly simplified to *St. Louis Post-Dispatch.* Pulitzer established an independent, liberal policy from the beginning and took a strong stance against corruption in public office. The paper conducted a succession of civic crusades and sensational exposés that attracted a growing readership. By 1881 the *Post-Dispatch* had a circulation of 22,000 and was the largest evening paper in the city.

Joseph Pulitzer II joined the paper in 1906 and took control on his father's death in 1911. He, in turn, was succeeded by Joseph Pulitzer III in 1955. Under the second Pulitzer, particularly, the *P-D,* as it is widely known, greatly improved its international coverage, though not by the usual practice of setting up permanent bureaus in foreign capitals. Instead, the *Post-Dispatch* sent reporters or teams from St. Louis to wherever world news was being made. In domestic coverage it stressed accurate reporting and clear analysis. In its editorials, the paper has consistently espoused minority-group causes and waged campaigns to eliminate social ills. It has clung to the independence declared at its founding, variously supporting Democrats or Republicans, usually of a liberal persuasion.

Saint Louis-San Francisco Railway Company, byname THE FRISCO, railroad with lines in nine southern and central U.S. states before it merged with Burlington Northern, Inc.

The railroad was established in 1876 as the St. Louis and San Francisco Railway, but its antecedents go back to 1849; at that time the Missouri legislature granted a charter to the Pacific Railroad to build a road to Missouri's western border, there to meet any line laid eastward from the Pacific Coast.

The St. Louis and San Francisco acquired a number of feeder lines after it was set up. Although it went bankrupt in 1916 and 1947, it did well in the decades from 1950 to 1980, serving as a bridge line between the big southern and western railroads. In 1967 it discontinued its last two passenger trains between Kansas City, Mo., and Birmingham, Ala., becoming an all-freight railroad.

When merged into the Burlington Northern in 1980, it operated about 4,500 miles (7,240 km) of track, extending from St. Louis and Kansas City southwestward to central Texas and southeastward to Mobile, Ala., and Pensacola, Fla.

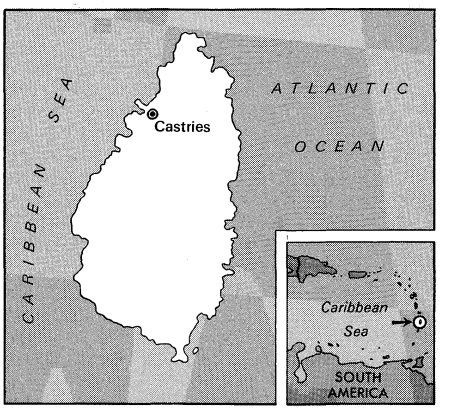
Saint Louis Zoological Park, zoo in St. Louis, Mo., U.S., site of the first zoo tissue banks for preserving tissues from dead specimens for future scientific study. The zoo, built on the grounds of the Louisiana Purchase Exposition (St. Louis World's Fair) of 1904, also maintains a diverse animal collection for public viewing. Opened in 1913, the 33-hectare (81-acre) zoo is owned and operated by the city with the aid of a local zoological society. The zoo's aviary, one of the world's largest, contains approximately 125 free-flying large birds. Its waterfowl lakes support about 450 birds of 90 species. The zoo also has a herpetarium that is organized by ecological realms and houses a pair of tuataras, rare lizardlike reptiles from New Zealand. The bear displays are among the best in the world.

Saint Lucia, island state of the Lesser Antilles in the eastern Caribbean Sea, situated about 24 miles (39 km) south of Martinique and some 21 miles (34 km) northeast of Saint Vincent. The island, the second largest of the Windward group, covers an area of 238 square miles (616 square km). Castries, the capital and main port, is located on the northwestern shore. The population in 1990 was estimated at 151,000.

A brief treatment of Saint Lucia follows. For more information about regional aspects of Saint Lucia, *see* MACROPAEDIA: West Indies.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. Saint Lucia is of volcanic origin and in the southwest, near Soufrière, is



Saint Lucia

the Qualibou Volcano with solfataras (boiling sulfur springs); it last erupted in 1766 but continues to emit steam and gases. One of the island's prime tourist sights, Qualibou is accessible by road. Wooded mountains run north–south, culminating in Mount Gimie (3,145 feet [959 m]), and many streams flow from them through fertile valleys. In the southwest are the Gros and Petit Pitons (2,619 feet [798 m] and 2,461 feet [750 m], respectively), forest-clad volcanic domes or pinnacles enclosing a small bay. Saint Lucia has a tropical maritime climate. Rainfall and temperature vary with elevation. Average annual rainfall ranges from 51 inches (1,300 mm) on the coast to as much as 150 inches (3,810 mm) inland. The mean temperature is about 80° F (27° C), with a maximum high of 88° F (31° C) and a minimum low of 66° F (19° C) reached in certain years. On the whole, Saint Lucia has had fewer hurricanes than have other West Indian islands.

What remains of Saint Lucia's lush natural rain forest now exists only in the relatively inaccessible highlands. At lower levels the forest was cleared for farmland, and secondary forest has grown up where the land can no longer support crops. A type of scrub vegetation is all that grows on the eroded northern tip of the island. More than one-fourth of the island is used for agricultural purposes.

The people. The great majority of the inhabitants of the island are black. Slightly less than a tenth of the people are of mixed European and black African blood, and a small percentage are Asians and Europeans. Most Saint Lucians are Roman Catholics, although a small number belong to various Protestant faiths. English is the official language. French patois, a creole dialect, is also spoken. The main population centre is the capital, Castries, population 52,900 (1986 est.). Other sizable towns include Soufrière and Vieux Fort. Like many West Indian islands, Saint Lucia has a high density of population. With lower-than-average emigration, but high birth and infant-mortality rates, the population growth rate has remained high for the region.

The economy. Saint Lucia's economy is based on agriculture and tourism. The gross national product (GNP) is growing more rapidly than the population, but the GNP per capita is low for a Caribbean country.

A large proportion of the cultivated land is in small farms. Saint Lucia's agriculture is dominated by one major cash crop, bananas, which provides about two-thirds of the value of exports. Other cash crops include cacao, coconuts, and citrus fruits. Subsistence crops include cassava, yams, plantains, mangoes, and papaya.

Manufacturing is mostly based on agricultural products. Industry was diversified by the early 1980s, producing electrical components, cardboard cartons, clothing, rum, tobacco products, coconut products, concrete blocks, and beer. Electrical energy is produced exclusively by thermal-power plants. An oil-refining transshipment complex at Cul-de-Sac Bay was built in the late 1970s. Infrastructure on the island was heavily damaged by Hurricane Allen (1980), which also destroyed almost the entire banana crop and reduced tourism. The nation's chief imports are foods, fuels, chemicals, and machinery and other manufactured items. Saint Lucia's chief trading partners are the United Kingdom, the United States, Trinidad and Tobago, and Barbados.

The road system, covering about 465 miles (748 km), about four-fifths paved, provides access to most of the island. The main port at Castries has been modernized, and there are additional port facilities at Vieux Fort and at Soufrière. Hewanorra is an international airport, located just outside of Vieux Fort, about 50 miles (80 km) south of Castries. A smaller airport at Vigie accommodates domestic and regional flights.

Government and social conditions. Saint Lucia is a constitutional monarchy and a member of the Commonwealth. The British monarch is the head of state and is represented in the country by a governor-general, who is appointed. The head of government is the prime minister, who is the leader of the majority party. The bicameral parliament consists of the House of Assembly, which is elected for five years, and the Senate, the majority of whose members are appointed on the advice of the prime minister.

A very high rate of unemployment, compounded by rapid population growth, is one of the major problems facing the government. These conditions, combined with growing inflation and high living costs, have been the basis of considerable unrest in the country. The government provides health facilities for the people. The main hospital facility is at Castries, with smaller hospitals at Vieux Fort, Soufrière, and Dennery. Primary education is free and compulsory; there is a branch of the University of the West Indies at Castries. There is also a technical college and a teacher-training college. About three-fourths of the adult population is literate. There are two radio stations, as well as a television station that broadcasts on a limited basis in the evenings.

History. The warlike Caribs, whose archaeological remains have been found on the island, drove out the original Indians, the Arawaks, that occupied Saint Lucia. Data of the early history of Saint Lucia is so scant that the date of its discovery by Europeans is uncertain. Saint Lucia probably was first visited or sighted by Europeans about 1500, and it appears as Santa Lucia on a Vatican globe of 1520. The first colonizing attempts by the English in 1605 and 1638 failed. The French, claiming the island since 1635, established a settlement in 1650 and made a treaty with the Carib inhabitants in 1660. Beginning in 1664 Saint Lucia changed hands several times during wars between Great Britain and France and was finally ceded to Britain in 1814, becoming one of the Windward Islands in 1871. In the 19th century, prosperity was impeded by the effects of wars, epidemics, and a decline in the sugarcane industry. Although sugarcane revived later, with an increase in banana and cacao cultivation, its production finally ceased in 1964. Representative government was granted by the constitution of 1924, and that of 1936 provided for an unofficial majority of elected representatives in the legislative council. Saint Lucia was a member of the Federation of the West Indies (1958–62), and in 1967, under the West Indies Act, it became fully self-governing in internal affairs, while the United Kingdom remained responsible for defense and external matters. The island gained full independence on Feb. 22, 1979. The United Workers Party (UWP), then in power, called for new elections and was defeated by the Saint Lucia Labour Party (SLP). The struggle for power continued, however, and the UWP was returned in the elections of 1982 and again by a narrow margin in 1987.

Saint Lucia Game Reserve, sanctuary on the northeastern coast of Natal, South Africa, encompassing Lake St. Lucia, a shallow, H-shaped lagoon and estuary system. Established in 1897, the reserve has an area of 142 square miles (368 square km). It is subtropical and is noted for its lush vegetation, including a variety of wild orchid and the flower-bearing Barringtonia tree. There are hundreds of species of birds, as well as crocodiles, hippopotamuses, leguans, and mongooses. Headquarters are at Mtubatuba.

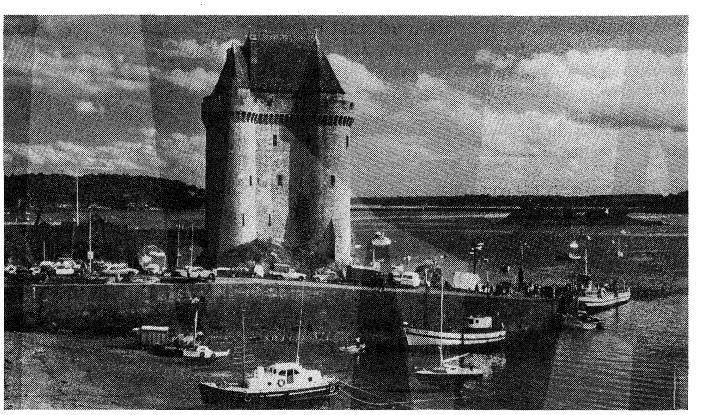
Saint-Malo, seaport, Ille-et-Vilaine *département,* Britanny region, northwestern France. It is situated on the English Channel, on the right bank of the estuary of the Rance River. The old walled city stands on a granite islet, joined to the mainland by an ancient causeway and by an avenue bridging the inner harbour.

Named after Maclou, or Malo, a Welsh monk who fled to Brittany, making his headquarters on the island, in the 6th century and probably became the first bishop of Aleth (Saint-Servan), the island was not substantially inhabited until the 8th century, when the population of the surrounding district sought refuge there from the Normans. The bishopric was transferred to the island in 1144 and was abolished in 1790. In the 17th to the 18th century, Saint-Malo derived prosperity from its navigators, traders, and privateers. The town was three-fourths destroyed during World War II, but it has been rebuilt.

The port of Saint-Malo–Saint-Servan, trading mainly with England and Scandinavia, has more than 2.5 miles (4 km) of quays. Cod fishing has lost its former importance, but Saint-Malo still has a small but efficient fleet of trawlers. The port has considerable accommodation for yachts and pleasure craft. There is a regular summer ferry service to the Channel Islands.

The fortress at the northeast corner of the ramparts, built between the 14th and the 17th century, has four great round towers, one of which houses a museum devoted largely to famous mariners born in the city, including the 16th-century French navigator Jacques Cartier. The 12th- to 17th-century church of Saint-Vincent, previously the cathedral, damaged in World War II, has undergone restoration work.

In 1967 Saint-Malo was merged with Saint-Servan, to the south, and the seaside suburb of Paramé, to the east. Fishing still plays a part in the local economy, but industry (especially printing and machinery) employs many more. Pop. (1982) 46,347.



The Tower of Solidor on the estuary of the Rance River at Saint-Malo, Fr.

Toni Schneiders—Bruce Coleman Inc.

Saint-Malo, Gulf of, French GOLFE DE SAINT-MALO, gulf of the English Channel indenting the north coast of Brittany, France, extending from the Île de Bréhat (west) to the peninsula of Cotentin of Normandy (east). It is 60 miles (100 km) wide and 20 miles (32 km) long and receives the Trieux, Rance, Couesnon, and Sélune rivers. The gulf includes the bays of Saint-Brieuc and Mont-Saint-Michel, site of the rocky islet of Le Mont-Saint-Michel, famous for its medieval walls and towers and its ancient abbey. At the main port, Saint-Malo, tides rise 23 to 26 feet (7 to 8 m) normally and as much as 49 feet (15 m) at spring and autumn tide; thus, at low water an immense tract of land is uncovered. The shore of the gulf is lined with numerous small resorts.

Saint Mark's Basilica (Venice): *see* San Marco Basilica.

Saint Martin, Dutch SINT MAARTEN, French SAINT-MARTIN, island at the northern end of the windward group of the Lesser Antilles in the Caribbean Sea. The island is hilly and receives about 45 inches (1,140 mm) of rain annually. The southern third is controlled by the Dutch, the northern two-thirds by the French; there are no customs barriers between the two.

The island was named by Columbus in honour of the saint on whose feast day the island was discovered. Valued for its natural lakes of salt, a scarce commodity in Europe, it changed between Dutch and Spanish hands several times. In 1648 the Dutch returned to the island to find it occupied by the French, with whom they signed a partition treaty. Sugarcane plantations, worked by black slaves (ancestors of most of the present inhabitants), were important for a time but declined in the 19th century.

The Dutch (southern) part of the island, Sint Maarten, covers 13 square miles (34 square km). It became a part of the Dutch West Indies in 1828, and in 1845 it became one of the six islands constituting the Netherlands Antilles. In the early 1980s, together with the neighbouring islands of Saba and Sint Eustatius, it comprised the electoral district of Windward Islands (Bovenwindse Eilanden) within the Netherlands Antilles, an integral part of The Netherlands; the capital of the district and seat of the island's administration is Philipsburg. The economy, formerly dependent on governmental grants and on money sent home by emigrants working in Curaçao and Aruba, draws increasingly on tourism as the government actively encourages exploitation of the island's most valuable natural resources, the clean beaches and pleasant climate.

The French (northern) part of the island, with an area of 20 square miles (52 square km), is one of seven islands forming the French overseas *département* of Guadeloupe. Fishing is the main occupation on Saint Martin, but tourism is developing rapidly. Trade flourishes in Marigot, the capital. Most of the people are English-speaking blacks. Pop. (1981) Dutch Sint Maarten, 13,156; (1982) French Saint-Martin, 8,072.

Saint-Martin, Louis-Claude de (b. Jan. 18, 1743, Amboise, Fr.—d. Oct. 13, 1803, Aulnay), French visionary philosopher who was one of the leading exponents of illuminism, an 18th-century philosophical movement that attempted to refute the rationalistic philosophies prevalent in that period.

After practicing law for six months at Tours, Saint-Martin joined the army in 1765. Stationed at Bordeaux, he came under the influence of the Jewish mystic Martinez Pasqualis. He left the army in 1771 and began to propagate mysticism. After visiting England and Italy, he returned to France in 1788 and was introduced to the writings of the German mystic Jakob Boehme, under the influence of which he gradually broke loose from the influence of Martinez Pasqualis. He later came under the influence of the Swedish philosopher Emanuel Swedenborg.

His writings include: *Des erreurs et de la vérité* (1775; "Errors and the Truth"); *L'Homme de désir* (1790; "The Man of Desire"); *Le Nouvel Homme* (1792; "The New Man"); *Considérations sur la Révolution Française* (1795; "Considerations on the French Revolution"); *Le Crocodile* (1798; "The Crocodile"), an allegorical poem; *L'Esprit des choses* (1800; "The Spirit of Things"); and *Le Ministère de l'homme-esprit* (1802; *The Ministry of Man and Spirit*). He signed his works Le Philosophe Inconnu ("The Unknown Philosopher").

Saint Martinville, town, seat (1807) of St. Martin parish, southern Louisiana, U.S., on the Bayou Teche, just southeast of Lafayette. Originally known as Poste des Attakapas (for a local Indian tribe), it was settled about 1760. In 1765 a colony of Acadians, expelled by the British from Nova Scotia, arrived; this event laid ground for the story of Evangeline made famous in Henry Wadsworth Longfellow's poem. Beneath the Evangeline Oak on the bayou at the end of Port Street, Evangeline and her lover, Gabriel, are said to have been reunited. Their romance and Acadian life are perpetuated in the Longfellow-Evangeline State Commemorative Area (*q.v.*) just outside the town. St. Martin's Church (1838) replaces an earlier structure (1765) that was the mother church of the Acadians; the grave of Emmeline Labiche, traditionally believed to have been Evangeline, is behind the church. After the French Revolution many Royalist refugees went to St. Martinville, which became a focus of French customs and culture and was known as Le Petit Paris. After Louisiana became a state in 1812, the town was incorporated and was named for the 4th-century French bishop Martin of Tours. The town's Petit Paris Museum contains memorabilia of the French aristocrats.

The town, which thrived as a river resort for New Orleans society, declined soon after the American Civil War following an outbreak of yellow fever, a disastrous fire, a damaging hurricane, and the end of steamboat travel. Sugar, rice, cotton, salt, timber, and oil are produced in the locality. Tourism has become an economic asset. Pop. (1986 est.) 9,070.

Saint Marys River, outlet for Lake Superior, forming part of the boundary between Michigan, U.S., and Ontario, Can. Flowing east, then south, for 70 miles (110 km) into Lake Huron, it is an important link in the St. Lawrence Seaway. At Sault Ste. Marie, Ont., the river drops more than 20 feet (6 m) in 1 mile (1.6 km) through the Sault Ste. Marie Rapids. Since navigation there is impossible, the Sault Ste. Marie Canals (or Soo Canals), containing five locks, provide a bypass for the heavy shipping. Large islands divide the river into a series of lakes (Nicolet, George, and Munuscong) and channels (St. Joseph). The river is the narrowest part of the Great Lakes system and a natural crossing site, which was used by the Indians and the early French explorers and missionaries.

Saint-Maur-des-Fossés, town, in the Val-de-Marne *département,* Paris region, residential southeastern suburb of Paris, on a loop of the Marne River. The locality received its name from the abbey founded there in the 7th century by Benedictine monks from Saint-Maur-sur-le-Loire, who had fled from the Norman invaders. The abbey became powerful in the Middle Ages but was secularized in the 16th century. It was destroyed in 1793 during the upheavals of the French Revolution. Saint-Maur is separated from Paris by the Vincennes Forest; commuter service is provided by metro electric railway. The area within the Marne peninsula was developed as a garden suburb in the 1830s and has retained its character in spite of the urban spread around it. Pop. (1982) 80,811.

Saint-Maure, Charles de: *see* Montausier, Charles de Saint-Maure, duc de.

Saint-Maurice River, French RIVIÈRE SAINT-MAURICE, river in Trois-Rivières region, southern Quebec province, Canada, a major tributary of the St. Lawrence River. From its sources in the mountains of south-central Quebec, the river flows to Gouin Reservoir, draining the 500-square-mile (1,300-square-kilometre) body of water southeastward into the St. Lawrence at Trois-Rivières city, descending 1,300 feet (400 m) over its course of 350 miles (563 km). Its main stream is joined by many tributaries, including the Mattawin, Manouan, and Vermilion rivers, and interrupted by falls at La Tuque, Grand-Mère, and Shawinigan. Discovered by the French navigator Jacques Cartier in 1535 and named after Maurice Poulin, who was granted a seigniory north of its mouth in 1668, the river first served as a fur-trading route. It became a major logging river, serving large pulp and paper factories at La Tuque, Grand-Mère, Shawinigan, and Trois-Rivières, the main riparian centres. Since 1900 the Saint-Maurice has also become a major source of hydroelectric power; eight power plants, together generating more than 1,500,000 kilowatts, have attracted many new industries to the valley, including those that manufacture aluminum, plastics, and chemicals.

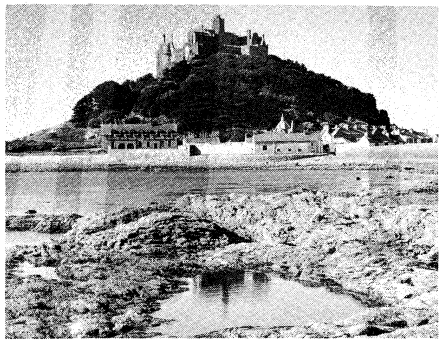
Saint Michael and Saint George, The Most Distinguished Order of, British order of knighthood founded in 1818 by the prince regent, later King George IV, to commemorate the British protectorate over the Ionian islands and Malta, which came under British rule in 1814.

Originally membership was exclusively for the inhabitants of the Ionian islands and Malta, as well as for British citizens who had performed important government services in the Mediterranean area. Since 1879 any citizen of the United Kingdom has been eligible; however, it is an honour conferred mostly on officials in colonial affairs, foreign-service officers and diplomats, and others who have performed important duties in Commonwealth countries. Foreigners can be admitted as "honorary members."

It was William IV who instituted the three classes of knights of the order, which, listed in descending order of rank, are knight grand cross or dame grand cross (G.C.M.G.), knight commander or dame commander (K.C.M.G. or D.C.M.G., respectively), and companion (C.M.G.). Membership is limited to 120 knights grand cross, 390 knights commanders, and 1,775 companions. Conferment of the two highest classes of the order entails admission into knighthood. The order's officers are prelate, chancellor, secretary, king of arms, registrar, and gentleman usher of the Blue Rod.

The chapel of the order, dedicated in 1906, is in St. Paul's Cathedral, London, and contains the banners and coats of arms of the knights grand cross. The order's badge depicts St. Michael encountering the devil, emblazoned with the order's motto *Auspicium melioris aevi* ("Augury of a better age"); the other side portrays St. George and the dragon. The collar of the order (if awarded after 1948) must be returned upon the death of the holder, but the other insignia are the personal property of the holder. Among the more picturesque symbols adorning the collar are the Maltese Cross, referring to the Hospitalers, and the winged lion of St. Mark, referring to the long Venetian control over the Ionian islands.

Saint Michael's Mount, granite island about 400 yards (365 m) offshore in Mount's Bay on the English Channel, in the western part of the county of Cornwall, England. At low tide only, a natural causeway links the island to the nearby community of Marazion. Administratively, the island is a parish within Penwith district, Cornwall.



St. Michael's Mount off the coast of Cornwall
Ace Williams—Shostal/EB Inc.

Edward the Confessor (reigned 1042–66) gave the island to Mont-Saint-Michel, Normandy, of which abbey it remained a priory until Henry V's reign (1413–22); the abbot rebuilt the monastery in the 12th century. It came into the crown's possession at the Reformation. In 1659 it was sold to Colonel John St. Aubyn, and his descendant Lord St. Levan maintained a residence in the castle more than 300 years later, although the National Trust now takes most responsibility for the property's upkeep. Of the original monastic buildings the refectory is the chief survival. The Chapel of St. Michael dates from the 15th century. Pop. (1981) 26.

Saint-Mihiel, town, Meuse *département,* Lorraine region, northeastern France, on the right bank of the Meuse River, 22 miles (35 km) south-southeast of Verdun. The town grew around a Benedictine abbey, founded in 709. The abbey buildings (17th- and 18th-century) are now occupied mainly by a school and a library. The churches of Saint-Michel and Saint-Étienne have works by the 16th-century sculptor Ligier Richier, who was a native of the town. The capture of Saint-Mihiel by the Germans in 1914 gave them command of the Meuse Valley. The town was retaken by the Allies in 1918. Pop. (1982) 5,511.

Saint-Moritz (Switzerland): *see* Sankt Moritz.

Saint-Nazaire, town and seaport, Loire-Atlantique *département,* Pays de la Loire region, western France, on the right bank of the Loire estuary, 38 miles (61 km) west-northwest of Nantes. Almost completely destroyed in World War II, it has been rebuilt according to a plan that separates the residential districts from the industrial centre. Saint-Nazaire is the outport for Nantes, and its shipbuilding yard is one of the most important in Europe, specializing in warships, supertankers, and ocean liners. Other industries include chemical plants and aircraft works.

Saint-Nazaire was little more than a fishing harbour until the mid-19th century, when the port was built to accommodate vessels too large to sail up the Loire to Nantes. During World War II, it was used by the Germans as a submarine base. Pop. (1982) 68,040.

Saint Nicholas Island (Cape Verde): *see* São Nicolau Island.

Saint-Nicolas, Môle (Haiti): *see* Môle Saint-Nicolas.

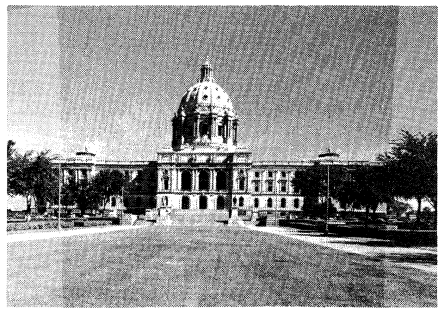
Saint-Omer, town, Pas-de-Calais *département,* Nord-Pas-de-Calais region, northeastern France, on the canalized Aa River and 22 miles (36 km) southwest of the Belgian frontier. The town grew around a monastery and a chapel, founded in the 7th century by St. Omer and his companions. The last king of the Frankish Merovingian dynasty (5th to 8th centuries), Childeric III, died there (755) after being deposed by the first ruler of the succeeding Carolingian dynasty (8th to 10th centuries), Pepin III the Short. Saint-Omer was fortified by the counts of Flanders in the 10th century and eventually passed to the Spanish crown. The capture of it in 1677 by Louis XIV of France was ratified the following year by the Treaty of Nijmegen. The old town has a number of fine 17th- and 18th-century houses. The 13th- to 15th-century basilica of Notre-Dame (formerly a cathedral) contains numerous works of art, including the 16th-century alabaster tomb of a bishop of Arras, the 8th-century tomb of St. Erkembode, and a 13th-century cenotaph to St. Omer. The Sandelin Museum, housing a collection of ceramics and Flemish paintings, is in an elegant 18th-century building.

The town was heavily damaged during World Wars I and II. It is the centre of an active truck-gardening region, and its recent industrial growth has been dynamic, with manufacturing of paper, glass, and textiles. Pop. (1982) 13,692.

Saint-Ouen, city, Seine-Saint-Denis *département,* Paris region, a northern industrial suburb of Paris, France. With an area of 1.7 square miles (4.3 square km), it is bounded to the northwest by the Seine River, along the banks of which are vast docks. It contains in its southeastern section, north of the Porte de Clignancourt Métro (subway) station, the picturesque Marché aux Puces (Paris flea market), much visited by tourists. The suburb is a centre for liqueur distilling, the electrical industry, automobile construction, and the manufacture of machine tools. The flea market attracts Parisians in search of bargains in furniture, curios, and antiques. Pop. (1982) 43,589.

Saint-Paul, island in the southern Indian Ocean, administratively a part of Terres Australes et Antarctiques Françaises (French Southern and Antarctic Lands). A volcanic island, the crater of which has been inundated by the sea, Saint-Paul has an area of 2.7 square miles (7 square km) and a maximum elevation of 1,618 feet (493 m) above sea level. It was discovered in the 16th century and first settled in the 18th century by fishermen from Réunion. France annexed Saint-Paul, together with the island of Nouvelle-Amsterdam, in 1843.

Saint Paul, capital of Minnesota, U.S., seat of Ramsey County, port of entry at the head of navigation on the Mississippi River near its junction with the Minnesota River. It is adjacent to Minneapolis, with which it forms the Twin Cities metropolitan area. In 1680 the Franciscan missionary Father Louis Hennepin passed the site, and in 1766 Jonathan Carver, searching for the Northwest Passage, probed a nearby cavern (since known as Carver's Cave).



State Capitol, St. Paul, Minn.
C. Mills—Shostal/EB Inc.

In 1805 Lieutenant Zebulon Montgomery Pike, leader of an American expedition to explore the headwaters of the Mississippi, made an unofficial treaty there with the Dakota (Sioux) for possession of the region, including the site on which the military outpost Fort Snelling was later built. The first land claim was made in 1838 by Pierre "Pig's Eye" Parrant. The settlement was known as Pig's Eye until 1841, when Father Lucian Galtier built a log chapel dedicated to St. Paul. In 1849 St. Paul became the capital of the newly formed Minnesota Territory and was made the state capital when Minnesota was admitted to the Union in 1858.

The city's economic development was influenced by its strategic location on the river; it became an important trading post for furs and supplies. In 1862 the first train left the city on the 10-mile track of the St. Paul and Pacific Railroad. In 1883 a great celebration marked the completion of the Northern Pacific Railway to the West Coast, and 11 years later the Great Northern Railway, under the leadership of James J. Hill, was completed. The manufacture of boots and shoes was of prime importance in the 1870s. In 1882 the Union Stock Yards Company was established by the railroads. By the mid-20th century the livestock market, now in suburban South St. Paul, was one of the world's largest public livestock markets in salable receipts.

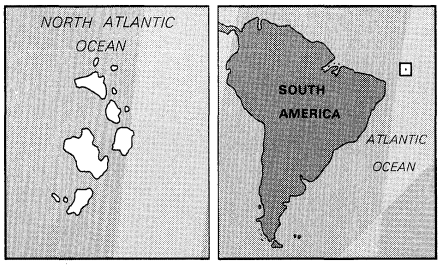
St. Paul is now a major transportation, financial, and industrial centre. Highly diversified manufactures include automobiles, electronic communications equipment, abrasives, magnetic tape, refrigerators, construction equipment, advertising specialties, beer, and food products. There are also oil refineries, foundries, and printing and chemical plants. The city is the seat of the College of St. Thomas (1885), College of St. Catherine (1905), Hamline University (1854), Macalester College (1874), Bethel College and Bethel Theological Seminary (1871), Luther-Northwestern Seminaries (1876), St. Paul Seminary (1894), Concordia College (1893), the William Mitchell College of Law, and a branch of the University of Minnesota. The state capitol, Minnesota's third, was designed by Cass Gilbert and completed in 1904. Dominating the concourse of the 19-story city hall and county courthouse (1931) is the Swedish sculptor Carl Milles' "Indian God of Peace," a 44-foot- (13-metre-) high memorial carved of white Mexican onyx. Nearby are the Fort Snelling State Park and several ski areas. St. Paul's Winter Carnival is a popular festival. Inc. town, 1849; city, 1854. Pop. (1984 est.) city, 265,903; (1985 est.) Minneapolis–St. Paul metropolitan statistical area (MSA), 2,262,400.

Saint Paul River, river rising in eastern Guinea, western Africa. Its source is in the mountains east of Macenta, and its upper reach (the Diani, or Nianda, River) forms part of the border between Guinea and Liberia. It was first sighted by Portuguese navigators in the 15th century on St. Paul's feast day. Entering northern Liberia about 30 miles (50 km) due north of Gbarnga, it discharges into the Atlantic (5 miles [8 km] north of Monrovia) after a southwesterly course of about 280 miles (450 km). Navigable for 18 miles upstream to the falls at White Plains, the river and its major tributaries (the Via, Wuni, and Tuma) drain a basin of 8,460 square miles (21,900 square km) in Liberia and Guinea. Two arms of the St. Paul enclose Bushrod Island, site of the port of Monrovia, from which a rail and road bridge (1949) connects with the now closed iron mine at Vaitown. The Mount Coffee Hydroelectric Plant (1966) is upstream.

Saint Paul's Cathedral, in London, cathedral of the Church of England. The present building was designed in a restrained, classical Baroque style by Sir Christopher Wren and was constructed of Portland stone between 1675 and 1710, replacing Old St. Paul's, which had been completely destroyed in the Great Fire of 1666. Among Wren's distinguished assistants were the architect Nicholas Hawksmoor, the master wood-carver Grinling Gibbons, who did the organ case and choir stalls, and the French ironworker Jean Tijou, responsible for the iron gates of the choir. The church is 515 feet (156 m) long and 180 feet (54.9 m) wide across the west facade and 227.5 feet (69.3 m) wide across the transepts. The dome is 112 feet (34 m) in diameter and 365 feet (111.3 m) high (from the church floor to the cross). The towers of the west facade are 212.5 feet (64.8 m) high. As at Westminster Abbey, many illustrious persons are buried in the main body of the church and the crypt.

Saint Paul's School, in the borough of Hammersmith, London, one of the major public (*i.e.,* privately endowed) schools in England, founded in 1509 by John Colet, dean of St. Paul's Cathedral. It has scholarship affiliation with the University of Oxford, and its curriculum objectives are largely directed toward careers in government. Originally in the cathedral churchyard, it was removed to Hammersmith Road in 1884. Among its pupils were English poet John Milton, diarist Samuel Pepys, and John Churchill, 1st Duke of Marlborough.

Saint Peter and Saint Paul Rocks, Portuguese PENEDOS DE SÃO PEDRO E SÃO PAULO, a group of Atlantic islets under Brazilian sovereignty, lying northwest of Cape San Roque, Brazil. They are located just north of



St. Peter and St. Paul Rocks

the equator (0°56′ N) at about 29°22′ E longitude. They are uninhabited.

Saint Peter Port, French SAINT-PIERRE-PORT, chief town, resort, parish, and capital of Guernsey (*q.v.*), Channel Islands, on the east coast of the island where a narrow valley reaches the sea between moderately high cliffs. Early in the 13th century, Castle Cornet was built on an offshore tidal islet, reinforced later with La Tour Beauregard on the main shore to protect the roadstead. The Anglo-Gascon wine trade was then developing, and the existence of well-protected anchorage, together with Guernsey's position on the English Channel near the route of medieval shipping, meant that St. Peter Port was used increasingly as a refuge and port of call. Late in the 13th century a quay was built, and in 1309 the island's chief market was moved to St. Peter Port, then described as "a kind of borough" (*quasi-burgus*). The quay was extended in the 16th century, a second arm was built in the 18th, and the present fine harbour was constructed between 1853 and 1874. A charter (*c.* 1048) refers to St. Peter's, the town's ancient church, which preserves a variety of styles from the 13th century. Other notable buildings are the Royal Court House (1799), the Markets (1822), Elizabeth College (1826;


St. Peter Port, Guernsey
T.F. Holland—De Wys Inc.

founded 1563), the Constables' Office, and the Priaulx Library. Hauteville House, former residence (1856–70) of Victor Hugo, is now the property of the city of Paris. Pop. (1986) 16,085.

Saint Peter's Basilica, also called NEW ST. PETER'S BASILICA, present basilica of St. Peter's in Rome, begun by Pope Julius II in 1506 and completed in 1615 under Paul V. It is designed as a three-aisled Latin cross with a dome at the crossing, directly above the high altar, which covers the shrine of St. Peter the Apostle. The edifice—the church of the popes—is a major pilgrimage site.

The idea of building the church was conceived by Nicholas V (pope 1447–55), prompted by the state in which he found Old St. Peter's Basilica (*q.v.*)—walls leaning far out of the perpendicular and frescoes covered with dust. In 1452 Nicholas ordered Bernardo Rossellino to begin the construction of a new apse west of the old one, but the work stopped with Nicholas' death. Paul II, however, entrusted the project to Giuliano da Sangallo in 1470.

On April 18, 1506, Julius II laid the first stone for the new basilica. It was to be erected in the form of a Greek cross according to the plan of Donato Bramante. On Bramante's death (1514) Leo X commissioned as his successors Raphael, Fra Giocondo, and Giuliano da Sangallo, who modified the original Greek-cross plan to a Latin cross with three aisles separated by pillars. The architects after Raphael's death in 1520 were Antonio da Sangallo the Elder, Baldassarre Peruzzi, and Andrea Sansovino. After the sack of Rome in 1527, Paul III (pope 1534–49) entrusted the undertaking to Antonio da Sangallo the Younger, who returned to Bramante's plan and erected a dividing wall between the area for the new basilica and the eastern part of the old one, which was still in use. On Sangallo's death (1546) Paul III commissioned the aged Michelangelo as chief architect, a post he held under Julius III and Pius IV. At the time of Michelangelo's death in 1564, the drum for the massive dome was practically complete. He was succeeded by Pirro Ligorio and Giacomo da Vignola. Gregory XIII (1572–85) placed Giacomo della Porta in charge of the work. The dome, modified from Michelangelo's design, was finally completed at the insistence of Sixtus V (1585–90), and Gregory XIV (1590–91) ordered the erection of the lantern above it. Clement VIII (1592–1605) demolished the apse of Old St. Peter's and erected the new high altar over the altar of Calixtus II. Paul V (1605–21) adopted Carlo Maderno's plan, giving the basilica the form of a Latin cross by extending the nave to the east, thus completing the 615-foot- (187-metre-) long main structure. Maderno also completed the facade of St. Peter's and added an extra bay on each end to support campaniles. Although Maderno left designs for these campaniles, only one was built, and that was of a different design executed by Gian Lorenzo Bernini in 1637. Under the commission of Alexander VII (1655–67) Bernini designed the elliptical piazza, outlined by colonnades, that serves as the approach to the basilica.

The interior of St. Peter's is filled with many masterpieces of Renaissance and Baroque art, among the most famous of which are Michelangelo's "Pietà," the baldachin over the main altar by Bernini, the statue of St. Longinus in the crossing, the tomb of Urban VIII, and the bronze cathedra of St. Peter in the apse.

Until 1989 St. Peter's was the largest church in Christendom. In that year its size was exceeded by that of the newly built basilica in Yamoussoukro, Côte d'Ivoire.

Saint Peter's Basilica, Old: *see* Old Saint Peter's Basilica.

Saint Peter's College: *see* Westminster School.

Saint Petersburg (Russian S.F.S.R.): *see* Leningrad.

Saint Petersburg, city, Pinellas county, west-central Florida, U.S., near the tip of Pinellas Peninsula, adjacent to Tampa Bay. Settled in 1876 by John C. Williams of Detroit and Peter A. Demens, who built a railroad that reached the site in 1888, it was named for Demens' birthplace in Russia. In the late 1940s St. Petersburg became one of the first Florida cities to promote "residentism," encouraging former tourists to spend their retirement years there. A resort city with some industry, it is connected by bridges with the city of Tampa and the mainland (east and south) and with a string of sand-reef island resorts known as the Holiday Isles, to the west, between the Gulf of Mexico and Boca Ciega Bay. It is the seat of Eckerd College (formerly Florida Presbyterian College; 1958), St. Petersburg Junior College (1927), and Stetson University College of Law (1901), and it has a fine-arts museum (1961). Inc. town, 1892; city, 1903. Pop. (1987 est.) city, 246,548; Tampa–St. Petersburg–Clearwater metropolitan area (MSA), 1,965,100.

Saint Petersburg porcelain, pottery ware produced from 1744 to the present day by the principal Russian factory, the Imperial Porcelain Factory (from 1925 the State Porcelain Factory M.V. Lomonosov), established in St. Petersburg (now Leningrad) with the patronage of the daughter of Peter I the Great, the empress Elizabeth. A few pieces, some underglaze-blue-painted, survive from the early period—*e.g.,* snuffboxes, Oriental figures, and tea and coffee services. The factory's prime was reached when Catherine II became empress in 1762. She provided annual subsidies, as well as able directors and foreign artists, whose skills were passed on to Russian workers in the reigns of her successors. The porcelain of Catherine II's reign is Neoclassical, and the objects produced are typified by large, imposing services (such as the "Arabesque," with 1,000 pieces for 60 settings) and biscuit figure groups. Also during this period Dominique Rachette, a French sculptor working in Russia, modeled a series of Russian peasant figures and portrait busts. Under Paul I, large display vases were made. Alexander I commissioned wares painted with battle scenes; the production of porcelain decorated predominantly with military motifs continued under Nicholas I, much of it sumptuously executed. Art Nouveau porcelain, reflecting Danish influence, dates from the reign of Alexander III and the famous painted Easter eggs from that of Nicholas II. In the 1920s, "propaganda" porcelain was produced. Modern porcelain tends to have patriotic decorative motifs or to reflect other arts, such as of ballet dancers.

Saint-Pierre, town and small port on the Caribbean island of Martinique, French West Indies. Founded in 1635 by French settlers,

it was the island's commercial centre until May 8, 1902, when Mt. Pelée erupted, killing all but one inhabitant, a prisoner in a strong underground jail cell. Some 30,000 persons died. Rebuilding has been limited, and many ruins remain. The town is now the centre of a sugar-producing area and has a geological laboratory and a volcanological museum. Pop. (1982) 5,438.

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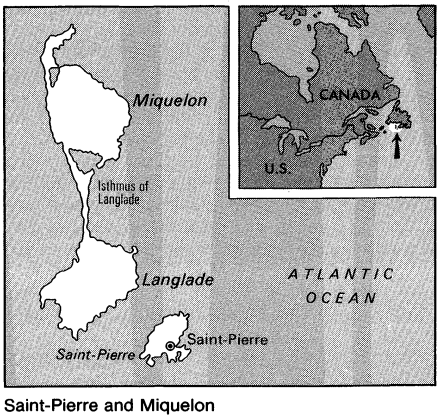
Saint-Pierre, Charles-Irénée Castel, abbé de, original name CHARLES-IRÉNÉE CASTEL (b. Feb. 13, 1658, Saint-Pierre-Église, Fr.—d. April 29, 1743, Paris), influential French publicist and reformist, one of the first modern European writers to propose an international organization for the purpose of maintaining peace.

In 1693 Saint-Pierre gained a footing at court as almoner to the duchesse d'Orléans, who presented him to the abbacy of Tiron. He entered the Académie Française in 1695. From 1712 to 1714 he acted as secretary to Melchior de Polignac, the French plenipotentiary at the Congress of Utrecht, which ended the wars of Louis XIV. Because of the political offense given by his *Discours sur la polysynodie,* in which, among other things, he argued that Louis XIV should not be named "the Great," Saint-Pierre was dismissed from the Académie Française.

Many of the reforms Saint-Pierre preached had a utopian character. His works were almost entirely occupied with an acute criticism of politics, law, and social institutions and proposals for administrative, political, and fiscal reforms. His chief work, *Le Projet de paix perpétuelle* (1713), was translated into English as early as 1714, and as a scheme for securing universal peace exercised influence up to the 20th century. Invoking the "great design" of Henry IV, he proposed a European peace based on the Peace of Utrecht and assured by a European confederation that would name a permanent arbitration council.

Saint-Pierre and Miquelon, archipelago about 15 mi (25 km) off the southern coast of the island of Newfoundland, Canada, a *collectivité* of France since 1985. The area of the main islands is 93 sq mi (242 sq km), 83 sq mi of which are in the Miquelons (Miquelon and Langlade, sometimes known as Great and Little Miquelon, connected by the slim, sandy Isthmus of Langlade); but Saint-Pierre, only 10 sq mi in area, has a large majority of the population and is the administrative and commercial centre. The total population in 1985 was estimated at 6,000.

The island of Miquelon has a rocky cape, about 1 mi wide, that extends to the northeast for about 4 mi. The Plain of Miquelon, to the south of the cape, is an area of peat bogs and marshes with many small lakes; the southern part of the island is characterized by rugged, barren hills (the Mornes) that rise to Morne de la Grande Montagne (787 ft [240 m]), the highest point on the archipelago.



Saint-Pierre and Miquelon

The island of Langlade is an ancient peneplain drained by numerous short rivers, including the Belle Rivière, the largest, which flows to the northwest. The coast of Langlade is lined with cliffs, except to the north, where it is joined to Miquelon by the Isthmus of Langlade. Saint-Pierre, located to the southwest of Langlade across a channel (La Baie) about 3 mi wide, comprises a region of rugged hills to the northwest and a rocky lowland to the southeast; both areas of the island have peat bogs and small lakes and ponds. Saint-Pierre's coast is varied, with cliffs to the north and irregular capes and points to the south. The archipelago includes a number of rocky islets; the only one that is inhabited is Ile aux Marins (123 ac [50 ha]) off the eastern coast of Saint-Pierre.

Despite a mild, humid climate, the archipelago is stark in appearance, the forest cover of the hills, except in parts of Langlade, having been removed for fuel long ago. Temperatures range from 14° F (−10° C) in the winter to 68° F (20° C) in the summer; average annual rainfall is about 59 in. (1,500 mm). Seabirds are the most common fauna.

The archipelago was first settled by immigrant seafarers from western France (mainly Basques, Normans, and Bretons) early in the 17th century. The Basques live mostly on Saint-Pierre and the Normans on the Ile aux Marins. Almost 90 percent of the total population lives on Saint-Pierre. The inhabitants speak French and adhere to French customs and traditions; the majority of the population is Roman Catholic. The total population, which was 6,500 in 1902, has not increased in the 20th century.

The importance attached to this last foothold in North America has led France to subsidize the islands, since the meagre local resources cannot support the population; about 70 percent of the islands' supplies are imported from Canada or from France via Nova Scotia. Cod fishing is still virtually the only occupation; frozen and dried fish, as well as fish flour, are the main exports. Other rather minor economic activities include fox and mink farming and, with improved transportation, especially in Newfoundland, tourism. Potatoes, cabbages, carrots, and beets are grown in vegetable gardens. Some dairy cattle, pigs, sheep, and goats are raised. Foodstuffs and petroleum products are the main imports.

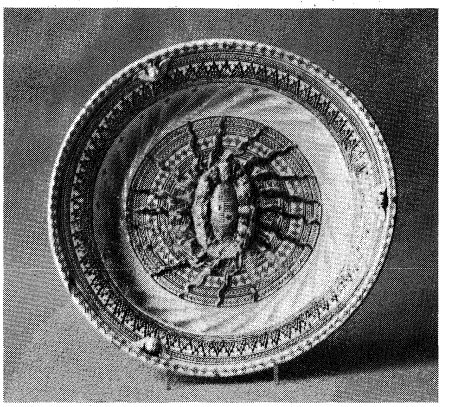
Supply ships from France and the Canadian mainland serve the archipelago; regular ferry services and air services connect it with Halifax and Sydney in Nova Scotia. There are telegraph and telephone connections with Europe and North America.

The islands are presided over by a French-appointed governor, who is assisted by a privy council and an elected general council. The islands are policed by gendarmes, regularly rotated from France. The inhabitants possess French citizenship and suffrage. Primary education is free and mostly parochial. Saint-Pierre, the territorial capital, is the seat of the law courts and the apostolic prefecture. There is a small hospital at Saint-Pierre.

The first explorer to visit the archipelago was a Portuguese, José Alvarez Faguendez, who landed there in 1520. The first permanent French fishing settlement was established in 1604. The islands were subsequently exchanged between the French and British several times until restored permanently to France in 1816 under the Treaty of Paris (1814). The islands became a French overseas territory in 1946 and then, in 1976, an overseas *département,* on a presumed par with the *départements* of metropolitan France. In May 1985, the islands were given a new status with a new name, *collectivité,* because the former departmental arrangement conflicted with the tariff structure of the European Economic Community, to which France belonged.

Saint-Pierre-Port (Channel Islands): *see* Saint Peter Port.

Saint-Porchaire faience, also called HENRI DEUX WARE, or FAÏENCE D'OIRON, lead-glazed earthenware (inaccurately called faience, or tin-glazed ware) made in the second quarter of the 16th century at Saint-Porchaire in the *département* of Deux-Sèvres, Fr. Its uniqueness


Saint-Porchaire lead-glazed earthenware dish, *c.* 1540; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London; photograph, EB Inc.

consisted in its method of decoration, which took the form of impressions stamped in the whitish soft clay with bookbinders' stamps and filled in with clays of contrasting colour. Among the stamps used were those of Henry II of France (hence the name Henri Deux ware), though the earthenware was also made in the reign of his predecessor, Francis I. Ornament consisted of abstract patterns under a yellowish lead glaze. Surviving examples are very rare.

Saint-Quentin, city, Aisne *département,* Picardie region, northeastern France, situated on the slopes of a hill on the right bank of the Somme River at its junction with the Canal de Saint-Quentin.

The Gothic collegiate church of Saint-Quentin (13th to 15th centuries; restored after World War I) has a fine 13th-century nave built over the tomb of Gaius Quentinius (St. Quentin), a 3rd-century martyr. The Antoine Lécuyer Museum houses a good collection of pastels by the 18th-century artist Maurice-Quentin de La Tour, who was born in the town. The entomological museum has one of the richest collections of its kind in Europe.

A wool centre since the Middle Ages, Saint-Quentin now also produces artificial textiles. Other industries include the manufacturing of electrical and mechanical machinery. The Saint-Quentin Canal, largely supplanted by the Canal du Nord (opened in 1965), is still used for transporting coal, industrial products, and grain to the Paris region.

An important medieval pilgrimage town, Saint-Quentin was besieged and captured in 1557 by the Spanish and in 1871 by the Germans. It was almost completely destroyed in World War I. Pop. (1982) 63,010.

Saint-Quentin, Battle of (1918): *see* Somme, Second Battle of the.

Saint-Quentin-en-Yvelines, new town (French *ville nouvelle*), located in the *département* of Yvelines and situated approximately 15 mi (25 km) southwest of Paris. Saint-Quentin-en-Yvelines was established in 1972 and is one of several new towns de-

veloped outside Paris since 1965. The new town is linked to the capital by highway and railway. A lake has been developed outside Saint-Quentin-en-Yvelines for recreation. Pop. (1975) 62,016.

Saint-Saëns, (Charles-) Camille (b. Oct. 9, 1835, Paris, Fr.—d. Dec. 16, 1921, Algiers [Algeria]), composer chiefly remembered for his symphonic poems—the first of that genre to be written by a Frenchman—and for his



Saint-Saëns

By courtesy of the Musee de Dieppe, France; photograph, Bernard Delacroix

opera *Samson et Dalila.* Saint-Saëns was notable for his pioneering efforts on behalf of French music, and he was also a gifted pianist and organist, as well as a writer of criticism, poetry, essays, and plays. Of his concerti and symphonies, in which he adapted the virtuosity of Franz Liszt's style to French traditions of harmony and form, his *Third Symphony* is most often performed.

A child prodigy on the piano, Saint-Saëns gave his first recital in 1846. He studied organ and composition at the Paris Conservatory, and in 1855 his *First Symphony* was performed. He became organist at the famed Church of the Madeleine in Paris in 1857, an association that lasted for 20 years. Liszt, whom he met about this time and with whom he formed an enduring friendship, described him as the finest organist in the world. From 1861 to 1865 he was professor of piano at the Niedermeyer School, where his pupils included Gabriel Fauré and André Messager.

In 1871, after the Franco-Prussian War, he helped found the National Society of Music, which promoted performances of the most significant French orchestral works of the succeeding generation. In the same year, he produced his first symphonic poem, *Le Rouet d'Omphale* (*Omphale's Spinning Wheel*), which, with *Danse Macabre,* is the most frequently performed of his four such works. His opera *Samson et Dalila,* rejected in Paris because of the prejudice against portraying biblical characters on the stage, was given in German at Weimar in 1877, on the recommendation of Liszt. It was finally staged in Paris in 1890 at the Théâtre Eden and later became his most popular opera.

In 1878 Saint-Saëns lost both of his sons, and three years later he separated from his wife. Over the following years, he undertook extensive tours throughout Europe, the United States, South America, the Middle East, and East Asia, performing his five piano concerti and other keyboard works and conducting his symphonic compositions. As a pianist he was admired by Richard Wagner for his brilliant technique and was the subject of a study by Marcel Proust. From about 1880 until the end of his life, his immense production covered all fields of dramatic and instrumental music. His *Third Symphony* (1886), dedicated to the memory of Liszt, made skilled use of the organ and two pianos. In the same year, he wrote *Carnaval des Animaux* (*Carnival of Animals*) for small orchestra, a humorous fantasy not performed during his lifetime that has since won considerable popularity as a work for young people's concerts. Among the best of his later works are the *Fifth Piano Concerto* (1895) and the *Second Cello Concerto* (1902).

Though he lived through the period of Wagner's influence, Saint-Saëns remained unaffected by it and adhered to the classical models, upholding a conservative ideal of French music that emphasized polished craftsmanship and a sense of form. In his essays and memoirs he described the contemporary musical scene in a shrewd and often ironic manner.

Saint-Simon, Henri de, in full CLAUDE-HENRI DE ROUVROY, COMTE (count) DE SAINT-SIMON (b. Oct. 17, 1760, Paris, Fr.—d. May 19, 1825, Paris), French social theorist and one of the chief founders of Christian socialism. In his major work, *Nouveau Christianisme* (1825), he proclaimed a brotherhood of man that must accompany the scientific organization of industry and society.

Life. Saint-Simon was born of an impoverished aristocratic family. His grandfather's cousin had been the Duke de Saint-Simon, famous for his memoirs of the court of Louis XIV. Henri was fond of claiming descent from Charlemagne. After an irregular education by private tutors, he entered military service at 17. He was in the regiments sent by France to aid the American colonies in their war of independence against England and served as a captain of artillery at Yorktown in 1781.

During the French Revolution he remained in France, where he bought up newly nationalized land with funds advanced by a friend. He was imprisoned in the Palais de Luxembourg during the Reign of Terror and emerged to find himself enormously rich because of the depreciation of the Revolutionary currency. He proceeded to live a life of splendour and license, entertaining prominent people from all walks of life at his glittering salons. Within several years he had brought himself close to bankruptcy. He turned to the study of science, attending courses at the École Polytechnique and entertaining distinguished scientists.

In his first published work, *Lettres d'un habitant de Genève à ses contemporains* (1803; "Letters of an Inhabitant of Geneva to His Contemporaries"), Saint-Simon proposed that scientists take the place of priests in the social order. He argued that the property owners who held political power could hope to maintain themselves against the propertyless only by subsidizing the advance of knowledge.

By 1808 Saint-Simon was impoverished, and the last 17 years of his life were lived mainly on the generosity of friends. Among his many later publications were *De la réorganisation de la société européenne* (1814; "On the Reorganization of European Society") and *L'industrie* (1816–18, in collaboration with Auguste Comte; "Industry"). In 1823, in a fit of despondency, Saint-Simon attempted to kill himself with a pistol but succeeded only in putting out one eye.



Henri de Saint-Simon, lithograph by L. Deymaru, 19th century

BBC Hulton Picture Library

Throughout his life Saint-Simon devoted himself to a long series of projects and publications through which he sought to win support for his social ideas. As a thinker, Saint-Simon was deficient in system, clearness, and coherence, but his influence on modern thought, especially in the social sciences, is undeniable. Apart from the details of his socialist teachings, his main ideas are simple and represented a reaction against the bloodletting of the French Revolution and the militarism of Napoleon. Saint-Simon correctly foresaw the industrialization of the world, and he believed that science and technology would solve most of humanity's problems. Accordingly, in opposition to feudalism and militarism, he advocated an arrangement whereby businessmen and other industrial leaders would control society. The spiritual direction of society would be in the hands of scientists and engineers, who would thus take the place occupied by the Roman Catholic church in the European Middle Ages. What Saint-Simon desired, in other words, was an industrialized state directed by modern science, and one in which society would be organized for productive labour by the most capable men. The aim of society would be to produce things useful to life. Saint-Simon also proposed that the states of Europe form an association to suppress war. These ideas had a profound influence on the philosopher Auguste Comte, who worked with Saint-Simon until the two men quarreled.

Although the contrast between the labouring and the propertied classes in society is not emphasized by Saint-Simon, the cause of the poor is discussed, and in his best-known work, *Nouveau Christianisme* (1825; "The New Christianity"), it takes the form of a religion. It was this development of Saint-Simon's teaching that occasioned his final rupture with Comte. Before the publication of *Nouveau Christianisme,* Saint-Simon had not concerned himself with theology, but in this work, beginning with a belief in God, he tries to resolve Christianity into its essential elements, and he finally propounds this precept: that religion "should guide the community toward the great aim of improving as quickly as possible the conditions of the poorest class." This became the watchword of the entire school of Saint-Simon.

His movement and its influence. Saint-Simon died in 1825, and, in the subsequent years, his disciples carried his message to the world and made him famous. By 1826 a movement supporting his ideas had begun to grow, and by the end of 1828 the Saint-Simonians were holding meetings in Paris and in many provincial towns. In July 1830 revolution brought new opportunities to the Saint-Simonians in France. They issued a proclamation demanding the ownership of goods in common, the abolition of the right of inheritance, and the enfranchisement of women. The sect included some of the ablest and most promising young men of France. In the following years, however, the leaders of the movement quarreled among themselves, and as a result the movement fragmented and broke up, its leaders turning to practical affairs.

Despite this, the ideas of the Saint-Simonians had a pervasive influence on the intellectual life of 19th-century Europe. Thomas Carlyle in England was among those influenced by the ideas of Saint-Simon or his followers. Friedrich Engels found in Saint-Simon "the breadth of view of a genius," containing in embryo most of the ideas of the later socialists. Saint-Simon's proposals of social and economic planning were indeed ahead of his time, and succeeding Marxists, socialists, and capitalist reformers alike were indebted to his ideas in one way or another. Felix Markham has said that Saint-Simon's ideas have a peculiar relevance to the 20th century, when socialist ideologies took the place of traditional religion in many countries.

BIBLIOGRAPHY. The standard and most complete edition of all his works is *Oeuvres de Saint-Simon et d'Enfantin,* 47 vol. (1865–78). Useful selections are *Textes choisis,* ed. by Jean Dautry (1951); and, in English, *Social Organization, the Science of Man and Other Writings,* ed. by Felix Markham (1964), which contains nearly all of *New Christianity.* Biographical and critical works include A.J. Booth, *Saint-Simon and Saint-Simonism* (1971); E.M. Butler, *The Saint-Simonian Religion in Germany* (1926); M.M. Dondo, *The French Faust: Henri de Saint-Simon* (1955); Maxime Leroy, *La Vie véritable du Comte Henri de Saint-Simon (1760–1825)* (1925); F.E. Manuel, *The New World of Henri de Saint-Simon* (1956) and *The Prophets of Paris* (1962). See also the relevant chapters in D.G. Charlton, *Secular Religions in France, 1815–1870* (1963); and Alexander Gray, *The Socialist Tradition,* rev. ed. (1963).

Saint-Simon, Louis de Rouvroy, duc de (duke of) (b. Jan. 15, 1675, Paris—d. March 2, 1755, Paris), French soldier and writer, best known as one of the great memoirists of France. His *Mémoires* are an important historic document of his time.

His father, Claude de Rouvroy (1607–93), was raised to the nobility by Louis XIII in 1635. The young Saint-Simon began his career with honourable military service (1691–1702); during this period he began a fragmentary diary. He fell out of royal favour, however, when he publicly opposed the policy of Louis XIV that reduced the power of the nobility. Saint-Simon was briefly connected with Louis, duc de Bourgogne, who was dauphin from



Duc de Saint-Simon, engraving by Louis-François Mariage after a portrait by Van Loo
By courtesy of the Bibliotheque Nationale, Paris

1711 until his death in 1712. Saint-Simon then turned to Philippe II, duc d'Orléans, who became regent for Louis XV in 1715. The Regent appointed Saint-Simon to his council of regency (1715–18) and sent him on a diplomatic mission to Spain in 1721. Upon the Regent's death in 1723, Saint-Simon retired from the court.

From 1729 to 1738 Saint-Simon annotated the *Journal* of Philippe de Courcillon, marquis de Dangeau, a work that provided a framework for his own memoirs, begun about 10 years later. Saint-Simon produced a composite narrative of court life based upon his own memory and papers, oral and written testimony from his fellow courtiers, and other sources. Saint-Simon's life at court limited his perspective, however, and consequently his memoirs overemphasized personalities and petty intrigue. Nonetheless, he presents an unforgettable picture of the last years of Louis XIV and the regency period.

The definitive edition of the *Mémoires* was produced in 41 volumes of text and 2 volumes of tables (1879–1928). In the Bibliothèque de la Pléiade is a seven-volume edition (1947–61). A translation of selections edited by W. H. Lewis is *Memoirs of the Duc de Saint-Simon* (1964).

Saint-Sorlin, Henri I de Savoie, marquis de: *see* Nemours, Henri I de Savoie, duc de.

Saint-Sorlin, Jacques de Savoie, marquis de: *see* Nemours, Jacques de Savoie, duc de.

Saint-Sorlin, Jean Desmarets de: *see* Desmarets de Saint-Sorlin, Jean.

Saint Stephen, town, Charlotte County, southwestern New Brunswick, Canada, on the

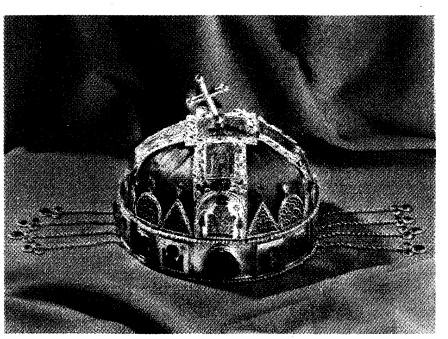


St. Stephen, N.B., on the St. Croix River
Malak, Ottawa

St. Croix River at the head of navigation, 71 miles (114 km) west of Saint John. It is linked by the international Ferry Point Bridge with Calais, Maine, to which it supplies fresh water from a well at Maxwell's Crossing. The two communities have long cooperated in matters of fire protection, public utilities, and observance of national holidays. The Duncan McColl United Church, the town's chief landmark, is named for a Methodist minister who is credited with keeping peace between the two communities during the War of 1812. The principal settlement (1783) was by United Empire Loyalists. The town of Saint Stephen (earlier called Scoodic, Morristown, and Dover Hill) took its name from Saint Stephen Parish, which was established in 1786 and supposedly named for Stephen Pendleton, a surveyor, but facetiously changed to conform with neighbouring parishes that were named after saints. In 1973 Milltown (inc. 1878, which once had 21 lumber mills) amalgamated with Saint Stephen (inc. 1871) to form a single town. Once an important builder of wooden ships, the community now has a lumber and mixed-farming economy. Pop. (1981) 5,120.

Saint Stephen's Cathedral (Vienna): *see* Stephansdom.

Saint Stephen's Crown, greatly venerated crown of Hungary, the symbol of Hungarian nationhood, without which no sovereign was truly accepted by the Hungarian people. It is made from an 11th-century jeweled circlet of Byzantine style, augmented early in the 12th century by the addition of arches and an upper rim composed of alternate pointed



Saint Stephen's Crown
Interfoto MTI

and round-topped plaques of enameled gold. Small pendants hang on short chains on both sides and at the back. The cross on the top is crooked, because the screw hole in the knob it stands on was set at an angle, suggesting that originally it was not meant to occupy the top of the crown but to go on a sloping surface, possibly the curve of the foremost arch.

The crown was given to a U.S. Army unit by a Hungarian honour guard to keep it from being seized by advancing Soviet troops after World War II. It remained in U.S. guardianship at Fort Knox until it was returned in 1978.

Saint Swithin's Day (July 15), one of the several days from which, in folklore, the weather for a subsequent period is dictated. In popular belief, if it rains on St. Swithin's Day, it will rain for 40 days, but if it is fair, 40 days of fair weather will follow. St. Swithin (b. *c.* 800 near Winchester, Hampshire—d. July 2, 862) was bishop of Winchester from 852 to 862. At his request he was buried in the churchyard, where rain and the steps of passersby might fall on his grave. According to legend, after his body was moved inside the cathedral on July 15, 971, a great storm ensued.

Weather frequently changes around midsummer, and thus the tradition that this day influences the weather may stem from ancient pagan belief. On the Continent similar beliefs are attached to other saints (*e.g.,* St. Médard, June 8, France).

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Saint Thomas, city, seat of Elgin County, southeastern Ontario, Canada, on Kettle Creek, just north of Lake Erie. Founded in 1817 as Sterling, it was renamed after Colonel Thomas Talbot, who made it the capital of the extensive settlement that he founded in 1803. A major railway division point and terminal centre, midway between Detroit and Buffalo and south of London, Ont., the city is also an important industrial centre. Manufactures include automotive parts, power tools, construction machinery, pet supplies, bearings, and pipes. St. Thomas is the site of Alma College (1878), a junior college for women. Pop. (1981) 28,165.

Saint Thomas, chief island of the U.S. Virgin Islands in the eastern Caribbean, situated 40 miles (64 km) east of Puerto Rico. With an area of 32 square miles (83 square km), the island rises to a maximum of 1,550 feet (474 m) above sea level. Temperatures vary between 70° and 90° F (21° and 32° C) with an average of 78° F (26° C). The climate is semiarid, and most of the annual average of 45 inches (1,150 mm) of rainfall is used by vegetation or evaporates. The island is volcanic, and a chain of rugged hills with little vegetation runs east–west. The capital is Charlotte Amalie (*q.v.*), situated halfway along the southern coast on hill slopes. Its well-sheltered harbour is in the crater of an extinct volcano.

Sighted in 1493 by Christopher Columbus, St. Thomas was later colonized, first by the Dutch (1657) and then by the Danish (1666). In 1672 it passed into the hands of the newly chartered Danish West India Company and subsequently, in 1685, of the mainly Dutch Brandenburg Company. After 1673, when slavery was introduced, the island became one of the chief sugar producers of the Caribbean and was extremely prosperous. In 1754/55 St. Thomas was acquired by the King of Denmark, and Charlotte Amalie was declared a free port open to international shipping. Its neutrality during the Napoleonic Wars made it a centre of the distributing trade and the largest slaving port in the Western Hemisphere. In 1801 and again in 1807–15 the British held St. Thomas, but it was afterward restored to Denmark. Falling sugar prices after 1820, together with the abolition of slavery in 1848, led to a decrease in sugarcane profits

and a falloff of trade, until the colony was operated at a loss. Though a possible cession had been suggested as early as 1867, the United States bought St. Thomas and two other islands of the Danish West Indies as a naval base for $25,000,000 in 1917.

St. Thomas is a municipality with a legislating municipal council under the governor of the U.S. Virgin Islands. The inhabitants are 80 percent black, though with Spanish, Portuguese, Scottish, Danish, English, French, and Puerto Rican admixtures. English is the main language, though there are French- and Spanish-speaking pockets.

Because there are no wells, drinking water is shipped from Puerto Rico by barge, supplemented by catchment of rain and desalination of seawater. These sources do not meet demand, and public water supply is a critical deterrent to development. The chief industry is tourism, which gives the island one of highest per capita incomes in the Caribbean. The distilling of rum and its by-product, bay rum, and the assembly of watches provide the most important sources of export income. A number of citizens of the British Virgin Islands go to work in the U.S. islands. Pop. (1986 est.) 52,260.

Saint Thomas (town, U.S. Virgin Islands): *see* Charlotte Amalie.

Saint-Tropez, Pierre André de Suffren de: *see* Suffren de Saint-Tropez, Pierre André de.

Saint Valentine's Day Massacre (Feb. 14, 1929), mass murder of a group of unarmed bootlegging gang members in Chicago. The bloody incident dramatized the intense rivalry for control of the illegal liquor traffic during the Prohibition Era in the United States. Disguising themselves as policemen, members of the Al Capone gang entered a garage at 2122 North Clark Street run by members of the George "Bugs" Moran gang, lined their opponents up against a wall, and shot them in cold blood. The victims included gang members Adam Heyer, Frank Gusenberg, Pete Gusenberg, John May, Al Weinshank, and James Clark, as well as a visitor, Dr. Reinhardt H. Schwimmer.

The St. Valentine's Day Massacre and other gangland killings, frequently portrayed vividly by the mass media throughout the world, came to symbolize the violence of the Prohibition Era in Chicago.

Saint Vincent, Cape, Portuguese CABO DE SÃO VICENTE, cape, southwesternmost Portugal, forming with Sagres Point a promontory on the Atlantic Ocean. To the Greeks and Romans it was known, from the presence of a shrine there, as the Sacred Promontory. Pastoralism and fishing are the economic mainstays of the region, which is somewhat desolate, and Sagres is the main settlement. Near Sagres was the town of Vila do Infante, where in about 1420 Henry the Navigator established a naval observatory and school for navigators.



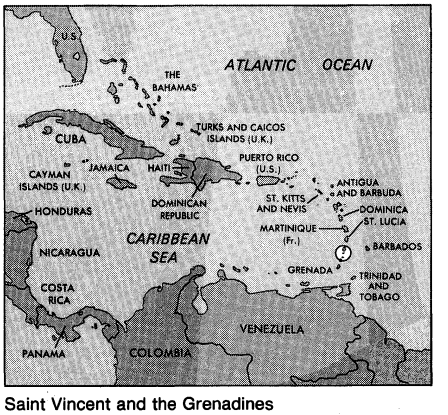
Cape St. Vincent, Portugal
J. Allan Cash—Ostman Agency

Several naval battles have been fought off the cape, notably one in 1797 that resulted in a victory for an English fleet under Admiral John Jervis (later Earl of St. Vincent), with Commodore (later Admiral) Horatio Nelson, over a numerically superior Spanish fleet.

Saint Vincent, Gulf, triangular inlet of the Indian Ocean, on the southeast coast of South Australia, between Yorke Peninsula to the west and the mainland. About 90 mi (145 km) long and 45 miles (73 km) wide, it is linked with the ocean by Investigator Strait to the southwest, passing north of Kangaroo Island and by Backstairs Passage to the southeast. The Gawler, Torrens, and Onkaparinga rivers empty into the gulf near Adelaide. The shores are mostly low and sandy, and high salinity and hot solar evaporation have favoured an important salt industry based at Dry Creek near Port Adelaide, on the east coast. The gulf was investigated in 1802 by the English explorer Matthew Flinders and was named after Admiral John Jervis, Earl of St. Vincent. Port Adelaide, South Australia's leading port, is on the eastern side of the gulf.

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Saint Vincent and the Grenadines, island nation in the eastern Caribbean Sea within the Lesser Antilles. The island of Saint Vincent lies about 21 miles (34 km) southwest of Saint Lucia and about 100 miles (160 km) west of Barbados. The rest of the nation is made up of the northern Grenadine Islands, which stretch southward from Saint Vincent toward Grenada. Saint Vincent is 18 miles (29 km) long and has a maximum width of 11 miles (18 km); the total area of the nation is 150 square miles (388 square km), of which Saint Vincent constitutes 134 square miles (347 square km). The capital and chief port, on the southwestern coast, is Kingstown. The nation's main islands in the Grenadines are Bequia, Balliceau, Canouan, Mayreau, Mustique, Isle D'Quatre, Petit Saint Vincent, and Union Island. The population in 1990 was estimated to be 116,000.

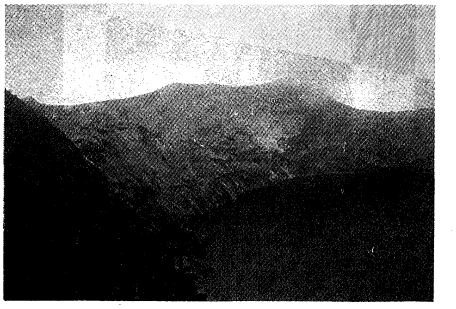


Saint Vincent and the Grenadines

For information about regional aspects of Saint Vincent and the Grenadines, *see* MACROPAEDIA: West Indies.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. Saint Vincent, like its neighbours, is composed of volcanic rock. The most prominent landscape feature is the thickly wooded volcanic mountains that run north and south and that are cut by many swift, short streams. The dense forests have prevented road building across the mountains. The highest peak is Mount Soufrière (4,048 feet [1,234 m]) in the north, an active volcano that has had violent eruptions in 1812, 1902, and 1979, causing severe damage to the island. Other noteworthy peaks on the island include Grand Bonhomme, Richmond, and Mount St. Andrew. Common physical characteristics of the Grenadines include their white-sand beaches and coral reefs.



Soufrière, volcano on Saint Vincent Island
Bradley Smith, New York

Saint Vincent and the Grenadines lies in the path of the northeasterly trade winds, and the nation has a tropical climate. Temperatures at Kingstown range from a minimum 64° F (18° C) to a maximum 90° F (32° C), but the average temperature throughout the year is about 80° F (27° C). Rainfall is heaviest in the mountains, which receive about 150 inches (3,810 mm) yearly. More moderate amounts fall on the coastal area, which annually receives 60 to 80 inches (1,520 to 2,030 mm), the heavier amount falling on the eastern (windward) side of the island. Hurricanes sometimes strike the island, but usually they pass to the north. The deep, light, and porous soil of Saint Vincent enables cotton- and arrowroot-growing that would otherwise be restricted to drier islands. Vegetation is varied, and there are a number of plants of striking brilliance, including hibiscus and poinsettia. Palm and fruit trees also grow on the islands. Cultivated land spreads out below the forest zone, and terracing has taken place in some areas as a guard against soil erosion.

The people. Nearly three-fourths of the people of Saint Vincent and the Grenadines are descended from black African slaves who were brought in to work the sugar plantations. About one-fifth of the people are mulattoes, and there are small numbers of East Asians and Europeans. Few of the Carib Indians, the original inhabitants of the islands, are left; nor are there many Black Caribs, a group that evolved from African slaves shipwrecked in 1675, who eventually mixed with the Caribs on Saint Vincent. Church membership is greatest among the Protestants, chiefly the Anglican and Methodist denominations; there are also a substantial number of Roman Catholics. The official language of the country is English, although a French patois is also used. Most of the people live along the coastal plain. The main population centres, on Saint Vincent, include Kingstown and Georgetown. The Grenadines are sparsely populated. Like most of its neighbouring island countries, Saint Vincent has a rather high rate of natural population increase; it is also one of the more crowded islands of the Lesser Antilles. Three-fourths of the nation's population is rural. More than one-third of the population is less than 15 years of age.

The economy. Agriculture continues to be the mainstay of the nation's economy, employing as much as 40 percent of the people. The gross national product (GNP) of Saint Vincent and the Grenadines, which is growing much more rapidly than the population, is still fairly low in comparison with other Caribbean nations. The real GNP per capita declined somewhat in 1970–80 owing largely to two

natural disasters, the eruption of Soufrière (1979) and Hurricane Allen (1980); but by the late 1980s the GNP per capita had begun to increase again.

Small peasant farms occupy about half of the agricultural land, and the rest is devoted to large estates. The chief crop and most valuable export is bananas. Another important crop, and also an export, is arrowroot (originally brought to the island by Caribs), of which Saint Vincent is a major producer. Other important agricultural items include root crops, sweet potatoes, flour, and plantains. There is a small fishing industry that produces local food. Forests, though they are of little commercial value, are protected for water conservation. Manufacturing is of minor economic importance, the major industrial activity being confined to the processing of agricultural products.

Tourism has not contributed as greatly to the economy as it has on some of the neighbouring islands, but it has been encouraged and is growing both on Saint Vincent and in the Grenadines, the latter particularly favoured by yachtsmen and sports fishermen. The major imports are basic and miscellaneous manufactures, foods and beverages, machinery and transport equipment, chemicals, and fuels. The main trading partners are Trinidad and Tobago, the United Kingdom, and the United States.

Transportation on the island of Saint Vincent is adequate. About three-fifths the country's road mileage is paved. Kingstown, with a deepwater harbour, is the major port, and there is a small international airport at Arnos Vale, 2 miles (3 km) southeast of Kingstown. There are also landing strips for small planes in the Grenadines.

Government and social conditions. Saint Vincent and the Grenadines is a constitutional monarchy with a parliamentary type of government. A member of the Commonwealth, the country's head of state is the British monarch. The crown is represented by a governor-general who is appointed on the advice of Saint Vincent's prime minister. The unicameral legislature is the House of Assembly, which is composed of 15 members elected for five-year terms and six senators who are appointed by the governor-general. The prime minister, who is the leader of the majority party, is appointed by the governor-general to lead the government.

The high birth rate and rate of population growth complicate government programs designed to bring better living conditions to the islands. Government-provided health services have been improved through legislation, and the health of the people is generally good. A form of social security provides retirement, health, and death benefits. Primary education, although free, is not compulsory, and attendance is low. There are a few government-assisted secondary schools, but most are run by religious organizations. The nation has a teacher's college and a technical college. There is a radio station and a weekly newspaper, and automatic telephone service is available throughout the islands. The main library is located in Kingstown, with branches at various locations throughout Saint Vincent. A museum at the Kingstown library possesses an interesting collection of Carib artifacts. Cultural attractions include the Botanic Gardens in Kingstown, founded in 1765; of architectural interest is the Georgian-style St. George's Cathedral.

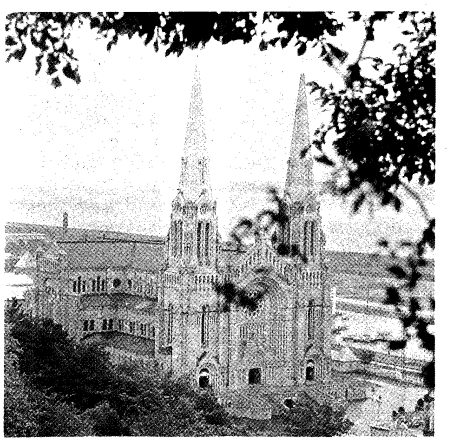
History. The Carib inhabitants of Saint Vincent were firmly entrenched in 1498, when Christopher Columbus, who may have given the island its name, became the first European to visit it. Various objects of Carib culture are to be found about Saint Vincent, including large engraved stones that may have served as altars. It was not until the 18th century that Europeans were able to settle in Saint Vincent, and then only by making treaties with the Caribs. The French vied with the British for control of the island until 1763, when, by the Treaty of Paris, it was ceded to England. In 1773 the Caribs, by treaty, recognized British sovereignty and permitted the island to be divided between themselves and the British. The Caribs grew resentful, however, and, aided by the French, revolted in 1795. But the British brought in reinforcements, and the Caribs were finally subdued in 1796. Most of the Caribs were deported to islands in the Gulf of Honduras, and most of the remaining Caribs were killed by eruptions of Soufrière in 1812 and 1902.

Cotton was the main crop grown until the British switched to sugarcane, bringing in African slaves to work the plantations. Emancipation in 1834 was a serious blow to the island's economy because the former slaves often refused to work for the low wages offered them. Portuguese and East Indian labourers were introduced later in the century. In the second half of the 19th century the price of sugar fell, and a serious economic depression set in, lasting until the end of the 1800s. Islanders began growing other crops, such as sea island cotton, arrowroot, and, eventually, bananas, which became the dominant product. The British made Saint Vincent a part of its Windward Island colony in 1871. In 1956 colonial administration was ended, and Saint Vincent was part of the Federation of the West Indies from 1958 until the dissolution of the federation in 1962. In 1969 the island became a self-governing state in association with the United Kingdom, a status it maintained until it became an independent member of the Commonwealth in 1979.

Saint Vincent Island (Cape Verde): *see* São Vicente Island.

Saint Vitus' dance, one of the principal types of the neurological disease known as chorea (*q.v.*).

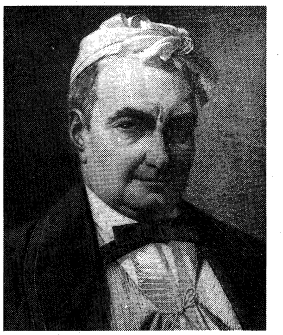
Sainte-Anne-de-Beaupré, village, Québec region, southern Quebec province, Canada, on the St. Lawrence River near the mouth of the Sainte-Anne. Settled about 1650, the village, about 20 miles (32 km) northeast of the city of Quebec, has been a noted Roman Catholic pilgrimage centre since 1658,



The Basilica of Sainte-Anne-de-Beaupré, Que.
Tourism Canada; photograph, P. Gaudard

when its first chapel was built, according to tradition, by shipwrecked French sailors who reached land there. A miracle, the curing of a local resident's rheumatism, was reported in the same year. Numerous miraculous cures have been reported since, and the shrine has been visited by pilgrims from all over Canada and the United States. The present basilica was completed in 1963; constructed in the 12th-century Romanesque-Gothic style, it can accommodate 9,000 worshipers. Sainte-Anne-de-Beaupré is the headquarters of the French Redemptorists and the seat of their college. An attraction of the village is a huge cyclorama of Jerusalem depicting the day of the Crucifixion. Pop. (1986) 3,162.

Sainte-Beuve, Charles-Augustin (b. Dec. 23, 1804, Boulogne, Fr.—d. Oct. 13, 1869, Paris), French literary historian and critic, noted for applying historical frames of reference to contemporary writing. His studies of French literature from the Renaissance to the 19th century constitute a great compendium of detailed information.



Sainte-Beuve, oil painting by Barthelemy-Eugene Demarquay; in the Musée des Beaux-Arts et d'Archéologie, Boulogne-sur-Mer, Fr.
By courtesy of the Musee des Beaux-Arts et d'Archeologie, de Boulogne-sur-Mer; photograph, H. Devos

Early life and Romantic period. Sainte-Beuve was the posthumous only child of a tax collector. After a sheltered childhood, he completed his classical education in Paris and began to study medicine, which, however, he abandoned after a year. A talented but in no way brilliant youth, he continued his general education at his own pace, attending the University of Paris and extension institutions, and in 1825 was drawn into journalism by his former teacher, Paul Dubois, editor of a new liberal periodical, *Le Globe.* In its pages he wrote his first essays on the poetry of Victor Hugo and soon became a member of his literary circle of Romantic writers and poets. In his first book, *Tableau historique et critique de la poésie française et du théâtre français au XVI^e siècle* (1828; "Historical and Critical Description of French Poetry and Theatre in the Sixteenth Century"), he discovered, perhaps naturally, a Renaissance ancestry for Hugo and others of his new friends. A brief visit to England in 1828 strengthened his taste for the poetry of William Wordsworth and Samuel Taylor Coleridge, both of whom were then little known in continental Europe. His visit to England may also account for the appearance of elements of the style of William Cowper and George Crabbe in volumes of his own poetry, *Vie, poésies et pensées de Joseph Delorme* (1829; "The Life, Poetry, and Thought of Joseph Delorme") and *Les Consolations* (1830), which on their publication attracted some attention—not least because of their deliberate flatness and apparent uncouthness, much in contrast to the grander manner of Hugo and the poet Alfred de Vigny.

He had meanwhile developed a taste for social speculation and a concern for problems of religious experience. His social concerns first crystallized in a passing attachment to the group of reformers assembled around the doctrines of Count Claude-Henri de Saint-Simon. According to Saint-Simon's disciples, the feudal and military systems were to be replaced by one controlled by industrial managers, and scientists rather than the church were to become the spiritual directors of society. When this group in 1830 took over management

of *Le Globe,* Sainte-Beuve was entrusted with drafting two manifestos, or "professions of faith"; and, although he was soon to be repelled by the sentimental excesses and intemperance of its leaders, he retained for 30 years a lingering sympathy for its vision of a technocratic society founded on the brotherhood of man. Almost simultaneously, Sainte-Beuve came under the powerful spell of a religious reformer and polemist, Félicité Robert de Lamennais, to whom for a time he looked for religious guidance. Lamennais was then the spiritual adviser of the wife of Victor Hugo, with whom Sainte-Beuve in 1831 struck up a lasting but seemingly platonic relationship of great intensity. Many of the details of this shadowy affair are more or less accurately related in the critic's privately printed volume of lyrics, *Livre d'amour,* which was, however, not published in the lifetime of either of them.

In the 1830s, in his "portraits" of contemporaries, he developed a kind of critique, novel and much applauded at the time, of studying a well-known living writer in the round and entering into considerable research to understand the mental attitudes of his subject.

By 1832 Sainte-Beuve was writing regularly for leading Parisian literary periodicals but was much hampered by his dislike for the newly established regime of King Louis-Philippe, which had aroused his anger mainly by its brutal handling of the riots of 1832. He accordingly refused several educational posts that would have relieved his poverty, fearing that they might compromise his freedom of judgment.

In 1834 he tried his hand at novel writing and published *Volupté,* an intensely introspective and troubling study of frustration, guilt, religious striving, and "renunciation" of the flesh and the devil. Like so much that he wrote—poetry, criticism, fiction—*Volupté* represented a breach with the flamboyance of current taste and won the minority approval mainly of those friends—Lamennais, the novelist George Sand, and the poet and dramatist Alfred de Musset—who recognized its subtlety or approved of its literary transmutation of his feelings for Adèle Hugo.

While continuing to chronicle the intellectual "portraits" of his literary contemporaries—*Critiques et portraits littéraires* (1836–39); *Portraits contemporains* (1846)—friends or former friends, he became a member of the circle presided over by Mme Récamier, the famous hostess, and the writer and politician François-René de Chateaubriand. Sainte-Beuve celebrated the appearance of Chateaubriand's memoirs with enthusiasm, though a decade and a half later he was to write an extensive and far more detached study, *Chateaubriand et son groupe littéraire sous l'Empire.*

Break with Romanticism. A softening of Sainte-Beuve's attitude toward Louis-Philippe's regime coincided in 1836 with an invitation from François Guizot, then minister of education, to accept a one-year appointment as secretary of a government commission studying the nation's literary heritage. Guizot's suggestion at that time that Sainte-Beuve demonstrate his eminence as a scholar by producing a major work led to *Port-Royal,* his most famous piece of writing.

In 1837 this essentially Parisian critic accepted a year's visiting professorship at Lausanne to lecture on Port-Royal, the convent famous in the 17th century for advancing a highly controversial view of the doctrine of grace, loosely called Jansenism. For his lectures he produced the first version of the history of *Port-Royal,* which he published and revised over the next two decades. This monumental assemblage of scholarship, insights, and historical acumen—unique of its kind—reflects most of the varied intellectual adventures through which Sainte-Beuve had passed in the preceding 10 years.

Appointment as conservateur. On completing his year in Lausanne, Sainte-Beuve returned to Paris. Following his last major journey, to Naples and Rome, he was appointed in 1840 to a post in the French Institute's Mazarine Library, which he held until 1848. In addition to a regular gossip column that he undertook for anonymous publication by his friends in Lausanne, he continued regular essay writing. The first two volumes of *Port-Royal* had also been published when he was elected to the Académie Française (French Academy) in 1844. By then he had already broken his earlier close links with the Romantics and was highly critical of what now appeared to him as the undisciplined excesses of that movement.

After the overthrow in 1848 of Louis-Philippe, Sainte-Beuve was not impressed by what he saw of Revolutionary democracy. Unfairly accused in the republican press of accepting secret government funds for the repair of a chimney in his apartment, he resigned his library appointment in a fit of pique, considered emigrating to London, and finally settled for a year at Liège (Belgium) as visiting professor. Here he wrote his definitive—but unfinished—study of Chateaubriand and the birth of literary Romanticism and carried out research on medieval French literature.

Causeries du lundi. Returning to Paris again in 1849, he contracted with the review *Le Constitutionnel* to furnish a weekly essay; this was the start of the famous collection of studies that he named *Causeries du lundi* ("Monday Chats"), after the review's day of publication. With few interruptions he maintained a prodigious level of literary production and research until his death 20 years later; the *Lundis* fill 15 volumes in the definitive 3rd edition and are followed by a further 13 volumes of *Nouveaux lundis.*

In these essays he tried, first, to reformulate his concept of culture, a concept based on a strong sense of tradition, stability, and decorum. To him, the highest manifestation of French culture was the world of the salons of Mme du Deffand, in pre-Revolutionary France, or Mme Récamier in his own time; but he expanded his survey to suit the larger horizons of the 19th century, also giving some attention to the contribution of other European and Oriental cultures. Not surprisingly, he welcomed the rise of Napoleon III's more dictatorial and orderly regime. In due course, his sympathy was rewarded by appointment to the chair of Latin at the Collège de France, a well-paid but largely nominal post. In his own case it remained entirely nominal, since his first lectures were interrupted by demonstrations of radical students, and he resigned his duties and salary, retaining only the title. The intended lectures were published as a full-length study of Virgil.

In 1858 Sainte-Beuve received a temporary teaching appointment in literature at the École Normale Supérieure, where he drew upon his 1848 researches to deliver a course on medieval French literature; but otherwise his whole later career was based upon free-lance essay writing.

Critical essays during the Second Empire. Under the Second French Empire, which survived him by less than a year, many of Sainte-Beuve's earlier acquaintances, now dead or in retirement, were replaced by other writers: Gustave Flaubert, Ernest Renan, the Goncourt brothers, Prosper Mérimée, Ivan Turgenev, Alexandre Dumas, Matthew Arnold, and a large number of scholars, historians, and academicians. He frequented the salon of the Emperor's cousin, the princess Mathilde, somewhat of a literary centre itself, though less formal in style than had been the salon of Mme Récamier until 1848. At the restaurant Magny he relaxed from time to time with his literary friends. He regularly attended the theatre once a week. And he continued to see old friends from time to time—including Adèle Hugo, who occasionally visited him in Paris.

Nevertheless, the crushing task of researching, writing, correcting, and proofreading a 3,000-word essay for publication every Monday in effect largely prevented Sainte-Beuve from exploring in the same leisurely way as in his youth the many new trends being developed by young writers.

In religious matters, he retained (like his young friend and admirer Renan) a lively sensibility and curiosity but essayed no further commitment whatever. He was uninterested in the debates on evolution. Living a sheltered, almost monastic, bachelor existence, he paid little attention to the rise of industrialism or the economic controversies of the empire. On the other hand, his social conscience remained extremely acute. He welcomed the influence of earlier Saint-Simonian friends at the new court, and his sympathy for the underdog was reflected not only in his charitable activities but also in his support for popular education and self-help.

Politically, also, he retained a very decided independence even vis-à-vis his imperial patrons and protectors. Although in 1865 he was made a senator, he took little or no part in the formal proceedings of the upper legislative house except on one occasion. When, under heavy pressure from the church, the government banned the works of Ernest Renan from the public libraries as being subversive of good morals and religion, he prepared and attempted to deliver a withering denunciation of this violation of intellectual liberty. This brought down upon him the wrath of the princess Mathilde and the indignation of many officials and friends, but Sainte-Beuve was unrepentant. In fact, he transferred his weekly essay to an independent review.

Sainte-Beuve died in 1869 after unsuccessful bladder stone operations. For the last year of his life he had suffered considerable pain, borne courageously.

Reputation and influence. His writings were not only voluminous but also enormously influential in the world of French literature, and they continue to be consulted and used. For the study of French literature from the Renaissance to the mid-19th century, they constitute a vast and unequalled repository of information, much of it well indexed. A portion of his scholarly research has, with time, become old-fashioned, but within limits the precision of his documentation is almost always impeccable, even over details on which it has been challenged by literary opponents. This precision is due to a lifetime's habit of extreme care in documentation as well as to his fanatical respect for historical accuracy. In one of the commonplace books in which he recorded his thoughts as they came to him, he wrote:

> The *Good,* the *True,* and the *Beautiful* make a fine motto, and a specious one. It has been adopted by M. Cousin for his well-known book: but dare I say it, it is not my motto. If I had a motto it would be "*Truth* and *Truth* alone." And let the *Good* and the *Beautiful* look after themselves as best they may.

This attitude lies back of a somewhat unfavourable aura that surrounds the critic's reputation as a judge. From his earliest review articles on Hugo, Sainte-Beuve was never afraid to introduce specific reservations into his most enthusiastic eulogies, and it was this liberty that in his own eyes justified his claim to uncompromising independence but also earned him the reputation of being an unreliable, or even perfidious, critic of friends. His essay "Critical Genius" (1835) postulates a critical activity that is inquisitive, untrammelled, independent, and a contributory element in the fomation of public opinion and

private taste; and to this liberal conception he adhered throughout his working life.

(A.G.L.)

MAJOR WORKS. *Verse. Vie, poésies, et pensées de Joseph Delorme* (1829); *Les Consolations* (1830); *Pensées d'août* (1837); *Livre d'amour* (1904 [private printing, 1843]).

Novel. Volupté (1834).

Criticism. Tableau historique et critique de la poésie française et du théâtre français au XVI^e siècle (1828); *Port-Royal,* 3 vol. (1840–48); *Critiques et portraits littéraires* (1836–39); *Portraits de femmes* (1844); *Portraits contemporains* (1846); *Causeries du lundi,* 15 vol. (1851–62); *Étude sur Virgile* (1857); *Chateaubriand et son groupe littéraire sous l'Empire* (1861); *Nouveaux lundis,* 13 vol. (1863–70); *Premiers lundis,* 3 vol. (1874–75).

Translations. Not all of Sainte-Beuve's works are available in English, but some useful collections include *Causeries du lundi* (selected and ed. by G. Saintsbury, 1885; Eng. trans. with introduction and notes by E.J. Trechmann, 8 vol., 1909–11; 2 vol. also by Trechmann, 1933); *Essays by Sainte-Beuve,* ed. by A. Tilley (1918); and *Sainte-Beuve: Selected Essays,* ed. by F. Steegmuller and N. Guterman (1963).

BIBLIOGRAPHY. J. Bonnerot, *Bibliographie de l'oeuvre de Sainte-Beuve,* 3 vol. (1937–52), covers the huge range of textual and critical problems and also attempts to itemize what Sainte-Beuve actually read in his long career. The *Correspondance générale,* ed. by J. Bonnerot, 16 vol. to date (1934–70), is the most fully annotated and comprehensive collection of Sainte-Beuve's letters. A.G. Lehmann, *Sainte-Beuve: A Portrait of the Critic, 1804–1842* (1962), based on recent research, is a study of the critic in the world of ideas and letters of his time; A. Billy, *Sainte-Beuve: sa vie et son temps,* 2 vol. (1952–62), contains many anecdotes.

Sainte-Claire Deville, Henri-Étienne (b. March 11, 1818, St. Thomas, Danish Virgin Islands—d. July 1, 1881, Boulogne, Fr.), French chemical researcher who invented the first economical process for producing aluminum.

Sainte-Claire Deville was the son of a French diplomat. He received a degree in medicine in Paris in 1843 but was already attracted to chemistry. He established his own laboratory and published a paper on his turpentine researches, winning a doctorate in science. Appointed professor of chemistry and dean of science at the University of Besançon, he proved exceptionally capable of combining research with teaching and was soon appointed professor of chemistry at the École Normale Supérieure in Paris, where in the 1850s and 1860s he trained a number of students who became outstanding chemists.

As early as 1849 he made the important research contribution of synthesizing nitrogen pentoxide, which turned his attention to inorganic chemistry. Within a few years he worked out a process for obtaining pure aluminum from its compounds by treating them with sodium instead of the expensive potassium; the Deville process made aluminum a commercial metal for the first time. He also made important contributions to the study of the metallurgy of platinum and other minerals.

Sainte-Foy, city, Québec region, southern Quebec province, Canada. Although chiefly a residential suburb of Quebec city, Sainte-Foy has some zoned industrial development in Colbert and Jean Talon parks. Originally named after a village in France, the settlement was called Notre-Dame-de-Foy after a canonical parish was formed in 1698, but the shorter name prevailed. Sainte-Foy was the scene of a French victory over the British in 1760, a year after the fall of Quebec. The arrival of British naval forces, however, forced the withdrawal of the French to Montreal. The new 443-ac (179-ha) campus of Laval University (founded 1852 in Quebec city) occupies the city's eastern boundaries. Sainte-Foy is also the site of Marymount and Saint-Lawrence colleges and a provincial aquarium. Since 1950 there has been rapid industrial growth due to the city's central location on both national railways and several major highways and its proximity to Quebec's airport and the only regional bridge spanning the St. Lawrence River. Inc. city, 1955. Pop. (1951) 5,236; (1981) 68,883.

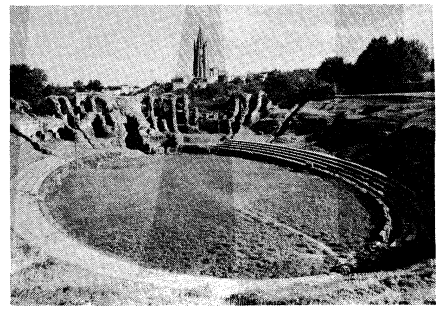
Sainte Genevieve, city, seat (1812) of Ste. Genevieve County, eastern Missouri, U.S., on the Mississippi River, opposite Kellogg, Ill. 65 mi (105 km) south of St. Louis. The first permanent white settlement in Missouri, it was founded by French Canadians in 1735 in what was then the Territory of Louisiana. The original settlement, called LeVieux (the Old) Village, was located in La Grand Champ (Big Field), but, following a flood in 1785, it was moved to its present site on higher ground. Once called Misère, the community's French origin is reflected in its Jour de Fete à Ste. Genevieve, a festival held each August, which includes a tour of historic French homes (notably Bolduc and Amoureaux houses), a parade, art shows, French market, a display of antiques, and the King's Ball. A museum contains a display of birds mounted by John James Audubon, the 19th-century U.S. ornithologist, who lived briefly in the city.

Ste. Genevieve is a trade centre for grain and livestock. Lime is quarried and processed, and light manufactures include wooden sashes, doors, and clothing. Inc. 1808. Pop. (1980) 4,481.

Sainte-Pelaye, Jean-Baptiste de La Curne de: *see* La Curne de Sainte-Pelaye, Jean-Baptiste de.

Sainte-Thérèse, city, Montréal region, southern Quebec province, Canada, on the Montreal-Laurentian Autoroute. The parish of Sainte-Thérèse, dating from 1789, and the community were named for Thérèse de Blainville, daughter of the seignior who made the first land grants for it about 1730. In the workshop attached to the Sainte-Thérèse Seminary (1825), Joseph Casavant made his first pipe organs and founded a piano industry (1834–48). The city's modern economy depends chiefly on the manufacture of auto parts, farm machinery, furniture, plastics, and plywood. Inc. village, 1849; town, 1916; city, 1959. Pop. (1981) 18,750.

Saintes, town, Charente-Maritime *département,* Poitou-Charentes region, western France, on the Charente River. Formerly the capital of Saintonge district, it was the administrative centre of the Charente Inférieure *département* (now Charente-Maritime) from 1791 until La Rochelle supplanted it in 1810. Its bishopric was suppressed during the French Revolution of the late 18th century. Saintes was a prosperous Gallic settlement before the Roman conquest, after which it became known as Mediolanum Santonum. The most noteworthy Roman remains are a ruined 1st-century amphitheatre and an arch from a bridge. Apart from the old Saint-Pierre cathedral, dating from the 15th century, the Romanesque church of Sainte-Marie and the adjoining 11th-century Abbaye-aux-Dames are among the noteworthy buildings in the town. Telephone equipment is manufactured. Pop. (1982) 23,580.



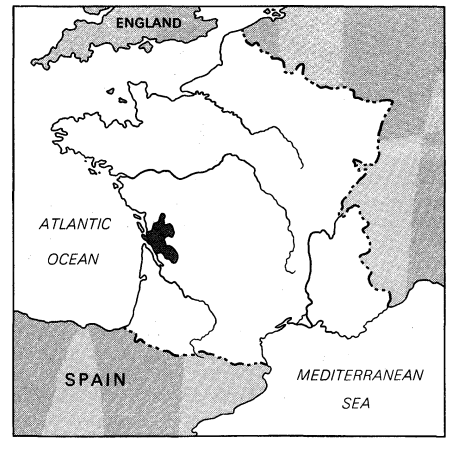
The Roman amphitheatre, Saintes, Fr.

By courtesy of the Commissariat General au Tourisme, France; photograph, Jean Feuillie

Saintes, Battle of the (April 12, 1782), in U.S. War of Independence, major British naval victory in the West Indies, ending the French threat to British possessions in that area. Setting out from Martinique on April 8, a French fleet of 35 warships and 150 merchantmen under the Comte de Grasse intended to descend upon Jamaica with Spanish help. They were intercepted at the Saintes Passage, between the islands of Dominica and Guadeloupe, by a British fleet of 36 ships commanded by Adm. Sir George Rodney. After preliminary skirmishing, the main action took place on April 12, when a shift in the wind altered the course of two French ships, causing gaps in their line of battle that were quickly entered by the British. The French fleet was thus scattered and the ensuing British victory at the Saintes helped restore that country's naval prestige. As a result, in the Treaty of Paris (Sept. 3, 1783) Britain regained most of her islands in the West Indies.

Saintes-Maries-de-la-Mer, also called LES SAINTES-MARIES, village of the Camargue, Bouches-du-Rhône *département,* Provence-Alpes-Côte-d'Azur region, on the Mediterranean coast, southern France. The name originates in the ancient Provençal tradition that the early Christian figures Mary, sister of the Virgin, and Mary, mother of St. James and St. John, together with their black servant, Sara, and others miraculously escaped persecution in Judaea about the year 40 and landed there in a frail craft. Their relics were put in a local oratory, which was replaced in the 12th century by the present pre-Romanesque fortified church. Pilgrimages take place annually in May and October. Gypsies from all over the world gather for the May pilgrimage to do honour to Sara, their patroness. Pop. (1982) 1,207.

Saintonge, former province of western France, covering most of the present *département* of Charente-Maritime. Its chief city was Saintes. Saintonge was originally the territory inhabited by the Santones, a Gallic tribe. Through the Middle Ages, Saintonge shared the political fortunes of neighbouring



The province of Saintonge

Guyenne and Poitou. It was definitively incorporated into France in 1375, and, during the last centuries of the old French monarchy, before the Revolution of 1789, it formed, with Angoumois, one of the *gouvernements* (major administrative units) of France.

saints, communion of, Latin COMMUNIO SANCTORUM, in Christian theology, the fel-

lowship of those united to Jesus Christ in Baptism; the phrase is first found in the 5th-century version of the Apostles' Creed by Nicetas of Remesiana. The original Greek phrase has been translated both as a sharing of the benefits of membership in the church and as a communion with the saints (in the biblical sense of all who have been baptized). Both translations accord with the New Testament doctrine that the baptized are united with Jesus Christ, who shares in their human nature, and that their goal is to share in his present glorified state. The new relationship with other Christians, living and dead, and with Christ replaces the covenant relationship of the Old Testament.

In medieval Western Christianity, special emphasis was placed on the benefits to be derived for the living ("the church militant") through the intercession of the saints in heaven with God ("the church triumphant"); the dead who were not yet perfected ("the church suffering") were also believed to be the beneficiaries of prayers said in their behalf. Major Protestant Reformers, wishing to reaffirm the unique mediatory role of Jesus Christ, denied the intercessory role of the saints and viewed the communion of saints as all believers in Christ.

saint's play: *see* miracle play.

Saintsbury, George (Edward Bateman) (b. Oct. 23, 1845, Southampton, Hampshire, Eng.—d. Jan. 28, 1933, Bath, Somerset), the most influential English literary historian and critic of the early 20th century. His lively style and wide knowledge helped make his works both popular and authoritative.

Disappointed at not getting a fellowship at Merton College, Oxford (M.A., 1868), Saintsbury spent almost a decade as a schoolmaster, at the same time beginning a lifelong study of French literature and writing reviews for the *Academy*. The appearance of his essay on Baudelaire in the *Fortnightly Review* in 1875 caught the attention of the literary world. When a school at which he was teaching failed in 1876, he decided to write for a living. He contributed 35 biographies and the article on French literature for the *Encyclopædia Britannica* (9th ed., 1875–89). He was an unorthodox critic of French literature, but his *Primer of French Literature* (1880), *A Short History of French Literature* (1882), and *Specimens of French Literature from Villon to Hugo* (1883) all had great success. In 1881 his study of Dryden ("English Men of Letters Series") was the first of his extensive writings on English literature. *Specimens of English Prose Style from Malory to Macaulay* (1885) and *A History of Elizabethan Literature* (1887) followed.

In 1895 Saintsbury was appointed to the Regius chair of rhetoric and English literature at the University of Edinburgh. He continued his writing while at Edinburgh, producing, among other works, *A Short History of English Literature* (1898) and *A History of Criticism and Literary Taste in Europe from the Earliest Texts to the Present Day*, 3 vol. (1900–04), one of the first surveys of critical literary theory and practice from ancient Greek to modern times. He also wrote *A History of English Prosody from the Twelfth Century to the Present Day*, 3 vol. (1906–10); the supplementary *Historical Manual of English Prosody* (1910); and the complementary *History of English Prose Rhythm* (1912). He retired from his professorship in 1915.

Saintsbury continued his writing with *The Peace of the Augustans: A Survey of Eighteenth Century Literature as a Place of Rest and Refreshment* (1916) and a book on wine, *Notes on a Cellar-Book* (1920), which led to the foundation of the Saintsbury Club. Saintsbury's *Minor Poets of the Caroline Period*, 3 vol. (1921), helped revive interest in 17th-century poetry, as did his editions of Dryden and Shadwell for Restoration drama.

Saintsbury was the foremost practitioner of the so-called conversational school of criticism; he analyzed the style of literary works and the development of literary forms in an informal, lively, and readable prose designed as much to stimulate and entertain as to inform. Saintsbury deliberately formulated no philosophy of criticism. Though a more rigorous approach has replaced his copious, wide-ranging writing, he opened the way to a broad view of Western literature and, by his diverse enthusiasms, emphasized enjoyment as literature's primary aim.

Saionji Kimmochi, KŌSHAKU (Duke, or Prince) (b. Dec. 7, 1849, Kyōto—d. Nov. 24, 1940, Okitsu, Japan), the longest surviving member of the oligarchy that governed Japan after the Meiji Restoration (1868), which had overthrown the ruling Tokugawa family and restored power to the emperor. As prime minister and elder statesman (genro), he attempted to moderate his nation's increasing militarism.

Saionji was born into the old court nobility. After studying in France, he returned to Japan in 1881 and founded the *Tōyō jiyū shimbun* ("Oriental Free Press"), a newspaper dedicated to popularizing democratic ideas. But journalism was considered a scandalous profession for a court noble; hence his colleagues prevailed on the emperor to force Saionji to leave the newspaper and join government service, in which he soon rose to high position.

He became one of the principal organizers and later president (1903) of the Rikken Seiyūkai (Friends of Constitutional Government), the major political party in Japan at that time, and he served as prime minister in 1901–02, 1906–08, and 1911–12. During his years in office he attempted to curtail military expenditures and pushed for party control of the Cabinet. He retired from party politics and government office in 1912, although in 1919 he headed Japan's delegation at the Versailles Peace Conference, which ended World War I.

Saionji spent the last 25 years of his life as a genro, an honour reserved for the exclusive group of leaders who had participated in the Meiji Restoration and who had also served as prime ministers. As such he was a close and trusted adviser of the emperor. Because of his moderating influence upon ultranationalistic and militaristic trends in pre-World War II Japan, right-wing fanatics in the 1930s made several attempts to assassinate him.

Saipan, island, part of the U.S. Commonwealth of the Northern Mariana Islands, in the western Pacific Ocean. Saipan served as headquarters of the U.S.-administered United Nations Trust Territory of the Pacific Islands from 1962 to 1986. The island is hilly (rising to Mount Tagpochau, 1,529 feet [466 m]) and is 14 miles (23 km) long and 5½ miles (8.8 km) across at its widest point. It has an area of 47 square miles (122 square km). Broad inlets (Magicienne [Laulau] Bay and Tanapag Harbor) are on both its sides. The smaller island of Tinian lies immediately southwest across the Saipan Channel. Under Spanish sovereignty from 1565 to 1899, Saipan came under German rule (1899–1914) and was a Japanese mandate from 1920 until captured (1944) by U.S. forces during World War II. It became an important U.S. military air base during the latter part of the war, and between 1953 and 1962 it was under U.S. naval jurisdiction. The Northern Mariana commonwealth headquarters is at Chalan Kanoa, which is the chief settlement of Saipan.



Suicide Cliff on the coast of Saipan, one of the Mariana Islands

Milt and Joan Mann—CameraMann

Copra is the chief product of the islanders' agricultural activities. Subsistence crops include taro, cassava, yams, breadfruit, and bananas. Saipan has a commercial dock and an international airport. Pop. (1985 est.) 17,840.

Sa'iqah, as- (Arabic: "Thunderbolt"), Syrian terrorist commando force sponsored by the Syrian government with the purpose of promoting the interests of the Palestinian branch of the Syrian Ba'th Party. As-Sa'iqah was founded by the government-controlled Ba'th Party in 1967 and is socialist in ideology. Chosen from the upper ranks of the Syrian Army, members viewed as-Sa'iqah as an alternative to the Palestine Liberation Organization (PLO) and unsuccessfully challenged that group's supremacy before engaging in guarded cooperation with al-Fatah, a major group within the PLO. The chief of as-Sa'iqah, Zuhair Muhsen, was a member of the PLO executive committee until his assassination in 1979.

Sais, Arabic ṢĀ AL-ḤAJAR, also spelled SA EL-HAGAR, ancient Egyptian city (Sai) in the Nile Delta on the Canopic (Rosetta) Branch of the Nile River, in al-Gharbīyah *muḥāfaẓah* (governorate). From prehistoric times Sais was the location of the chief shrine of Neith, the goddess of war and of the loom. The city became politically important late in its history. In the late 8th century BC Tefnakhte, a Libyan prince of Sais, fought with the Cushites for control of Lower Egypt, but he lost in 713–712 BC to Shabaka, founder of the 25th dynasty of Egypt. When Assyria defeated the Cushites in 671 BC, Saite princes, as Assyrian vassals, again gained control of the Nile Delta, and the Saite governor Psamtik I (664–609 BC), after expelling his Assyrian masters, conquered all of Egypt (*c.* 656 BC). Sais became the capital of Egypt under Psamtik I and his successors of the 26th dynasty. Enriched by Mediterranean and African trade, the Saite kings lavished their wealth on temples and palaces in Sais and built near them their tombs. When Herodotus visited Sais, it was still one of the finest cities in Egypt.

The modern site's extensive and imposing mound has been little explored and in fact has been extensively denuded by pilferers since it was first described by J.F. Champollion in 1818. Inscribed stones found on the site and in nearby villages are all that remain of the once-great city. The modern settlement at Sais produces primarily cotton. Pop. (1966) 12,581.

Saisset, Bernard (b. *c.* 1232—d. December 1311?, Pamiers?, Fr.), first bishop of Pamiers (in present-day Ariège *département,* southern France), an aggressive and outspoken prelate whose activities exacerbated the disputes between Pope Boniface VIII and King Philip IV the Fair of France.

Of a noble family of Toulouse, Saisset became an Augustinian canon and in 1267 was elected abbot of Saint-Antonin at Pamiers. A first dispute, with the count of Foix over the control of the city, was settled once Saisset had become bishop in 1295. But soon afterward he was denounced to Philip IV, probably by the bishop of Toulouse, from whose lands Pope Boniface VIII had carved the diocese of Pamiers for Saisset, his protégé; and in October 1301 he was charged with treason, simony, heresy, and blasphemy. Philip, faced

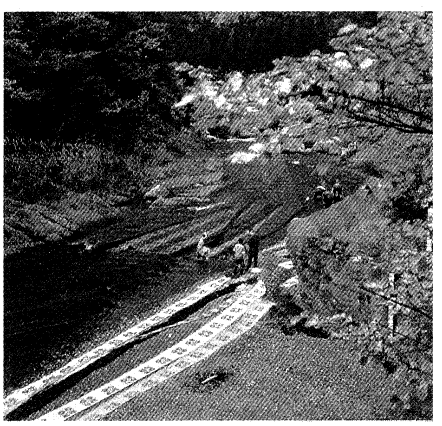
with the prospect of executing a bishop, communicated the charges to the Pope. Boniface ordered that Philip release Saisset's possessions and set him free to be judged by the church. Expelled from the kingdom (February 1302), Saisset went to Rome but was apparently back in Pamiers late in 1305.

Śaiśunāga DYNASTY, ancient ruling family in the Indian kingdom of Magadha. The Śaiśunāga line of kings followed the reigns of Bimbasāra and Ajātaśatru (both contemporaries of the Buddha). The line is generally placed immediately before the Nandas and is dated roughly from the mid-5th to the mid-4th century BC.

Śiśunāga, or Susunaga, the founder, was of obscure origin and may have initially served as Magadhan viceroy at Kāśī (Vārānasi). Gradually he came to be associated with the early Magadhan capital Girivraja, or Rājgīr, and reestablished the city of Vaiśālī (Basarh in north Bihār). Śiśunāga's reign, like that of his Magadhan predecessors, represents a stage in the history of the fast expansion of the Magadhan empire. He successfully fought against Avantivardhana and annexed Avanti to his empire.

The reign of Śiśunāga's son Kālāśoka is known chiefly for two important events: the meeting of the second Buddhist Council at Vaiśālī and the shifting of the Magadhan capital to Pāṭaliputra. The end of Śiśunāga's line is obscure, as is much of the pre-Mauryan dynastic history of Magadha. Kālāśoka's sons, according to traditional lists, were 10 in number, but no details about them are known. Kālāśoka was brutally murdered, presumably by the founder of the Nanda line, and the Śaiśunāga dynasty ceased to rule.

Saitama, *ken* (prefecture), Honshu, Japan, bordering (south) on Tokyo Metropolis. Its area of 1,467 square miles (3,799 square km) includes extensive stretches of level land. Fruits, vegetables, and flowers are grown for the Tokyo market, and green tea is produced.



Washing dyed cloth near Chichibu, Saitama Prefecture, Japan

Imperial Press—FPG/EB Inc.

The prefecture's machinery and textile industries evolved from its previous casting and sericulture industries.

Cities in the south, including Urawa, Ōmiya, Kawagoe, and others, form the northern extremity of the Keihin Industrial Zone. Urawa is the prefectural capital and houses Saitama University (1949). The town of Chichibu, in the southwest within Chichibu-Tama National Park, is noted for its annual festival (December), in which large, elaborate floats are paraded through the streets. Pop. (1985) 5,863,669.

Saite DYNASTY (664–525 BC), the 26th dynasty of ancient Egypt, a native dynasty between the reigns of the earlier Cushites, or Ethiopians, and the later Achaemenid Persians.

Psamtik I, prince of Sais and Memphis, managed to assert his independence and, by gaining the trust of the other princes around him, was able to assert his sovereignty over the entire Nile Delta. Under his firm rule, Egypt rapidly recovered its prosperity. Greek traders entered Egypt in increasing numbers and were encouraged to settle at Naukratis, near Sais. Psamtik guarded the frontiers of Egypt with three strong garrisons. Toward the end of his reign he sent support to the Assyrians against the attacks of the Medes and Babylonians, but in 612 BC Nineveh fell, and the might of Assyria was broken.

Psamtik died in the 54th year of his reign and was succeeded by his son Necho II (610–595 BC). The new Pharaoh, perhaps dreaming of a new empire in Asia, prepared an expedition to help the remnant of the Assyrian forces in Syria against the Babylonians. After some initial successes, however, his forces were so thoroughly routed at Carchemish (605) that he relinquished Syria and only barely saved Egypt. Herodotus relates that, in Necho's reign, Phoenician sailors dispatched from Egypt actually circumnavigated Africa, and the attempt was made to complete a canal through the Wadi Tumilat connecting the Mediterranean and the Red seas by way of the lower Egyptian Nile.

The next king, Psamtik II (595–589 BC), visited Syria or Phoenicia and sent an army of Egyptians and mercenaries against the Cushites (to the south), perhaps to forestall a threatened attack. Pharaoh Apries (589–570 BC) intervened in Syria and fomented rebellion against the Babylonian suzerainty in Judah, but he accomplished little there. Herodotus describes Apries' reign as exceedingly prosperous. He incurred the wrath of his Egyptian troops, however, and the general who was sent to put down the ensuing rebellion was proclaimed king and ruled as Ahmose II (570–526 BC) after defeating Apries and his mercenaries. Though Ahmose had been brought to power over the issue of undue Greek influence, he nonetheless employed Greeks in numbers and cultivated the friendship of their tyrants. His rule was confined to Egypt (and perhaps Cyprus), but Egypt itself remained prosperous. At the beginning of his reign, he was threatened by Nebuchadrezzar II. Later he is said to have joined the league against Cyrus II the great of Persia; but shortly after his death the invading army of the Persians led by Cambyses II reached Egypt and dethroned his son, Psamtik III.

Saitō Makoto, SHISHAKU (Viscount) (b. Nov. 13, 1858, Mizusawa, Japan—d. Feb. 26, 1936, Tokyo), Japanese naval officer and statesman who was prime minister of Japan (1932–34) and twice governor-general of Korea (1919–27, 1929–31).

Saitō graduated from the Japanese Naval Academy in 1879 and went to the United States for study in 1884, remaining there for some years as naval attaché to the Japanese legation. After serving as vice-minister and chief of naval administration, Saitō was naval minister from 1906 to 1914. In 1912 he was made an admiral.

As governor-general of Korea (1919–27), Saitō is credited with promoting the civilian rather than the previously military administration of that Japanese colony. He received the title of viscount in 1925. In 1927 Saitō attended a disarmament conference in Geneva as a member of the plenipotentiary committee. Upon his return he resigned from the governorship and became privy councillor to the emperor. From 1929 to 1931 he resumed the post of governor-general of Korea, but in 1932, on the assassination of Prime Minister Inukai Tsuyoshi, Saitō was made prime minister of Japan. In that capacity, he took the controversial steps of recognizing the Japanese-controlled state of Manchukuo (in Manchuria) and withdrawing from the League of Nations. After financial scandal forced Saitō and his Cabinet to resign, he became the lord keeper of the privy seal. Saitō was assassinated by a group of young army officers during the abortive military revolt of Feb. 26, 1936.

Śaiva-siddhānta, a religio-philosophical system of South India in which Śiva is worshiped as the supreme deity. The Śaiva-siddhānta system is realistic and dualistic, in contrast to Kashmir Śaivism (*q.v.*), which is idealistic and monistic. The principal literature of the Śaiva-siddhāntas are the Tamil devotional hymns written by Śaiva saints from the 5th to the 9th century, known in their collected form as *Tirumurai.* Meykaṇḍadevar (13th century) was the first systematic philosopher of the school.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Śaivism, also spelled SHAIVISM, cult of the Indian god Śiva, with Vaiṣṇavism and Śāktism, one of the three principal forms of modern Hinduism. Śaivism includes such diverse movements as the highly philosophic Śaiva-siddhānta, the socially distinctive Liṅgāyat, ascetic orders such as the *daśnāmī sannyāsins,* and innumerable folk variants.

The beginnings of the Śiva cult have been traced back by some scholars to non-Aryan phallic worship. Although this is not conclusive, it is clear that the Vedic god Rudra ("the Howler") was amalgamated with the figure of Śiva ("Auspicious One") that emerged in the period after the *Upaniṣads.* The *Śvetāśvatara Upaniṣad* treats Śiva as the paramount deity, but it is not until sometime between the 2nd century BC and the 2nd century AD and the rise of the Pāśupata sect that organized sectarian worship developed.

There are several schools of modern Śaiva thought, ranging from pluralistic realism to absolute monism, but they all agree in recognizing three principles: *pati,* Śiva, the Lord; *paśu,* the individual soul; and *pāśa,* the bonds that confine the soul to earthly existence. The goal set for the soul is to get rid of its bonds and gain *śivatva* ("the nature of Śiva"). The paths leading to this goal are *caryā* (external acts of worship), *kriyā* (acts of intimate service to God), *yoga* (meditation), and *jñāna* (knowledge). Śaivism, like some of the other forms of Hinduism, spread in the past to other parts of Southeast Asia, including Java, Bali, and parts of Indochina and Cambodia.

saivo, one of the Lapp regions of the dead, where the deceased, called *saivoolmak,* lead happy lives in the *saivo* world with their families and ancestors; they build tents, hunt, fish, and in every way act as they did on earth. In Norway the *saivo* world was thought to exist in the mountains, whereas in Finland it was usually believed to be under special double-bottomed lakes connected by a small hole. The *saivo* localities were regarded as sacred and as sources of power that could be used by the shaman, or *noiade.* When the *noiade* wished to go into a trance, he would call to his aid his guardian spirits from the *saivo,* the *saivo-sarva, saivo-guolle,* and *saivo-loddle,* or the "*saivo*-reindeer," "*saivo*-fish," and "*saivo*-bird." The *saivo* should be differentiated from the other Lapp otherworld, *yabme-aimo,* which, for example, was associated with the sacrifice of black animals and was generally conceived as much less pleasant.

Sajan Mountains (Russian S.F.S.R.): *see* Sayan Mountains.

Śaka SATRAP, also called KSHATRAPA, either of two dynasties of satraps in northwestern

India who ruled with considerable independence on behalf of the Pahlava suzerains. The two families are both known to Indian literature as the Śakas (from the native word for Scythians) and to most Western historians as the Kshatrapas.

The shorter lived of the two families bears the name Kshaharāta and is known for two rulers, Bhūmaka and Nahapāna, whose reigns are established by coinage and by a few surviving inscriptions that appear to fix the year AD 124 as a date in Nahapāna's reign. These documents claim that Nahapāna ruled over a large area in western India around the Gulf of Cambay, which he could only have won from the Andhras. This possession was, however, brief because the Andhra king Gautamīputra is known to have destroyed the Śakas in the latter part of the Śaka year 46 (AD 124–125).

The second dynasty of satraps, founded by Chaṣṭana in AD 78, ruled for two or three centuries and gave its name to the Śakanripakala, or era of Śaka kings, in Indian history. The rulers of this house can be dated with incomplete accuracy from their coinage. Chaṣṭana is mentioned by Ptolemy as ruling into the 2nd century (probably AD 78–110) and also considerably aggrandized his holdings at the expense of the Andhras while this house was preoccupied with mounting a defense against his namesakes. The wars of these Śakas with the Andhras continued for several regnal generations. The first great Śaka ruler was Rudradāman I, Chaṣṭana's grandson, who reigned after AD 130. The direct line of Chaṣṭana became extinct in AD 304–305 with the death of Viśvasena, son of Bhartṛidāman. It is doubtful that the dynasty was important in the 4th century, although one of its members—probably Rudrasimha III—is recorded as the "Śaka king" killed by Candra Gupta II when he sacked the Śaka capital in AD 388.

Saka language, also called KHOTANESE, Middle Iranian language spoken in Chinese Turkistan by the Saka tribes. Two dialectal varieties are distinguished. Khotanese, from the kingdom of Khotan, is richly attested by Buddhist and other texts dating from the 7th to the 10th century. Most of these writings remain unedited. The other dialect, known from only one Buddhist fragment, is connected with Tumshuq. The texts are written in Brāhmī script and contain many loanwords from the Prākrit languages of India.

Sakai (pejorative), any of various pagan peoples of the Malay Peninsula, especially the Senoi and Jakun (*qq.v.*). The term is in the Malay language.

Sakai, city, Ōsaka Urban Prefecture (*fu*), Honshu, Japan, on Ōsaka-wan (Ōsaka Bay). Many large earthen tomb mounds in the area attest to the city's antiquity. The mausoleum of the emperor Nintoku—1,594 ft (486 m) long and 115 ft high—is the largest in Japan. Sakai was celebrated as the leading eastern inland seaport in the 16th century and was known for its rich merchants, who traded with the Philippines and other Southeast Asian nations. A shift in the course of the Yamato-gawa (Yamato River), however, silted its harbour, and the city sank into obscurity as Ōsaka rose to commercial and industrial greatness.

Sakai revived as an industrial satellite of Ōsaka in the Hanshin Industrial Zone, when the two cities were connected by rail. Chief products are iron, steel, ships, machinery, bicycle and automobile parts, and chemicals. The main industrial belt is located on reclaimed coastal land, while residential areas spread inland on elevated sites. Pop. (1984 est.) 818,050.

Sakai Hōitsu, original name SAKAI TADANAO (b. Aug. 1, 1761, Edo, Japan—d. Jan. 3, 1829, Edo), Japanese painter and poet of the late Tokugawa period (1603–1867).

The younger brother of a feudal lord, Sakai developed artistic talents in many directions. In 1797, giving poor health as the reason, he became a monk affiliated with the Nishihongan-ji and was raised to a high rank. In 1809, however, he retired to Negishi in Edo (now Tokyo) and led the life of a gifted dilettante. He studied painting with masters



"Summer Grasses," painting by Sakai Hōitsu, colour on paper covered with silver leaf, 19th century; in the Tokyo National Museum

By courtesy of the Tokyo National Museum

of various schools, but was particularly influenced by the decorative style of Ogata Kōrin, which he succeeded in reviving. He published *Kōrin hyakuzu* ("One Hundred Designs of Kōrin") and *Ogata-ryū ryakuin-fu* ("Album of Simplified Seals in the Ogata Style") in commemoration of the 100th anniversary of Kōrin's death. These works were instrumental in making Kōrin's art very influential posthumously. Apart from being a revivalist, Sakai became a very successful painter and haiku poet. The screen painting, "Kashū sōzu byōbu" ("Summer and Autumn Flowers") is his masterpiece.

Sakai languages: *see* Senoic languages.

Sakai Toshihiko, pseudonym KOSEN (b. Nov. 25, 1871, Fukuoka Prefecture, Japan—d. Jan. 23, 1933, Tokyo), socialist leader and one of the founders of the Japanese Communist Party.

Originally a schoolteacher, Sakai became a reporter and in 1903, together with Kōtoku Shūsui, started a weekly paper, the *Heimin shimbun* ("Peoples News"). Arrested for the espousal of pacifist beliefs shortly before the Russo-Japanese War (1904–05), he was finally released after the conflict and in 1906 helped organize the Japanese Socialist Party. After starting several small magazines, he was attracted to Marxism as a result of the Bolshevik Revolution of 1917. For helping to found the Japanese Communist Party, he was imprisoned again in 1923. In his later years he opened an agricultural school in his native district.

Sakaida FAMILY, also called KAKIEMON FAMILY, celebrated family of Japanese potters whose founder, Sakaida Kizaemon (1596–1666), was awarded the name Kakiemon in recognition of his capturing the delicate red colour and texture of the persimmon (*kaki*) in porcelain. *See* Kakiemon ware.

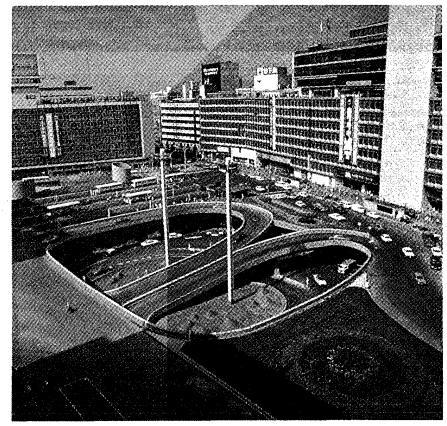
Sakaide, city, Kagawa Prefecture (*ken*), Shikoku, Japan, facing the Inland Sea. The city has been a centre of salt manufacture since the early 17th century. Part of the salt fields were reclaimed for industrial use after World War II, and Sakaide became heavily industrialized. Besides salt, products include chemicals, petrochemicals, and machinery. A large shipyard is attached to the city's busy commercial port. Shiramine-san (Mt. Shiramine), 4 mi (7 km) to the east, is crowned with the mausoleum of the emperor Sutoku (1119–64). Pop. (1980) 66,290.

Sakākah, oasis and capital of al-Jawf *minṭaqah* (province), Northern region, northwestern Saudi Arabia. It lies on an old caravan route from the Mediterranean Sea coast to the central and southern parts of the Arabian Peninsula. Sakākah is situated north of the desert an-Nafūd and northeast of al-Jawf oasis. The government has undertaken pastoral projects in order to improve agricultural conditions in the area. The main products of the oasis are dates and dairy products.

sakaki, low-spreading, flowering evergreen tree (*Cleyera japonica,* or *ochnacea*) used in Shintō to demarcate or decorate sacred spaces. The tree, which grows in warm areas of the Japanese islands, Korea, Taiwan, and mainland China, may reach a height of about 30 feet (10 metres) and in spring produces white, drooping flowers. Its branches are used in decorating Shintō shrines or sites of festivals, and even entire uprooted trees may appear in processions.

Sakakura Junzō (b. May 29, 1904, Gifu Prefecture, Japan—d. Sept. 1, 1969, Tokyo), architect who was one of the first to combine 20th-century European architecture with elements from the traditional Japanese style.

Sakakura's first outstanding work in that East–West blend was the Japanese pavilion at the 1937 World Exposition in Paris. Sakakura by then had been working with the architect Le Corbusier for eight years, and he continued to be known as the leading advocate in Japan of Le Corbusier's idiom. Sakakura returned to Japan, which was embroiled in wars from 1937 to 1945, and thus designed no buildings until the 1950s. Some of his outstanding works are the Museum of Modern Art at Kamakura



West-side plaza of Shinjuku Station Square, Tokyo, by Sakakura Junzō 1964–67

Nobuyuki Masaki

(1951), the Hajima Town Hall at Gifu (1959), the city hall at Hiraoka (1964), the Kanagawa Prefectural Office Building at Yokohama (1966), and the Shinjuku Station Square and Odakyu department store in Tokyo (1967).

Sakalava, a Malagasy people living in the western third of Madagascar. The Sakalava live in a sparsely populated area of vast plains, grasslands, and rolling foothills.

The Sakalava formed the first major Malagasy kingdom, which develped along the southwestern coast in the late 16th century. Splitting into two allied kingdoms in the mid-17th century, the Sakalava reached the height of their power in the next century; their rule extended over nearly half of the entire island, and they carried on a lively trade in cattle and slaves with Europeans in exchange for guns and other manufactured goods. The Sakalava state declined in the late 18th century, however, and nominal hegemony in the area passed to the expanding kingdom of the

Merina. In the 1890s the French subdued both the Sakalava and the Merina, and the Sakalava were integrated into the newly established French colony.

The Sakalava are primarily seminomadic pastoralists who let their herds roam freely over the grasslands of their native Majunga and Tulear provinces. They also practice a fairly primitive agriculture, sowing rice in riverbeds. They have benefited from the progressive cultivation practices of other ethnic groups, such as the Merina and Betsileo, who have migrated to the Sakalava's thinly populated region in search of farmland.

Sakamoto Ryōma, original name SAKAMOTO NAONARI (b. Jan. 3, 1836, Kōchi, Tosa Province, Japan—d. Dec. 10, 1867, Kyōto), noted Imperial loyalist whose effort to forge the Satsuma–Chōshū Alliance (1866) between the two large feudal fiefs, or *han*s, of Chōshū and Satsuma was critical in setting the stage for the Meiji Restoration (1868).

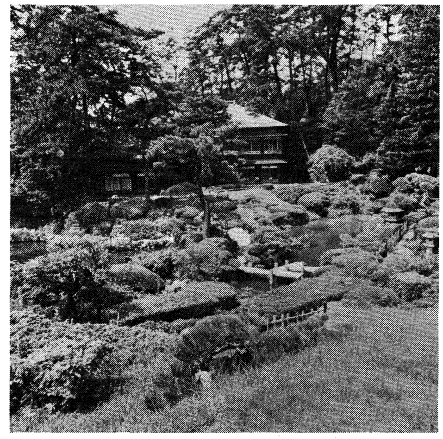
Descendant of a low-ranking samurai family, Sakamoto early established a reputation for swordsmanship. The contacts he made through his sword fighting served him in good stead when, influenced by Imperial ideology, he began to plot against the Tokugawa shogunate for a restoration of power to the emperor.

When his seditious activities forced Sakamoto to leave his native *han* of Tosa, he served Katsu Kaishū in a naval training school; subsequently he took refuge in Satsuma *han,* where antishogun sentiment had become widespread. Believing that restoration was possible only if the antishogun forces agreed to act in unison, Sakamoto persuaded the leaders of Satsuma to drop their historic enmity toward Chōshū. In his role as intermediary between the two *han*s, Sakamoto even arranged for Satsuma to aid Chōshū in obtaining British arms when the shogunate attempted to block foreign trade to that fief.

Sakamoto also drew on his ancestors' merchant background in forming a shipping company that doubled as a tiny navy. Rejoining his Tosa compatriots, he worked to develop the program under which Tosa persuaded the shogun to resign and began planning for a new regime. He was murdered by proshogunal samurai on the eve of the restoration.

Sakarya, *il* (province) of northwestern Turkey, extending southward from the Black Sea along both sides of the Sakarya River. The area of Sakarya province is 1,936 sq mi (5,015 sq km). The northern part of the province is a low-lying plain dotted with lakes and marshes. The soil is rich and heavily cultivated, producing wheat, corn (maize), beans, and potatoes. Some grapes are grown on the higher land in the south. The province is also one of Turkey's leading producers of sugar beets, processed at a large sugar refinery in Adapazarı, the capital. In the 20th century Sakarya's countryside has received heavy emigration from less fertile regions, and the rural population is fairly dense. The Sakarya River, from which the province takes its name, has a total length of about 490 mi (790 km) and flows into the Black Sea at Karasu, 85 mi east of the Bosporus. Pop. (1983 est.) 579,000.

Sakata, city, Yamagata Prefecture (*ken*), Honshu, Japan, on the Mogami-gawa (Mogami River). A prosperous commercial and fishing port during the Muromachi era (1338–1573), it later developed as a seaport for the shipment of rice along the Sea of Japan coast. The chemical industry was introduced in 1940, and manganese ore, phosphate fertilizer, and ferroalloys are now produced. During the 1970s a port north of the city and an industrial complex around it were built. Agricultural products of the surrounding region include rice, potatoes, sweet potatoes, and fruit. Large national storehouses, established in 1926, contain government rice holdings.



Homma Art Museum, Sakata, Japan
World Photo—Shostal/EB Inc.

The city houses a municipal library and an art museum. Pop. (1984 est.) 102,035.

Sakcagöz, also spelled SAKCEGÖZÜ, or SAKJEGOZU, village in the Anti-Taurus Mountains near Zincirli Hüyük in Gaziantep *il* (province), Turkey. Sakcagöz first attracted the attention of archaeologists as the location of a Late Hittite slab relief depicting a royal lion hunt. John Garstang, a British archaeologist, traced its original source to a small mound called Cobba Hüyük, adjacent to the village. Excavations of the mound between 1907 and 1911 revealed a Late Hittite palace at its summit. The fortification walls, nearly 12 feet (4 metres) thick, were strengthened by projecting external buttresses and by turrets at the corners. The palace itself was approached through a portico with an outstanding series of sculptures showing a strong Assyrian influence.

Lack of inscriptional material made precise dating of the palace settlement impossible, although a deep sounding indicated that the whole mound was composed of stratified debris dating back to the 5th and early 4th millennia BC.

Sakdal Uprising, also called SAKDALISTA UPRISING, brief peasant rebellion in the agricultural area of central Luzon, Philippines, on the night of May 2–3, 1935. Though quickly crushed, the revolt of the Sakdals (or Sakdalistas) served as a warning of Filipino peasant frustration with the oppressive land tenancy situation.

The Sakdal (Tagalog: "Accuse") movement was founded in 1930 by Benigno Ramos, a discontented former government clerk. Drawing strength from illiterate, landless peasants, the movement advocated a drastic reduction of taxes on the poor and a radical land reform, including a breakup of the large estates. It also opposed the policy of the dominant Nacionalista Party of accepting gradual independence from the United States, demanding instead immediate severance of all Philippine–American ties.

During the early 1930s the Sakdals seemed to draw inspiration from Gandhi's noncooperation movement in India and urged nonparticipation in government, boycott of elections, and withholding of taxes. In 1933 they changed tactics and organized as a political party. The Sakdals did surprisingly well in the Philippine election of 1934 and were thus encouraged to attempt an uprising the following year.

On the night of May 2, partially armed mobs seized municipal buildings in 14 towns. The uprising was crushed the next day, with the loss of about 100 lives. Ramos fled to Tokyo and the Sakdals were disbanded, but rural conditions remained a source of frustration and dissension and led to numerous other such peasant rebellions.

sake, also spelled SAKI, strong Japanese rice beer, light in colour and noncarbonated, with a sweet flavour, having up to 18 percent alcoholic content. It is often mistakenly called a wine because of its appearance and alcoholic content. Production begins with *koji,* a preparation of steamed rice, and *Aspergillus oryzae,* a mold that converts the rice starch to fermentable sugars. The *koji,* mixed with water and fresh steamed rice, is kneaded by hand into a smooth paste and placed in a vat with more rice and water.

This mixture, allowed to ferment for four weeks, becomes *moto,* with an alcoholic content of about 11 percent. More *koji,* steamed rice, and water are added to the vat, and a second fermentation begins, lasting about seven days. After resting for another week, the sake is filtered and bottled. In Japan, where it is the national beverage, sake is served with special ceremony. It is warmed before serving and is usually sipped from a small porcelain cup, which may have a device to produce a whistling sound while sipping.

Sakel, Manfred J(oshua) (b. June 6, 1900, Nadvorna, Austria-Hungary—d. Dec. 2, 1957, New York City), Viennese neurophysiologist and psychiatrist who introduced insulin-shock therapy for schizophrenia.

Sakel received his medical training at the University of Vienna, graduating in 1925, and subsequently practiced in both Vienna and Berlin. He became a research associate at the University Neuropsychiatric Clinic in Vienna in 1933. He was forced to flee the Nazis in 1936 and completed his work at the Harlem Valley State Hospital in the United States, publishing his findings in *The Pharmacological Shock Treatment of Schizophrenia* (1938).

Sakel had used insulin to tranquilize morphine addicts undergoing withdrawal, and in 1927 one addict accidentally received an overdose of insulin and went into a coma. After the patient recovered from the overdose, Sakel noted an improvement in his mental state. Sakel hypothesized that inducing convulsions with insulin could have similar effects in schizophrenics. His initial studies found the treatment effective in 88 percent of his patients, and the method was applied widely for a brief period. Follow-up studies showed the long-term results to be less satisfactory, and insulin-shock treatment was largely replaced by other methods of treatment.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Saker, Alfred (b. July 21, 1814, Wrotham, Kent, Eng.—d. March 12, 1880, Peckham, London), missionary who established the first British mission in the Cameroons and who was, in the opinion of David Livingstone, the most important English missionary in West Africa. Saker founded the city of Victoria, Cameroon, and translated the Bible into Douala, the local language.

Saker first went to Africa in 1844 as part of a missionary team on the island of Fernando Po (now Macías Nguema Po). He established his first missionary station on the continent near present-day Douala, Cameroon, in 1845. Saker had been a manual labourer before he became a missionary, and he taught carpentry and agriculture to the tribes along the coast. When the Spanish government expelled the Protestant missionaries from Fernando Po in 1858, Saker undertook the construction of Victoria as a permanent missionary station. There he printed his Douala translation of the Bible in 1872. He left Africa in 1876.

Sakha (people): *see* Yakut.

Sakhalin, also spelled SACHALIN, *oblast* (province), extreme eastern Russian S.F.S.R. It occupies a land area of 33,650 square miles (87,100 square km) and is composed of Sakhalin Island and the chain of the Kuril Islands. The present *oblast* was formed in 1947 after southern Sakhalin and the Kurils were acquired from Japan. The economy is dominated by fishing, lumbering, and the mining of coal in southern Sakhalin and the extraction of oil in the north. Pop. (1989 prelim.) 709,000.

Sakhalin Island, also spelled SACHALIN, Russian OSTROV SAKHALIN, island at the far eastern end of the Russian S.F.S.R., between the Tatar Strait and the Sea of Okhotsk. With the Kuril Islands, it forms Sakhalin *oblast* (province) of the Russian S.F.S.R.

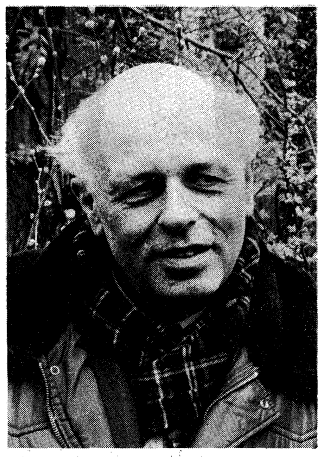
Sakhalin was first settled by Japanese fishermen along its southern coasts. In 1853 the first Russians entered the northern part. By an agreement of 1855, Russia and Japan shared control of the island, but in 1875 Russia acquired all Sakhalin in exchange for the Kurils. As a result of the Russo-Japanese War, Japan in 1905 (Treaty of Portsmouth) gained Sakhalin south of the 50th parallel and gave this part the Japanese name of Karafuto. In 1918, after the Russian Revolution, the Japanese occupied all of Sakhalin, but they withdrew in 1924; in the following year White Russian forces were driven out of the north by Soviet troops. The Soviet Union regained the southern half of the island in 1945, at the end of World War II, together with the Kurils, and the entire Japanese population was repatriated.

The island is 589 miles (948 km) long from north to south and about 100 miles (160 km) wide, covering 29,500 square miles (76,400 square km). Most of the land is mountainous, reaching an elevation of 5,279 feet (1,609 m) at Mount Lopatin. Vegetation ranges from tundra and stunted forests of birch and willow in the north to dense deciduous forest in the south. Fishing, mainly of crab, herring, cod, and salmon, is the principal economic activity around the coast. Petroleum extraction in the north, coal mining in the south, and lumbering, including paper production, are the basis of the rest of the economy. Agriculture is poorly developed because of the mountainous terrain and cold climate. Most of the population is Russian; there was considerable emigration in the 1960s. The major settlement on the island is Yuzhno-Sakhalinsk, which is the administrative centre for Sakhalin *oblast*. Pop. (1983 est.) 660,000.

Sakharov, Andrey Dmitriyevich (b. May 21, 1921, Moscow, Russian S.F.S.R.—d. Dec. 14, 1989, Moscow), Soviet nuclear physicist, an outspoken advocate of human rights, civil liberties, and reform in the Soviet Union as well as for rapprochement with noncommunist nations. He was awarded the Nobel Prize for Peace in 1975.

Sakharov was the son of a physicist, and his exceptional scientific promise was recognized early. He won a doctorate at the age of 26 and was admitted as a full member of the Soviet Academy of Sciences at age 32. By that time he had worked for several years with Igor Tamm as a theoretical physicist to develop the Soviet Union's first hydrogen bomb and had also devised, with Tamm, the theoretical basis for controlled thermonuclear fusion. As a preeminent Soviet scientist, he was accorded luxuries and honours.

After years of attempts at less public persuasion, Sakharov in 1961 went on record against Premier Nikita S. Khrushchev's plan to test a 100-megaton hydrogen bomb in the atmosphere, fearing the effects of widespread radioactive fallout. Three years later Sakharov successfully mobilized opposition to the spurious doctrines of the still-powerful Stalin-era biologist T.D. Lysenko. In 1968 he published in the West his essay "Progress, Coexistence, and Intellectual Freedom," in which he called for nuclear arms reductions, predicted and endorsed the eventual integration of communist and capitalist systems in a form of democratic socialism, and criticized the increasing repression of Soviet dissidents. In 1971 he married the human-rights activist Yelena G. Bonner.



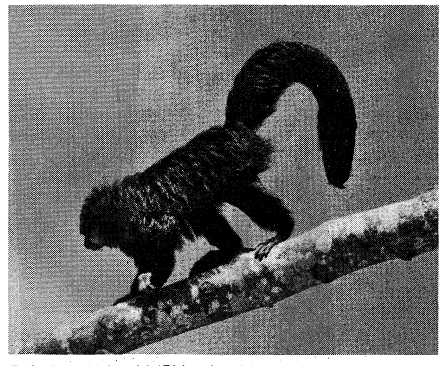
Sakharov, 1978
S. Zal—Sygma

Sakharov and Bonner continued to be at odds with the Soviet government. Speaking out against Soviet political repression at home and hostile relations abroad, he was isolated and became the target of official censure and harassment. In December 1979, with his denunciation of the Soviet invasion of Afghanistan and his call for a world boycott of the Moscow Olympic Games, he was (at least somewhat) silenced. In January 1980 the Soviet government stripped him of his honours and exiled him to the closed city of Gorky. In 1984 Bonner was convicted of anti-Soviet activities and was likewise confined to Gorky. In December 1986 the Soviet government under Mikhail S. Gorbachev released Sakharov and Bonner from their exile in Gorky and permitted them to return to Moscow. Elected to the Congress of People's Deputies in April 1989, Sakharov had his honours restored and saw many of the causes for which he had fought and suffered become official policy under the leadership of Gorbachev.

Saki: *see* Munro, H.H.

Saki (Nigeria): *see* Shaki.

saki, any of the long-tailed, arboreal South American monkeys of the genera *Pithecia* and *Chiropotes,* family Cebidae. Sakis of the genus *Pithecia* are about 30–50 cm (12–20 inches) long without the bushy, tapering tail, which is 25–55 cm long. They are covered with long, coarse hair that falls like a hood on the head and a cape over the shoulders. The pale-headed saki (*P. pithecia*) is black with whitish hair surrounding the dark muzzle of the male. The monk saki (*P. monachus*), the other species, is grizzled gray. Monk sakis are diurnal, live in pairs or small groups, and feed on fruit and possibly small animals. Births are single; the young at first cling to the female's belly and later are carried on her back until they can travel independently. Monk sakis are gentle in captivity but nervous and difficult to maintain.



Pale-headed saki (*Pithecia pithecia*)
Root—Okapia

Bearded sakis (*Chiropotes*) are less known. Members of the two species are about 40–45 cm (16–18 inches) long excluding the heavily furred tail, which grows to 35–40 cm. They have dense coats of long, primarily black hair. They have rounded tails, and their hair parts in the centre of the head, grows thickly along the sides of the face, and extends into a full, heavy beard. Bearded sakis are diurnal and are thought to live in small groups and feed on fruit.

saki (Japanese rice beer): *see* sake.

sakia, also spelled SAKIEH, Arabic SĀQĪYAH, also called PERSIAN WHEEL, mechanical device used to raise water from wells or pits. A sakia consists of buckets fastened to a vertical wheel, or to a rope belt about the wheel, which is itself attached by a shaft to a horizontal wheel turned by horses, oxen, or asses.

Sakias made of metal, wood, and stone are found throughout the Middle East, especially in Egypt, where they provide the steady streams of water required for irrigation. Historically, they have also been used in palaces and gardens to fill fountains. Earthen pots used as sakia buckets, identified by fastening knobs and by marks from rubbing against the wheels, guard rods, or walls of wells, have been dated to the 2nd century AD.

Sakjegozu (Turkey): *see* Sakcagöz.

Sakkara (Egypt): *see* Ṣaqqārah.

sakkos, outer liturgical vestment worn by bishops of the Eastern Orthodox church. It is a short, close-fitting tunic with half sleeves, buttoned or tied with ribbons on the sides, and usually heavily embroidered. Small bells on the sleeves or sides imitate those worn by Jewish high priests. It is similar to the dalmatic worn by Roman Catholic deacons. Possibly derived from the tunic of Byzantine emperors, it may also have been influenced by the Western deacon's dalmatic or the Jewish high priest's sleeveless tunic. It was adopted by all Greek metropolitans in 1433 and by Russian bishops in the 17th century.

Sakon Nakhon, town, northeastern Thailand. The town lies along the shore of Han Lake and is a road junction and agricultural market.

The surrounding region includes the forested Phu Phan range, the home of the Phu Thai people. The region sheltered the Free Thai during World War II and became a base for communist activities in the late 1950s. Northeast of the town is the Sakon Nakhon basin, which is drained by the Songkhram River (a Mekong tributary). The river's Nam Pung Dam is the basis of a large hydroelectric, irrigation, and flood-control scheme. Rice and fish are major products of the area. Pop. (1986 est.) 23,454.

Sakonnet River, inlet of the Atlantic Ocean, extending about 14 miles (23 km) to Mount Hope Bay, southeast Rhode Island, U.S. Although called a river, it is actually a saltwater strait separating Rhode (Aquidneck) Island from the mainland to the east. Sakonnet is an Indian name said to mean "haunt of the wild blackgoose." East of the river's mouth, at the southern tip of the mainland peninsula of Newport county, are Sakonnet Point and the resort village of Sakonnet.

Saktism (Hinduism): *see* Shaktism.

Sakuma Zōzan, also called SAKUMA SHŌZAN, original name SAKUMA KUNITADA (b. March 10, 1811, Matsudai, Shinano Province, Japan—d. Aug. 2, 1864, Kyōto), early and influential proponent of Westernization in Japan whose slogan "Eastern ethics and Western science" became the basis of the Japanese modernization effort in the late 19th century. Sakuma's ideas, especially as they became known through his colourful disciple Yoshida Shōin, provided one of the main inspirations for the Meiji Restoration, the movement that in 1868 returned the Japanese emperor to power and swept away the remnants of feudalism in the country.

After receiving a traditional Confucian education, Sakuma became one of the most trusted councillors of Sanada Yukitsura, a member of the council of advisers to the shogun, the hereditary military dictator of Japan. His espousal of Japan's adoption of Western technology, however, was at odds with the shogunate's xenophobic attitudes, and he and Sanada were forced to resign.

Sakuma devoted himself to Western studies, including the language of the Dutch, then the only Westerners with whom Japan had contact. Teaching himself to cast weapons and make glass, he worked to improve the armed strength and the agriculture of his small native fief of Matsuhiro. His success attracted many disciples, including some who later held important posts in the new government.

In 1854 Sakuma, in an effort to acquire more knowledge of the West, encouraged his disciple Yoshida Shōin to stow away on one of the ships of U.S. Commodore Matthew C. Perry, who was trying to induce Japan to open itself to trade and other relations with the West. When Yoshida was caught, both he and Sakuma were imprisoned but were spared the death penalty. Within a year Sakuma was released into the custody of his clan.

After the 1858 U.S.–Japan commercial treaty was signed, he became one of the most forceful advocates of the new policy of "opening the country." Meanwhile, those who believed the treaty betrayed Japanese tradition started a movement to overthrow the shogun and restore power to the emperor. Sakuma, who felt such a division in the country could be disastrous, was on a mission to help smooth relations between shogun and emperor when he was assassinated by a group of nationalistic samurai.

Sakurada Jisuke I, pseudonym SATO (b. 1734, Edo [now Tokyo]—d. 1806, Edo), Kabuki dramatist who created more than 120 plays and at least 100 dance dramas.

After completing his studies with Horikoshi Nisōji in 1762, he moved to Kyōto to write plays for a theatre there. On his return to Edo three years later he became chief playwright at the Morita-za (Morita Theatre). His play *Edo no hana wakayagi soga,* a success at the Ichimura-za in 1769, made his reputation, and for the next 40 years he was a leading playwright at Edo, becoming the chief writer for the Kabuki actors Ichikawa Danjūrō III and V and for Matsumoto Kōshirō V.

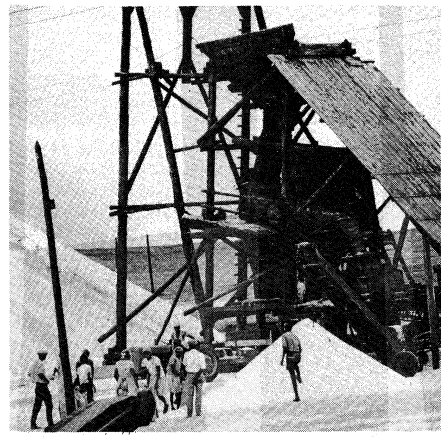
Sakurada's work is distinguished by its wit. He was an excellent satirist, excelled at *sewamono* ("contemporary domestic drama"), and became famous for his refined verse. Sakurada's name was adopted by a succession of disciples who achieved lesser prominence in the Kabuki theatre. Foremost among them were Sakurada Jisuke II (1768–1829) and Sakurada Jisuke III (1802–77).

Śākyamuni (Sanskrit: "Sage of the Śākyas"), epithet applied to Gautama Buddha. *See* Buddha.

Sakyapa (Buddhist sect): *see* Sa-skya-pa.

sal ammoniac: *see* ammonium chloride.

Sal Island, Portuguese ILHA DO SAL, northeasternmost island of Cape Verde, in the Atlantic Ocean, about 400 miles (640 km) off



Saltworks near Pedra Lume, Sal Island
Walter Imber

the coast of western Africa. It has an area of 83 square miles (216 square km) and rises to an elevation of 1,332 feet (406 m). Sal (Portuguese for "salt") is noted for its saltworks near the towns of Pedra Lume and Santa Maria, the island's chief town. The town of Espargo has an international airport. Pop. (1980) 5,826.

Salaberry-de-Valleyfield, English VALLEYFIELD, city and port, Montréal region, southern Quebec province, Canada. It lies on the south shore of the St. Lawrence River, at the east end of Lake Saint-François (St. Francis), which is a widening of the river. The settlement was built on a group of small islands in the river 25 miles (40 km) southwest of Montreal after a paper mill was established there in 1870. The abundant water and hydroelectric power, as well as the city's location at the head of the Beauharnois Canal section of the St. Lawrence Seaway, led to its development as a centre of the cotton-textile industry in the late 19th century. Other industries include



Salaberry-de-Valleyfield on Lake Saint-François, Quebec
By courtesy of the Department of Tourism, Fish and Game, Que.

the manufacture of drugs, chemicals, paper, bronze, canned goods, wood products, and tires. Salaberry-de-Valleyfield is the seat of a Roman Catholic bishopric and serves as an administrative, commercial, and cultural centre for the area. There are two colleges in the city. Pop. (1981) 29,574.

salad, any of a wide variety of dishes that fall into the following principal categories: green salads; vegetable salads; salads of pasta, legumes, or grains; mixed salads incorporating meat, poultry, or seafood; and fruit salads. Most salads are traditionally served cold, although some, such as German potato salad, are served hot.

The restorative powers of green salad have been celebrated since antiquity: "Eat cress and gain wit," advises a Greek proverb. The earliest salads were wild greens and herbs seasoned with salt; these were the first vegetable foods available in spring and acted as a tonic after a dull winter diet. Green salads are eaten at the beginning of a meal, with the entrée, or after the main course. Most leafy vegetables that can be eaten raw are used: all varieties of lettuce, garden cress and watercress, endives, cabbage, spinach, escarole, romaine (cos), arugula, and fresh herbs. Other vegetables, raw or cooked—tomatoes, onions, cucumbers, peppers, beets, and so on—may garnish the green salad. In France a piece of dry bread rubbed with garlic, a chapon, is sometimes tossed with the salad to season it. Caesar salad, invented in Tijuana, Mexico, in the 1920s, is a green salad of romaine with a highly seasoned dressing of pounded anchovies, olive oil, lemon juice, egg, and Parmesan cheese, garnished with croutons.

Vegetable salads may be marinated or sauced mixtures of raw or cooked vegetables. They are commonly based on tomatoes, green beans, cucumbers, beets, and mushrooms. Cole slaw (from the Dutch *kool,* "cabbage") is made of shredded or chopped cabbage with a mayonnaise or vinegar-based dressing. Some Middle Eastern salads are puréed or finely chopped cucumbers, eggplants, or chickpeas, mixed with *tahini* or yogurt. *Salade russe* is a variety of chopped cooked vegetables and potatoes bound with mayonnaise. Although they are sometimes served as hors d'oeuvres, salads of this type usually take the place of hot or cold vegetable side dishes. A similar function is served by salads based on rice, pasta, potatoes, dried beans, bulgur (cracked wheat), or other starches. Mixed salads are hearty versions of green, vegetable, and starchy salads. The addition of meat, poultry, seafood, eggs, or cheese transforms the dish into a light entrée. The julienne salad popular in the United States is a green salad garnished with narrow strips of cheese, chicken, ham, beef, and vegetables. The *salade niçoise* of France combines lettuce with potatoes, green beans, olives, tuna, tomatoes, and anchovies, all dressed with olive oil and vinegar. A Scandinavian specialty is a herring salad of finely chopped pickled herring, potatoes, beetroot, cold meats such as tongue or roast veal, onions, and apples.

Salads of fruit mixtures with sweet dressings are often eaten as desserts. Fruits may be added to green salads; avocado, orange, and grapefruit are suitable accompaniments to fatty meats such as duck or pork. Named for the Waldorf Hotel in New York City, the Waldorf salad is made of apples, walnuts, and celery in mayonnaise. Gelatins are often used in various fruit or vegetable salads.

The simplest salad dressings are mixtures of oil and vinegar (the usual proportion is three parts oil to one part vinegar); to this is added salt and pepper, herbs, and frequently Dijon mustard. In France a spoonful of the juices from a roast is sometimes added to the dressing. Creamy dressings are based on mayonnaise, sweet or sour cream, or a cooked sauce containing eggs, flour, milk, or cream. These dressings are often highly seasoned with crumbled blue cheese; green onions, garlic, anchovy paste, tarragon, and parsley (green goddess dressing); catsup, minced onion, olives, onion, parsley, and egg (Thousand Island dressing); and so on. The commercial "French" dressing widely used in the United States is a sweet, pungent mixture flavoured with tomato and vinegar.

Saladin, Arabic in full ṢALĀḤ AD-DĪN YŪSUF IBN AYYŪB (Righteousness of the Faith, Joseph, Son of Job), also called AL-MALIK AN-NĀṢIR ṢALĀḤ AD-DĪN YŪSUF I (b. 1137/38, Takrīt, Mesopotamia—d. March 4, 1193,

Damascus), Muslim sultan of Egypt, Syria, Yemen, and Palestine, founder of the Ayyūbid dynasty, and the most famous of Muslim heroes. In wars against the Christian crusaders, he achieved final success with the disciplined capture of Jerusalem (Oct. 2, 1187), ending its 88-year occupation by the Franks. The great Christian counterattack of the Third Crusade was then stalemated by Saladin's military genius.

Saladin was born into a prominent Kurdish family. On the night of his birth, his father, Najm ad-Dīn Ayyūb, gathered his family and moved to Aleppo, there entering the service of 'Imad ad-Dīn Zangī ibn Aq Sonqur, the powerful Turkish governor in northern Syria. Growing up in Ba'lbek and Damascus, Saladin was apparently an undistinguished youth, with a greater taste for religious studies than military training.

His formal career began when he joined the staff of his uncle Asad ad-Dīn Shīrkūh, an important military commander under the *amīr* Nureddin, son and successor of Zangī. During three military expeditions led by Shīrkūh into Egypt to prevent its falling to the Latin-Christian (Frankish) rulers of the states established by the First Crusade, a complex, three-way struggle developed btween Amalric I, the Latin king of Jerusalem, Shāwar, the powerful vizier of the Egyptian Fāṭimid caliph, and Shīrkūh. After Shīrkūh's death and after ordering Shāwar's assassination, Saladin, in 1169 at the age of 31, was appointed both commander of the Syrian troops and vizier of Egypt. His relatively quick rise to power must be attributed not only to the clannish nepotism of his Kurdish family but also to his own emerging talents. As vizier of Egypt, he received the title king (*malik*), although he was generally known as the sultan.

Saladin's position was further enhanced when, in 1171, he abolished the Shī'ī Fāṭimid caliphate, proclaimed a return to Sunnah in Egypt, and consequently became its sole ruler. Although he remained for a time theoretically a vassal of Nureddin, that relationship ended with the Syrian emir's death in 1174. Using his rich agricultural possessions in Egypt as a financial base, Saladin soon moved into Syria with a small but strictly disciplined army to claim the regency on behalf of the young son of his former suzerain. Soon, however, he abandoned this claim, and from 1174 until 1186 he zealously pursued a goal of uniting, under his own standard, all the Muslim territories of Syria, northern Mesopotamia, Palestine, and Egypt. This he accomplished by skillful diplomacy backed when necessary by the swift and resolute use of military force. Gradually, his reputation grew as a generous and virtuous but firm ruler, devoid of pretense, licentiousness, and cruelty. In contrast to the bitter dissension and intense rivalry that had up to then hampered the Muslims in their resistance to the crusaders, Saladin's singleness of purpose induced them to rearm both physically and spiritually.

Saladin's every act was inspired by an intense and unwavering devotion to the idea of *jihād* ("holy war")—the Muslim equivalent of the Christian crusade. It was an essential part of his policy to encourage the growth and spread of Muslim religious institutions. He courted its scholars and preachers, founded colleges and mosques for their use, and commissioned them to write edifying works especially on the *jihād* itself. Through moral regeneration, which was a genuine part of his own way of life, he tried to re-create in his own realm some of the same zeal and enthusiasm that had proved so valuable to the first generations of Muslims when, five centuries before, they had conquered half the known world.

Saladin also succeeded in turning the military balance of power in his favour—more by uniting and disciplining a great number of unruly forces than by employing new or improved military techniques. When at last, in 1187, he was able to throw his full strength into the struggle with the Latin crusader kingdoms, his armies were their equals. On July 4, 1187, aided by his own military good sense and by a phenomenal lack of it on the part of his enemy, Saladin trapped and destroyed in one blow an exhausted and thirst-crazed army of crusaders at Ḥaṭṭīn, near Tiberias in northern Palestine. So great were the losses in the ranks of the crusaders in this one battle that the Muslims were quickly able to overrun nearly the entire Kingdom of Jerusalem. Acre, Toron, Beirut, Sidon, Nazareth, Caesarea, Nābulus, Jaffa (Yafo), and Ascalon (Ashqelon) fell within three months. But Saladin's crowning achievement and the most disastrous blow to the whole crusading movement came on Oct. 2, 1187, when Jerusalem, holy to both Muslim and Christian alike, surrendered to the Sultan's army after 88 years in the hands of the Franks. In stark contrast to the city's conquest by the Christians, when blood flowed freely during the barbaric slaughter of its inhabitants, the Muslim reconquest was marked by the civilized and courteous behaviour of Saladin and his troops.

His sudden success, which in 1189 saw the crusaders reduced to the occupation of only three cities, was, however, marred by his failure to capture Tyre, an almost impregnable coastal fortress to which the scattered Christian survivors of the recent battles flocked. It was to be the rallying point of the Latin counterattack. Most probably, Saladin did not anticipate the European reaction to his capture of Jerusalem, an event that deeply shocked the West and to which it responded with a new call for a crusade. In addition to many great nobles and famous knights, this crusade, the third, brought the kings of three countries into the struggle. The magnitude of the Christian effort and the lasting impression it made on contemporaries gave the name of Saladin, as their gallant and chivalrous enemy, an added lustre that his military victories alone could never confer on him.

The Crusade itself was long and exhausting, and, despite the obvious, though at times impulsive, military genius of Richard I the Lion-Heart, it achieved almost nothing. Therein lies the greatest—but often unrecognized—achievement of Saladin. With tired and unwilling feudal levies, committed to fight only a limited season each year, his indomitable will enabled him to fight the greatest champions of Christendom to a draw. The crusaders retained little more than a precarious foothold on the Levantine coast, and when King Richard set sail from the Orient in October 1192, the battle was over. Saladin withdrew to his capital at Damascus. Soon, the long campaigning seasons and the endless hours in the saddle caught up with him, and he died. While his relatives were already scrambling for pieces of the empire, his friends found that the most powerful and most generous ruler in the Muslim world had not left enough money to pay for his grave. (P.W.)

BIBLIOGRAPHY. On the sources, see H.A.R. Gibb, "The Arabic Sources for the Life of Saladin," *Speculum*, 25:58–72 (1950). C.W. Wilson's English translation, *The Life of Saladin* (1897), of one of the most important Arabic works has recently been reprinted (1971). The best biography to date is Stanley Lane-Poole, *Saladin and the Fall of the Kingdom of Jerusalem*, new ed. (1926, reprinted 1964), although it does not take account of all the sources.

Salado Formation, evaporite deposit and a major world source for potassium salts that occurs in the region of the Guadalupe Mountains of western Texas. In the Delaware Basin it reaches a maximum thickness of about 720 metres (2,400 feet).

The Salado Formation is a division of the Ochoan Stage of the Upper Permian Series of rock strata (the Permian Period began about 280,000,000 years ago and lasted about 55,000,000 years). It overlies the Castile Formation and is found beneath the Rustler Formation. The Salado evaporites are halite with interbedded lenses of potash salts such as sylvite, carnallite, and polyhalite. The formation was named for Salado (Spanish: "salty") Wash in Loving County, Texas, where exposures were found.

Salado River, Spanish RÍO SALADO, river in northeastern Buenos Aires province, Argentina, rising at Laguna (lake) El Chañar, which lies at an elevation of 130 ft (40 m) above sea level on the border of Santa Fe province. It flows through the Pampa, generally southeastward for approximately 400 mi (640 km) to the Atlantic Ocean, where it empties into Bahía Samborombón (Samborombón Bay), 105 mi southeast of the city of Buenos Aires.

The meandering course past Junín, Roque Pérez, and General Belgrano often flows through small lakes and marshland. Peripheral canalization of the lower course has improved the river's drainage system. Before 1800 the Salado marked the frontier between Spanish colonization (to the northeast) and indigenous Indians (to the southwest).

Salado River, Spanish RÍO SALADO, river in northeastern Mexico, rising in the Sierra Madre Oriental in Coahuila state and flowing generally east-northeastward for approximately 175 mi (280 km) into the lake created by the Venustiano Carranza Dam at Don Martín. Leaving the reservoir, the Salado, joined by the Sabinas, winds southeastward for 110 mi (175 km) through northern Nuevo León and northwestern Tamaulipas states, joining the Falcón Reservoir on the Rio Grande (Río Bravo del Norte) opposite Zapata, Texas. The Salado is of considerable economic importance, for its waters are used extensively for irrigation, particularly for cotton growing.

Ṣalāh ad-Dīn, *muḥāfaẓah* (governorate), north central Iraq, with an area of 11,198 sq mi (29,004 sq km). The Tigris River runs from north to south through the central part of the governorate, which is mostly arid. Some irrigated areas near the river support plantations of palm trees, vineyards, and orchards. Its capital, Tikrit, lies 120 mi (150 km) north of Baghdad, the national capital, and is the original home of many members of the Ba'th party leadership including Saddām Hūssein, the fourth president of Iraq.

In 1971 the Iraqi air force-affiliated college and flight schools moved to Tikrit from Rashīd Airbase. In mid-1977 the Arabian Gulf Academy for Naval studies was opened. Pop. (1977) 363,819.

Ṣalāḥ ad-Dīn Yūsuf ibn Ayyūb (Muslim sultan): *see* Saladin.

Sălaj, *judeţ* (district), northwestern Romania, occupying an area of 1,486 sq mi (3,850 sq km). The Western Carpathian Mountains, including the Şes Mountain range, rise above settlement areas in the valleys. The district is drained northwestward by the Someş River and its tributaries. Zalău (*q.v.*) is the district capital. Metal products, building materials, timber, and foodstuffs are produced in Zalău and Şimleu Silvaniei. Lignite mines are operated in Sărmăşag, Bobota, and Ip. Other towns include Jibou, Cehu Silvaniei, Şimleu Silvaniei, and Gîlgău. Agricultural activities consist of livestock raising, cereal growing, and viticulture.

An archaeological museum, located in Zalău, contains artifacts dating from prehistoric times and from the Roman occupation. Highway connections extend through the larger

towns, and an east–west railway connection crosses the district. Pop. (1984 est.) 267,687.

śalākāpuruṣa (religion): *see* mahāpuruṣa.

Ṣalālah, town in Oman, in the southern part of the country, on the coast of the Arabian Sea. The town is the historic centre of Dhofar, famous in ancient times as a source of frankincense, and was described by Marco Polo in the 13th century as a prosperous city. Although it declined in wealth and importance in succeeding centuries, Ṣalālah did not come under the rule of the sultans of Oman until the 1800s. From 1932 until he was deposed in July 1970, Sultan Sa'id ibn Taymūr ruled the country, then called Muscat and Oman, from Ṣalālah.

After an insurrection centred in Dhofar ended in the mid-1970s, the government began to develop the Ṣalālah area. Projects completed during the 1970s included a large modern hospital and a hotel; the town's airport was improved to meet international standards. The government also finished building a paved road in the 1980s linking Ṣalālah with the north. The town trades in agricultural products from the surrounding coastal plain. Ṣalālah's port is located at Raysūt, to the southwest.

Salam, Abdus (b. Jan. 29, 1926, Jhang Maghiāna, Punjab, India), Pakistani nuclear physicist, corecipient with Steven Weinberg and Sheldon Lee Glashow (*qq.v.*) of the 1979 Nobel Prize for Physics for work in formulating a theory that encompasses both the electromagnetic interaction and the so-called weak interaction of elementary particles (*see* fundamental interaction). He was the first Pakistani to win a Nobel Prize.

Salam attended the Government College at Lahore. In 1952 he received his Ph.D. in mathematics and physics from the University of Cambridge. He returned to the Government College as professor of mathematics, 1951–54, and then went back to Cambridge as a lecturer in mathematics. He became professor of theoretical physics at the Imperial College of Science and Technology, London, in 1957 and director of the International Centre for Theoretical Physics at Trieste, Italy, in 1964.

Salamá, city, central Guatemala. It lies between the Chuacús Mountains and the Minas Mountains on the Salamá River, a tributary of the Chixoy, at 3,084 feet (940 m) above sea level. Salamá is a commercial and manufacturing centre for its agricultural and pastoral hinterland. The city suffered serious damage from the earthquake of 1976.

Salamá is accessible by road from San Cristóbal Verapaz and from Guatemala City, 37 miles (60 km) to the southwest. There is an airfield at nearby San Jerónimo. Pop. (1981 prelim.) mun., 115,206.

Salama, ABBA: *see* Frumentius, Saint.

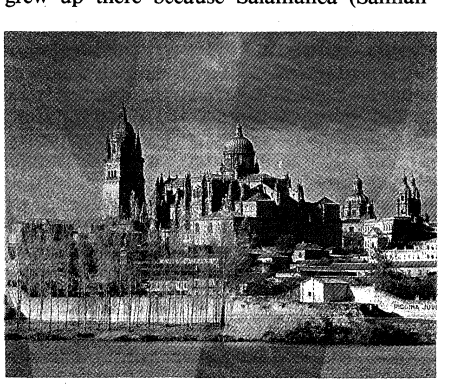
Salamanca, city, south-central Guanajuato state, central Mexico. It lies on the Lerma River at an elevation of 5,647 feet (1,721 m) above sea level.

Salamanca is an important agricultural and commercial centre, its central location in the fertile Bajío region giving it the name Granary of Mexico. Wheat, corn (maize), beans, chick-peas, fruits, and legumes all thrive in the temperate climate. The city is a prominent industrial centre, having a petroleum refinery as well as flour and textile mills, tanneries, chemical plants, and potteries. The city is also a transportation centre, where both a branch railroad line and a highway join the Mexico City–Ciudad Juárez routes. Pop. (1980) 160,040.

Salamanca, province, in the autonomous community (region) of Castile-León, western Spain. It is bounded by Portugal (west) and the provinces of Zamora and Valladolid (north), Ávila (east), and Cáceres (south); its northern boundary is marked by the Duero (Portuguese Douro) River. It has an area of 4,763 square miles (12,336 square km), more than half of which is in the Meseta Central, the central plateau of Spain.

The Peña de Francia Mountains rise in the south to their highest point at Peña de Francia (5,653 feet [1,723 m]), which is crowned by a monastery and hostel. This part of the province is richly forested. The Gata Mountains lie along the boundary with Cáceres. In spite of the province's dryness, vegetables, including sugar beets, and cereals, especially wheat, are cultivated. Livestock and fighting bulls are raised. There is little industry. Notable cities are Ciudad-Rodrigo, Salamanca (the historic provincial capital), and Béjar, famous for its textiles. Pop. (1986 est.) 366,929.

Salamanca, city, capital of Salamanca province, in the autonomous community (region) of Castile-León, west-central Spain. The city lies at an elevation of 2,552 feet (778 m) above sea level on the north bank of the Tormes River; it is one of Spain's greatest historic and artistic cities. As an important Iberian settlement, it was ravaged by the Carthaginian general Hannibal in 217 BC. A Roman town grew up there because Salamanca (Salmantica) and its bridge were on the "Silver Road" from Astorga to Seville. It became a bishopric in the 7th century, though during the Moorish occupation the bishop lived in Oviedo. From the 8th to the 11th century, the city was in the area of warfare between Christians and Moors. The Christian repopulation took place from 1087 to 1102. In 1178 Ferdinand II of Leon held his Cortes (Parliament) there and granted a special *fuero* (charter of privileges) to the city, which was by then the second in his kingdom. The University of Salamanca originated under Alfonso IX in 1218. Saint Teresa of Ávila founded a Carmelite convent in the city in 1570. In the Spanish Civil War (1936–39) General Francisco Franco took up residence in the episcopal palace in Salamanca.



The new cathedral (completed in the 18th century) and the Romanesque old cathedral (begun *c.* 1140) at Salamanca, Spain

Paul Almasy

Salamanca's many outstanding architectural and historical landmarks include the Romanesque old cathedral (begun *c.* 1140) and the new cathedral (begun 1513 and completed in the 18th century). The main building of the university (1415–33), facing the new cathedral, has a fine Plateresque west facade (1494). Adjoining buildings include the former residence of the university's most famous rector, the scholar and writer Miguel de Unamuno, with his library and personal relics. To the south of the new cathedral stand the Neoclassical Colegio de Anaya (1760–68), designed by José Mamerto Hermosilla and containing the faculties of science and of philosophy and letters; and the only remaining old residential college, the Colegio de Fonseca (1527–78), generally known as the Colegio de los Irlandeses because it was ceded after the Peninsular War (1808–14) to the Irish (Irlandeses) as a seminary and so used until World War II. The faculty of law adjoins the university, and the new faculty of medicine is in the valley to the west. Three residential colleges for students, the first of their kind in Spain, were built in the 1950s.

The former Jesuit seminary (1617–1755) is now the Pontifical University, most of whose students are priests or seminarians; the Jesuits still officiate in its church of La Clerecía. Also notable are the Italian-style church of the convent of the Augustinians (1636–87), containing a painting of the "Immaculate Conception" by José de Ribera; the Dominican convent and church of San Esteban (1524–1610), older remaining portions of which include the cloister where Christopher Columbus was reputedly examined by the Council of Theologians in 1486; the Romanesque church of St. Thomas of Canterbury (rebuilt 15th century); and the 12th-century church of San Martín.

The city still centres on its fine arcaded Plaza Mayor (1729–33; designed by Alberto de Churriguera and completed by Andrés García de Quiñones), which was originally intended to serve on occasion as a bullring and which has a surrounding arcade ornamented on two sides with medallions of the kings of Spain and General Franco. There also is the Town Hall (Ayuntamiento) designed by Alberto de Churriguera. Other secular landmarks include the Roman bridge, 15 of whose arches date from Roman times; the Torre del Clavero (*c.* 1480), almost all that remains of the town walls; the legendary Cave of Salamanca in the ruined crypt of the former church of St. Cyprian; and the 16th-century Casa de las Conchas, the walls of which are covered with carvings of scallop shells, the symbol of the military Order of Santiago of which its first owner, Talavera Maldonado, was chancellor.

A military airfield is 12 miles (19 km) east at Matacán. The city serves as an agricultural centre (grains) and has a few factories, but tourism is the economic mainstay. Pop. (1986 est.) 161,991.

Consult the INDEX *first*

Salamanca, University of, Spanish UNIVERSIDAD DE SALAMANCA, state institution of higher learning at Salamanca, Spain. It was founded in 1218 under Alfonso IX, but its real beginnings date from 1254, when, under Alfonso X, grandson of the founder, three chairs in canon law and one each in grammar, arts, and physics were established. From that time until the end of the 16th century, Salamanca was one of the leading centres of learning in Europe, ranking with Paris, Bologna, and Oxford. Francisco de Vitoria, in his lectures there (1526–46), set forth some of the fundamental principles of international law, and the scholar and poet Luis de León lectured in the university from 1561 until his death in 1591, except for the years 1572–76, when he was a prisoner of the Inquisition on a charge of unorthodoxy; a room in the university is still known as his *aula* (lecture hall).

The university was at its peak in 1584, with nearly 7,000 students. A decline began at the end of the 16th century, and by 1875 enrollment was down to 391. In the early 19th century, a quarter of Salamanca containing many university buildings was destroyed by the French when the defeat of Napoleon ended their occupation of Spain (for its present buildings, *see* Salamanca). The university continued ecclesiastical until 1835, after which it was forcibly secularized. The contemporary university has faculties of philosophy and letters, law, science, medicine, and pharmacy.

salamander, any member of a group of about 320 species of amphibians that have tails and that constitute the order Urodela (or Caudata). The order comprises nine families, among which are newts and salamanders proper (family Salamandridae) as well as hellbenders, mud puppies, and lungless salamanders. They most commonly occur in freshwater and damp woodlands, principally in temperate regions of the Northern Hemisphere.



Salamander (*Salamandra terrestris*)
Jacques Six

A brief treatment of salamanders follows. For full treatment, *see* MACROPAEDIA: Amphibians.

Salamanders are generally short-bodied, four-legged, moist-skinned animals, about 10 to 15 cm (4 to 6 inches) long. They are often boldly patterned or brightly coloured. The largest of the order is the giant salamander, *Andrias japonicus,* of Japan, which grows to 180 cm (70 inches) in length and to a weight of 25 kg (55 pounds).

Typical salamanders undergo a larval stage that lasts for a period of a few days to several years. Larval forms have external gills and teeth in both jaws and lack eyelids. These and other larval features may persist into sexual maturity—a condition known as neoteny. A mud puppy (*Necturus maculosus*) of eastern North America and the axolotl (*Ambystoma mexicanum*) of central Mexico are common species that exhibit this phenomenon.

Salamanders feed on insects, worms, snails, and other small animals, including members of their own species. Like other amphibians, they absorb water through their skins, and they require a moist habitat. In regions where the temperature goes below freezing, they often hibernate.

Most adult salamanders hide by day and feed by night. Some remain hidden underground until the breeding season, or they may emerge only when levels of moisture and temperature are appropriate. Many species, especially in the family Plethodontidae, are strictly terrestrial and avoid ponds and streams.

Fertilization in primitive forms (suborder Cryptobranchoidea) is external. In higher forms, fertilization is usually internal; males of such forms often produce a spermatophore, or sperm case, which the female takes into her body through the cloacal opening. Breeding often occurs in the water, but certain members of the Salamandridae and most species of the Plethodontidae families breed on land.

Salamanes Hermeios Sozomenos: *see* Sozomen.

Salamis, principal city of ancient Cyprus, located on the east coast of the island, north of modern Famagusta. According to the Homeric epics, Salamis was founded after the Trojan War by the archer Teucer, who came from the island of Salamis, off Attica. This literary tradition probably reflects the Sea Peoples' occupation of Cyprus (*c.* 1193 BC), Teucer perhaps representing Tjekker of the Egyptian records. Later, the city grew because of its excellent harbour; it became the chief Cypriot outlet for trade with Phoenicia, Egypt, and Cilicia.

Salamis came under Persian control in 525 BC. In 306 BC Demetrius I Poliorcetes of Macedonia won a great naval victory there over Ptolemy I of Egypt. Salamis was sacked in the Jewish revolt of AD 115–117 and suffered repeatedly from earthquakes; it was completely rebuilt by the Christian emperor Constantius II (reigned AD 337–361) and given the name Constantia. Under Christian rule, Salamis was the metropolitan see of Cyprus. Destroyed again by the Arabs under Muʿāwiyah (*c.* 648), the city was thereafter abandoned.

Salamis, Modern Greek SALAMÍS, island (*nísos*) and town, *nomós* (department) of Attikí, Greece, in the Saronic Gulf of the Aegean Sea, west of the city of Piraeus. The town (the present combined municipality of Salamís–Naústathmos) is a port on the west coast of the island. On the east, between the island and the mainland, are the straits in which the Greeks won a decisive naval victory over the Persians in 480 BC. Pop. (1981) town, 20,437; island, 28,574.

Salamis, Battle of (480 BC), battle in the Greco-Persian Wars in which a Greek fleet defeated much larger Persian naval forces in the straits at Salamis, between the island of Salamis and the Athenian port-city of Piraeus. By 480 the Persian king Xerxes and his army had overrun much of Greece, and his navy of about 800 galleys bottled up the smaller Greek fleet of about 370 triremes in the Saronic Gulf. The Greek commander, Themistocles, then lured the Persian fleet into the narrow waters of the strait at Salamis, where the massed Persian ships had difficulty maneuvering. The Greek triremes then attacked furiously, ramming or sinking many Persian vessels and boarding others. The Greeks sank about 300 Persian vessels while losing only about 40 of their own. The rest of the Persian fleet was scattered, and as a result Xerxes had to postpone his planned land offensives for a year, a delay that gave the Greek city-states time to unite against him. The Battle of Salamis was the first great naval battle recorded in history.

Salan, Raoul(-Albin-Louis) (b. June 10, 1899, Roquecourbe, Fr.—d. July 3, 1984, Paris), French military officer who sought to prevent Algeria from gaining independence from France. In 1961–62 he led an organization of right-wing extremists, the Organisation de l'Armée Secrète (OAS; Secret Army Organization), in a campaign of terror against the government of Charles de Gaulle in both France and Algeria before being captured, tried, and imprisoned.

Salan, the son of a doctor, was educated at the military academy at Saint-Cyr (1917–18) and served briefly in World War I, receiving the Croix de Guerre. (By the end of his military career, he had become the most decorated man in the French army.) Between the world wars he was attached in various capacities to the Ministry of Colonies, and in 1941–43 he served with the Free French forces in French West Africa. After participating in the Allied invasion of France in 1944, he went to Indochina in 1945 and was commander in chief there during 1952–53.

He was posted to Algeria in 1956, and in 1958 he was one of the coterie of right-wing military and political figures who rose up against the French Fourth Republic and called Charles de Gaulle to power, thereby establishing the Fifth Republic. When de Gaulle slowly moved toward giving Algeria its independence, Salan felt himself betrayed and was one of four generals who led an abortive military insurrection in Algeria on April 22, 1961. When the coup collapsed four days later, Salan went into hiding and directed the OAS' campaign of terrorism and sabotage in France and Algeria. He was not captured by the French authorities until a year later, on April 20, 1962. In May he was tried for treason and was sentenced to life imprisonment. Salan was freed in 1968 in an amnesty, and his full rank and pension were restored to him by the French president François Mitterand in 1982.

Salandra, Antonio (b. Aug. 13, 1853, Troia, Puglia, Kingdom of the Two Sicilies [Italy]—d. Dec. 9, 1931, Rome), Italian statesman who was premier at the beginning of World War I (1914–16).

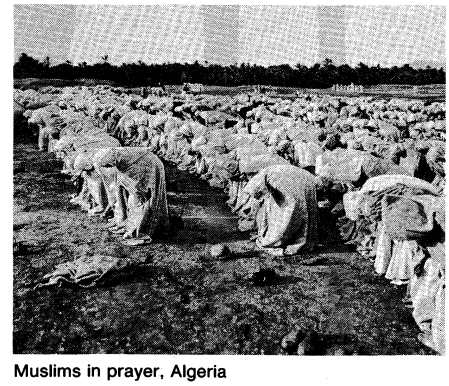
Salandra was educated in law and taught public administration at the University of Rome before entering politics. A member of a wealthy family and a conservative, he rose to become minister of agriculture in 1899 and finance minister in 1906 and again in 1909–10. He became premier in March 1914 and so was confronted with a critical decision on the outbreak of World War I in July. Despite the generation-old Triple Alliance of Germany, Austria-Hungary, and Italy, Salandra chose neutrality, taking for legal ground the failure of the Austrians to consult the Italian government before their attack on Serbia. Salandra then used Italy's strong position to bargain with both sides, at length bringing his country into the war on the side of the Allies in May 1915 on the basis of definite promises of the completion of Italian unification by acquisition of territory from Austria-Hungary.

In 1916 Salandra was forced to resign as a result of Italy's growing military difficulties. After the war his authoritarian conservatism led him to support Benito Mussolini and fascism, but, when the extreme course of the new regime became clear, he modified his support. Nevertheless, Mussolini made him a senator in 1928.

salat, also spelled SALAH, Arabic ṢALĀT, the daily ritual prayer enjoined upon all Muslims as one of the five Pillars of Islām (*arkān al-Islām*). There is disagreement among Islāmic scholars as to whether some passages about prayer in the Muslim sacred scripture, the Qurʾān, are actually references to the salat. Within Muḥammad's lifetime five ritual prayers, each preceded by ablution, were observed: *ṣalāt al-fajr* (dawn), *aẓ-ẓuhr* (midday), *al-ʿaṣr* (afternoon), *al-maghrib* (sunset), and *al-ʿishāʾ* (evening). Under such special circumstances as illness, a journey, or war, a modification or limited postponement of these salats is allowed.

Though individual performance of salat is permissible, collective worship in the mosque has special merit. With their faces turned in the direction of the shrine of the Kaʿbah in Mecca, the worshipers align themselves in parallel rows behind the imam, or prayer leader, who directs them as they execute the rakʿahs (physical postures coupled with Qurʾānic recitations).

On Fridays, instead of the prayer just after noon, a congregational prayer (*ṣalāt al-jumʿah*) is offered; it includes two sermons



Muslims in prayer, Algeria
H. Roger-Viollet

(khutbah) delivered from the pulpit. Special congregational prayers are offered in the middle of the morning on the two festival days (*ʿīds*), one immediately following the month of fasting, Ramaḍān, and the other following the pilgrimage, or hajj. Although not obligatory, individual devotional prayers, especially during the night, are emphasized and are a common practice among pious Muslims.

Salatiga, *kotamadya* (municipality), Jawa Tengah *provinsi* ("province"), Java, Indonesia. The city lies 35 miles (56 km) north-northeast of Yogyakarta, at the foot of Mount Merbabu. At an elevation of 1,916 feet (584 m), it is a well laid out city that stands in the midst of fruit- and vegetable-growing highlands. The nearby hills are covered with plantations of rubber and coffee, and rice fields stretch before the peaks of a chain of volcanic mountains, now dormant. Most of the population is Javanese, with a mixture of Chinese and Indians, the latter mostly traders and merchants. The city is a centre of trade and transshipment for rice, corn (maize), rubber, cassava, coffee, cacao, and cinchona. Industries include rice milling, sawmilling, coffee and rubber processing, manufacture of machine tools and agricultural equipment, and textile production. Crafts include wood carving, plaiting, batik printing, bamboo working, and basket weaving. The Satya Wacana Christian University, originally founded as a private Christian teacher-training college in 1956, is located there. Kopeng, a hill resort (4,593 feet [1,400 m]), is about 9 miles (14 km) to the south of Salatiga. Pop. (1980) 85,849.

Salatis (king of Egypt): *see* Salitis.

Salavat, city, Bashkir Autonomous Soviet Socialist Republic, western Russian Soviet Federated Socialist Republic, on the Belaya (White) River. It was founded in 1948 as a major oil centre of the Volga–Urals oil field, and the city has a large refinery and petrochemical industry. Technical glass and machinery for the petroleum industry are also produced in Salavat. A network of pipelines links Salavat to the petroleum-drilling areas. Pop. (1989 prelim.) 150,000.

Salayar (Indonesia): *see* Selayar.

Salazar (Angola): *see* Ndalatando.

Salazar, António de Oliveira (b. April 28, 1889, Vimieiro, Port.—d. July 27, 1970, Lisbon), economist who as prime minister governed Portugal for 36 years (1932–68).

Salazar, the son of an estate manager at Santa Comba Dão, was educated at the seminary at Viseu and at the University of Coimbra. He graduated from there in law in 1914 and became a professor specializing in economics at Coimbra. He helped form the Catholic Centre Party in 1921 and was elected to the Cortes (parliament), but he resigned after one session and returned to the university. In May 1926, after the army had overthrown Portugal's parliamentary government, Salazar was offered the Cabinet post of minister of finance, but he could not obtain his own conditions. In 1928 General António Óscar de Fragoso Carmona, as president, offered him the finance ministry with complete control over the government's income and expenditures, and this time Salazar accepted. As finance minister, he reversed the century-old tradition of deficits and made budgetary surpluses the hallmark of his regime. The surpluses were invested in a series of development plans.



Salazar
EB Inc.

Gaining in power, Salazar was named prime minister by Carmona on July 5, 1932, and thus became the strong man of Portugal. He drafted a new constitution that reorganized Portugal's political system along authoritarian lines. Salazar called his new order in Portugal the New State (Estado Novo). The National Assembly was composed solely of government supporters, and Salazar chose his own ministers, whose work he closely supervised. Political freedoms in Portugal were thus curtailed, and attention was concentrated on economic recovery.

Owing to the crises occasioned by the Spanish Civil War and World War II, Salazar served as minister of war (1936–44) and minister of foreign affairs (1936–47) in addition to holding the office of prime minister. He was friendly with Francisco Franco and recognized the Nationalist government in Spain in 1938, but he kept Portugal neutral in World War II and led the country into the North Atlantic Treaty Organization in 1949. After World War II, Portugal's railways, road transport, and merchant navy were reequipped, and a national airline was instituted. Electrification was planned for the whole country, and rural schools were developed. However, Salazar's insistence on maintaining Portugal's colonies in Africa could only be sustained with difficulty at a time when the other European colonial empires in Africa were being dismantled.

Salazar suffered a stroke in September 1968 and was unable to continue his duties. He was replaced as prime minister by Marcelo Caetano, a change that the disabled Salazar was never told had taken place. He died two years later. Salazar lived a life of frugal simplicity, shunning publicity, rarely making public appearances, and never leaving Portugal.

Salcedo, city, northern Dominican Republic. It lies in the fertile Cibao Valley between the mountain chains of the Cordillera Central and the Cordillera Septentrional. Salcedo serves as a commercial centre for the agricultural hinterland, which yields principally cacao, coffee, and corn (maize). It is accessible by secondary highway from San Francisco de Macorís and Moca. Pop. (1981) 10,651.

Salchow, (Karl Emil Julius) Ulrich (b. Aug. 7, 1877—d. April 19, 1949, Stockholm, Swed.), Swedish figure skater who established a record by winning 10 world championships for men (1901–05, 1907–11). At the 1908 Games in London, he won the first Olympic gold medal awarded for men's figure skating.

Salchow originated the Salchow jump, a maneuver frequently used in the free-skating division of figure-skating competition. From 1925 to 1937 he served as president of the International Skating Union, and from 1919 to 1932 he was a member of the Swedish amateur boxing committee.

In performing the basic Salchow jump, the skater takes off from the rear inside edge of one skate, makes one full turn in the air, and lands on the rear outside edge of the other skate.

Salcillo, Francisco: *see* Salzillo (y Alcaraz), Francisco.

Saldanha, João Carlos de Saldanha, duque de (duke of), in full JOÃO CARLOS GREGÓRIO DOMINGUES VICENTE FRANCISCO DE SALDANHA OLIVEIRA E DAUM, DUQUE DE SALDANHA (b. Nov. 17, 1790, Azinhaga, Port.—d. Nov. 21, 1876, London, Eng.), Portuguese military officer and statesman who was prominent in Portugal's turbulent politics for half a century.

Saldanha joined the Portuguese army at an early age and fought in the Peninsular War (1808–14) in Portugal and Brazil. He was appointed captain general of the Brazilian province of Rio Grande do Sul in 1821 but returned to Portugal in 1823, following Brazilian independence. Now a general, he was appointed military governor of Oporto in 1825. After the accession of Pedro IV in 1826, Saldanha was responsible for the proclamation in Portugal of Pedro's constitutional charter. He was created Count de Saldanha in 1827, but he emigrated to London in October of that year, when Pedro's brother, Dom Miguel, became regent. After the regent was proclaimed King Miguel I in 1828, Saldanha led two unsuccessful missions against him, in Portugal (1828) and the Azores (1829).

Saldanha went to France, returning to Portugal in 1833 to fight for Pedro against Miguel in the war that ended in Miguel's abdication (May 1834). Saldanha was then created marquês, and, following the accession of Maria II (September 1834), he headed the government from May to November 1835. He took part in an unsuccessful revolution in 1837 and was exiled. Returning to Portugal in 1846, he was created Duke de Saldanha (1847) and headed the government in 1847–49 and 1851–56.

During his second term, Saldanha helped foster a realignment of Portugal's political factions into two new parties, the Regenerators and the Progressists, a program that helped promote stability. Saldanha's government also established a Ministry of Public Works and undertook some economic reforms. Saldanha served in various ambassadorial posts between 1862 and 1869. In 1870 he led a coup that briefly brought him to power. He later became ambassador to London.

Saldanha Bay, Afrikaans SALDANHABAAI, deep, essentially landlocked harbour of the Atlantic Ocean, on the southwest coast of South Africa. Named after the early 16th-century Portuguese navigator António de Saldanha, it is both larger and safer than Table Bay, 65 miles (105 km) farther south-southeast. The bay's former abundance of seals, fish, and guano deposits was long contested between French, English, and Dutch interests, with exploitation restricted only by a lack of fresh water in the area.

Important harbour works, exporting chiefly high-grade iron ore, were opened at Saldanha Bay in 1976; and air and naval bases, along with the nation's professional military academy are located nearby. Commercial fishing is significant in the adjacent Atlantic waters.

Sale, coastal city, southeastern Victoria, Australia. It lies along the Thomson River near the latter's junction with the Macalister. Sale is the major regional centre for East Gippsland, an irrigated area of intensive farming and livestock raising. Founded in 1845, the settlement was named after Sir Robert ("Fighting Bob") Sale, a British general who fought in India. It grew as an early river port and became successively a borough (1863), town (1924), and city (1950).

Sale is connected to Melbourne (115 mi [185 km] west) by rail and is on the Gippsland and Prince's highways. Its industries include foundry and joinery working, plastics and other manufacturing, and a gas absorption plant fed from the gas field in Bass Strait with a pipe link to Melbourne. The city is near the Gippsland Lakes (lagoons) and the Ninety Mile Beach of the south coast, and tourism is an added source of income. It is also an

educational centre and the seat of Anglican and Roman Catholic bishoprics. Pop. (1981) 12,968.

Salé, Arabic SLA, old walled city on the Atlantic coast of Morocco. It lies at the mouth of the Wadi Bou Regreg, opposite Rabat. Founded in the 10th century, it reached its zenith as a medieval merchant port and entrepôt. After 1627 Salé—with Rabat as its vassal—became the corsair republic of Bou Regreg and the base for the notorious Sallee Corsairs, the most dreaded of the Barbary pirates; because of this, it was frequently bombarded by European naval squadrons. The



Salé, Morocco
De Wys Inc.

two communities grew together until the right bank of the Wadi Bou Regreg silted up and Salé port was closed. The city is a concentration of mosques and mausoleums; the most venerated sanctuary is the tomb of Sīdī 'Abd Allāh ibn Ḥasan, Salé's patron saint. Pop. (1982) 289,391.

Salekhard, also spelled SALECHARD, formerly (until 1933) OBDORSK, city and centre of Yamalo-Nenets autonomous *okrug* (district), Tyumen *oblast* (province), Russian Soviet Federated Socialist Republic, in northwestern Siberia. It lies on the Poluy River at its entrance to the Ob River.

Salekhard was founded in 1595 and became a city in 1938. Fish canning and sawmilling reflect the regional economy. It is also a base for the northern gas fields of western Siberia. Teacher-training and medical colleges are located in the city. Pop. (1975 est.) 26,000.

Salem, town, north-central Tamil Nādu state, southeastern India. It is on the Tirumanimuttar River near Āttūr Gap between the Kalrāyan and Pachamalai hills. Situated at the junction of the Bangalore, Tiruchchirāppalli, and Cuddalore roads, 200 miles (332 km) southwest of Madras, the town's name derives from *sēla nād* (a corruption of *cēra nād*), a term denoting the visit of an early Cēra king. Well-known for cotton and silk handloom weaving, it has developed as a large-scale industrial centre, with electrical and chemical factories, tool workshops, and brass rolling mills. It has numerous colleges affiliated with the University of Madras.

The area around Salem is composed of a series of hills (the Shevaroy, Kalrāyan, Kollaimalai, and Pachaimalai hills) in the east and a section of the Cauvery River valley in the west. It is primarily an agricultural area specializing in fruit, coffee, cotton, and peanuts (groundnuts). Minerals include iron-ore, bauxite, and manganese deposits. After the completion of the Mettūr Dam in 1937, large-scale industry developed, especially in Salem.

Archaeological remains show that the region was occupied during the Neolithic period. In historic times the land formed part of independent Koṅgu Nād but was later conquered by Cōla, Vijayanagar, and Muslim rulers. It was ceded to the British in 1797. Pop. (1981) town, 361,394; metropolitan area, 518,615.

Salem, city, seat (1823) of Marion county, south-central Illinois, U.S. It originated in 1813 as a stop on the St. Louis–Vincennes stagecoach route and was laid out in 1823. The family home of William Jennings Bryan, the lawyer and politician, who was born in Salem, is maintained as a museum. The Gutzon Borglum statue of Bryan that once stood in Washington, D.C., is in Bryan Memorial Park.

Nearby oil fields and agriculture (corn, soybeans, and apples) contribute to the city's economy. Light manufactures include industrial tools, abrasives, bakery equipment, and sleeping bags. Inc. 1837. Pop. (1984 est.) 7,984.

Salem, city, one of three seats (1646) of Essex county (Salem, Lawrence, and Newburyport), northeastern Massachusetts, U.S., on Salem Bay, 16 miles (26 km) northeast of Boston. It was founded in 1626 by Roger Conant, who emigrated from Cape Ann, 14 miles (22 km) northeast. The first Congregational Church in America was organized there in 1629, and Roger Williams, founder of Rhode Island colony, served as an early pastor. It was incorporated as a town in 1630. Its name is probably the shortened form of the biblical Jerusalem ("City of Peace"). Salem's early history was clouded by religious intolerance that led to the witchcraft trials of 1692. During the 18th and 19th centuries, it developed as one of New England's leading maritime and shipbuilding centres, and during the American Revolution (1776–83) and the War of 1812 its port served as a privateers' base. After the decline in foreign commerce, due mainly to the shallowness of its harbour, the community turned to the production of textiles, leather, and shoes. Industry (notably the manufacture of electronic equipment and machinery) is now well-diversified, and tourism is also an important source of income.



The Custom House, Salem, Mass.
Arthur Griffin—EB Inc.

Nathaniel Hawthorne was born (1804) in Salem, the setting for several of his novels, notably *The House of the Seven Gables,* which has immortalized the house built (1668) by Captain John Turner; Hawthorne's birthplace (about 1740) and the Hathaway and Retire Beckett houses are also preserved on its grounds. Hawthorne was employed (1846–49) as a port surveyor and worked in the Custom House (1819), which, together with the old wharves, is maintained within a maritime national historic site. Salem is rich in colonial and federal architecture. Outstanding buildings include the John Ward House (1684; a national historic landmark, operated as a museum by the Essex Institute), the Witch House (1642; where Judge Jonathan Corwin held hearings during the witchcraft trials that led to the hanging of 19 persons), the Pickering House (1651; the oldest house in Salem), and the Federal masterpieces designed by Samuel McIntire (*q.v.*), the "architect of Salem," notably of the Pierce-Nichols (1783) and Gardner-White-Pingree (1804) houses. Institutions include the Peabody and Salem State College (1854), which has an art gallery, an observatory, and "The Chronicle of Salem," a 50-sequence mural. The city's Pioneer Village is a reconstruction of early Salem. Inc. city, 1836. Pop. (1984 est.) 38,555.

Salem, city, seat (1851) of Dent county, southeast-central Missouri, U.S., situated in the Ozark Mountains between the Current and Meramec rivers. Established in 1845 on the site of an inn and trading post, it was named for Salem, N.C. The town was occupied by Federal forces during the American Civil War, except briefly in 1864, when raiders burned the courthouse and jail. In a battle that was fought there on Dec. 3, 1861, Federal troops repulsed the Confederates. The Dent County Courthouse (rebuilt 1871) was designated a national shrine in 1972.

The development of local iron mines in the 1870s and the arrival of the St. Louis, Salem, and Little Rock Railroad (Frisco) in 1872 contributed to the community's growth. The economy is based on the mining of lead, zinc, and copper; lumbering; the production of charcoal briquets; raising of livestock; and the manufacture of shoes and clothing. Tourism is an additional source of income, based on Indian Trail State Forest (northeast), Montauk State Park (southwest), and sections of the Mark Twain National Forest (east and west). Inc. 1881. Pop. (1984 est.) 4,365.

Salem, town (township), Rockingham county, southeastern New Hampshire, U.S., just west of Haverhill, Mass. Originally a part of Haverhill, the town was set off in 1725 and incorporated as Methuen. The final decision of the Massachusetts–New Hampshire boundary line (1741) divided the town; the New Hampshire portion was incorporated as Salem in 1750.

Salem Depot village, located within Salem town, was important during the American Civil War for the shoe manufacturing that was developed there by Prescott C. Hall.

Nearby are Mystery Hill (an archaeological site of prehistoric stone structures), Canobie Lake Park, and Rockingham Park Race Track. Pop. (1988 est.) 26,943.

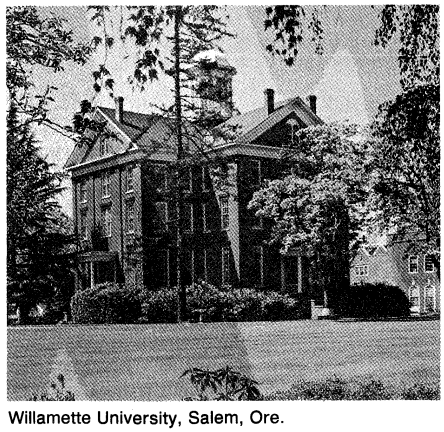
Salem, city, seat (1694) of Salem county, southwest New Jersey, U.S. It lies along the Salem River near the latter's confluence with the Delaware River, 34 miles (55 km) southwest of Philadelphia. It was established in 1675 by John Fenwick, an English Quaker, who took the name Salem from the Hebrew word *shalom* ("peace"). The Friends (Quakers) Burial Ground in Salem has the Salem Oak (a tree said to be more than 500 years old), under which Fenwick signed a treaty with the Lenni Lenape Indians. The Alexander Grant House (1721) is now headquarters of the Salem County Historical Society. Fort Mott State Park, site of an American Civil War fortification, and Finns Point National Cemetery, containing the graves of more than 2,400 Confederate prisoners and 300 Union soldiers, are immediately northwest, fronting the Delaware River. Salem's industries include the manufacture of glass containers, floor coverings, and clothing. Inc. village, 1695; city, 1858. Pop. (1986 est.) 6,960.

Salem (North Carolina, U.S.): *see* Winston-Salem.

Salem, city, Columbiana county, northeastern Ohio, U.S., 20 miles (32 km) southwest of Youngstown. It was settled in 1801 by Quakers from Salem, N.J., and was laid out in 1806. Before the American Civil War it was a station on the Underground Railroad for runaway slaves, and it was also headquarters of the Western Anti-Slavery Society, which published the *Anti-Slavery Bugle.*

Salem's manufactures include household appliances, tools and dies, pumps, and rolling-mill machinery. The Salem campus of Kent State University was opened in 1962. Inc. town, 1830; city, 1887. Pop. (1988 est.) 12,312.

Salem, capital of Oregon, U.S., and the seat of Marion county. It lies along the Willamette River, 43 miles (69 km) southwest of Portland. Methodist missionaries, led by Jason Lee, settled the site in 1840. Its Indian name, Chemeketa, meaning "place of rest," was translated into the biblical name of Salem (from Hebrew *shalom,* "peace"). A settlement was laid out in 1848, and homesites were sold by the missionaries to finance the Oregon Institute (1842), a religious school for Indians that later became Willamette University. Prospering as migration increased over the Oregon Trail, the town became the territorial capital of Oregon in 1851. The capital was briefly moved to Corvallis, but in 1864 Salem was confirmed as the state capital by popular vote. The town was an early river port whose growth was stimulated by railroad connections in the 1870s. Salem became the food-processing centre for a vast dairying, fruit, and truck-garden area; wood, metal, and cloth industries also developed in the city.



Willamette University, Salem, Ore.
Ray Atkeson—EB Inc.

The State Capitol (adjoining Wilson Park), built in 1937 of Neoclassical design, dominates Capitol Mall. The city is the site of several state health and penal institutions and of Chemeketa Community College (1969). Salem is the focus of an urban complex encompassing Marion and Polk counties. Inc. 1860. Pop. (1988 est.) city, 95,741; metropolitan area (MSA), 269,800.

Salem witch trials (May–October 1692), in American history, a series of investigations and persecutions that caused 19 convicted "witches" to be hanged and many other suspects to be imprisoned in the town of Salem in the Massachusetts Bay Colony. Stimulated by voodoo tales told by a West Indian slave, Tituba, a few young girls claimed they were possessed by the devil and subsequently accused three Salem women, including Tituba, of witchcraft. As Tituba and other accused persons were pressured and consequently incriminated others in false confessions, public hysteria over the threat of witchcraft mounted throughout Massachusetts.

Civil magistrates, encouraged by the clergy, set up a special court in Salem to try those accused of practicing witchcraft, and Samuel Sewall, John Hathorne, and William Stoughton were chosen as the court's judges. The list of the accused increased (even Massachusetts governor William Phips's wife was implicated) until 150 people had been imprisoned and were awaiting trial. By September, however, the climate of mass hysteria had begun to abate, and public opinion first stopped, and then condemned, the trials. Governor Phips dissolved the special court in October and released the remaining prisoners. The Massachusetts General Court (legislature) later annulled the witch trials' convictions and granted indemnities to the families of those who had been executed.

Salerno, Latin SALERNUM, city, capital of Salerno *provincia,* Campania *regione,* southern Italy. It lies west of the mouth of the Irno River on the Gulf of Salerno, southeast of Naples. The Roman colony of Salernum was founded in 197 BC on the site of an earlier town, possibly Etruscan, called Irnthi. Part of the Lombard duchy of Benevento from AD 646, it became the capital of an independent Lombard principality in 839 until it was conquered by the Norman Robert Guiscard and became his splendid capital. Sacked by the Swabian Hohenstaufens in 1194, it revived under Giovanni da Procida, hero of the war of the Sicilian Vespers against the French (1282) and a native of Salerno, who enlarged the port and started a great annual fair. In 1419 Salerno passed to the Colonna and later to the Orsini and the Sanseverino before reverting to the Kingdom of Naples.

Much of Salerno's historic interest derives from its medical school—the earliest in Europe—which flourished there in the 11th and 12th centuries and to which flocked students from Europe, Asia, and northern Africa; it still exists.



San Matteo Cathedral, Salerno, Italy
SCALA—Art Resource/EB Inc.

In World War II, the Salerno coast was the scene of a battle (Sept. 8–18, 1943) between Allied landing forces and the Germans. Parts of the old episcopal city suffered great damage before the British 8th Army arrived from Calabria and forced the Germans to withdraw.

Ruins of the castle of Arechi, prince of Benevento, and the remains of a palace survive from the Lombard period; but the city's principal monument is the San Matteo (St. Matthew) Cathedral founded in 845 and rebuilt in 1076–85 by Robert Guiscard. In the crypt is the sepulchre of St. Matthew, whose body, according to legend, was brought to Salerno in the 10th century. The cathedral also contains the tomb of Pope Gregory VII.

An active Tyrrhenian seaport, Salerno is on the Naples–Reggio di Calabria railway. The city's main industrial products and exports are foodstuffs, construction materials, textiles, machinery, ceramics, and wrought ironwork. Pop. (1988 est.) mun., 153,807.

Salerno, University of, Italian UNIVERSITÀ DEGLI STUDI DI SALERNO, institution of higher learning in Salerno, Italy. Much of the historic interest of the university derives from an antecedent medical school in Salerno that was the earliest and one of the greatest medical schools of the Middle Ages. In fact, some scholars have called this school medieval Europe's first university. The medical school was noted for its physicians as early as the 10th century, and by the 11th century it was attracting students from all over Europe, as well as Asia and Africa. In 1221 the Holy Roman emperor Frederick II decreed that no doctor in the kingdom could legally practice medicine until he had been examined and publicly approved by the school at Salerno.

The present University of Salerno is a distinct institution founded in 1970. Its faculties include letters and philosophy, teacher training, mathematics and science, law, and economics.

sales tax, a levy imposed upon the sale of goods and services. A sales tax levied on the manufacture, purchase, sale, or consumption of a specific commodity is known as an excise tax.

A brief treatment of sales taxes follows. For full treatment, *see* MACROPAEDIA: Taxation.

Excise taxes have been known since ancient times. The general sales tax is a comparatively recent innovation. Sales taxes are commonly classified according to the levels of business activity at which they are imposed—production, wholesale, or retail. Excise tax rates frequently vary according to whether the taxed commodities are considered essential or nonessential.

Multiple sales taxes imposed on goods at more than one level in the production and distribution chain are sometimes called turnover taxes. Such taxes are frequently based on gross receipts; therefore, the taxable value at each stage includes the taxes already paid at previous stages. In order to avoid this pyramiding effect, a variation called the value-added tax, based on the net receipts (total sales minus expenditures), can be used.

In the United States single-stage sales taxes account for significant portions of the revenues of most states. Many local governments impose taxes at the retail level. In Canada the federal government collects a manufacturers' tax, while retail sales taxes are levied by nearly all provinces. Most Latin American countries rely heavily on excises and on sales taxes. In western Europe value-added taxes are common.

It is generally assumed that sales and excise taxes are borne by the consumer. Even in turnover taxes, the burden is expected to be shifted to the last buyer in the form of a higher price. Whether the burden is shifted entirely or partly depends on the sensitivity of the demand for a given commodity to increases in price. In many cases the supplier and the consumer share the tax burden in terms of lower profits and higher prices.

Because sales taxes at the retail level are strongly regressive—that is, they consume a larger proportion of the income of low-income groups than of higher income groups—certain classes of essential goods, such as food, clothing, or drugs, are sometimes exempted. Excise taxes are also regressive, although less strongly so, in part because the consumer can choose not to purchase the specific commodities that are so taxed. Excises can, moreover, be so allocated that the burden falls on those who benefit from the tax expenditures, as in the case of motor fuel taxes being used for highway construction or maintenance.

Salesbury, William, Salesbury also spelled SALISBURY (b. *c.* 1520, Cae Du, Llansannan, Denbighshire, Wales—d. *c.* 1584, Llanrwst, Denbighshire), Welsh lexicographer, translator, noted particularly for his Welsh–English dictionary and for translating the New Testament into Welsh.

Salesbury spent most of his life at Llanrwst following antiquarian, botanical, and literary pursuits. About 1546 he edited a collection of Welsh proverbs, *Oll Synnwyr Pen Kembero Ygyd* ("The Whole Sense of a Welshman's Head"), possibly the first book printed in Welsh. His *Dictionary in Englyshe and Welshe* (1547), the first work of its kind, appeared in a facsimile edition in 1877. His translation of the New Testament (1567), based on the Greek version, was prepared in collaboration with Richard Davies, bishop of St. David's, Abergwili, Carmarthenshire.

Salesian, member of either of two Roman Catholic religious congregations, one of men and one of women, devoted to the Christian education of youth—especially the less privileged.

The founder of the Salesians of Don Bosco (formally, the Society of St. Francis de Sales; S.D.B.) was St. John Bosco (Don Bosco), a young priest who focussed his concern on the orphaned and homeless child labourers whom he encountered in Turin, Italy. In 1859, inspired by the amiable example of St. Francis de Sales, Don Bosco founded the Salesians to befriend, educate, and help these impoverished boys. Thirty years later, at the time of Don Bosco's death, the original group of 17 members had grown to more than 1,000 and had 57 foundations in Italy, Spain, France, England, Uruguay, and Brazil. The congregation continued to spread so rapidly that it soon became the third largest among men's orders. Its works have expanded to include trade, agricultural, and academic schools; seminaries; recreational centres and youth clubs in large cities; summer camps; parishes; and foreign missions.

The Salesian Sisters (formally, the Daughters of Our Lady Help of Christians; F.M.A.) are one of the largest Roman Catholic religious congregations of women, founded in 1872 at Mornese, Italy, by St. John Bosco and St. Mary Mazzarello. Like their male counterparts, the sisters followed Don Bosco's norms for education: reason, religion, and amiability and the employment of all that is humanly useful in character formation—academic studies, manual skills, work, clubs, and athletic games.

Salford, district (city), in the southwestern part of the metropolitan county of Greater Manchester, England, with an area of 37 sq mi (97 sq km). The historic town of Salford, with a market granted in 1228 and Ordsall Hall (still standing) built in the 14th century, had a tradition of domestic textile production. Beginning in the late 18th century, cottage industry gave way to factory production, and Salford rapidly became one of the most important cotton towns. Coal mining and heavy engineering were also significant. Eccles, also within the boundaries of modern Salford city, was another cotton town with machine tool and locomotive manufactures. Much of Irlam was formerly part of Chat Moss, a peat lowland that was drained about 1800 and became rich agricultural land. Worsley was important for coal mining. The 3rd duke of Bridgewater, who lived at Worsley Old Hall, employed the engineer James Brindley to construct the Bridgewater Canal (1761), the first true canal in England, to let him transport coal cheaply to Manchester from his mines in Worsley. The building of the Manchester Ship Canal in 1894 was important to the economy of all the Salford towns.

Rapid population growth in the 19th century brought into being large areas of dense, poor-quality housing, which remained a problem in the 20th century. Since World War II, the contraction of the traditional industries has resulted in diversification, and the district now manufactures a wide range of chemicals, plastics, electronic equipment, and light industrial products. The University of Salford, founded as the Royal Technical Institute in 1896 (university status 1967), has large engineering and technological departments. Pop. (1981 prelim.) city, 98,024; (1983 est.) district, 245,000.

Salghurid DYNASTY (1148–1270), Iranian dynasty that ruled in Fārs in southwestern Iran as vassals of the Seljuq, Khwārezm-Shāh, and Il-Khanid dynasties.

The Salghurids were one of the several dynasties of *atabegs* (notables who acted as guardians and tutors of infant Seljuq princes) dynasties deputized to govern Iranian provinces on behalf of Seljuq kings. The Salghurids in origin belonged to the Salor (Salghur) Turkmen tribe and moved into Fārs early in the 12th century. The founder of the dynasty was Muẓaffar ad-Dīn Sonqur (ruled 1148–61), who took advantage of a disturbed state in Fārs to expel his reputed uncle Boz-Aba, the local *atabeg*. Muẓaffar ad-Dīn's son Zangī (ruled 1161–*c.* 1175) was confirmed in his possession of Fārs by the Seljuq ruler Arslan ibn Toghrïl.

With the decline of Seljuq power, the Salghurids enjoyed virtual autonomy. During the reign of the fifth Salghurid ruler, 'Izz ad-Dīn Sa'd (ruled 1203–31), however, the Salghurids were forced to acknowledge the suzerainty of the Khwārezm-Shāh dynasty. With the eclipse of the Khwārezm-Shāhs, the Salghurids transferred their allegiance to the Il-Khanid rulers of Iran. The last Salghurid ruler, Ābish Khātūn (ruled 1265–70), was a woman who married the son of the Il-Khanid ruler of Iran. With Ābish Khātūn's death in 1270, the Il-Khanids assumed direct control over Fārs.

Salgótarján, town, seat of Nógrád *megye* (county), north central Hungary, in the Tarján River Valley near the border with Czechoslovakia and is surrounded by hills, some of which exceed 2,000 ft. (600 m). Industrial development, based on extensive brown coal deposits, began in the late 19th century. The development of the mines produced the most militant traditions of the Hungarian labour movement. Salgótarján has a cast iron foundry, glassworks, and factories producing agricultural machinery and consumer products. Some of the nearby hills have been bulldozed to accommodate urban expansion. Many of the town's narrow ancient streets have notable houses from the 17th and 18th centuries.

The nearby hills of Várhegy (Castle Hill), Karancs, and Boszorkányő (Witches' Crag) offer panoramic views. The ruined 13th-century Salgó Castle is on a basalt cone (2,050 ft) overlooking the town. In the valley south of Salgótarján are the smaller communities of Zagyvapálfalva and Kisterenye, a mining centre. Pop. (1983 est.) 50,000.

Salian DYNASTY, royal and imperial line that came to power with the election of a Salian Frank, Conrad of Swabia, as German king, after the Saxon dynasty of German kings and Holy Roman emperors died out in 1024. Conrad (Conrad II) was crowned Holy Roman emperor in 1027, obtained suzerainty over the kingdom of Burgundy, and reasserted German power in Italy; he began the policy of imperial reliance on a new class of officials, the *ministeriales,* men of low rank closely attached to the crown.

His son and successor, Henry III (reigned 1039–56), inherited three of the five German stem (tribal) duchies; he augmented his power of possession with the use of the *ministeriales,* close cooperation with German churchmen, and virtual control of the papacy, and thereby formed the strongest central government in the history of the medieval German empire. Henry's son succeeded him as Henry IV reigned (1056–1106) at the age of six. After a minority, troubled by the conflicting ambitions of lay and ecclesiastical magnates, the young king became engaged in a struggle with the reformed papacy under Pope Gregory VII reigned (1073–85), who sought to free the church from any dependence on the emperor for its German lands. Their dispute over the control of appointments to ecclesiastical office initiated nearly two centuries of intense papal-imperial conflict. After Gregory excommunicated him and had him dethroned in 1076, Henry came to terms with the pope at Canossa (January 1077). Henry IV had to meet many revolts of German princes; the last, in 1105, was led by his son, who succeeded him as Henry V. During his reign (1106–25), Henry V made peace with the papacy. The Salian line became extinct when he died without an heir.

Salic Law, Latin LEX SALICA, the code of the Salian Franks who conquered Gaul in the 5th century and the most important, although not the oldest, of all Teutonic laws (*leges barbarorum*). The code was issued late (*c.* 507–511) in the reign of Clovis, the founder of Merovingian power in western Europe. It was twice reissued under the descendants of Clovis and under the Carolingians (Charlemagne and his successors), was repeatedly altered and systematized, and was translated into Old High German. The Salic Law is primarily a penal and procedural code, containing a long list of fines (*compositio*) for various offenses and crimes. It also includes, however, some civil-law enactments, among these a chapter that declares that daughters cannot inherit land. Although this section was not invoked in the exclusion of the daughters of Louis X, Philip V, and Charles IV from the throne, it took on critical importance under the later Valois (16th century), when it was incorrectly cited as authority for the existing assumption that women should not succeed to the crown.

In its original form the code is structurally without the ecclesiastical influences found in other Germanic laws, such as those of the Visigoths and the Burgundians. Despite the fact that it was first written in Latin, the Salic Law was not much influenced by Roman law. Frankish legal terms used in it are sometimes Latinized, but in certain cases Frankish words remained in the text; these were probably those in common use in the Frankish *mallus,* or *mallobergus,* the court of law.

Salic Law of Succession, the rule by which, in certain sovereign dynasties, persons whose

descent from a previous sovereign is traced only through a woman are excluded from succession to the throne. Gradually formulated in France, the rule takes its name from the Lex Salica, or the law of the Salian Franks (*see* Salic Law).

From Hugh Capet (d. 996) to Philip IV (d. 1314), the Capetian dynasty was not faced with any problem about succession to the throne of France, because each king had a son who could take his place. Only when the dynasty ended in the early 14th century was the principle established whereby women were excluded from succession to the French throne. During the same period, the corollary principle came to be accepted, namely, that descent from a daughter of a French king could not be admitted as constituting a claim to royal succession.

During the 14th and 15th centuries, attempts were made to provide juridical grounds for the exclusion of women from the royal succession; the main reason adduced in each case was custom, with Roman law and the priestly character of kingship also noted. During this time the Salic Law was first mentioned.

The text of the Salic Law was taken up by expositors of the theory of royal power in the 16th century, who advanced it as a fundamental law of the kingdom. In 1593 the authority of the Salic Law was expressly invoked to set aside the candidature for the French throne of the Spanish infanta Isabella, granddaughter of Henry II of France by his daughter's marriage to Philip II of Spain, despite the strongly pro-Spanish attitude of the dominant faction in Paris at the time. Thenceforward, the Salic Law was invariably accepted as a fundamental law of the kingdom, even if it was not always given as the reason for excluding women from the throne.

In England, Scandinavia, and Angevin Naples (1265–1442), there was no principle against succession by daughters in default of sons. In Spain, likewise, there was no such principle until Philip V, the first Spanish king to come from the French Bourbon dynasty, introduced the Salic Law by his Auto Acordado of 1713.

Salicaceae, family of shrubs and trees comprising poplars and willows, order Salicales, concentrated in northern temperate areas.

The leaves are alternate and simple. The two sexes almost always occur on separate trees, organized in catkins of many individual flowers. Staminate (male) flowers consist of from one to many stamens; pistillate (female) flowers of a one-chambered ovary with several to many ovules (potential seeds). The fruits, usually capsules, open to release the seeds, each with silky hairs at one end.

Salicales, the willow order of flowering plants, belonging to the class called dicotyledon (characterized by two seed leaves). It consists of the Salicaceae family, having two genera, *Salix* (willow) and *Populus* (poplar, aspen, cottonwood), with about 320 and 30 species, respectively. All are trees and shrubs, distributed largely in the cooler regions of the Northern Hemisphere. Only *S. tetrasperma,* found in Asia, is native to tropical and subtropical regions. Most members of Salicales have extended ranges.

Tree species of both *Salix* and *Populus* are commercially important. Some *Salix* species are large trees, but many are tall shrubs that grow along streams or are prostrate plants of the Arctic. The wood of *Salix* trees is fashioned into furniture, caskets, cabinets, and boxes. Pliable twigs of several species of willow are used in wicker furniture and baskets. Aspirin is a derivative of salicylic acid, which is obtained from willow bark. The soft, white wood of *Populus* is fabricated into plywood, pulpwood, excelsior, boxes, and matches. Poplars are often used to line avenues and form windbreaks.

Common features of the Salicales include rapid growth, woodiness, leaves with simple blades, and a pair of leaflike stipules borne on either side of the base of the petiole (leaf stalk). This order is different from other catkin-bearing families in that male (staminate) and female (pistillate) flowers are borne on separate plants and are accompanied by bracts (scale leaves); in addition, seeds are covered with many long hairs for wind dispersal.

The *Salix* genus is distinguished from *Populus* by linear leaves, winter buds covered with a single scale, catkins (elongate, compact flower clusters) appearing with (or before) leaves (and these erect with a simple scale associated with each flower), and few stamens. Poplars possess broadly triangular, pointed leaves and a flattened petiole that permits leaves to flutter. A sticky resin covers the numerous bud scales. The catkins are well-developed before leaves expand, and associated catkin scales are finely divided. They have many stamens.

Most willows and many poplars produce roots when larger stems are placed in wet ground. Following forest fires, roots of aspens produce suckers (sprouts) around the parent stump. In addition to vegetative means of propagation, seeds are produced prodigiously; in the European aspen (*Populus tremula*), for example, as many as 54,000,000 seeds are produced each season on one tree.

Flowers in the Salicales lack sepals and petals. In *Populus,* stamens and pistils arise from a conspicuous disk in their respective catkins. In *Salix,* one or two glands may develop. In both genera the pistil is composed of two or four joined carpels that are differentiated into a basal, one-chambered ovary, a style, and pollen-receptive stigmas. A fringed bract, characteristic of the genus, arises from the stalk of each flower.

Solitary bees arrive as the small flowers of willows emerge; other insects also pollinate these plants. Some species of *Populus* are wind-pollinated. In this order, all fruits, derived from the ovary, are capsules that open to release the hair-tufted seeds.

Saliceto, William of, Italian GUGLIELMO DA SALICETO, French GUILLAUME DE SALICET (b. *c.* 1210, Saliceto, Piacenza, Lombardy [Italy]—d. *c.* 1277), physician and cleric, the outstanding European surgeon of the 13th century. His influence was felt throughout western Europe for nearly a century after his death.

Saliceto practiced in the principal towns of Lombardy until 1270, when he was appointed to the chair of surgery at the University of Bologna. Four years later he resigned the post to become city physician of Verona, where he wrote the *Cyrurgia* (1275; "Surgery"), an original treatise far more extensive than earlier medieval works on the subject. The section devoted to surgical anatomy, perhaps the first of its kind, indicates experience in human dissection, and his refusal to separate methods of surgical diagnosis from the practice of internal medicine exemplifies his advocacy of a union between medicine and surgery.

Saliceto also described the suture of severed nerves, differentiated arterial from venous hemorrhage, and rendered a notable account of dropsy resulting from a kidney disorder, characterized by cloudy urine (Bright's disease).

salicylic acid, also called ORTHO-HYDROXYBENZOIC ACID, a white, crystalline solid that is used chiefly in the preparation of aspirin and other pharmaceutical products. The free acid occurs naturally in small amounts in many plants, particularly the various species of *Spiraea.* The methyl ester also occurs widely in nature; it is the chief constituent of oil of wintergreen. Salicylic acid was first prepared by the Italian chemist R. Piria in 1838 from salicylaldehyde. In 1860 the German chemists H. Kolbe and E. Lautemann discovered a synthesis based on phenol and carbon dioxide. Today the compound is made from dry sodium phenolate and carbon dioxide. Most salicylic acid produced commercially is treated with acetic anhydride for the preparation of aspirin. Large quantities of salicylic acid are esterified with methyl alcohol to yield methyl salicylate, synthetic oil of wintergreen, for medicinal and flavouring use. A certain amount is used to prepare phenyl salicylate for sunburn creams and enteric-coated pills and to make salicylanilide for use as a fungicide and mildew preventive. Salicylic acid is a component of preparations used to combat warts, corns, calluses, and various skin diseases; the sodium salt is employed as an antipyretic and analgesic. Large amounts of the crude acid are used in the manufacture of certain classes of dyes.

Pure salicylic acid crystallizes from hot water in the form of white needles, which sublime without decomposition at temperatures up to 155° C (311° F) and melt at 159° C (318° F). Above 200° C (392° F) the acid decomposes to phenol and carbon dioxide.

Salientia (amphibian order): *see* Anura.

Salieri, Antonio (b. Aug. 18, 1750, Legnago, Republic of Venice [Italy]—d. May 7, 1825, Vienna, Austria), Italian composer whose operas were acclaimed throughout Europe in the late 18th century.

At the age of 16, Salieri was taken to Vienna by F.L. Gassmann, the imperial court composer and music director (*Hofkapellmeister*), and was introduced to Emperor Joseph II. Salieri's first opera, *Le donne letterate,* was produced at the Burgtheater in Vienna in 1770. Four years later the emperor made him



Salieri, drawing by F. Rehburg, 1821
J.P. Ziolo

the court composer, and in 1788 he became *Hofkapellmeister,* a position Salieri held for 36 years. During his official career he composed operas not only for theatres in Austria but also for companies in France and Italy. His best-known work was the French opera *Tarare* (1787), translated into Italian as *Axur, re d'Ormus,* which the Viennese public preferred to Wolfgang Amadeus Mozart's *Don Giovanni.* Salieri's last opera was performed in 1804, and he then devoted himself to composing sacred music.

Throughout his life Salieri remained friendly with Joseph Haydn and with Ludwig van Beethoven, whom he had given lessons in counterpoint and who dedicated the *Three Violin Sonatas,* Op. 12 (1797), to him. Salieri's relationship with Mozart has been the subject of much speculation. There is, however, little evidence for Salieri's supposed intrigues and damaging remarks against Mozart; indeed, Mozart himself commented in a letter on Salieri's favourable reception of *The Magic Flute.* There is also no foundation for the belief that Salieri tried to poison Mozart—a legend that was the basis of Nikolay Rimsky-

Korsakov's opera *Mozart et Salieri* (1898). The relationship between the two composers received further speculative treatment in Peter Shaffer's play *Amadeus* (1979; filmed 1984).

Ṣalīf, aṣ-, coastal village, western Yemen, on the Tihāmah (coastal plain). It is situated in a cove of a promontory forming the southern coast of Kamarān Bay of the Red Sea and is protected by the offshore island of Kamarān, which belongs to Yemen.

Aṣ-Ṣalīf is important because of its large deposits of rock salt. The salt, of exceptional purity, is mined by a government-owned corporation. A large-scale expansion of the aṣ-Ṣalīf port was completed in 1976. Pop. (1975 est.) 2,574.

Ṣāliḥ, in ancient Arabia, a Christian tribe prominent during the 5th century AD. Although the Ṣāliḥ originated in southern Arabia, they began moving northward about AD 400, finally settling in the area southeast of Damascus. According to tradition, they were the first Arabs to found a kingdom in Syria.

The Ṣāliḥ kings, who were recognized by the Byzantine emperors, managed to control the area until the end of the 5th century, when a poll-tax dispute resulted in extended wars between the Ṣāliḥ and the Ghassānids, a tribe from western Arabia. Although the Ghassānids finally gained control and established themselves as rulers of the Syrian Arabs, the Ṣāliḥ remained in Syria at least until about 635.

Ṣāliḥ, aṭ-Ṭayyib (b. 1929, ash-Shamalīyah province, Sudan), Arabic-language novelist and short-story writer.

Ṣāliḥ attended universities in the Sudan (in Khartoum) and in London and devoted much of his professional life to radio broadcasting, for many years as head of drama for the BBC Arabic Service. Ṣāliḥ, coming from a rural background of small farmers and orthodox religious teachers, attempted in his work to harmonize the traditions of the past with the worldliness of the "traveled man," the African who has returned from schooling abroad. His novel *Season of Migration to the North* (1966; Eng. trans. 1969) is a prose poem that reflects the conflicts of modern Africa: traditions and common sense versus education, rural versus urban, men versus women, and the specific versus the universal. Ṣāliḥ's prose (translated from the Arabic by Denys Johnson-Davies) is polyrhythmic and haunting.

Ṣāliḥ also wrote *The Wedding of Zein and Other Stories* (1969). These tales evoke the warmth, compassion, humour, and sadness of traditional Sudanese Arabic life, examining authority and unwritten codes through its beautifully structured narrative rhythms.

Ṣāliḥ Ayyūb, aṣ-, in full AL-MALIK AṢ-ṢĀLIḤ NAJM AD-DĪN AYYŪB (d. 1249), last effective ruler (reigned 1239 and 1245–49) of the Ayyūbid dynasty in Egypt.

Aṣ-Ṣāliḥ's campaign against the crusader Kingdom of Jerusalem in alliance with the Khwārezmians (1244) provoked the launching of the Seventh Crusade under Louis IX of France. Aṣ-Ṣāliḥ died during Louis's subsequent invasion of Egypt. The Mamlūk mercenaries to whom he had given extensive power overthrew his dynasty in 1250.

Salii (Latin: "Dancers"), in ancient Italy, a priesthood usually associated with the worship of Mars, the god of war. Chapters of the priesthood existed in Rome and in other central Italian cities. The Salii, who were all born patricians, were usually young men, with both parents living. Their resignation from the priesthood was common on the assumption of high political office, and vacancies were filled by co-option (vote of the Salii). The priests wore the archaic Roman war dress: a conical helmet and a short, red military cloak covering a bronze breastplate. They carried the figure-eight shield (*ancile*) and the old-fashioned long spear. The chief Salii festivals were held at the opening (March) and closing (October) of the summer campaigning season.

In later times the character of the festivals changed, the *ancilia* coming to be regarded as magical relics and the priests' primitive chant as a community prayer on behalf of the Roman state.

Salimbene DI ADAM (b. Oct. 9, 1221, Parma [Italy]—d. *c.* 1290), Italian Franciscan friar and historian whose *Cronica* is an important source for the history of Italy and, to a lesser extent, France, in the 13th century.

The son of Guido di Adam, a wealthy citizen of Parma, Salimbene entered the Franciscan order in 1238, serving his novitiate in the Monastery of Fano (on the Adriatic coast). Fra Salimbene subsequently led a wandering existence, never holding any office in his order. He transferred from one monastery to another, meeting many notable people and becoming an eyewitness to historic events. In the 1240s he resided at Lucca, Pisa, Cremona, Parma, Troyes, Paris, and Provence, among other places. He returned to Italy in 1248. After seven years in Ferrara, he resumed his travels, spending his time in Franciscan convents in northern Italy.

Salimbene began to write his *Cronica* ("Chronicle") in 1282, probably in Reggio Emilia, and continued to work on it until his death. Organized as annals (yearly records), the *Cronica* encompasses the years 1168–1288—from the founding of the city of Alessandria (south of Milan) by the Lombard League to within a few years of Salimbene's death. In his *Cronica* Salimbene describes his own travels, experiences, and meetings with famous people. He provides an earthy, vivid picture both of the ordinary life of his time and of contemporary Italian politics and spirituality. Another often-cited work by Salimbene is *The Twelve Calamities of Emperor Frederick II* (*XII scelera Friderici imperatoris*), probably written in 1248. Several other historical and religious works by him have been lost.

salimeter: *see* salinometer.

Sālimīyah, school of Muslim theologians founded by the Muslim scholar and mystic Sahl at-Tustarī (d. AD 896). The school was named after one of his disciples, Muḥammad ibn Sālim (d. AD 909). Even though the Sālimīyah were not a Ṣūfī (mystic) group in the strict sense of the word, they utilized many Ṣūfī terms and ideas in their doctrines.

The Sālimīyah spoke of God's *tajallī* (appearance) on the day of judgment in human form for all his creatures to see. When this happens, God's light will overwhelm the scene, and salvation will be granted to everyone and everything. They held also that *ittiḥād* (mystical union) with God can be achieved through man's contemplation of his own personality until he gains complete consciousness of it. They based this view on the well-known concept that God created man after his image. Consequently, they maintained that every man has an element of divinity that he must try to realize through constant contemplation.

Salina, city, seat of Saline county, central Kansas, U.S., on the Smoky Hill River. Founded in 1858 by an antislavery group headed by William A. Phillips, it was named for the Saline River, which enters the Smoky Hill just to the east. The town's growth was slow until the arrival of the Union (later Kansas) Pacific Railroad in 1867. The city was rebuilt after being largely destroyed by floods in 1903.

Salina is a trading centre for a large wheat-growing area, and grain milling is the chief industry. Kansas Wesleyan University (founded 1886), Marymount College (1922), Kansas Technical Institute (1966), and St. John's Military School (1887) are located there. A prehistoric Indian burial ground is 4 miles (6 km) east. Inc. city, 1870. Pop. (1988 est.) 43,351.

salina: *see* alkali flat.

Salina Island, Italian ISOLA SALINA, Latin DIDYME INSULA, second largest of the Eolie Islands (Lipari Islands), in the Tyrrhenian Sea (of the Mediterranean) off northeastern Sicily. It has an area of 10 square miles (26 square km) and is administered as part of Messina *provincia,* Sicily, Italy.

Salina, the highest of the Eolie Islands, consists of two extinct volcanoes and rises to 3,156 feet (962 m). Malmsey wine, raisins, figs, and olives are exported, and fishing is carried on. Salina's three towns (Santa Marina Salina [the port], Malfa, and Leni) have the largest population concentration in the Eolie Islands outside of Lipari. *See also* Eolie Islands. Pop. (1988 est.) 2,346.

Salinas, city, seat (1872) of Monterey county, western California, U.S.. It lies in the Salinas valley just east of Monterey Bay. The site, at a crossroads location on the El Camino Real (the old Spanish trail between San Diego and San Francisco), was settled by Elias Howe in 1856 and became a cattle centre. The arrival of the Southern Pacific Railroad in 1868 stimulated agricultural development (lettuce, artichokes, celery, and sugar beets).

Salinas was the birthplace of writer John Steinbeck, who often referred to it in his work, especially *East of Eden,* and who is buried there. It is the seat of Hartnell Community College (1920). The California Rodeo is an annual event. Inc. 1874. Pop. (1988 est.) city, 99,720; Salinas-Seaside-Monterey metropolitan area (MSA), 348,800.

Salinas de Gortari, Carlos (b. April 3, 1948, Mexico City, Mex.), economist and government official who became president of Mexico in 1988.

The son of a Mexican senator, Salinas joined the Institutional Revolutionary Party (PRI) at age 18 and studied economics at the National Autonomous University of Mexico and at Harvard University, earning a Ph.D in 1978. From 1971 on he held successively more important economic-affairs posts in the government and was supported in his rise by Miguel de la Madrid, who had been one of his professors at the National Autonomous University. When Madrid became president of Mexico in 1982, he made Salinas his minister of planning and the budget, a post that Salinas held until Madrid named him in 1987 to be his successor as the presidential candidate of the PRI in 1988.

No PRI candidate for the presidency had won less than 70 percent of the popular vote in 60 years. In the elections of July 1988, however, Salinas won a bare 50.4 percent of the vote, according to the official tallies; the opposition parties contended that Salinas' total share of the vote would have been even lower had the PRI not resorted to vote fraud. As president, Salinas continued Madrid's program of economic retrenchment, selling off inefficient state-owned enterprises and encouraging foreign investment.

Salinas y Serrano, Pedro (b. Nov. 27, 1891, Madrid, Spain—d. Dec. 4, 1951, Boston, Mass., U.S.), Spanish poet, scholar, dramatist, and essayist who was one of the outstanding writers of the Generation of 1927, an influential group of poets that included Jorge Guillén and Federico García Lorca.

Salinas studied and lectured at the Sorbonne for three years (1914–17) and then returned to Spain as professor of Spanish at Seville (1918). He later taught at the University of Cambridge, and, after the outbreak of the Spanish Civil War (1936), he lived in the United States,

lecturing at Wellesley College, Massachusetts, and Johns Hopkins University, Baltimore.

Salinas' first poems were published in the literary magazine *Prometeo.* His volumes of poetry include *Presagios* (1923; "Omens"), *Seguro azar* (1929; "Certain Disaster"), *La voz a ti debida* (1934; *My Voice Because of You,* 1976), *Todo más claro y otros poemas* (1949; "Everything Clearer and Other Poems"). A selection of his love poems in English translation, *To Live in Pronouns,* was published in 1974. Salinas was also a respected scholar, known for studies on the 15th-century Spanish poet Jorge Manrique, the Nicaraguan poet Rubén Darío, and a modern verse rendition of the *Poem of the Cid.* The leading literary figures of his time were among his friends. Salinas also helped effect the revival of interest in the 17th-century Spanish poet Luis de Góngora.

Salinger, J(erome) D(avid) (b. Jan. 1, 1919, New York City), U.S. writer whose novel *The Catcher in the Rye* (1951) won critical acclaim and devoted admirers, especially among the post-World War II generation of college students. His entire corpus of published works consists of that one novel and 13 short stories, all originally written in the period 1948–59.

Salinger was the son of a Jewish father and a Christian mother, and, like Holden Caulfield, the hero of *The Catcher in the Rye,* he grew up in New York City, attending public schools and a military academy. After brief periods at New York and Columbia universities, he devoted himself entirely to writing, and his stories began to appear in periodicals in 1940. After his return from service in the U.S. Army (1942–46), Salinger's name and writing style became increasingly associated with *The New Yorker* magazine, which published almost all of his later stories. Some of the best of these made use of his wartime experiences: "For Esmé—With Love and Squalor" (1950) describes a U.S. soldier's poignant encounter with two British children; "A Perfect Day for Bananafish" (1948) concerns the suicide of the sensitive, despairing veteran Seymour Glass.

Major critical and popular recognition came with the publication of *The Catcher in the Rye,* whose central character, a sensitive, rebellious adolescent, relates in authentic teenage idiom his flight from the "phony" adult world, his search for innocence and truth, and his final collapse on a psychiatrist's couch. The humour and colourful language of *The Catcher in the Rye* place it in the tradition of Mark Twain's *Adventures of Huckleberry Finn* and the stories of Ring Lardner, but its hero, like most of Salinger's child characters, views his life with an added dimension of precocious self-consciousness. *Nine Stories* (1953), a selection of Salinger's best work, added to his reputation.

The reclusive habits of Salinger in his later years made his personal life a matter of speculation among devotees, while his small literary output was a subject of controversy among critics. *Franny and Zooey* (1961) brought together two earlier *New Yorker* stories; both deal with the Glass family, as do the two stories in *Raise High the Roof Beam, Carpenters; and Seymour: An Introduction* (1963).

salinometer, also called SALINIMETER, or SALIMETER, device used to measure the salinity of a solution. It is frequently a hydrometer that is specially calibrated to read out the percentage of salt in a solution.

Because the concentration of chloride has been shown to be directly related to the salinity of seawater, titration of chloride with silver nitrate is widely used in oceanography to measure salinity. The International Council for the Exploration of the Sea in 1937 established for worldwide comparison a standard for seawater of 19.381 parts of chlorine per 1,000 parts of seawater.

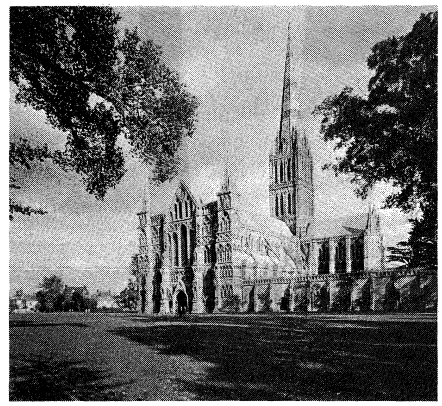
Salis, Johann Gaudenz, FREIHERR VON (count of) SALIS-SEEWIS (b. Dec. 26, 1762, Malans, Switz.—d. Jan. 29, 1834, Malans), Swiss poet whose work is tender and sometimes elegiac, celebrating friendship, humanity, and the serenity of nature.

Some of Salis' poems, such as "Lied eines Landmanns in der Fremde," became anthology pieces. In 1779 he became an officer in the Swiss guards in Paris, but he supported the ideas of the French Revolution and voluntarily remained in Paris until 1793. In 1799 he became chief of staff of the Swiss militia, taking part in the Battle of Zürich, and later filled several public offices.

Salisbury, southernmost district in the county of Wiltshire, England, centred on the historic city of Salisbury. With 388 sq mi (1,005 sq km), it is a predominantly rural area in which cattle and produce are raised.

The Ministry of Defense owns much of the land and maintains a number of camps there. The district is rich in prehistoric monuments, including Stonehenge, Neolithic burial sites, and Iron Age strongholds. Pop. (1983 est.) 102,500.

Salisbury, formerly NEW SARUM, city in Salisbury district, county of Wiltshire, England, at the confluence of the Rivers Avon and Wiley. It has functioned historically as the



The cathedral at Salisbury, Wiltshire
Kenneth Scowen

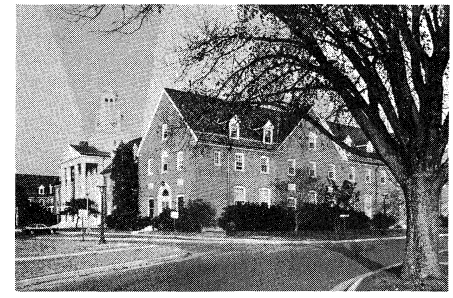
principal town of Wiltshire and is the seat of an Anglican bishop.

The origins of Salisbury lie in Old Sarum (1½ mi [2.5 km] north), an Early Iron Age fort taken over by the Romans. Under the Saxons it became an important town, and by the 11th century it possessed a mint. The Normans built a castle on the mound, and Old Sarum became a bishopric when the see was transferred from Sherborne in 1075. The present cathedral was founded in the neighbouring valley, site of modern Salisbury, in 1220, and a new city quickly developed around it. The Black and Grey friaries were both established in the 13th century. An earthen rampart was built around the city in 1310, and soon afterward gates were added. The cloth and wool trades flourished in the Middle Ages, and the making of cutlery also became prominent.

Today the city centre remains much as it was in medieval times, laid out in gridiron fashion. The cathedral and a large number of timber-framed buildings survive. Salisbury is a tourist and market centre. Principal occupations are cattle and poultry marketing, engineering, brewing, leatherwork, and printing. Pop. (1981 prelim.) 35,355.

Salisbury, city, seat (1867) of Wicomico County, southeastern Maryland, U.S., at the head of the Wicomico River, in the south central part of the Delmarva Peninsula, near the Delaware state line. It was established in 1732 and named for the English city of Salisbury in Wiltshire. Colonial landmarks include Old Green Hill (St. Bartholomew's) and All Hallows churches, Poplar Hill Mansion, and Pemberton Hall. The first stone marker of the Mason and Dixon Line was laid 7 mi (11 km) northwest in 1763.

Salisbury developed as a commercial-transportation centre for the peninsula and became



Holloway Hall, Salisbury State College, Salisbury, Md.
Milt and Joan Mann from CameraMann

the second port of Maryland. Its agricultural-based economy is augmented by light industries and tourism (duck hunting, fishing). The city is host to the annual (February) National Indoor Tennis Tournament. Salisbury State College was established in 1925. Wicomico State Forest is nearby. Inc. city, 1872. Pop. (1980) 16,429.

Salisbury, city, seat (1753) of Rowan County, west central North Carolina, U.S., near High Rock Lake; with Winston-Salem, Greensboro, and Charlotte, it forms the Piedmont Industrial Triangle. It was settled in 1753 and was presumably named for the city of Salisbury in Wiltshire, Eng.

The pioneer Daniel Boone lived along the banks of the nearby Yadkin River from 1755 to 1767, and in 1787 Andrew Jackson was admitted to the bar in Salisbury after studying law with Judge Spruce Macay. The troops of the British general Lord Cornwallis pursued those of the colonial general Nathanael Greene through the town in February 1781, before the Battle of Guilford Courthouse; a small skirmish resulted at Old Trading Ford, 6 mi (10 km) east. In Salisbury National Cemetery are the graves of about 11,700 Federal soldiers who died during the Civil War in a large Confederate prison. Salisbury is the site of a U.S. Veterans Administration hospital (1953), Catawba College (1852), Livingstone College (1879), and Rowan Technical Institute (1962). Inc. 1755. Pop. (1980) 22,677.

Salisbury (capital city, Zimbabwe): *see* Harare.

Salisbury, EARLS AND MARQUESSES OF, titled English nobility of several creations, grouped below chronologically and indicated by the symbol •.

• Salisbury, William Longsword, 3rd earl of, Longsword also spelled LONGESPÉE (d. March 7, 1226, Salisbury, Wiltshire, Eng.), an illegitimate son of Henry II of England, and a prominent baron, soldier, and administrator under John and Henry III. He acquired his lands and title from Richard I, who in 1196 gave him the hand of the heiress Ela, or Isabel, daughter of William, earl of Salisbury. He held numerous official positions in England under John.

He was sent on missions to France (1202) and to Germany (1209). In 1213–14 he organized John's Flemish allies, taking part in the destruction (1213) of the French fleet at Damme, then the port of Bruges, and leading the right wing of the allied army at Bouvines (July 27, 1214), where he was captured. He

was exchanged and was back in England by May 1215, when he was employed by John in inspecting the defenses of royal castles and fighting the rebels in the southwest.

During John's war against the barons, Salisbury deserted the king after the landing of Louis of France (May 1216); he returned to royal allegiance, however, by March 1217, fought at Lincoln (May) and Sandwich (August), and attested the Treaty of Kingston (September 1217). Salisbury held various posts during the minority of Henry III and served against the Welsh in 1223 and in Gascony in 1225. He and his wife were benefactors of Salisbury Cathedral and laid foundation stones of the new cathedral in 1220. William was buried there and his effigy, a splendid early example, still survives.

• Salisbury, Thomas de Montagu, 4th earl of, Montagu also spelled MONTACUTE (b. 1388—d. Nov. 3, 1428, Meung, Fr.), English military commander during the reigns of Henry IV, Henry V, and Henry VI.

The son of John, the 3rd earl, who was executed in 1400 as a supporter of Richard II, Thomas was granted part of his father's estates and summoned to Parliament in 1409, though not fully restored until 1421. He was present throughout the campaign of Agincourt in 1415 and at the naval engagement before Harfleur in 1416. In 1420 he was in chief command in Maine, and, when Henry V went home the next year, Salisbury remained in France as the chief lieutenant of Thomas, duke of Clarence. The Duke, through his own rashness, was defeated at Baugé on March 21, 1421. Salisbury came up with the archers too late to retrieve the day but recovered the bodies of the dead and by a skillful retreat averted further disaster.

Salisbury's success in Maine marked him out as a chief lieutenant in the French war after Henry's death. Subsequent operations completed the conquest of Champagne, leaving him to be employed on the Norman border and in Maine. After a year's visit to England he returned to the chief command in the field in July 1428. He determined to make Orléans his principal objective, and began the siege on October 12. On October 27, while surveying the city from a window in the castle of Tourelles he was wounded by a cannon shot and died a few days later. Salisbury was the most skillful soldier on the English side after the death of Henry V.

• Salisbury, Richard Neville, 2nd (or 6th) earl of: *see* Warwick, Richard Neville, 1st (or 16th) earl of.

• Salisbury, Robert Cecil, 1st earl of, also called (1591–1603) SIR ROBERT CECIL, or (from 1603) BARON CECIL OF ESSENDON, or (from 1604) VISCOUNT CRANBORNE (b. June 1, 1563, London—d. May 24, 1612, Marlborough, Wiltshire, Eng.), English statesman who succeeded his father, William Cecil, Lord Burghley, as Queen Elizabeth I's chief minister in 1598 and skillfully directed the government during the first nine years of the reign of King James I. Cecil gave continuity to the change from Tudor to Stuart rule in England.

Trained by his father in the craft of statesmanship, he entered the House of Commons in 1584 and in 1588 was sent on his first diplomatic mission abroad. After the death of Queen Elizabeth's secretary of state, Francis Walsingham, in 1590, Cecil gradually took over the work of secretary of state, although he was not formally appointed to the office until July 1596.

During this period Cecil's chief rival for power was the Queen's favourite, Robert Devereux, 2nd earl of Essex. After Essex was executed in 1601 for rebelling against the Queen,



Robert Cecil, 1st Earl of Salisbury, detail of a panel painting by J. de Critz the Elder, 1602; in the National Portrait Gallery, London

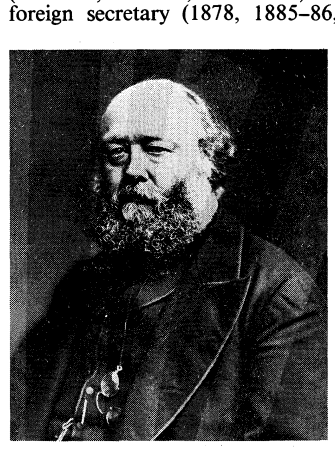
By courtesy of the National Portrait Gallery, London

Cecil felt free to initiate secret correspondence with King James VI of Scotland, advising the King on ways to cultivate Elizabeth's favour. As a result of his efforts, the succession, upon Elizabeth's death, passed without incident to James, who maintained Cecil as his secretary of state. He was made Viscount Cranborne in 1604 and earl of Salisbury in 1605.

In pursuing the policies worked out by his father and Queen Elizabeth, Cecil followed a moderately anti-Roman Catholic, anti-Spanish, and anti-Puritan line. In 1604 he negotiated a peace ending the 19-year war with Spain, but he supported the Dutch in their rebellion against the Spanish. When the 12-year truce between Spain and the Dutch was arranged in 1609, Cecil aligned his nation with France in guaranteeing that Spain would not violate the agreement.

In domestic affairs his influence was less decisive. It was not until 1608 that he gained control of the government's finances through his appointment as lord treasurer. He then set about reducing the crown's rising debt, but he could neither temper James's extravagant spending nor convince him to accept his proposal—the Great Contract of 1610—that the House of Commons grant the crown a fixed yearly sum in return for the abolition of certain feudal dues. The deterioration that took place in James's rule after Cecil's death was presaged as early as 1611, when the incompetent Robert Carr replaced Cecil in the King's confidence. Biographies include A. Cecil, *A Life of Robert Cecil* (1915), and P.M. Handover, *The Second Cecil* (1959).

• Salisbury, Robert Arthur Talbot Gascoyne-Cecil, 3rd marquess of, EARL OF SALISBURY, VISCOUNT CRANBORNE, BARON CECIL OF ESSENDON (b. Feb. 3, 1830, Hatfield, Hertfordshire, Eng.—d. Aug. 22, 1903, Hatfield), Conservative political leader who was three-time prime minister (1885–86, 1886–92, 1895–1902) and four-time foreign secretary (1878, 1885–86, 1886–92, 1895–1900), who presided over a wide expansion of Great Britain's colonial empire.



Robert Cecil, 3rd marquess of Salisbury

BBC Hulton Picture Library—Globe

Robert Cecil was the second surviving son of the 2nd Marquess of Salisbury, who had married Frances Gascoyne, an heiress to large landed estates. Cecil's elder brother suffered from a debilitating illness all his life and died in 1865; thus Lord Robert Cecil became heir to the estates, and, on the death of his father in 1868, he became the 3rd Marquess of Salisbury. His family background allowed him easy entry into any profession, but only merit and ability could ensure high office.

Robert Cecil's childhood was unhappy and lonely. He was exceptionally clever but not especially strong, and he hated games. His father was conscientious but lacking in warmth. His mother, by all accounts sociable and vivacious, died when he was only 10. He was sent to Eton, where he was perpetually bullied. He was by nature pessimistic, withdrawn, and shy, but his courtesy, modesty, and fair-minded tolerance combined to make an attractive personality. Taken from school when he was 15, he was tutored privately. His love for scholarship was deep. At 18 he entered Christ Church, Oxford, but his stay was cut short by a breakdown in health. On the advice of his doctors, he set out on a long sea voyage to Australia and New Zealand. He was absent from England for almost two years. During this time his character matured. He regained his health and acquired self-confidence. He was still uncertain as to his future career; both the church and politics attracted him. When he was offered a seat in Parliament for Stamford in 1853, he chose politics and was elected to the House of Commons.

He fell in love with Georgina Alderson, but his father objected to the marriage, regarding her lack of social standing and wealth as an impediment to an alliance with the Cecil family. Nonetheless, the marriage took place in 1857. They had five sons and two surviving daughters. Salisbury was a man of strong religious faith and enjoyed a happy home life. Lady Salisbury was intelligent and sociable, and all the Cecils came to regard Hatfield as their home. Hatfield also became one of the great houses in which distinguished visitors were entertained.

During the years from 1853 to 1874, Salisbury was only briefly a government minister (secretary of state for India, July 1866 to March 1867) but resigned office in disagreement over the Conservative government's espousal of parliamentary reform. He became deeply suspicious of the new Conservative leader, Benjamin Disraeli. Out of the government he was active as a member of the House of Commons and as a writer; he frequently contributed political articles to the *Saturday Review* and *The Quarterly Review*. He also interested himself in science, especially in botany and in electricity and magnetism; later he had his own laboratory built at Hatfield.

In February 1874 Salisbury was persuaded to join Disraeli's ministry and once more became secretary of state for India. During their seven years together in and out of office, Salisbury, overcoming his earlier prejudice, came to regard Disraeli with admiration and affection.

Succeeding the inept Lord Derby as foreign secretary, Salisbury first became responsible for Britain's foreign relations in April 1878, at a time of great crisis in the Balkans. It seemed probable that war would break out between Britain and Russia over the control of Constantinople. By masterly diplomacy Salisbury ensured that the Russians came to the conference table at the Congress of Berlin (June–July 1878). Disraeli occupied the limelight, but Salisbury's careful and patient diplomacy secured the essential compromises. For their success Disraeli and Salisbury were granted the Order of the Garter, the highest decoration Queen Victoria could bestow.

After Disraeli's death (1881), Salisbury was the obvious successor and led the Conservative opposition in the House of Lords. He became prime minister during the brief Conservative administration from June 1885 to January 1886. Ireland and imperial problems were the chief issues of the time. Salisbury opposed Gladstone on the question of Home Rule for Ireland and three times won the electoral support necessary to become prime minister (1886–92, 1895–1900, and 1900–02). During the greater part of these years, Salisbury combined the offices of prime minister and foreign secretary. He was not autocratic but left wide discretion to individual ministers. Weak control by the government as a whole sometimes had harmful results. This was one of the causes of the South African War (1899–1902), which occurred when Joseph Chamberlain was colonial secretary. But at the Foreign Office, Salisbury succeeded in avoiding serious conflict with the great European powers despite major crises and rivalries.

The partition of Africa largely preoccupied Salisbury's second ministry (1886–92) and remained a source of serious Anglo-French conflict until 1898, when France accepted British dominance on the Nile after the Fashoda Crisis. Salisbury was an imperialist: he believed a phase of European, preferably British, rule indispensable for the advancement of the "backward" races and had no hesitation in imposing this rule by force, as he did in the Sudan (1896–99). His foreign policy was directed toward the defense and enlargement of the British Empire. He had no sympathy for older empires, such as the Ottoman, whose rulers he regarded as corrupt oppressors. Salisbury attempted but failed to gain the cooperation of the European powers to intervene against Turkey to bring to a halt the Armenian massacres (1895–96). He refused to be frightened either by U.S. threats over Venezuela (1895) or by the Kaiser's Kruger telegram sent in January 1896, after the unsuccessful Jameson raid into the Transvaal in South Africa.

During the last decade of the 19th century, when the principal powers grouped into alliances, Salisbury maintained a free hand for Britain. He was opposed to alliance commitments, fearing that when the time came a democratic electorate might refuse to go to war; he also regarded alliances for Britain as unnecessary and dangerous. He did not back Chamberlain's unsuccessful efforts to conclude an alliance with Germany (1898–1901).

History has reevaluated Salisbury's contribution and acquitted him of the charge of "secret diplomacy"; nor was Salisbury an "isolationist," since his diplomacy was active wherever Britain's interests extended. During the last two years of his ministry, from the autumn of 1900 until the summer of 1902, old age and ill health forced him to give up the Foreign Office, though he continued as prime minister. With Lord Lansdowne as the new foreign secretary, he saw his principles of diplomacy partially abandoned when Britain concluded an alliance with Japan in January 1902. Later that year, in July, Salisbury retired.

Salisbury was the last aristocratic statesman to head a British government while in the House of Lords and not the elected Commons. He represented a tradition that passed away with him. His contemporaries recognized his greatness as a statesman. He combined a realism and clarity of view with a fundamentally ethical approach to diplomacy, which sought to conciliate and pacify while maintaining important national interests. (J.A.S.G.)

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• Salisbury, James Edward Hubert Gascoyne-Cecil, 4th marquess of, EARL OF SALISBURY, VISCOUNT CRANBORNE, BARON CECIL OF ESSENDON (b. Oct. 23, 1861, London—d. April 4, 1947, London), British statesman and Conservative politician whose recommendations on defense became the basis of the British military organization until after World War II.

Eldest son of the 3rd marquess, he was educated at Eton and at University College, Oxford. As a member of the House of Commons (1885–92 and 1893–1903), he won a reputation as a zealous defender of the established church. He succeeded his father as the 4th marquess of Salisbury in August 1903 and entered A.J. Balfour's Cabinet in October as lord privy seal. He was out of office during World War I, but after 1918 he gradually assumed the informal leadership of the Conservative opposition.

In the Cabinet of Bonar Law and Stanley Baldwin in 1922–23 Salisbury was lord president of the council; in Baldwin's second Cabinet (1924–29) he was lord privy seal, and from 1925 to 1929 he was leader of the House of Lords. Baldwin's "liberalism" gradually alienated him, however; he resigned his leadership of the Conservative peers in June 1931, stayed out of the national government formed in August, and devoted his energies to vain endeavours to strengthen the House of Lords and to oppose self-government for India. He was more successful in his efforts, in company with Winston Churchill, to organize British defenses against Nazi Germany. From 1942 to 1945 he was president of the National Union of Conservative and Unionist Associations.

Salisbury, Harrison E(vans) (b. Nov. 14, 1908, Minneapolis, Minn., U.S.), American author and journalist who as a foreign correspondent played a major role in interpreting the Soviet Union to English-speaking readers. He won a Pulitzer Prize in 1955 for international news reporting.

Salisbury became a newspaperman while still in college. He was a reporter for the *Minneapolis Journal* for two years while he was attending the University of Minnesota. Upon graduation in 1930 he joined the United Press (UP) and worked in the agency's St. Paul bureau. He held posts with UP from 1930 to 1948, variously based in Chicago, Washington, D.C., New York City, and London, and Moscow in 1944.

Salisbury joined the foreign staff of *The New York Times* in 1949 and served for five years as its Moscow correspondent and bureau chief. He returned to New York late in 1954 and was named an assistant managing editor in 1964. He served as associate editor from 1971 to 1975. A member of the National Academy of Arts and Letters, Salisbury was that organization's president in 1975–76. He won George Polk Memorial Journalism Awards in 1958 and 1967 and received many other awards and honours as well. His books include *Russia on the Way* (1946), *The Shook-up Generation* (1958), *Moscow Journal* (1961), *Behind the Lines—Hanoi* (1967), *The Siege of Leningrad* (1969), *The Gates of Hell* (1975), *Black Night, White Snow—Russia's Revolutions (1905–1917)* (1978), *Without Fear or Favor: The New York Times in Its Time* (1980), *Journey for Our Times* (1983), and *China: 100 Years of Revolution* (1983).

Salisbury, William (Welsh scholar): *see* Salesbury, William.

Salisbury Plain, one of Great Britain's best known open spaces, consisting of a plateau-like area covering about 300 sq mi (775 sq km), in Wiltshire, England. The largely treeless tract, drained to the south by the River Avon and its tributaries, is developed upon chalk. Its northern edge is defined by an escarpment overlooking the Vale of Pewsey. Its other boundaries are less clear.

The area was settled in early times and abounds in prehistoric monuments, of which the best known is Stonehenge. A large part of the plain is used for military exercises, and one of the largest army camps, founded in 1902, is situated at Tidworth.

Salish, group of North American Indian tribes speaking related languages of the Salish family and living in what is now British Columbia, northern Washington and Idaho, and western Montana, in the upper basins of the Columbia and Fraser rivers and their tributaries. Commonly also called the Interior Salish to distinguish them from the Coast Salish (*q.v.*) of the Northwest Pacific Coast, the tribes comprised mainly the Coeur d'Alene, Columbia, Cowlitz, Flathead, Kalispel, Lake, Lillooet, Nespelim, Okanagon, Sanpoil, Shuswap, Sinkaietk (southern Okanagon), Spokan, Thompson, and Wenatchee. Salish was formerly an alternative native name for the Flathead (*q.v.*) alone; now, however, it is more often the broad name that is applied to the entire group.

The Salish were major members of the so-called Plateau culture area, located between the Rocky Mountains and the coastal cordillera, in a semiarid land of grassland and forests interwoven with rivers and streams containing plentiful salmon and other fish. Most Salish tribes were divided into autonomous, loosely organized bands of related families, each with its own chief and its own local territory. In winter a band would occupy a river village; and in summer it would rove, living at campsites, fishing, and gathering berries and roots. Tribes toward the centre of the culture area, such as the Sanpoil, seemed to require no more complex social organization; warfare was almost unknown to them, and external trade was unimportant. On the fringes of the area, however, conditions were modified. The westernmost Salish groups, such as the Lillooet and western Shuswap, traded with the coast people and absorbed some of their traits. The Lillooet, for instance, had a well-organized clan system imitative of that of the coast, and the western Shuswap had both clans and castes of nobles, commoners, and slaves. The easternmost Salish, such as the Flathead, on the other hand, who were horsemen, bison hunters, and warriors, had a fairly well-developed system of tribal chiefs and councils, much in the manner of the Plains Indians just beyond the Rockies.

Although the typical Salish had either dugout or bark canoes, the rivers were so full of rapids that traveling was more often by foot. The typical dwelling was an earth- or mat-covered lodge, sometimes semisubterranean (the Flathead, though, used the Plains tepee, and the Lillooet used the coastal house of poles and planks). Most Salish wore clothing of the Plains type: breechclouts (breechcloths) for men, tunics for women, leggings, and moccasins, all made of dressed skins.

Religious belief focused chiefly on guardian spirits. In the years just prior to puberty, boys went on isolated nightly vigils in search of their spirits in visions (some girls did likewise). Shamans, or medicine men, could cure or cause disease. The winter guardian spirit dance, involving dances, feasts, and prayers in propitiation of guardian spirits, was by far the most important ritual.

Today the Salish live largely on small reservations in the United States or in mixed Eu-

ropeanized communities in Canada. Most are farmers or labourers.

salite, a silicate mineral intermediate in composition between diopside (*q.v.*) and hedenbergite.

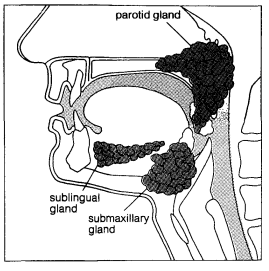
Salitis, also spelled SALATIS, also called SHALIK, the first Hyksos king of Egypt and founder of the 15th dynasty.

The Hyksos were Middle Bronze Age Palestinian invaders who infiltrated Egypt gradually and seized the kingship. Tradition says that Salitis overran all of Egypt, but his actual rule probably did not extend beyond Middle Egypt, while the rest of Egypt consisted of his vassals. His seals probably reached Nubia, to the south, through trade. Salitis also, according to tradition, was the Hyksos king who fortified Avaris in the northeastern Nile Delta, making it the chief Hyksos garrison in Egypt.

saliva, a thick, colourless, opalescent fluid that is constantly present in the mouth of humans and other vertebrates. It is composed of water, mucus, proteins, mineral salts, and the digestive enzyme amylase. As it circulates in the mouth cavity it picks up food debris, bacterial cells, and white blood cells. One to two litres of fluid are excreted daily into the human mouth. Three major pairs of salivary glands (*q.v.*) and many smaller glands scattered in the surface tissue of the cheeks, lips, tongue, and palate contribute to the total amount of saliva. Small amounts of saliva are continually being secreted into the mouth, but the presence of food, or even the mere smell or thought of it, will rapidly increase saliva flow.

The functions of saliva are numerous. Primarily, it lubricates and moistens the inside of the mouth to help with speech and to change food into a liquid or semisolid mass that can be tasted and swallowed more easily. Saliva helps to control the body's water balance; if water is lacking, the salivary glands become dehydrated, leaving the mouth dry, which causes a sensation of thirst and stimulates the need to drink. Saliva reduces tooth decay and infection by removing food debris, dead cells, bacteria, and white blood cells. It also contains small amounts of the digestive enzyme amylase, which chemically breaks down carbohydrates into simpler compounds.

salivary gland, any of the organs that secrete saliva, a substance that moistens and softens food and also contains the digestive enzyme amylase, into the oral cavity of vertebrates.



Salivary glands

Salivary glands may be predominantly serous, mucous, or mixed in secretion. Mucus is a thick, clear, and somewhat slimy substance. Serous secretion is a more liquid opalescent fluid composed of water, proteins, and sometimes enzymes for digestion. Depending on the types of cells present, the glands may be specific, giving off only one of these two substances; or they may be mixed, giving off combinations of both secretions. Glandular activity is regulated involuntarily by the nervous system and is often suppressed by fever, dehydration, or anxiety states. Secretions can be increased by the presence, thought, or smell of food and also by thermal stimulation.

In addition to numerous small glands in the tongue, palate, lips, and cheeks, human beings have three pairs of major salivary glands that open into the mouth through well-developed ducts. The parotid salivary glands, the largest of the three, are located between the ear and ascending branch of the lower jaw. Each is enclosed in a tissue capsule and is composed of fat tissue and cells that secrete mainly serous fluids. Each gland's major duct (Stensen's duct) opens in the rear of the mouth cavity near the second upper molar. The second pair, the submaxillary glands, are located along the side of the lower jawbone. The major duct of each (Wharton's duct) opens into the floor of the mouth at the junction where the front of the tongue meets the mouth's floor. A capsule of tissue also surrounds each of these glands, which give off mixed secretions mostly serous in nature. The third pair, or sublingual glands, are situated beneath the mucous membrane of the floor of the mouth, near the chin region. They are not covered by a capsule and are therefore more dispersed throughout the surrounding tissue. They have numerous ducts (Rivinus's ducts) that empty near the junction of the tongue and mouth's floor; several unite to form Bartholin's duct, which empties into or near the submaxillary duct. These glands secrete a mixed fluid that is mainly mucus. *See also* saliva.

Salix, genus of shrubs and trees known collectively by the common name willow (*q.v.*).

Salk, Jonas Edward (b. Oct. 28, 1914, New York City), U.S. physician and medical researcher who developed a vaccine for poliomyelitis.

Salk received his M.D. in 1939 from New York University College of Medicine, where he worked with Thomas Francis, Jr., who was conducting killed-virus immunology studies. As a National Research Council fellow, Salk joined Francis in 1942 at the University of Michigan School of Public Health and became part of a group that was working to develop an immunization against influenza.

In 1947 Salk became associate professor of bacteriology and head of the Virus Research Laboratory at the University of Pittsburgh School of Medicine, where he began research on poliomyelitis. Working with scientists from other universities in a program to classify the various strains of polio virus, Salk corroborated other studies in identifying three separate strains. He then demonstrated that killed virus of each of the three, although incapable of producing the disease, could induce antibody formation in monkeys. In 1952 he conducted field tests, first on children who had recovered from polio and then on subjects who had not had the disease; both tests were successful. His findings were published the following year in the *Journal of the American Medical Association.* In 1954 a mass field trial was conducted by Francis, and the vaccine, injected by needle, was found to reduce the incidence of polio. On April 12, 1955, the vaccine was released for use in the United States.

In 1957 Salk was named professor of experimental medicine at Pittsburgh, and in 1963 he became fellow and director of the Institute for Biological Studies in San Diego, California, later called the Salk Institute; he was named fellow and founding director of the institute in 1975. Among many other honours, Salk was awarded the Presidential Medal of Freedom in 1977.

Salkey, (Felix) Andrew (Alexander) (b. Jan. 30, 1928, Colón, Panama), Caribbean author.

Raised and educated in Jamaica, Salkey went to the University of London in 1952 and became part of the London community of emerging West Indian writers. "Jamaica Symphony" (later *Jamaica*; 1973) received the Thomas Helmore poetry prize in 1955. Salkey became a free-lance writer and journalist, regularly contributing to the British Broadcasting Company as a radio interviewer, critic, and author of radio plays and features.

His first novel, *A Quality of Violence* (1959), is set in a remote area of Jamaica around 1900, when a prolonged drought leads Christians to turn toward the older, "darker" ways of voodoo and *obeah.* The novel is narrated in the distinctive island patois, rich with folk-speech rhythms. His books for children, including *Hurricane* (1964) and *Riot* (1967), deal fictionally with events in Jamaica. In addition to his own writing, Salkey has edited such volumes as *West Indian Stories* (1960), *Caribbean Prose* (1967), *Caribbean Folk Tales and Legends* (1975), and *Writing in Cuba since the Revolution* (1975).

Sallārid DYNASTY: *see* Mosāferīd dynasty.

Sallé, Marie (b. 1707—d. July 27, 1756, Paris), innovative French dancer and choreographer who performed expressive, dramatic dances during a period when displays of technical virtuosity were more popular. The first



Marie Sallé in *Terpsichore,* engraving after Nicolas Lancret

BBC Hulton Picture Library

woman to choreograph the ballets in which she appeared, she anticipated the late 18th-century reforms of Jean-Georges Noverre by integrating the music, costumes, and dance styles of her ballets with their themes.

After childhood appearances in England, Sallé studied with Françoise Prévost, who sponsored her Paris Opéra debut in 1721. As early as 1729, she and her partner danced without the masks (traditionally used by dancers and only formally abolished in about 1770) to permit interplay of facial expression when they appeared together in the pas de deux *Les Caractères de la danse.* A rival of Marie Camargo, who also danced at the Paris Opéra, Sallé achieved her greatest success in London, where, in 1734, she created the solo *Les Caractères de l'amour* and a ballet, *Bacchus and Ariadne,* which revealed her power as a tragic actress. For the role of Venus in her revolutionary *Pygmalion* (also first performed in London, 1734), she discarded the elaborate, restrictive costume typical of 18th-century ballet for a Grecian-style muslin dress and loose, unornamented hair. The following year she danced in many of Handel's operas. Returning to Paris during Camargo's temporary retirement, she attained great distinction in 1737 as Hébé in *Castor et Pollux.* In 1740 she retired from the Opéra but intermittently appeared at French court performances until 1752. She was admired by Voltaire, Garrick, and Noverre and is remembered for her creativity and intelligence as well as for her grace and expressiveness.

Salle, René-Robert Cavelier, sieur de La (French explorer): *see* La Salle, René-Robert Cavelier, sieur de.

Sallisaw, city, seat (1907) of Sequoyah County, eastern Oklahoma, U.S., just north

of the Arkansas River and the Robert S. Kerr Reservoir, near the Arkansas state line. Settled in the 1880s, it was named for the nearby Sallisaw Creek (from the French *salaison,* meaning "salt provisions," because of local salt deposits). The settlement developed as a trading post and is now a service point for a recreational and diversified farming area (cotton, spinach, soybeans, and cattle) and has some light manufacturing. Dwight Mission, 7 miles (11 km) northeast, was founded in 1828 and functioned for more than a century; it was one of the most important educational institutions in the Indian Territory prior to the American Civil War. Sequoyah, who invented the Cherokee alphabet that enabled his people to become literate, built a log cabin in the hills near the mission; it is preserved as a state monument and houses his mementos and tools. Pop. (1986 est.) 7,770.

Sallust, Latin in full GAIUS SALLUSTIUS CRISPUS (b. *c.* 86 BC, Amiternum, Samnium [now San Vittorino, near L'Aquila, Italy]—d. 35/34 BC), Roman historian and one of the great Latin literary stylists, noted for his narrative writings dealing with political personalities, corruption, and party rivalry.

Sallust's family probably belonged to the local aristocracy, but he was the only member known to have served in the Roman Senate. Thus he embarked on a political career as a *novus homo* ("new man"); that is, he was not born into the ruling class, which was an accident that influenced both the content and tone of his historical judgments. Nothing is known of his early career, but he probably gained some military experience, perhaps in the east in the years from 70 to 60 BC. His first political office, which he held in 52, was that of a tribune of the plebs. The office, designed originally to represent the lower classes, by Sallust's time had developed into one of the most powerful magistracies. The evidence that Sallust held a quaestorship, an administrative office in finance, sometimes dated about 55, is unreliable.

Because of electoral disturbances in 53, there were no regular government officials other than the tribunes, and the next year opened in violence that led to the murder of Clodius, a notorious demagogue and candidate for the praetorship (a magistracy ranking below that of consul), by a gang led by Milo. The latter was a candidate for consul. In the trial that followed, Cicero defended Milo, while Sallust and his fellow tribunes harangued the people in speeches attacking Cicero. While these events were not of lasting significance, Sallust's experience of the political strife of that year provided a major theme for his writings.

In 50 Sallust was expelled from the Senate for alleged immorality. The following year Sallust sought refuge with Julius Caesar, and, when the civil war between Caesar and Pompey broke out in that year, he was placed in command of one of Caesar's legions. His only recorded action was unsuccessful. Two years later, designated praetor, he was sent to quell a mutiny among Caesar's troops, again without success. In 46 he took part in Caesar's African campaign (with modest success), and when Africa Nova was formed from Numidian territory (modern Algeria), Sallust became its first governor. He remained in office until 45 or early 44.

Upon returning to Rome, Sallust was accused of extortion and of plundering his province, but through Caesar's intervention he was never brought to trial. The evidence draws moralizing contrasts between Sallust's behaviour and his censorious writings and suggests a source for the ill-gotten wealth that created the splendid Sallustian Gardens (Horti Sallustiani). The tradition about his morals seems to have originated in scurrilous gossip and by a confusion between the historian and his adopted son, Augustus' minister Sallustius Crispus, a man of great wealth and luxurious tastes.

Sallust's political career ended soon after his return to Rome. His retirement may have been voluntary, as he himself maintains, or forced upon him by the withdrawal of Julius Caesar's favour or even by Caesar's assassination in 44.

Sallust may have begun to write even before the Triumvirate was formed late in 43. Sallust was born in a time of civil war. As he grew to maturity, foreign war and political strife were commonplace; thus it is not surprising that his writings are preoccupied with violence. His first monograph, *Bellum Catilinae* (43–42 BC; *Catiline's War*), deals with corruption in Roman politics by tracing the conspiracy of Catiline, a ruthlessly ambitious patrician who had attempted to seize power in 63 BC after the suspicions of his fellow nobles and the growing mistrust of the people prevented him from attaining it legally. Catiline was supported by certain members of the upper classes who were prompted either by ambition or by the hope of solving their financial problems by Catiline's accession to power. But he also had the backing of Italy's dissatisfied veterans, impoverished peasants, and overburdened debtors. In Sallust's view, Catiline's crime and the danger he presented were unprecedented. Indeed, alarmed contemporaries may have exaggerated the significance of the incident; yet, had the government not acted as firmly as it did, a catastrophe could have occurred. Sallust describes the course of the conspiracy and the measures taken by the Senate and Cicero, who was then consul. He brings his narrative to a climax in a senatorial debate concerning the fate of the conspirators, which took place on Dec. 5, 63. In Sallust's eyes, Caesar and Cato represented civic virtue and were the significant speakers in the debate; he regarded the deaths of these men as marking the end of an epoch in the history of the republic. A digression in this work indicates that he considered party strife as the principal factor in the republic's disintegration.

In Sallust's second monograph, *Bellum Jugurthinum* (41–40 BC; *The Jugurthine War*), he explored in greater detail the origins of party struggles that arose in Rome when war broke out against Jugurtha, the king of Numidia, who rebelled against Rome at the close of the 2nd century BC. This war provided the opportunity for the rise to the consulship of Gaius Marius, who, like Sallust and Cicero, was a "new man." His accession to power represented a successful attack on the traditionally exclusive Roman political elite, but it caused the kind of political conflict that, in Sallust's view, resulted in war and ruin. Sallust considered Rome's initial mismanagement of the war the fault of the "powerful few" who sacrificed the common interest to their own avarice and exclusiveness. Political turmoil in Rome during the late republic had social and economic causes (not overlooked by Sallust), but essentially it took the form of a power struggle between the aristocratic group in control of the Senate and those senators who enlisted popular support to challenge the oligarchy. This is the underlying framework of Sallust's schematic analysis of the events of that time—the clash between the nobility, or Senate, and the people, or plebeians. The *Histories,* of which only fragments remain, describes the history of Rome from 78 to 67 BC. Here Sallust deals with a wider range of subject matter, but party conflict and attacks on the politically powerful remain a central concern. Hints of hostility to the Triumvirate on Sallust's part may be detected in both *Bellum Jugurthinum* and the *Histories.* Two "Letters to Caesar" and an "Invective Against Cicero," Sallustian in style, have often been credited, although probably incorrectly, to Sallust.

Sallust's influence pervades later Roman historiography, whether men reacted against him, as Livy (59 BC–AD 17) did, or exploited and refined his manner and views, as Tacitus (*c.* 56–*c.* 120) did. Sallust's narratives were enlivened with speeches, character sketches, and digressions, and, by skillfully blending archaism and innovation, he created a style of classic status. And to the delight of moralists he revealed that Roman politics were not all that official rhetoric depicted them to be.

Sallust is not an entirely admirable historian; his work shows many instances of anachronisms, inaccuracies, and prejudice; the geography of the *Bellum Jugurthinum* scarcely reveals personal acquaintance with North Africa; he treats the destruction of Carthage in 146 BC as the beginning of the Roman crisis, whereas symptoms were clearly visible before that date. Nor is he a deep thinker, being content to operate with philosophical commonplaces. He makes no attack on the structure of the Roman state; his moral and political values are traditional; they commemorate the past to castigate the present. But his own experiences in politics imbued his analysis and his idiom with an energy and passion that compel the attention of readers. There are English translations by S.A. Handford of *The Jugurthine War* and *The Catiline Conspiracy* in the "Penguin Classics Series" (1964) and in the "Loeb Classical Library Series."

Salluste, Guillaume de: *see* Bartas, Guillaume de Salluste, seigneur du.

Salmān al-Fārisī (fl. 7th century; b. near Eṣfahān, Iran), popular figure in Muslim legend, and a national hero of Iran. He was a companion of the Prophet Muḥammad.

While still a boy he became a Christian, left his father's house, and began a long religious quest. He traveled to Syria and then to central Arabia, seeking the prophet who, he was told, would revive the religion of Abraham. On the way he was sold into slavery. In Medina he met Muḥammad, with whose aid he purchased his freedom. The most important event connected with Salmān is the Battle of the Ditch in 627. According to tradition, when the Meccans came to besiege Muḥammad in Medina, it was Salmān who suggested that, instead of the usual practice of the besieged sallying out to meet their opponents, a ditch be dug across the city's approaches as a form of protection. This was an innovation in Arabian warfare and was instrumental in Muḥammad's successful defense.

Little is known of Salmān al-Fārisī as a historical figure. His fame is due largely to his nationality—he was a prototype of the Persians who were converted to Islām and who played a central role in the course of Muslim history. Salmān also has been important in Muslim religious thought. The moderates of the Shīʿite sect gave him special respect because of his nearness to the Prophet, and the extreme Shīʿites count him as one of the divine emanations recognized by their theology.

Salmasius, Claudius (Latin), French CLAUDE DE SAUMAISE (b. April 15, 1588, Semur-en-Auxois, Fr.—d. Sept. 3, 1653, Spa [now in Belgium]), French classical scholar who, by his scholarship and judgment, acquired great contemporary influence.

Salmasius studied at Paris (1604–06), where he became a Calvinist, and at Heidelberg (1606–09), where he discovered the Palatine manuscript of the Greek Anthology. In 1610 he became *avocat* of the Dijon *parlement,* but in 1629, as a Protestant, he was not allowed to succeed his father as *conseiller.* In the same year his monumental commentary on Solinus' *Polyhistor* was published. His erudition, especially in philology—he knew Hebrew, Arabic, Syriac, Persian, and Coptic, as well as Greek and Latin—led to invitations from several

universities, and in 1631 he became professor at Leiden. There, despite jealousy, ill health aggravated by the climate, and numerous incitements to return to France, he remained, except for a year (1650–51) at the Swedish court. His independence is also shown by his refusal to withdraw from publication his *De primatu papae* (1645; "On Papal Primacy"), which contained an edition of two 14th-century anti-papal tracts.

During the English Civil War (1642–51) Salmasius was regarded as an ally by Presbyterians and Parliamentarians, and at the time of Charles I's execution he was preparing, at the Scots' request, an attack on the Independent sects. At whose instigation he wrote a *Defensio regia pro Carolo I* ("Defense of the Reign of Charles I"), which was published anonymously in November 1649, is not clear, but it seems certain that Charles II paid for the printing. The work contains an attack on Independency, and, in contradiction to Salmasius' earlier views, a defense of prelacy as well as of absolute monarchy. It provoked the *Pro Populo Anglicano Defensio* (1651; *A Defense of the People of England*, 1692) from John Milton, then secretary for foreign languages to the Commonwealth. Also controversial were Salmasius' defenses of usury, *De usuris liber* (1638; "Book on Usury") and *De modo usurarum* (1639; "On the Practice of Usury"), which persuaded the Dutch church to admit moneylenders to the sacrament.

Salmo, fish genus that includes the popular food and sport fishes known as Atlantic salmon, brown trout, cutthroat trout, and rainbow trout (*qq.v.*). *See also* salmon.

salmon, originally, the large fish now usually called the Atlantic salmon (*Salmo salar*), though more recently the name has been applied to similar fishes of the same family (Salmonidae), especially the Pacific salmon, which comprise the genus *Oncorhynchus*, and to other fishes that bear some resemblance to salmonids.

Atlantic and Pacific salmon typically mature in the sea but ascend freshwater, often the parent stream, to spawn. Adult Pacific salmon die soon after spawning, but many Atlantic salmon return to the sea and after one or two years in open water may spawn again. Some subspecies of the Atlantic and sockeye salmon (*Oncorhynchus nerka*) are landlocked, and the coho (*O. kisutch*) has been introduced into the Great Lakes.

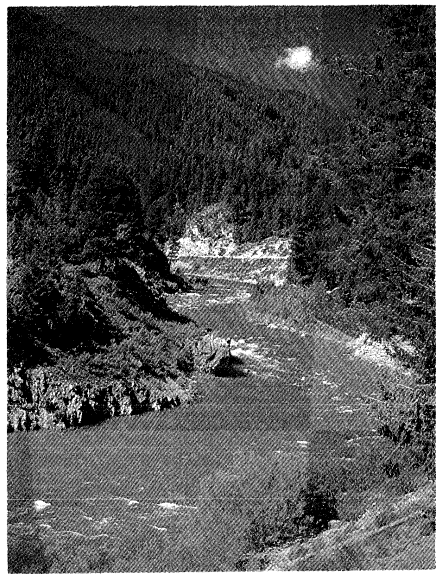
Salmon are silvery-sided fishes while in the ocean, but during the breeding season a change in coloration occurs that varies from one species to another. The males generally develop hooked jaws. The changes are most striking in male Pacific salmon. Adults run upriver in spring or fall and take no food although they will strike at fishing lures. The spawning grounds may be close to the sea, but the king salmon (*O. tshawytscha*) and chum salmon (*O. keta*) swim to the headwaters of the Yukon River. The migrating salmon, compelled by instinct, fight rapids and leap high falls until they reach their spawning grounds. Many pink salmon (*O. gorbuscha*) spawn on tidal flats. Even landlocked salmon, which mature in deep lakes, ascend tributary streams to spawn.

The eggs are laid and buried in gravel pits dug by the female. The young hatch in 60 to 200 days and consume the yolk in the attached egg sac before wriggling up through the gravel to seek food. Young pink salmon descend immediately to the sea, but the young of other seagoing species remain in freshwater for longer periods—as long as five years for the sockeye salmon.

The Atlantic salmon, chum salmon (also called dog or calico salmon), coho (also called silver, white, or jack salmon), king salmon (also called chinook or spring salmon, quinnat, and tyee), pink salmon (also called humpback salmon), and sockeye salmon (also called red or blueback salmon) are valuable food and game fishes. The cherry salmon (*O. masu*) is a small salmon found near Japan.

Other fishes called salmon include the walleyed pike (*Stizostedion vitreum; see* pike-perch), called jack salmon; a dealfish (*Trachipterus rexsalmonorum*), called king-of-the-salmon; the red snapper (*Lutjanus argentimaculatus; see* snapper), called rock salmon, which is also the name for several English food fishes; and a squawfish (*Ptchocheilus lucius*), a yellowtail (*Seriola dorsalis*), and the inconnu (*see* whitefish), all called white salmon.

Salmon River, river rising in the Sawtooth and Salmon River mountains, south Custer County, central Idaho, U.S. It flows generally northeast past the city of Salmon, where it is joined by the Lemhi River, and then northwest



Salmon River, Boise National Forest, Idaho
Ray Manley—Shostal Assoc./EB Inc.

to join the Snake River several miles south of the Idaho–Oregon–Washington border after a course of about 420 mi (676 km). The Salmon is the largest tributary of the Snake and flows through an extensive wildlife area of national forests. The section of the river midway between Salmon city and its confluence with the Snake is called the "River of No Return" because travel upstream was once impossible. Salmon River Canyon, a gorge 30 mi long, 1 mi deep, and in places 10 mi wide, is formed by the river in its lower course.

salmon trout: *see* lake trout.

salmonberry: *see* cloudberry.

Salmonella, genus of rod-shaped bacteria in the family Enterobacteriaceae, whose principal habitat is the intestinal tract of man and other animals. Some species exist in animals without causing disease symptoms; others are serious pathogens for man. They are microbiologically characterized as gram-negative, facultative anaerobes (not requiring oxygen), usually motile.

Salmonella typhi causes typhoid (*q.v.*) in man; paratyphoid fever (*q.v.*) is caused by *S. parathyphi, S. schottmuelleri,* and *S. hirschfeldii,* sometimes considered variants of *S. enteritidis.*

Any of a wide range of mild to serious animal infections due to *Salmonella* is termed salmonellosis.

Refrigeration prevents bacterial reproduction but does not kill the microorganisms, so that many *Salmonella* can develop in foods, which upon ingestion can give rise to a type of food poisoning, resulting in gastroenteritis (*see* enteritis).

S. cholerae-suis, from swine, can cause severe blood poisoning in man; *S. gallinarum* causes fowl typhoid; *S. arizonae* has been isolated from reptiles in the southwestern U.S.

salmonellosis, any of several bacterial infections caused by certain species of *Salmonella*, important as the cause of a type of food poisoning in man and of several diseases in domestic animals. The term salmonellosis has been used generally for two main kinds of gastrointestinal diseases in humans: enteric fevers (including typhoid and paratyphoid fevers) and gastroenteritis. The latter is caused primarily by *S. typhimurium* and *S. enteritidis*; it occurs following ingestion of the bacteria on or in food or drink or on fingers and other objects. Contamination is mainly from two sources: food products from diseased poultry, hogs, and cattle; and wholesome food subsequently exposed to infected fecal matter during food storage (mice and rats) and during food preparation (human handlers). The onset of the disease is sudden and sometimes severe, producing nausea, vomiting, diarrhea, prostration, and slight fever. In most cases recovery occurs within a few days and is followed by varying degrees of immunity.

Salmonellosis among domestic animals may range from latent (inapparent) to severe and fatal, the latter especially in young animals. Symptoms vary but usually include weakness, prostration, fever, and diarrhea. Pregnant animals may abort. Convulsions may occur in cattle. *S. typhimurium* causes disease in horses, cattle, and sheep; *S. choleraesuis* causes blood poisoning in some hogs but is latent in others, which act as carriers. Apparently healthy pets—*e.g.,* dogs, cats, turtles—can, through close contact, transmit salmonellosis to man.

The chain of transmission of salmonellosis is often complex and difficult to trace. Both improved sanitation and immunization (natural and artificial) have dramatically reduced the number of severe outbreaks in domestic animals and in man.

salmoniform, any member of the order Salmoniformes, a diverse group of fishes (about 1,000 species) occurring in both fresh and salt waters and including the trout, salmon, and pike.

A brief treatment of salmoniforms follows. For full treatment, *see* MACROPAEDIA: Fishes.

No single characteristic distinguishes the salmoniforms from other fishes, but the small, fleshy, adipose fin found on all salmoniform fishes indicates a remote but common ancestor. This group includes some of the most valuable sporting and commercial fishes, such as the North American muskellunge, the Danube and Siberian huchen, and the Pacific king salmon. Salmoniforms are generally small, about 150 millimetres (6 inches) long, but the largest, the lancet fish, reaches 2.1 metres (almost 7 feet).

Salmoniforms have very diverse capabilities. The features of deep-sea species range from luminous organs and huge teeth to eyes that are adapted to the dimmest blue light. Some small deep-sea predators have wide jaws that enable them to swallow fishes as large as themselves.

Swimming skills also vary among salmoniforms. Predator fish such as the trout and salmon are adapted to swift swimming and darting. Their bodies are slim and tapered, and their tails are large and serve as a rudder as well as for propulsion. Deep-sea forms, however, are sedentary and scarcely swim at all; they sometimes rely on luminous bait to coax their prey within reach. The barracudinas swim in a vertical plane, darting up and down, with the head always pointing downward.

A fascinating behavioral characteristic of the trout and salmon is their homing instinct. They spawn in freshwater streams and, after hatching, swim in schools to the open sea, where they may migrate for thousands of miles and generally stay from one to three years. Then, by means not fully understood, they find their way back to the spawning beds in which they were hatched. Their persistence is extraordinary; they may have to leap falls as much as 3 metres (10 feet) or more in height, but those that survive go unerringly to their natal place, there to spawn a new generation.

Salome (fl. 1st century AD), according to the Jewish historian Josephus, the daughter of Herodias and stepdaughter of Herod Antipas, tetrarch (ruler appointed by Rome) of Galilee, a region in Palestine. In Biblical literature she is remembered as the immediate agent in the execution of John the Baptist. Josephus states that she was twice married, first to the tetrarch Philip (a half brother of her father, Herod, and a son of Herod I the Great) and then to Aristobulus (son of Herod of Chalcis). She is not to be confused with Salome, sister of Herod I the Great.

According to the Gospels of Mark (6:14–29) and Matthew (14:1–12), Herod Antipas had imprisoned John the Baptist for condemning his marriage to Herodias, the divorced wife of his half brother Herod Philip (the marriage violated Mosaic Law), but Herod was afraid to have the popular prophet killed. Nevertheless, when Salome danced before Herod and his guests at a festival, he promised to give her whatever she asked. Prompted by her mother, Herodias, who was infuriated by John's condemnation of her marriage, the girl demanded the head of John the Baptist on a platter, and the unwilling Herod was forced by his oath to have John beheaded. Salome took the platter with John's head and gave it to her mother.

This story proved popular in Christian art from an early period and became especially popular during the Renaissance, exemplified by the work of the painter Masolino da Panicale. Salome has also been strikingly portrayed by the 19th-century artists Gustave Moreau and Aubrey Beardsley. Oscar Wilde's one-act play *Salomé* (published in 1893, first performed in 1896) was translated by Hedwig Lachmann as the libretto for Richard Strauss's one-act opera of the same name (first produced in 1905), in which Herod is portrayed as lusting after Salome, while Salome, in her turn, desires John the Baptist; she finally satisfies her corrupt wishes by kissing the lips of the severed head of John, who had spurned her. Hence, Salome has become an erotic symbol in art, and it is likely that it is her provocative "Dance of the Seven Veils" in the Strauss opera that most people connect with her name, although no such dance is mentioned in the Bible.

Salomon, Alice (b. April 19, 1872, Berlin—d. Aug. 30, 1948, New York City), American founder of one of the first schools of social work and an internationally prominent feminist.

She was one of the first women to receive the Ph.D. degree from the University of Berlin (1906); her doctoral thesis dealt with the inequality of pay for men and women doing equivalent work. In 1899, she had organized regular training courses for social workers; this evolved into the first German social-work school, of which she was president until 1928 and which was named for her in 1932. She also became president of the federation of German schools of social work.

In 1904 she helped found the International Congress of Women and in 1920 was chosen its vice president. She also was active in the field of public health and was awarded an honorary M.D. degree by the University of Berlin in 1932. Exiled from Nazi Germany five years later, she went to the United States, where she lectured on social work administration.

Salomon, Erich (b. April 28, 1886, Berlin—d. July 7, 1944, Auschwitz, Pol.), German photographer, one of the founders of photojournalism, best known for his candid photographs of statesmen and celebrities.

His early interests were divided between carpentry and zoology. Later, he took a doctorate



Erich Salomon holding his fast Ermanox f/2 camera, 1928

Peter Hunter, Amsterdam

in law from the University of Munich but practiced only briefly. His career as a freelance photographer began in 1928, when he bought one of the first miniature cameras equipped with a high-speed lens that enabled him to photograph in dim light. He concealed this camera in an attaché case and secretly made photographs of a sensational murder trial. These sold so well that he became a professional photojournalist. He began to specialize in photographing the international conferences and social gatherings of heads of state. His purpose was to show the human qualities of world leaders who up to that time had been stereotyped in deadening formal portraits. Working inconspicuously, he took special delight in catching their unguarded moments of fatigue, delight, or disgust. He had such an uncanny ability to get around restrictions that Aristide Briand, a frequent premier of France, called him "the king of indiscretion." His presence at state functions eventually became customary, however, and Briand later stated that nobody would believe a meeting was important unless Salomon photographed it.

Salomon visited England in 1929 and the United States in 1930, photographing prominent persons of both countries. In 1931 he published *Berühmte Zeitgenossen in unbewachten Augenblicken* ("Celebrated Contemporaries in Unguarded Moments"), a collection of his photographs of over 170 celebrities.

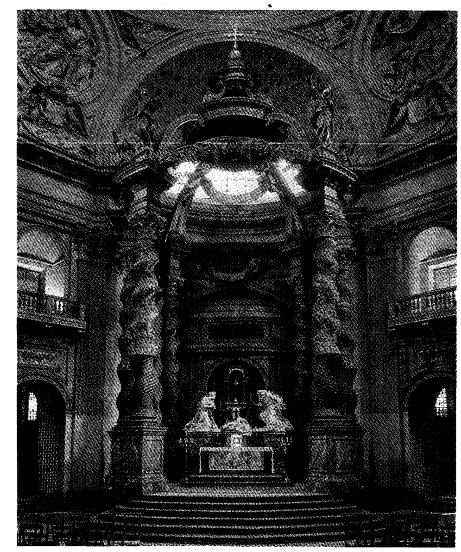
During World War II Salomon went into hiding in The Netherlands but was finally betrayed by a Dutch Nazi. In May 1944 he was sent to the concentration camp at Auschwitz.

Salomon, Haym (b. 1740, Lissa, Pol.—d. Jan. 6, 1785, Philadelphia), U.S. patriot who was a principal financier of the fledgling American republic and a founder of the first Philadelphia synagogue, Mikvah Israel.

In 1772, probably because of his revolutionary activities for Polish liberty, Salomon fled to New York City, where he established himself as a commission merchant. He soon became a successful financier and supported the patriotic cause on the outbreak of the American Revolution. In 1776 the British, who controlled New York City, arrested Salomon; exposure suffered in prison later contributed to his early death. He was paroled but was arrested again in 1778 on more serious charges; he escaped and went to Philadelphia. There he established a brokerage office and acted without salary as the financial agent of the French, doing all in his power to facilitate the Franco-American Alliance.

Among his many other contributions to the Colonies, Salomon subscribed heavily to government loans, endorsed notes, gave generously to soldiers, and equipped several military units with his own money. Robert Morris, the superintendent of finance from 1781 to 1784, appointed Salomon as broker to his office. Morris records in his diary that between 1781 and 1784 Salomon lent more than $200,000. In addition, he made private loans to prominent statesmen such as James Madison, Thomas Jefferson, and James Monroe, from whom he would not take interest. In all, the government owed Salomon more than $600,000. Generations of his descendants tried in vain to collect some portion of these loans, which had helped to impoverish Salomon in his last years.

salomónica (Spanish: "Solomon-like"), also called BARLEY-SUGAR COLUMN, in architecture, a twisted column (*q.v.*), so called because in the Old St. Peter's Church in Rome there was such a pillar, which according to legend had been imported from the Temple of Solomon in ancient Jerusalem. When Gian Lorenzo Bernini redesigned New St. Peter's Basilica, he repeated the salomónica design in the columns that supported the baldachin, or canopy, over the altar.



Salomónicas supporting the baldachin in the Church of Val-de-Grâce, Paris; designed by François Mansart, 1645, and completed by Gabriel Leduc, 1665

Giraudon/Art Resource, NY

The structure, similar in appearance to the twisted stalk of a barley-sugar plant, became popular in the type of Spanish Baroque called Churrigueresque. It is among the most notable characteristics of the work of the three architect brothers of the Churriguera family. Followers of this school continued to imitate José Benito Churriguera's graceful salomónicas, especially those behind the altar of the church of San Esteban in Salamanca, Spain, well into the 18th century.

Salon, official exhibition of art sponsored by the French government. It originated in 1667 when Louis XIV sponsored an exhibit

of the works of the members of the Académie Royale de Peinture et de Sculpture, and the salon derives its name from the fact that the exhibition was hung in the Salon d'Apollon of the Louvre Palace in Paris. After 1737 the Salon became an annual rather than a sporadic event, and in 1748 the jury system of selection was introduced. During the French Revolution the Salon was opened for the first time to all French artists, although the academicians continued to control most of the exhibitions held in the 19th century. With the formation in 1881 of the Société des Artistes Français to take over the responsibility of holding the Salon, and with the growing importance of independent exhibitions of the works of avant-garde artists, the Salon gradually lost its influence and prestige.

Salon d'Automne (French: Autumn Salon), exhibition of the works of young artists held every fall in Paris since 1903. The Salon was established when modern artists who were not accepted by the conservative, official Société Nationale des Beaux-Arts decided to form their own organization with the aims of welcoming any artist who wished to join, selecting a jury for exhibitions by drawing straws from the new group's membership, and giving the decorative arts the same respect accorded to the fine arts. The first Salon d'Automne was held on Oct. 31, 1903, at the Petit-Palais. During its early years, the Salon exhibited the works of Henri Matisse, Dunoyer de Segonzac, Georges Rouault, Jacques Villon, and several Impressionists. Exhibitions were still being held in the 1970s.

Salon-de-Provence, town, Bouches-du-Rhône *département,* Provence-Alpes-Côte-d'Azur region, southeastern France, northwest of Marseille. Founded in pre-Roman times as the *oppidum* (fortified town) of Le Salounet on a hill in the Val de Cuech, Salon achieved importance in the Middle Ages as a centre of the olive oil trade. It was the home of the 16th-century astrologer Nostradamus, whose house is preserved and whose tomb is in the 14th-century Collégiale Saint-Laurent. Other monuments are the fortified Château de l'Empéri (12th–13th centuries), a former residence of the archbishops of Arles; the 12th-century Romanesque church of Saint-Michel; and the 1630 clock tower. Olive oil products are still made, although petroleum lubricants are more important. Salon has been the site of the French Air Force Academy since 1936 and of a very important air base. Pop. (1982) 31,185.

Salon des Indépendants, annual exhibition of the Société des Artistes Indépendants, held in Paris since 1884. In the course of revolutionary developments in painting in France in the second half of the 19th century, both artists and the public became increasingly unhappy with the rigid and exclusive policies of the official Salon, an exhibition held sporadically between 1667 and 1737 and annually thereafter by the Académie, which had maintained almost total control over the teaching and exhibition of art since around 1661. In 1863 the Salon des Refusés was held for innovative artists whose works had been rejected by the official Salon. In 1880 the Salon rejected the work of many Impressionist and Postimpressionist painters; consequently, in 1883 the Impressionists organized a second Salon des Refusés. By 1884 the Société des Artistes Indépendants had been founded, to hold unjuried exhibitions, which would accept the work of any artist who wished to participate. The group's first show, held in the pavilion of the city of Paris, included paintings by Odilon Redon, Henri-Édmond Cross, Paul Signac, Paul Cézanne, Paul Gauguin, Henri de Toulouse-Lautrec, Vincent van Gogh, and Georges Seurat, whose "Une Baignade, Asnières" ("Bather"; 1883–84; National Gallery, London) had been refused by the official Salon that same year. By 1905 Henri Rousseau, Pierre Bonnard, Henri Matisse, and the Fauves had all been seen at this annual show. The Salon des Indépendants (held since 1950 at the Grand Palais in Paris) has about 3,000 members, many of whom have received international acclaim for their role in avant-garde art movements. The Salon des Indépendants is now only one of many outlets for new art in Paris, along with the Salon d'Automne, the Salon de Mai, Salon de la Jeune Peinture, and the Salon des Réalités Nouvelles, among others.

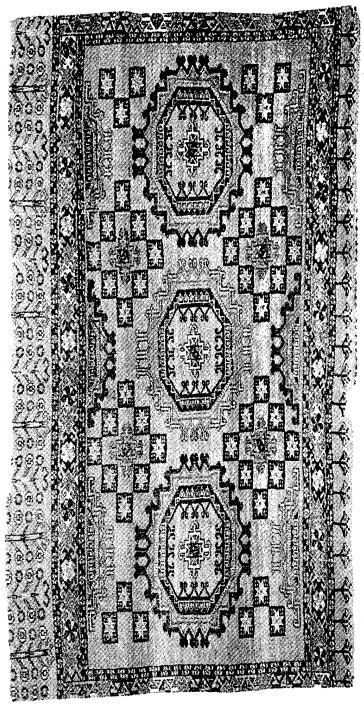
Salon des Refusés (French: Salon of the Refused), art exhibition held in 1863 in Paris by command of Napoleon III for those artists whose works had been refused by the jury of the official Salon. Among the exhibitors were Paul Cézanne, Camille Pissarro, Armand Guillaumin, Johan Jongkind, Henri Fantin-Latour, James Whistler, and Édouard Manet, who exhibited his famous painting "Le Déjeuner sur l'herbe," officially regarded as a scandalous affront to taste.

Salonga National Park, largest reserve in Zaire, Africa, covering 13,900 sq mi (36,000 sq km) and located midway between Kinshasa, the national capital, and Kisangani, 720 mi (1,160 km) to the northeast. The administrative headquarters at Monkoto (Équateur region), on the Luilaka River southeast of Mbandaka, is accessible only by boat from the Congo (Zaïre) River. The park was established in 1970 and has two separate sections, one north and one south of Monkoto; dense equatorial forest provides habitats for parrots, elephants, antelope, and a variety of monkeys and apes—including pygmy chimpanzees, unique to this part of the world. Park visitors observe the animals from motorized river boats and hunting is prohibited.

Salonika (Greece): *see* Thessaloníki.

Salop (England): *see* Shropshire.

Salor rug, floor covering handmade by the Salor Turkmens of the Turkmen S.S.R. Most examples are designed as *jovāl*s, the faces of large storage bags. The gul, or specific tribal motif, is an octagon surrounded and lined with little triangular projections, presumably vestiges of a knotted outline as seen in Holbein rugs and rugs depicted in Timurid Persian miniature paintings. The secondary motifs that appear between the guls are usually groups of squares in a diagonal format, each containing a star. A variety of madder reds are used in these *jovāl*s, and often red or pink silk is employed freely in the guls.



Salor rug of the *jovāl,* or bag-face, type, from Russian Turkistan, 19th century; in the Louise W. Mackie Collection

Collection of Louise W. Mackie; photograph, Otto E. Nelson—EB Inc.

Rugs of good size are sometimes seen, perhaps somewhat later in date, and in these the reds are apt to have more of a purplish cast. White grounds have been found among these 20th-century rugs. Salor rugs are all wool or goat hair, in Senna (Sehna) knotting. The *jovāl*s in particular are excellently woven, with short pile as in the Tekke carpets.

Saloth Sar, also spelled SALOT SAR (Cambodian leader): *see* Pol Pot.

salp, any small, pelagic, gelatinous invertebrate of the families Salpidae and Doliolidae (class Thaliacea, subphylum Urochordata). Found in warm seas, salps are common in the Southern Hemisphere. They have transparent barrel-shaped bodies that are girdled by muscle bands and open at each end. They are filter feeders that consume microscopic planktonic plants and animals. The life cycle of salps is complex, with alternating sexual and asexual phases. In the latter phase, long chains of individuals are formed. Many salps are luminescent.

Consult the INDEX *first*

Salpausselkä ridges, three parallel ridges traversing the breadth of southern Finland from Hangö (Hanko), at the mouth of the Gulf of Finland in the west, to Joensuu, on Lake Pyhäselkä, near the Soviet border in the east. The significance and origin of the Salpausselkä ridges has been a subject of much controversy. The ridges are acuate (needle-shaped) in form and sometimes more than 2 kilometres (as much as 1.5 miles) wide and 100 metres (320 feet) high.

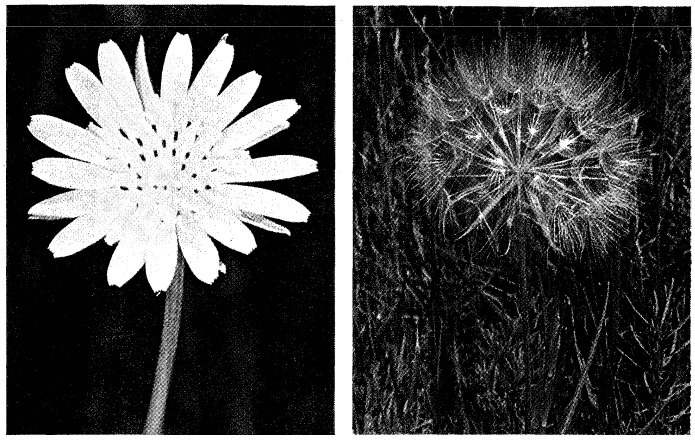
The ridges form two distinct arcs termed Salpausselkä I and II. In some regions a third arc, Salpausselkä III, is recognized, although this has a more restricted distribution. Salpausselkä ridges are characteristically narrow with a flat plateau. They consist of glacial till and material carried in streams that probably flowed through the ice.

Some authorities believe that the ridges were built up outside the ice margin at time of major halts of the glacial ice. The form and structure of the features were modified by the action of waves; this accounts for the flat tops of the ridges.

The Salpausselkä ridges thus provide information about the complex changes in sea levels that occurred simultaneously with the process of deglaciation. The Salpausselkä ridges also serve to provide evidence about varve chronologies, the measurement and counting of thin, annual layers of silts and clays deposited in glacially influenced basins.

salsify, also called OYSTER PLANT, or VEGETABLE OYSTER (*Tragopogon porrifolius*), biennial herb of the family Asteraceae, native to the Mediterranean region. The thick white taproot is cooked as a vegetable and has a flavour similar to that of oysters.

Salsify has purple flowers and narrow, often keeled leaves whose bases usually clasp the stem. Goatsbeard, or meadow salsify (*T. pratensis*), is a weedy European species, naturalized in North America, that has a large yellow



Flower (left) and seedhead (right) of goatsbeard (*Tragopogon pratensis*)
(Left) Louise K. Broman from Root Resources—EB Inc.; (right) A.J. Dignan—Bruce Coleman Inc.

flower head. It is occasionally cultivated as an ornamental, and its leaves and roots are sometimes eaten in salads.

salt, in chemistry, substance produced by the reaction of an acid with a base. A salt consists of the positive ion of a base and the negative ion of an acid. The reaction between an acid and a base is called a neutralization reaction. The term salt is also used to refer specifically to common table salt, or sodium chloride. When in solution or the molten state, most salts are completely dissociated into negatively and positively charged ions and are good electrical conductors.

salt, also called SODIUM CHLORIDE (chemical formula NaCl), COMMON SALT, or TABLE SALT, a crystalline compound, found abundantly in nature, that has widespread use as a food seasoning or preservative.

A brief treatment of salt follows. For full treatment, *see* MACROPAEDIA: Industries, Extraction and Processing.

Ideally salt can be produced in a pure form by the action of sodium on dry hydrogen gas and chlorine, causing the formation of sodium chloride (NaCl) crystals.

Physically salt appears as a cube-shaped crystal that, depending on purity, can be colourless, transparent, or translucent. Salt is hygroscopic, that is, under normal conditions, it will absorb water from the atmosphere. Salt's affinity for water is further demonstrated by the ease with which it can be dissolved. At 20° C (68° F), 100 grams of water will dissolve 36 grams of salt. The higher the water temperature, the greater the amount of salt that will be dissolved. Dissolving salt in water will also result in a reduction of the water temperature. If 36 grams of salt are dissolved in 100 grams of water at 15.5° C (60° F) the resultant solution will lose approximately 3.3–5.5 degrees C (6°–10° F). Salt will melt at 427° C (800° F) and vaporize at a slightly higher temperature. At 0° C (32° F) the specific gravity of salt is 2.165 (that is, salt is 2.165 times as heavy as water).

Mainly because of its preservative and seasoning properties, salt has always been one of man's most highly prized mineral resources. Frequently associated with that most basic of foods—bread—salt, where known in the ancient world, very often took on religious significance. Thus one finds, in the text of the Hebrew scriptures, the words ". . . a covenant of salt forever . . ." (Num. 18:19) and ". . . with all your offerings you shall offer salt" (Lev. 2:13). Similarly, in Greek the phrase "trespass not against the salt," in Arabic "there is salt between us," and in Persian "untrue to salt" all express, to one degree or another, the intimate connection of salt with the idea of a covenant or binding relationship between God and humans or one person and another. It is still the custom in many areas of the world to offer a guest bread and salt upon entering the home. The practice of presenting newlyweds with wine, bread, and salt further reflects the status of salt as a life-giving and sustaining substance.

The importance of salt can also be demonstrated by the fact that it has been used for money. The modern English world "salary" is derived from the Latin *salarium* which originally referred to the direct payment of salt as wages to soldiers.

The manufacture of salt is perhaps the least complicated and easiest developed of all mineral industries. In its most basic form all that is required is a source of saltwater or rock salt, a low ambient humidity, and a reasonable supply of sunlight to evaporate the water. This method, still used in many parts of the world including the United States, Africa, and India, accounts for up to 10 percent of all salt produced.

An average gallon of seawater contains about 3 to 5 percent solids. Of the various salts found in solution, sodium chloride is by far the most abundant, accounting for over 77 percent. Magnesium chloride is next at around 9–10 percent, magnesium sulfate at 4–6 percent, calcium sulfate 3 percent, potassium chloride 2–3 percent, magnesium bromide 0.27 percent, and calcium carbonate 0.3 percent.

Other important sources of salt are naturally occurring deposits of saltwater, called brines, found in the Dead Sea and in various parts of the United States, Great Britain, Germany, France, Austria, and India. Many of these brines, most notably in the Dead Sea, approach a supersaturated state—any further salts added will not dissolve. The presence of various salts not usually found in brines, *e.g.,* barium chloride and strontium chloride, makes some of these brines especially interesting.

Seawater and brines are processed by solar evaporation wherever possible. The brine, which has been allowed to evaporate to a specific gravity of 1.21, is channeled into a series of three or four crystallizing pans where the concentration is gradually increased. The salt crystallized out at each pan is gathered, washed with a saturated brine solution, rewashed with fresh water, dried, and sold.

Where low levels of sunlight or too high an ambient humidity make evaporation unfeasible, heat from some other source may be employed.

In the open crystallization, or graining, process, the brine is first treated with lime and sodium hydroxide to settle out calcium and magnesium compounds. It is then fed into the grainer, a long, open trough surrounded by steam heating coils. As the brine evaporates, salt crystals are formed. These are recovered at the end of the trough by either draining or centrifuging the brine. To assure continual production, the grainer is replenished at the same rate the brine is evaporating.

In the multiple-effect evaporation process, a series of chambers, each subjected to a successively higher level of vacuum, is employed. The brine boils off through the action of the vacuum. The final crystals are treated like those produced by open crystallization.

Along with brines and seawater, natural deposits of halite, crystalline sodium chloride, serve as important sources of salt. These deposits, which are the products of the evaporation of seas in the distant past, can be exploited in several ways.

Beds of rock salt that lie on or near the surface can be excavated in much the same manner as any other mineral deposit. If the salt is of sufficiently high quality, it will simply be ground, sieved, and sold. If impurities are present in more than acceptable levels the salt may first be melted or leached with a dilute hydrochloric acid. The salt is then brine-washed, fresh water-washed, dried, and ground.

Where salt deposits are too far below the surface to be mined efficiently, water may be pumped down under pressure to dissolve them. The resultant brine is then collected and treated by either solar or artificial evaporation.

Salt is used universally as a seasoning and preservative. It is used in the manufacture of pickles and cheese and in the preserving and curing of fish and meat products. Animal skins and hides are pickled in salt before being processed into leather. It is indispensable in the manufacture of hydrochloric acid, sodium carbonate, and sodium bicarbonate along with other heavy and fine chemicals. Brine is used extensively in refrigeration and cooling processes. Water softening equipment uses salt, which exchanges sodium ions for those of calcium and magnesium in the water being treated.

SALT: *see* Strategic Arms Limitation Talks.

Salṭ, as-, also spelled SALT, or ES-SALT, capital of al-Balqā' *muḥāfaẓah* (governorate), west central Jordan. It is on the old main highway (often called the as-Salṭ Road) leading from Amman to Jerusalem. The town is situated in the al-Balqā' highland, about 2,600–2,750 ft (about 790–840 m) above sea level, and is built on two hills, one of which has the ruins of a 13th-century fortress.

An old settlement, it was known as Saltus in Byzantine times and was the seat of a bishopric; later destroyed by the Mongols, it was rebuilt by the Mamlūk sultan Baybars (ruled 1260–77). Later, as-Salṭ was blown up by the Egyptian viceroy Ibrāhīm Pasha during his campaigns against Palestine (1830s). After World War I it was at as-Salṭ that Sir Herbert Samuel, British high commissioner for Palestine and Transjordan, announced to the Transjordanian *shaykh*s and notables that the British favoured self-government for the country (August 1920).

The town is an agricultural market, as well as an administrative centre; chief crops produced in the vicinity are grapes (for raisins) and grain; tanning extract is produced from sumac bushes. In 1966 a pharmaceutical factory was opened at as-Salṭ, producing both for the Jordanian market and for export to other Arab states. Pop. (1979 prelim.) 33,037.

salt dome, largely subsurface geologic structure that consists of a vertical cylinder of salt (including halite and other evaporites) one kilometre (0.6 mile) or more in diameter, embedded in horizontal or inclined strata. In the broadest sense, the term includes both the core of salt and the strata that surround and are "domed" by the core. Similar geologic struc-

tures in which salt is the main component are salt pillows and salt walls, which are related genetically to salt domes, and salt anticlines, which are essentially folded rocks pierced by upward migrating salt. Other material, such as gypsum and shale, form the cores of similar geologic structures, and all such structures, including salt domes, are known as diapiric structures, or diapirs, from the Greek word *diapeirein,* "to pierce." The embedded material in all instances appears to have pierced surrounding rocks. Upward flow is believed to have been caused by the following: gravity forces, in situations where relatively light rocks are overlain by relatively heavy rocks and the light rocks rise like cream to the surface; tectonic (earth-deformation) forces, in situations where mobile material (not necessarily lighter) is literally squeezed by lateral stress through less mobile material; or a combination of both gravity and tectonic forces.

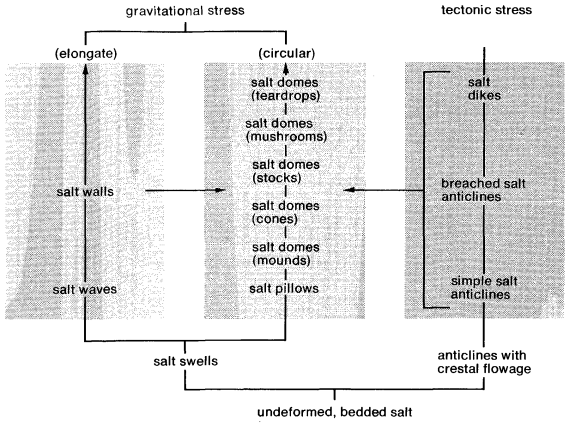


Figure 1: Interrelationships of salt structures (see text)

Salt domes are one of a number of kinds of salt structures whose interrelationships are shown diagrammatically in Figure 1. "Classic" salt domes develop directly from bedded salt by gravitational stress alone. Salt domes also may develop from salt walls and salt anticlines, however. In the latter case, the development of the domes results from superposition of gravitational stress on salt masses that initially developed due to tectonic stress.

Physical characteristics of salt domes. A salt dome consists of a core of salt and an envelope of surrounding strata. In some areas, the core may contain "cap rock" and "sheath" in addition to salt.

The size of typical salt domes (including cap rock and sheath) varies considerably. In most cases, the diameter is a kilometre or more and may range up to more than 10 km. The typical salt dome is at least 2 km high (in the subsurface), and some are known to be higher than 10 km.

The cores of salt domes of the North American Gulf Coast consist virtually of pure halite (sodium chloride) with minor amounts of anhydrite (calcium sulfate) and traces of other minerals. Layers of white pure halite are interbedded with layers of black halite and anhydrite. German salt dome cores contain halite, sylvite, and other potash minerals. In Iranian salt domes, halite is mixed with anhydrite and marl (argillaceous limestone) and large blocks of limestone and igneous rock.

The interbedded salt–anhydrite and salt–potash layers are complexly folded; folds are vertical and more complex at the outer edge of the salt. In German domes, when relative age of the internal layers can be deciphered, older material is generally in the centre of the salt mass and younger at the edges. Study of halite grains in some Gulf Coast salt domes indicates a complex pattern of orientation that varies both vertically and horizontally in the domes. Mineral grains in the centre of a Caspian salt dome are vertical; those at its edge are horizontal.

Cap rock is a cap of limestone–anhydrite, characteristically 100 metres (328 feet) thick but ranging from 0 to 300 m. In many cases, particularly on Gulf Coast salt domes, the cap can be divided into three zones, more or less horizontally, namely, an upper calcite zone, a middle transitional zone characterized by the presence of gypsum and sulfur, and a lower anhydrite zone. These zones are irregular and generally are gradational with each other, although in some instances the contact between gypsum and anhydrite is quite abrupt. Cap rock is generally believed to develop from solution of salt from the top of the salt core; this leaves a residue of insoluble anhydrite that is later altered to gypsum, calcite, and sulfur. Presumably, solution takes place in the circulating (shallow) water zone; deeply buried domes with cap rock must have been shallow at some former time and subsequently buried.

Shale sheath is a feature that is common to many Gulf Coast salt domes. In shape, it may completely encase the salt (like a sheath), or it may be limited to the lower portions of the salt. It is most common on the deeper portions of salt domes whose tops are near the surface or on deeply buried salt domes. The fluid pressure within the shale is significantly greater than that within the surrounding rocks, and the stratification (bedding planes) of the shale is distorted. Fossils in the shale are older than in surrounding sediments, indicating that the shale came from an older, and therefore deeper, layer.

The strata around salt cores can be affected in three ways: they can be uplifted, they can be lowered, or they can be left unaffected while surrounding strata subside relatively. Uplifted strata have the structural features of domes or anticlines; characteristically they are domed over or around (or both) the core (including cap and sheath if present) and dip down into the surrounding synclines. The domed strata are generally broken by faults that radiate out from the salt on circular domes but that may be more linear on elongate domes or anticlines with one fault or set of faults predominant. Lowered strata develop into synclines, and a circular depression called a rim syncline may encircle or nearly encircle the domal uplift. Unaffected strata develop into highs surrounded by low areas. These highs, called remnant highs or turtleback highs, do not have as much vertical relief as the salt domes among which they are interspersed. Present-day structure of strata around salt domes may not in every instance coincide with the present-day position of the salt. This offset relationship suggests that late uplift of the salt dome shifted its centre compared with early uplift.

Origin of salt domes. In general, salt structures associated with folds have been linked with the same forces that caused the folding. Salt structures in areas without any apparent folding, however, puzzled early geologists and gave rise to a bewildering series of hypotheses. It is now generally agreed that salt structures (and diapiric or piercement structures) develop as the result of gravitational forces, tectonic forces, or some combination of these forces, at the same time or with one force following the other. Whatever the precise circumstance, development of diapiric structures requires a rock that flows.

Although rock flow is difficult to visualize because of slow rates of movement, its results can be clearly seen: stonework that sags, mine and tunnel openings that flow shut, and glaciers of rock salt that move down mountainsides with all the features of glaciers of ice. Given very long periods of time and the relatively high temperature and pressure due to depth of burial, considerable movement of a relatively plastic material such as salt can result. A movement of one millimetre (0.039 inch) a year, for example, over a period of 1,000,000 years would produce a net movement of 1,000 m. The most common rocks that flow are halite, sylvite, gypsum, and high-pressure shale. These rocks also have densities that are lower than consolidated rock such as sandstone, and if buried by sandstone they would be gravitationally unstable. All of them are deposited by normal processes of sedimentation and are widespread in sedimentary strata.

Study of models and natural salt structures have led to a reconstruction of the sequence of events in the development of salt domes, as shown in Figure 2. First, thick salt is deposited and buried by denser sedimentary strata. The salt and overlying strata become unstable and

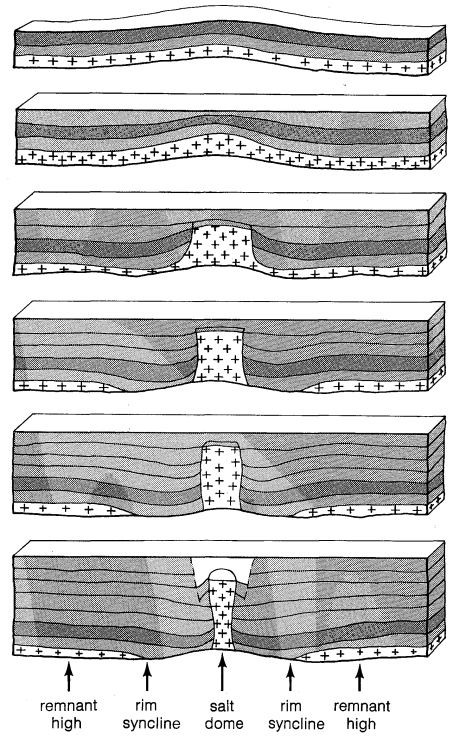


Figure 2: Stages in the development of shallow piercement salt dome; initial stage at top

After L.L. Nettleton, *American Association of Petroleum Geologists Bulletin,* in M. Halbouty, *Salt Domes—Gulf Region, U.S. and Mexico* (copyright 1967); used with permission of Gulf Publishing Company, Houston, Texas

salt begins to flow from an undeformed bed to a rounded salt pillow. Flow continues into the centre of the pillow, doming the overlying strata; at the same time the area from which the salt flowed subsides, forming a rim syncline. The strata overlying the salt, because they are literally spread apart, are subject to

tension, and fractures (faults) develop. Eventually, the salt breaks through the centre of the domed area, giving rise to a plug-shaped salt mass in the centre of domed, upturned, and pierced strata. Upward growth of the salt continues apace with deposition of additional strata, and the salt mass tends to maintain its position at or near the surface. If the salt supply to the growing dome is exhausted during growth, development ceases at whatever stage the dome has reached, and the dome is buried.

Distribution of salt structures. Salt structures develop in any sedimentary basin in which thick salt deposits were later covered with thick sedimentary strata or tectonically deformed or both. With the exception of the shield areas, salt structures are widespread. By their very nature, the classic salt domes generated by gravitational instability alone are limited to areas that have not been subject to significant tectonic stress. Some salt domes do, however, occur in regions that were subject to tectonic stress. Three of the many areas of salt structures in the world are representative of all; these are the Gulf of Mexico region of North America, the North German–North Sea area of Europe, and the Iraq–Iran–Arabian Peninsula of the Middle East.

Economic significance of salt domes. Salt domes make excellent traps for hydrocarbons because surrounding sedimentary strata are domed upward and blocked off. Major accumulations of oil and natural gas are associated with domes in the United States, Mexico, the North Sea, Germany, Romania, and the Soviet Union. In the Gulf Coastal Plain of Texas and Louisiana, salt domes will be a significant source of hydrocarbons for some years to come. Huge supplies of oil have been found in salt dome areas off the coast of Louisiana. Some individual salt domes in this region are believed to have reserves of more than 500,000,000 barrels of oil. Salt domes in northern Germany have produced oil for many years. Exploration for salt dome oil in the North Sea has extended production offshore.

The cap rock of shallow salt domes in the Gulf Coast contains large quantities of elemental sulfur. Salt domes are major sources of salt and potash in the Gulf Coast and Germany; halite and sylvite are extracted from domes by underground mining and by brine recovery.

Salt domes have also been utilized for underground storage of liquefied propane gas. Storage "bottles" are made by drilling into the salt and then forming a cavity by subsequent solution. Such cavities, because of their impermeability, also have been considered as sites for disposal of radioactive wastes.

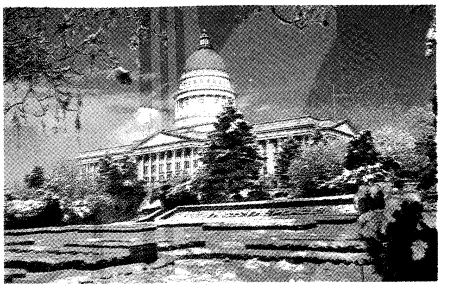
salt flat: *see* alkali flat.

salt glaze, in ceramics, a glaze having the texture of orange peel, formed on stoneware by throwing common salt into the kiln at the peak temperature. Sodium from the salt combines with silica in the clay to form a glassy coating of sodium silicate. The glaze may be colourless or may be coloured various shades of brown (from iron oxide), blue (from cobalt oxide), or purple (from manganese oxide).

salt grass (genus *Spartina*): *see* cordgrass.

salt karst, solution phenomena occurring in rock salt by the action of groundwater. Although rock salt is considerably more soluble in water than is the calcite that forms karst topography, rock salt is impervious, and solution can take place only on the exterior surfaces. The brine formed by initial solution must be drained off by groundwater before more solution can occur. Salt karst sinkholes, caverns, and crevices may be formed depending on the thickness of the salt body. Shallow features may be formed on playa surfaces with thick salt crusts by the percolation of water down to the water table.

Salt Lake City, state capital and seat (1852) of Salt Lake County, north central Utah, U.S., on the Jordan River near the southeastern end of Great Salt Lake. The Wasatch-Cache National Forest (headquartered in the city) is



The State Capitol, Salt Lake City, Utah
By courtesy of the Utah State Department of Highways

to the east and north. The world capital of the Church of Jesus Christ of the Latter-day Saints (Mormons), it influences the social, economic, political, and cultural life of the people in a 185,000-sq-mi (480,000-sq-km) area in Utah and bordering regions in Idaho, Nevada, and Wyoming. Built on benches of ancient Lake Bonneville, the city (approximate elevation 4,400 ft [1,350 m]) lies at the foot of the Wasatch Mountains, which rise as high as 8,000 ft above the Salt Lake Valley floor.

Founded in 1847 by Brigham Young and a band of 148 Mormons as a refuge from religious persecution, it was known as Great Salt Lake City until 1868. The city was laid out by Young according to Joseph Smith's plan for the city of Zion: 10-ac (4-ha) blocks bounded by wide streets were grouped around the Temple block. Mormon immigrants from the East and Europe flocked to "the New Jerusalem," the "City of the Saints," in the Provisional State of Deseret (a Book of Mormon word interpreted as "honeybee"). After the Treaty of Guadalupe Hidalgo (1848), Utah passed to U.S. sovereignty and became a territory in 1850. Except for a brief period in 1858, Salt Lake City was the territorial capital from 1856 to 1896, when it was made the state capital. Conflicts between Mormons and U.S. officials led to the so-called Utah War of 1857–58, when Gen. Albert Sidney Johnston's troops marched through the city to establish Camp Floyd west of Utah Lake. Social and religious conflict between Mormons and non-Mormons continued to influence the life of the city for a century.

The opening of the mining industry (1862) and completion (1870) of the Utah Central Railroad, connecting Salt Lake City with the Union Pacific at Ogden, along with other rail connections, made the city a thriving hub of Western commerce. Now the commercial centre for nearby mining operations (copper, silver, lead, zinc, coal, and iron), it also has diversified manufactures, including computer and mining equipment, steel plate, petroleum, and textiles and is a trade, processing, and transportation centre for agricultural products of nearby irrigated farmlands.

Educational institutions include the University of Utah (1850), Westminster College (1875), and Utah Technical College at Salt Lake City (1947). Monuments and buildings include the Mormon Tabernacle (1867; famous for its choir), Temple (1893), and Seagull Monument (1913), all within Temple Square. Others include Beehive and Lion houses, residences for Brigham Young's families. Young's grave is on First Avenue. The State Capitol (1916), built of Utah granite and marble in Corinthian style, has an exhibition hall. Ft. Douglas, on the outskirts, was founded in 1862. Inc. 1851. Pop. (1980) city, 163,033; (1982 est.) Salt Lake City-Ogden metropolitan area (SMSA), 969,700.

salt marsh, area of low, flat, poorly drained ground that is subject to daily or occasional flooding by salt water or brackish water and that is covered with a thick mat of grasses and such grasslike plants as sedges and rushes. Salt marshes are common along low seacoasts, inside barrier bars and beaches, in estuaries, and on deltas and are also extensive in deserts and other arid regions that are subject to occasional overflow by water containing a high content of salts. Maritime salt marshes often extend many miles inland and are variably subject to tidal action; inland brackish marshes are found frequently on mineral substrates of alluvial and lacustrine origin.

salt nucleus, tiny particle in the atmosphere that is composed of a salt, either solid or in an aqueous solution; it promotes the condensation of water and thus is one form of condensation nucleus (*q.v.*).

Salt Range, series of hills and low mountains between the valleys of the Indus and Jhelum rivers, located in the northern part of the Punjab region of Pakistan. It derives its name from extensive deposits of rock salt that form one of the richest salt fields in the world; they are of Precambrian age and range up to more than 1,600 ft (4,875 m) in thickness. The range is approximately 186 mi (300 km) long from east to west, and its width, in the central and eastern parts, is from 5 to 19 mi. Its average height is 2,200 ft, and its highest altitude, at Sakesar mountain, is 4,992 ft (1,522 m). In addition to the salt deposits, mined from ancient times, the Salt Range contains coal, gypsum, and other minerals.

The landform is that of a range of low mountains from which the top strata have been removed by erosion. Forming the southern terrace of the Potwar Plateau (1,700 ft), southwest of Rāwalpindi, it consists of two unsymmetrical, parallel ridges divided by a longitudinal valley. The southern slopes of both ridges are steep; the northern slopes are slanting. The northern ridge (a cuesta—*i.e.*, a sloping plain, culminating at the upper end at the crest of a cliff), with an average height of from 2,300 to 2,600 ft and with very steep southern slopes, is the lower. In the west and east, the Range divides into separate mountain masses, or massifs. West of Sakesar the course of the Range swings to the northwest, with low, longitudinal ranges. The Indus River breaks through the ranges at Kālābāgh, flowing between vertical cliffs inaccessible to communication. The summits of the Salt Range are slanting, hilly, and plateau-like. The highest peaks are Sakesar, in the west, and the massif Chel (Chail), 3,700 ft, in the east. On the northern slope, a system of deep ravines (badlands) has developed.

Structurally, the Salt Range is a highly upheaved block of the northwestern part of the Indian Platform, or Shield, raised to a significant height along the southern fracture, with the sedimentary strata sloping uniformly to the north. The incline of the strata in the central part is around 10°, and in the western, eastern, and northern parts it is up to 45°.

The climate of the Salt Range is continental and arid, changing from tropic to subtropic. Tropical air prevails during all seasons of the year except the cold winter months, when the relatively cool polar air penetrates at the tail end of high-pressure systems (cyclones). This is a cold, damp season. During summer, precipitations are connected with the equatorial, moist, southwestern (Indian) monsoon, which reaches the limits of its occurrence in West Punjab but brings the largest amounts of precipitation (more than 50 percent annually).

Agriculture is limited because of the poverty of the soil and lack of water for irrigation.

Small areas on the slopes and in the longitudinal valleys are being terraced for irrigation using the water of lakes and springs. In the valleys dry farming prevails.

In the flora of the Salt Range there are both African–Arabian and Mediterranean elements. Before the loss of the natural vegetation, the area was covered in the south by xerophyte (drought-resisting) thin forests and in the north chiefly by savannas. At present a small mass of thin forest has been preserved by conservation on the southeast. Among the forest trees are acacia, pine, wild olive, and others. Other characteristic vegetation includes spurge (*Euphorbia*) and camel thorn and other scrubs and brushwood. The grasses burn out in April or May.

On the southern slope of the Salt Range are located the largest deposits of rock salt in Pakistan, at Khewra, Warcha, and Kālābāgh. Salt deposits of smaller importance occur at Jatta, Bahādur Khel, and Kharak. Coal deposits are found at Dandot, Pidh, and Makarwāl Kheji. Traces of petroleum are associated with limestone and sandstone deposits in the western part of the Salt Range. In the salt-bearing series in the eastern part of the Salt Range, layers of bituminous shales and dolomites are found. In the eastern parts, too, occur beds of bauxite (aluminum-bearing laterite).

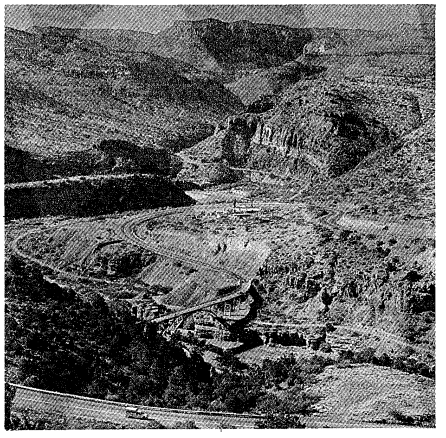
Large deposits of high-grade gypsum and anhydrite, an important calcium mineral, are traced from Jalalpur Kālābāgh and the district of Khewra-Dawdot. Economically, the salt and coal mines and limestone quarries are the most important.

The only population centre of any size associated with the Salt Range is Jhelum, headquarters of the district of that name that encompasses the range and stretches north to Rāwalpindi. Most of the towns in the range itself serve the mines and quarries.

The main ethnic groups of the region are the Pandzhabt, Dzhat, and Aran peoples, who speak Indian languages (mainly Lakhrda). While there is marginal farming in the valleys and on the few terraces and some animal husbandry on the overgrazed hillsides, the principal occupation is salt mining.

BIBLIOGRAPHY. Two standard works—M.B. Pithawalla, *An Introduction to Pakistan: Its Resources and Potentialities* (1948); and O.N.K. Spate, *India and Pakistan,* 2nd ed. (1957)—contain some information on the Salt Range. K.S. Ahmad, *A Geography of Pakistan* (1964), is a popular work that mentions some characteristics of the range. The geology of the range is covered by August Gansser in *Geology of the Himalayas* (1964).

Salt River, tributary of the Gila River, east central Arizona, U.S. Formed at the confluence of the Black and White rivers on a plateau in eastern Gila County, the Salt River flows 200 mi (320 km) in a westerly direction and empties into the Gila River 15 mi west-southwest of Phoenix. The Salt River and its main tributary, the Verde, are part of the Colorado River drainage basin. The Salt River Irrigation Project includes Roosevelt, Horse Mesa, Mormon Flat, and Stewart Mountain dams. In pre-Columbian times the broad salt valley was cultivated by Hohokam Indians, who constructed systems of irrigation canals.



Salt River Canyon, Arizona
Herb and Dorothy McLaughlin

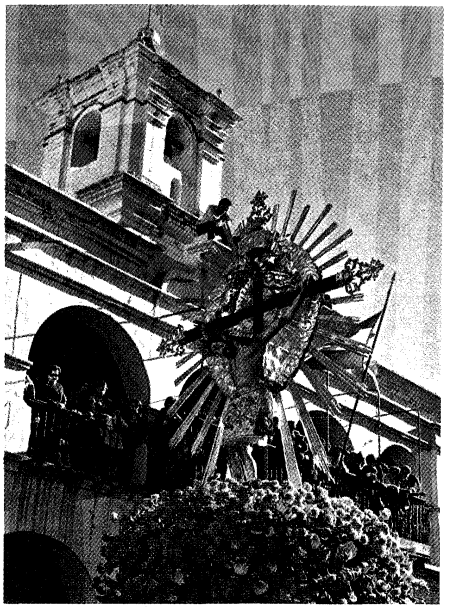
Salta, province, northwestern Argentina, with an area of 59,759 sq mi (154,775 sq km), bounded on the west by Chile, on the north by Bolivia, and on the northeast by Paraguay. In the western part of the province, high Andean cordilleras, separated by the broad 11,500-ft (3,500-m)-high salt flats (the Puna de Atacama), descend from the Andean Cordillera Oriental through *quebradas* (deep and broad ravines that were historically important as routes of penetration into the highest Andes) into valleys bounded on the east by sub-Andean sierras and the lowland plain of the Gran Chaco. Several small rivers, of which the chief is the Bermejo, drain the region into the Gran Chaco. The Puna is the home of a small number of Colla Indians. In the north and centre are Baritú and El Rey national parks, respectively. Both are mostly inaccessible areas covered in subtropical mountain rain forests at merger points of the Gran Chaco and the Andes.

Salta was the gateway in the 16th century for settlers coming into Argentina from Peru and Bolivia. With the breakup in 1943 of Los Andes national territory in the Puna de Atacama, Salta province absorbed the former departments of San Antonio de los Cobres and Pastos Grandes.

The province has nationwide rail, land, and air connections and has rail links with Bolivia and the Chilean port of Antofagasta. The provincial capital is Salta (*q.v.*) city. The upper Bermejo Valley near the Bolivian border contains an oil refinery and exploited oil deposits. Important deposits of borax and salt are mined in the western region of Salta along with lesser deposits of gold, silver, and iron ore. Agricultural pursuits vary according to altitude, with tobacco, grapes, and corn (maize) being the chief crops grown in the Valle de Lerma south of the city of Salta. The province has a large hydroelectric complex on the Río Juramento in the Valle de Lerma. Pop. (1983 est.) 718,000.

Salta, city, capital of Salta province, northwestern Argentina, in the irrigated Andean valley of Lerma, on a headstream of the Río Salado. It was founded in 1582 as San Felipe de Lerma by Hernando de Lerma, governor of Tucumán. The Spanish royal forces were defeated at Salta (1813) during the Argentine War of Independence and capitulated to Gen. Manuel Belgrano there. Despite damage caused by earthquakes, many colonial buildings have been preserved, including the cathedral, and colonial-style architecture is prevalent in many modern buildings. Salta's Fiesta del Milagro (Miracle Fiesta), which is held each September, commemorates the end of a particularly severe earthquake in 1692 when religious icons were paraded through the streets. A celebration on June 17 honours Gen. Martín Güemes, a gaucho leader who opposed the Spanish in 1814–21. The city's commercial prominence dates from colonial times, when it was the scene of large pastoral fairs.

Salta's modern economy is based on diversified farming, lumbering, stock raising, and mining. It is a tourist centre with thermal springs nearby and has grown in importance as a centre of archaeological investigations of Inca and other pre-Columbian Indian cultures.

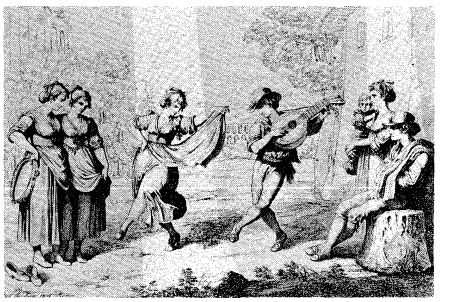


The Christ image, the object of reverence of the annual Fiesta del Milagro (Miracle Fiesta) in Salta, Arg.
Juan Carlos Franceschini

The Catholic University at Salta was opened in 1967. Pop. (1980) 260,323.

Saltaire, early planned industrial settlement near Bradford in Airedale, in what is now Bradford district, county of West Yorkshire, England. It was created in 1853 by the industrialist Sir Titus Salt, manufacturer of alpaca wool fabrics, as a model village for his employees. The community, named for its founder (Salt) and the nearby river (Aire), was built beside large woollen mills on the banks of the Leeds and Liverpool Canal. Its solid terraced houses remain. Shipley, an industrial and residential suburb of Bradford, is the nearest sizable present-day community.

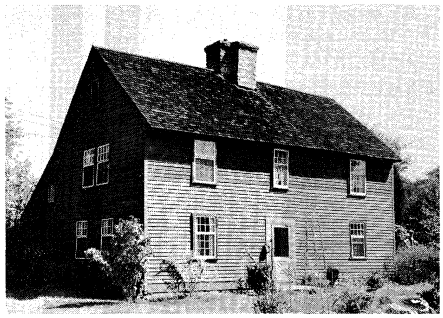
saltarello, medieval and Renaissance court dance and a folk dance of present-day Rome. In the 14th century the saltarello followed the



"Saltarello romano" by B. Pinelli, 1815
By courtesy of the Victoria and Albert Museum, London

estampie as an afterdance; a few examples survive in manuscript. In the 15th century it followed the basse danse and was sometimes called *paso de brabante.* It was light and gay and, like the 14th-century dance, was in triple metre (*e.g.,* $\frac{9}{8}$ or $\frac{3}{4}$). In the 16th century the saltarello was absorbed into and replaced by the galliard. The folk-dance saltarello is danced by couples to music in $\frac{3}{4}$ or $\frac{6}{8}$ time.

saltbox, in architecture, type of residential building popular in colonial New England, having two stories in front and a single story in the rear and a double-sloped roof that is longer over the rear section. The original clapboard houses of the New England settlers were constructed around a great central chimney. On the first floor were two large rooms, the hall and the parlour. Upstairs were bedrooms.



Joseph Clay residence, a saltbox house, Guilford, Conn., *c.* 1670
Wayne Andrews

As families grew both in size and in prosperity, it became traditional to move the kitchen out of the hall into a lean-to constructed at the back of the house. The pitched roof was then extended downward over the new kitchen, creating the characteristic long-in-back silhouette that gave the house its name. Late in the 17th century the lean-to was often included as part of the original design of a house. Well-preserved saltbox houses can still be seen in New England.

saltcellar, also called SALT, receptacle for table salt, usually made of metal or glass. Salt was taken from it with small spoons.



English saltcellar, silver gilt, 1592–93; in the Victoria and Albert Museum, London
By courtesy of the Victoria and Albert Museum, London; photograph, A.C. Cooper

From the Middle Ages until at least the 16th century, salt was a relatively expensive commodity and was kept at the table in vessels commensurate with this status. A large and elaborate standing saltcellar, frequently made of silver, was the centrepiece of the medieval and Renaissance table. Medieval inventories record fantastic saltcellars incorporating figures of human beings and animals, some late examples of which survive. The most famous saltcellar in the world is of this figural type; it is a gold and enamel piece that was made by Benvenuto Cellini (*q.v.*) and is the supreme example of goldsmith work in the Renaissance. The earliest existing standard type of saltcellar consists of late 15th-century spool-shaped hourglass salts. These were superseded in the 16th century by pedestal- or drum-shaped saltcellars, such as the Vyvyan Salt (Victoria and Albert Museum, London).

As salt became cheaper, saltcellars became more functional in design. The small English bell saltcellars of the late 16th century reflect a trend toward smaller saltcellars that, by the late 17th century, had produced a low, bun-shaped or polygonal trencher saltcellar for individual use. Eighteenth-century saltcellars were bowl-shaped and set on legs; late in the century they were pierced and supplied with blue glass liners. Saltcellars were eventually replaced by the modern salt shaker.

Salten, Felix, original name SIEGMUND SALZMANN (b. Sept. 6, 1869, Budapest—d. Oct. 8, 1945, Zürich), Austrian novelist and journalist, author of the children's classic and adult allegory *Bambi,* a sensitively told subjective story of the life of a wild deer.

As a self-taught young writer he was befriended by Hugo von Hofmannsthal, Arthur Schnitzler, and Hermann Bahr. A journalist at 18, he became an influential theatre critic. He lived in Vienna until, as a Jew, he was forced to flee in 1939; he then settled in Switzerland.

Bambi (1923), the book that brought him international fame, is a realistic, although anthropomorphized, account of a deer from his birth to his final role as a wise and tough old denizen of the forest, struggling with dignity to survive against his chief enemy, man the hunter. The close parallel between the fawn becoming a stag and a human child becoming an adult gives the book its moral overtone. In 1934 Salten published another popular children's book, *Florian, the Emperor's Stallion,* the tale of a proud Lippizaner horse who is reduced to pulling a cab after World War I.

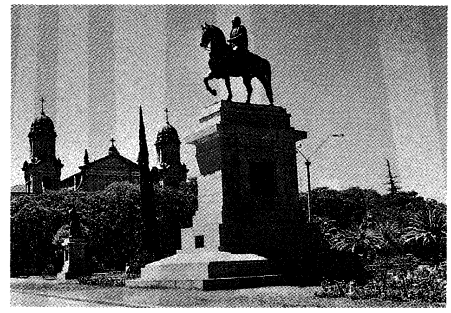
Saltillo, city, capital of Coahuila *estado* ("state"), northeastern Mexico. Lying at the northern edge of the great central plateau at an elevation of 5,246 feet (1,599 m), it has a cool, dry, healthful climate that has made it a summer resort. Although it was the first Spanish settlement (1575) in the region, which was then part of the province of Nueva Viscaya, Saltillo has few colonial buildings. Its 18th-century cathedral, however, is the best example of its type in northern Mexico. From 1824 to 1836 Saltillo was the capital of a vast province that included what is now Texas and other areas of the American Southwest. The Battle of Buena Vista (1847) in the Mexican War took place just south of Saltillo.

The city is now a commercial, communications, and manufacturing centre, producing woolen fabrics, knitted goods, and flour. It has long been famous for its fine woolen serapes. Gold, silver, lead, zinc, copper, iron, and coal are mined in the mountains nearby. The Autonomous University of Coahuila was established in Saltillo in 1957. The major railroad and highway leading from Piedras Negras to Mexico City via Monterrey pass through Saltillo. Pop. (1980) 284,937.

Consult the INDEX *first*

Salto, city, northwestern Uruguay. It is situated on the left bank of the Uruguay River across from Concordia, Arg. Now Uruguay's second largest city (after Montevideo), Salto is the terminus for the shallow-draft vessels that ply the Uruguay River. Its port supplies northwestern Uruguay and parts of the Brazilian state of Rio Grande do Sul. Wine production and orange-drink bottling, both using locally grown fruits, and meat processing are notable among Salto's industries. Pueblo Nuevo, a new suburb north of the city, has large shipyards. A branch of the faculty of agriculture of the National University is located in Salto.

The region in which Salto is situated is well suited for pasture, and cattle and sheep ranching are extensive. Orange and tangerine production is also important; citrus groves stretch for about 20 miles (32 km) around the city, and the area's vineyards are considered the best in Uruguay. Corn (maize), wheat,



Monument to José Gervasio Artigas, the Uruguayan national hero, with the cathedral in the background, Salto, Uruguay
Peter L. Gould

sunflower seeds, flax, forage crops, tomatoes, and strawberries are also grown. Salto has a television station and is linked to other riverine cities, to Tacuarembó, and to Montevideo by rail, highway, river, and air services. Pop. (1985 prelim.) 77,400.

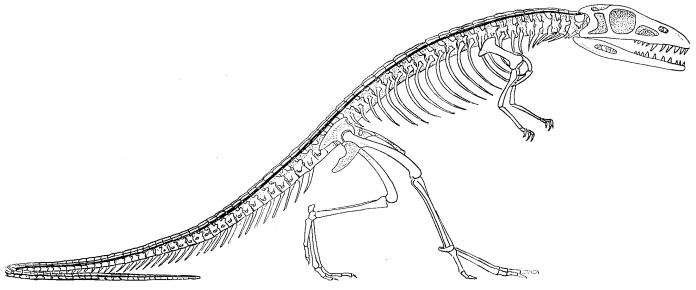
Salto del Guairá, town, eastern Paraguay. It is situated on the right bank of the Paraná River at the Brazil–Paraguay border. Salto del Guairá is the site of one of the earliest colonial settlements in Paraguay, Ciudad Real, which was established in 1556 by Rui Díaz de Melgarejo. The original settlement was abandoned in the 17th century. The modern town is linked by bridge to the Brazilian port city of Guaíra and is a centre of international trade. The local economy is based on the cultivation of Yerba maté (Paraguayan tea) and the exploitation of hardwoods used by the construction industry. Employment opportunities at the nearby Itaipú dam project (Paraguay–Brazil) attracted many new residents after 1977. Pop. (1982) 7,181.

Salton Sea, saline lake, in the California Desert, southern California, U.S. The area that is now the lake was formerly a salt-covered sink or depression (a remnant of prehistoric Lake Cahuilla) about 280 feet (85 m) below sea level until 1905–06, when diversion controls on the Colorado River broke a few miles below the California–Mexico border and floodwaters rushed northward, filling the depression. Subsequent deepening of the sink was stopped in 1907, when a line of protective levees was built. The lake at that time was about 40 miles (60 km) long and 13 miles (21 km) wide and covered an area of about 400 square miles (1,000 square km). Its surface lay 195 feet (60 m) below sea level. Over the next five years evaporation decreased the water level by 25 feet (7.5 m).

In subsequent years, increasing amounts of irrigation drainage water from the Imperial and Coachella valleys (southeast and northwest), flowing through the New and Alamo rivers and San Felipe Creek, have stabilized the lake at its present size—30 miles (48 km) long, 10 miles (16 km) wide, 65 feet (20 m) deep, and covering an area of 344 square miles (890 square km). Its surface is now about 235 feet (72 m) below sea level, and its salinity approximates that of seawater. The lake is now a focus of a state recreation area with facilities for swimming, boating, and camping.

Saltoposuchus, genus of extinct advanced thecodonts, the reptilian group that gave rise to the dinosaurs, flying reptiles, and birds. *Saltoposuchus,* a Late Triassic biped (the Triassic Period began 225,000,000 years ago and lasted 35,000,000 years), was lightly built and about 1.1 m (3¾ feet) long.

The skeletal remains of *saltoposuchus* reveal that its hind limbs were much more developed than the forelimbs. The long tail served as a counterbalance for the body. Its skull was



Saltoposuchus

Reprinted from *Vertebrate Paleontology* by A.S. Romer, by permission of the University of Chicago, Copyright 1933, 1945, 1966; all rights reserved

relatively large and had numerous openings and many pointed, sharp teeth.

saltpetre, also spelled SALTPETER, also called NITRE, or NITER, any of three naturally occurring nitrates, distinguished as (1) ordinary saltpetre, or potassium nitrate, KNO_3; (2) Chile saltpetre, cubic nitre, or sodium nitrate, $NaNO_3$; and (3) lime saltpetre, wall saltpetre, or calcium nitrate, $Ca(NO_3)_2$. These three nitrates generally occur as efflorescences caused by the oxidation of nitrogenous matter in the presence of the alkalis and alkaline earths.

Ordinary saltpetre. Potassium nitrate occurs as crusts on the surface of the Earth, on walls and rocks, and in caves; and it forms in certain soils in Spain, Italy, Egypt, Iran, and India. The deposits in the great limestone caves of Kentucky, Virginia, and Indiana have probably been derived from the overlying soil and accumulated by percolating water. In former times, the demand for saltpetre as an ingredient of gunpowder led to the formation of saltpetre plantations, or nitriaries, which were common in France, Germany, and other countries; the natural conditions were simulated by exposing heaps of decaying organic matter mixed with alkalis (lime, etc.) to atmospheric action. Potassium nitrate was used at one time in many different diseased conditions, especially asthma; but now it is rarely used medicinally, except as a diuretic. Its alleged value as a drug for suppressing sexual desire is purely imaginary.

Potassium nitrate is white in colour and soluble in water; it has a vitreous lustre and a cool and salty taste.

Chile saltpetre. Sodium nitrate occurs, under the same conditions as ordinary saltpetre, in deposits covering immense areas in South America, abounding especially in the regions of Tarapacá and Antofagasta in Chile. The chief applications of Chile saltpetre are in the nitric acid industry and particularly as a fertilizer.

Lime saltpetre. Calcium nitrate was once common as an efflorescence on the walls of stables; it is now manufactured from atmospheric nitrogen. Its chief applications are as a manure and in the nitric acid industry.

Saltus, Edgar Evertson (b. Oct. 8, 1855, New York City—d. July 31, 1921, New York City), one of the few U.S. novelists who adopted the sophisticated cynicism, art-for-art's-sake credo, and other mannerisms of the European school of Decadents. In his time his novels were popular for their wit and for their shocking, erotic incidents.

Educated at Yale and abroad, Saltus took a law degree at Columbia College in 1880 but never practiced. He wrote popularized histories of the Roman emperors, *Imperial Purple* (1893), and of the Russian tsars, *Imperial Orgy* (1920). In addition he wrote books on Balzac and Schopenhauer and *The Anatomy of Negation* (1886), a study of antitheistic philosophies from earliest times.

Saltykov, Mikhail Yevgrafovich, Graf (Count), pseudonym N. SHCHEDRIN (b. Jan. 27 [Jan. 15, old style], 1826, Spas-Ugol, Russia—d. May 10 [April 28, O.S.], 1889, St. Petersburg), novelist of radical sympathies and one of greatest of all Russian satirists.

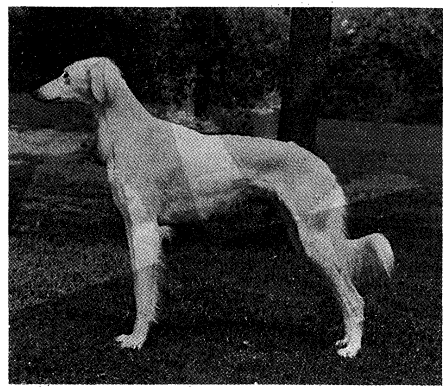
A sensitive boy, he was deeply shocked by his mother's cruel treatment of peasants, which he later described in one of his most important works, *Poshekhonskaya starina* (1887–89; "Old Times in Poshekhona"). In 1838 he was sent to the Imperial Lycée at Tsarskoye Selo, Russia's training ground for high officers of state, where he began to compose and publish verses. Reacting violently against its bureaucratic regime, he joined the revolutionary circles in St. Petersburg and met the critic Vissarion Belinsky.

In 1847 he began his literary career as a reviewer in the radical periodicals *Sovremennik* ("The Contemporary") and *Otechestvennye zapiski* ("Notes of the Fatherland"). As a result of the sympathy he expressed for French utopian socialists in his story *Zaputannoye delo* (1848; "A Complicated Affair"), he was exiled to Vyatka, where he worked in the provincial governor's office. After he returned to St. Petersburg in 1855, he published his first successful book, *Gubernskiye ocherki* (1856–57; selections in English translation, *Tchinovnicks. Sketches of Provincial Life*, 1861), in which he satirized Vyatka officials. In 1857 he wrote his only comedy, *Smert Pazukhina* (performed 1893; *The Death of Pazukhin*, 1924), about Russian merchants.

From 1858 he served as a provincial vice governor of Ryazan and then Tver and as president of the taxation boards at Penza, Tula, and Ryazan, successively. In 1862 Saltykov retired from government service and devoted himself to literature. He was editor of *Sovremennik* and then joined the radical poet Nikolay Nekrasov as co-editor of *Otechestvennye zapiski*, becoming editor after Nekrasov's death (1878). His major works include *Istoriya odnogo goroda* (written 1869–70; "History of One Town") and *Pompadury i pompadurshi* (written between 1863 and 1874; "Pompadours and Pompadouresses"), two biting satires on the highest Russian officials. His last works include a novel that traces the falling fortunes of a family of landed gentry, *Gospoda Golovlyovy* (1876; *The Golovlyov Family*, 1955); and *Skazki* (1880–85; *Fables*, 1931), a trenchant commentary on society.

Saluda River, river, rising in the Blue Ridge Mountains, west central South Carolina, U.S., in North and South forks, which join 10 mi (16 km) northwest of Greenville. The main stream flows southeastward past Pelzer and, after a course of approximately 145 mi, joins the Broad River at Columbia to form the Congaree River. Saluda Dam (1930) impounds Lake Murray above Columbia, and Buzzard Roost Dam (1940) impounds Lake Greenwood. Both are used for hydroelectric power. The name Saluda is of Indian origin, probably meaning "river of corn."

Saluki, also spelled SLOUGHI, breed of hound whose ancestors may date to 6000 or 7000 BC. Sacred to the Egyptians, who called it the "royal dog of Egypt," the Saluki was used to hunt gazelle. Graceful, keen-sighted, and generally hardy, it is a slender, greyhound-like dog with long ears and a silky coat; in one variety the hair is longer on the ears, legs, and tail. Colours include white, pale tan, reddish brown, black-and-tan, and a combination of black, tan, and white. It stands 18 to 28 inches



Saluki

Sally Anne Thompson—EB Inc.

(46 to 71 centimetres) and weighs 45 to 60 pounds (20 to 27 kilograms).

Salus, in Roman religion, the goddess of safety and welfare, later identified with the Greek Hygieia (*q.v.*). Her temple on the Quirinal at Rome, dedicated in 302 BC, was the scene of an annual sacrifice on August 5.

The *augurium salutis*, not involving a personification and possibly antedating the deification of Salus, was an annual ascertainment of the acceptability to the gods of prayers for the public *salus*. Because it was required to be performed on a day of peace, the constant warfare of the late republic caused its interruption, but it was revived by the emperor Augustus. In the empire, the goddess appeared both as Salus Publica and Salus Augusti. She was regularly represented on coins as Hygieia, with patera and sacred snake, or at times with ears of grain, symbolic of prosperity.

Salut, Îles du, island group of French Guiana, northeastern South America, in the Atlantic Ocean about 8 mi (13 km) northeast of Kourou, comprising three main islands: Royale, Saint-Joseph, and Diable, the site of the infamous "Devil's Island" penal colony from 1852 to 1953. Originally the entire group was called the Îles du Diable by their earliest known settlers, a group of colonists from France who retreated to the islands in the 1760s from the unhealthy lowlands around Kourou. The archipelago long served as an outport for ships too large to dock at Cayenne, the national capital. Today the islands are developed for tourism; a hotel on Île Royale was formerly a prison warders' mess hall.

Salutati, (Lino) Coluccio (di Piero) (b. Feb. 16, 1331, Stignano, Tuscany—d. May 4, 1406, Florence), Humanist and Florentine chancellor.

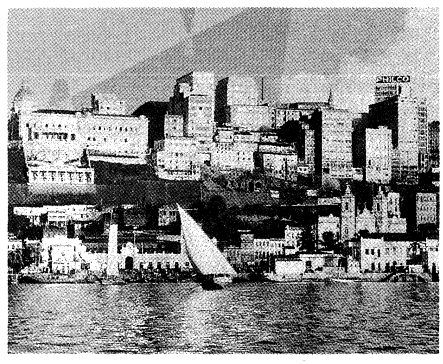
In his youth in Bologna he took up the study of law but soon abandoned it as unsuited to his temperament. When his father died, leaving him an orphan, he overcame his repugnance and apprenticed himself to a notary. After the fall of the Pepoli in Bologna (1351), Coluccio returned to his birthplace, Stignano, and later (1367) became chancellor of the commune of Todi (north of Rome), of Lucca (1371), and of the Papal Curia at Viterbo. In 1375 he

assumed the office of chancellor of the Florentine *signorie* (elected lords ruling as despots), which he held for 31 years until his death, taking part in the complicated and turbulent politics of the city and of Italy generally. His Latin letters to other states were so effective that the tyrannical Duke of Milan, one of the targets of his scorn, said that a thousand Florentine horsemen were less damaging than Salutati's epistles.

Although Salutati's life was filled largely by political and administrative matters, he also developed a keen interest in Humanism, writing treatises and private letters on philosophical questions and on literary and textual criticism and influencing and patronizing a number of disciples, including Poggio and Leonardo Bruni. He sought out and welcomed the Byzantine scholar Manuel Chrysoloras, whose arrival in Florence in 1396 was one of the great events of the Renaissance, renewing as it did a general interest in Greek. Even in his advanced age, Salutati himself began studying Greek. He was also a bibliophile and collector of "lost" manuscripts; part of his large library of ancient Latin and medieval authors went to San Marco's, Florence.

Saluzzo, town and episcopal see, Cuneo province, Piemonte (Piedmont) region, northwestern Italy, at the foot of the Alps, southwest of Turin. The seat of the marquesses of Saluzzo from 1142 to 1548, it then passed to France until it was ceded to Savoy in 1601. Notable buildings include the restored 13th-century castle of the marquesses, the cathedral (1491–1501), the 13th–15th-century church of S. Giovanni, and the Renaissance Casa Cavassa, housing the town museum. The 18th-century printer and typographer Giambattista Bodoni and the 19th-century dramatist Silvio Pellico were born there. A rail junction, Saluzzo is noted for its restoration of antique furniture. It is also a major chestnut market and has textile and food-processing industries. Pop. (1981 prelim.) mun., 16,812.

Salvador, also called SÃO SALVADOR, or BAHIA, city, major port and capital (since 1889) of Bahia state, northeastern Brazil, situated at the southern tip of a picturesque and bluff-formed peninsula that separates Baía de Todos os Santos (All Saints Bay), a deep natural harbour, from the Atlantic Ocean. One of the nation's oldest cities, it was founded in 1549 as capital of the Portuguese colony of Brazil by Tomé de Sousa, the first governor general. As the entrepôt of the thriving sugar trade that developed along the bay shores, the city soon became a tempting prize for pirates and enemies of Portugal. It was captured by Dutch forces in 1624 but was retaken the following year. It remained under Portuguese control until 1823, when the last Portuguese troops were expelled in the war for Brazilian independence. With the transfer of the colonial seat of government to Rio de Janeiro in 1763, Salvador lost political preeminence and entered a long period of economic decline from which it did not emerge until after 1900.



Salvador from Baía de Todos os Santos (All Saints Bay), Brazil
Reflejo—EB Inc.

Salvador was a major centre for the African slave trade in the colonial period and still has one of the largest concentrations of Negro and mulatto populations in Brazil. These groups have contributed many of the folkways, costumes, and distinctive foods for which Salvador is noted.

Since 1940 the city has experienced continuous and rapid population growth, accompanied by significant economic expansion, which is reflected in extensive public works and private construction. In the early 1970s the nearby Aratu Industrial Centre and the Camacari petrochemical complex were built and linked to Salvador by highway. The port of Salvador is one of the finest in Brazil. The first terminal of a deepwater port was opened in 1975. Imports consist chiefly of manufactured goods, while exports include cocoa, tobacco, sugar, sisal, hides, castor beans, diamonds, aluminum, iron ore, hardwoods, and petroleum from the nearby Candeias oil field. Food and tobacco processing, textile, ceramics, and automobile manufacturing, chemical production, metallurgy, wood- and leatherworking, and shipbuilding and repair are Salvador's main industries.

A distinctive feature of Salvador is its division into lower (*cidade baixa*) and upper (*cidade alta*) parts. The port, commercial district, and adjoining residential zones lie at the foot of a cliff on a low shelf of land facing west onto the bay, only a few feet above sea level. The principal shopping districts, state and municipal government offices, and leading residential areas are on the upper level, extending northward for several miles and eastward to the Atlantic shore. The two sections are connected by a few graded, winding roads, a funicular railway, and several elevators. The Lacerda elevator, an outstanding landmark, is the chief link, lifting passengers 234 ft (71 m) between the separate streetcar systems.

Salvador is served by domestic and foreign steamship lines and airlines, and there are rail and bus connections with central and southern Brazil. Tourism, based on historic associations and fine beaches, has developed. The city is famed for the beauty of its many Baroque colonial churches, especially the church of the convent of the Third Order of St. Francis (1701). There are also notable examples of colonial secular architecture, including the Barra lighthouse at the Atlantic tip of the peninsula and many 17th-century forts. Salvador is the seat of Universidade Federal da Bahia (1946) and Universidade Católica do Salvador (1961). There are several museums, including one displaying sacred art in the monastery of Santa Tereza. Pop. (1980 prelim.) 1,496,276.

salvage, in maritime law, the rescue of a ship or its cargo on navigable waters from a peril that, except for the rescuer's assistance, would have led to the loss or destruction of the property. Under some jurisdictions, aircraft may also be salved. Except for salvage performed under contract, the rescuer—known as the salvor—must act voluntarily without being under any legal duty to do so, apart from the general duty to give assistance to those in peril at sea or to stand by after a collision. So long as the owner or his agent remains on the ship, unwanted offers of salvage may be refused. A derelict—a vessel found entirely deserted or abandoned without hope or intention of recovery—is, however, fair game for anyone who comes across it. Typical acts of salvage include releasing ships that have run aground or on reefs, raising sunken ships (or their cargo), putting out fires, and so on.

The popular belief that a salvor becomes the owner of the property, at least if it was abandoned by the owner or was derelict, is erroneous. The owner may always reclaim his property from the salvor on paying salvage money. The salvor, for his part, has a maritime lien on the salved property (in an amount determined by national statute or juridical custom) and need not return the property to the owner until his claim is satisfied or until security to meet an award is given. An owner who elects not to reclaim his property cannot be made liable for a salvage reward.

Much salvage is carried out under contract by professional salvors. Ordinarily, such salvors get nothing unless the salvage is to some degree successful.

Salvaleón de Higüey (Dominican Republic): *see* Higüey.

salvation, also called REDEMPTION, in religion, the deliverance of mankind from fundamentally negative or disabling conditions, such as suffering, evil, finitude, and death; also, in some religions, the restoration or raising up of the natural world to a higher realm, or state.

A brief treatment of salvation follows. For full treatment, *see* MACROPAEDIA: Doctrines and Dogmas, Religious.

While salvation or redemption is a universal religious notion, the doctrine is perhaps most characteristic of Christianity, in which context it signifies the action of God within history whereby mankind is delivered from sin and death through the life, death, and Resurrection of Jesus Christ. In Christian theology emphasis has been placed on the voluntary and loving character of Christ's sacrificial act, on the costliness of this deliverance, on the representative and substitutionary activity of Christ in doing for men what they could not do for themselves, and on the needed response of men in faith, worship, and newness of life to this initiative of God in Christ.

In the Bible, redemption has a more limited context. According to the New Testament, "In him we have redemption through his blood, the forgiveness of our trespasses according to the riches of his grace" (Eph. 1:7). The biblical metaphor is that of buying back a parcel of land or of purchasing someone from slavery. In popular Christianity, it is the individual soul that is thus redeemed—according to some, by virtue of voluntary faith, and according to others, on the basis of divine election.

Judaism posits a collective salvation for the people of Israel. In the Old Testament, redemption is usually described as deliverance from material disasters, but in Ps. 130 it is promised that God "will redeem Israel from all his iniquities." The restoration of the holy nation and the vindication of the Jews as God's chosen people in the Last Judgment are regarded as the salvatory culmination of history.

Among other religions of Middle Eastern origin, the concept of salvation from future punishment by submission to Allāh appears as the ultimate aim of the faithful in Islām. Zoroastrianism and Parsiism envision a universal salvation of mankind through the ultimate triumph of good over evil.

While religions of the East tend to regard salvation or deliverance from the bondage of life and death as a matter of self-effort through practice and discipline, there have appeared in these contexts notions of intervening divine aid. In Mahāyāna Buddhism, the figure of Amitābha, or Amida, Buddha is an important example.

Salvation Army, international Christian religious and charitable movement organized and operated on a military pattern. The Army is established in more than 80 countries, preaching the gospel in about 112 languages in 16,000 evangelical centres and operating more than 3,000 social welfare institutions, hospi-

tals, schools, and agencies. Its international headquarters are in London.

The Salvation Army was founded by William Booth, a Methodist minister who began an evangelical ministry in the East End of London in 1865. He established mission stations to feed and house the poor and in 1878 changed the name of his organization to the Salvation Army. He and his son, William Bramwell Booth, gradually established the Army on a military pattern, with the elder Booth as general for life. It spread quickly over Britain and then expanded internationally.

Two schisms shook the Army in its early years. In 1884 the U.S. organization sought to establish its independence of General Booth. Upon being expelled, its leaders set up the American Salvation Army, which soon declined. In 1896 Ballington Booth, another son of the general and national commander in the United States, resigned after a dispute and set up the Volunteers of America. The Volunteers endured and is a national organization with headquarters in New York City.

The basic unit of the Army is the corps, commanded by an officer of a rank ranging from lieutenant to brigadier, who is responsible to a divisional headquarters. Divisions are grouped into territories (usually a territory is a country, except in the United States, where there are four territories).

Converts who desire to become soldiers in the Army are required to sign Articles of War and volunteer their services. The officers are the equivalent of ministers of other Protestant churches. Training for each officer consists of a two-year residence at one of the schools, followed by a five-year plan of advanced studies. Women have absolute equality with men.

The doctrines of the Army include the basic principles common to most Protestant evangelical denominations. William Booth believed that the sacraments were not necessary to the salvation of the soul. He sought to bring into his worship services an informal atmosphere that would put new converts at their ease. Joyous singing, instrumental music, clapping of hands, personal testimony, free prayer, and an open invitation to repentance characterize the services.

Salvelinus, fish genus that includes the popular food and sport fishes known as char, brook trout, lake trout, and Dolly Varden trout (*qq.v.*).

Salvi, Niccolò, Niccolò also spelled NICOLA (b. Aug. 6, 1697, Rome [Italy]—d. Feb. 8, 1751, Rome), Italian sculptor whose late Roman Baroque masterpiece is the Trevi Fountain in Rome.

After studying painting and architecture, Salvi competed unsuccessfully in 1732 for the commission to make the facade of San Giovanni in Laterano, Rome, but in the same year his project for the Trevi Fountain was chosen in preference to those of a great number of competitors. Most of his energy was absorbed by the work; he was responsible not only for the overall design but also for the details of the decoration and the program of the statuary. After Salvi's death, Giuseppe Pannini finished the fountain in 1762, somewhat altering the original scheme. The idea of combining palace front and fountain was derived from a project by Pietro da Cortona, but the grand pageantry of the fountain's central triumphal arch with its mythological and allegorical figures, of the natural rock formations, and of the gushing water was Salvi's. Salvi also executed minor works in churches and, with Luigi Vanvitelli, enlarged Gian Lorenzo Bernini's Odescalchi Palace.

Salvia, the sage genus, containing about 700 species of herbaceous and woody plants of the mint family (Lamiaceae), order Lamiales. Some members are important as sources of flavouring.

Sage proper (*S. officinalis*), a woody perennial growing to 60 cm (2 feet) tall, bears aromatic leaves that are the source of the culinary herb (*see* sage). Another species with



Clary (*Salvia sclarea*)
A to Z Botanical Collection—EB Inc.

foliage used for flavouring is clary (*S. sclarea*), a taller, biennial herb with strong-smelling, hairy, heart-shaped leaves. Its white flowers and leaflike bracts below them are pinkish or violet-flushed. Both species are native in southern Europe.

Montane tropical America has many *Salvia* species, perhaps the most spectacular of which is Wagner's salvia (*S. wagneri*), or *chupamiel,* a treelike shrub, native near the mountain lakes of Guatemala. It attains more than 4 m (13 feet) in height and has triangular, 30-centimetre (12-inch) spikes of wooly, scarlet corollas opening from magenta calyxes. Blue sage (*S. farinacea*) opens bright blue flowers after rains in the hills of southwestern North America. Possibly the best-known *Salvia* is the garden annual scarlet sage (*S. splendens*) from Brazil, the blazing spikes of which contrast with dark green, oval leaves.

Salviati, Antonio (b. March 18, 1816, Vicenza, Venetia, Austrian Empire [now in Italy]—d. Jan. 25, 1890, Venice, Italy), Italian glass manufacturer who helped reestablish Murano as a centre of Italian glassworking and was instrumental in stimulating European interest in brightly coloured, ornate pieces of Italian glass.

Murano had been a glassmaking centre since the European Middle Ages, but in the 19th century the industry was revitalized by Salviati and others who adapted traditional skills to modern manufacturing processes. Salviati's firm helped promote glass as an accessible art form and encouraged the public to collect glass ornaments and tableware.

A lawyer by profession, Salviati became involved in restoration work being done on the mosaics of Venice's St. Mark's Cathedral. His interest in mosaics led to an interest in glass and, ultimately, in glassmaking. He established his first business in 1859 with a partner, Lorenzo Radi, and within a few years began receiving major commissions from abroad—his firm made the mosaic glass for the altar screen of the high altar of Westminster Abbey. In about 1876 he left his business partners and established a new firm.

Salviati was the first modern Italian factory owner to employ many skilled workers to produce glass in quantity and designed primarily for export. His factory's designs were seen at exhibitions throughout Europe, and their elaborate ornamentation was popular in the Victorian era. Before Salviati's time, the production of art glass had been restricted to unique and expensive pieces, available only to the wealthy. By the late 19th century, however, through the efforts of Salviati and other progressive manufacturers, most Victorian parlours possessed at least one piece of colourful glass.

Salviati, Francesco, original name FRANCESCO DE' ROSSI, also called CECCHINO (b. 1510, Florence [Italy]—d. Nov. 11, 1563, Rome), painter and designer, one of the leading Mannerist fresco painters of the Florentine-Roman school.

Salviati studied and worked with Andrea del Sarto and in about 1531 was patronized by Cardinal Giovanni Salviati, from whom he took his surname. He later worked for several ecclesiastical and aristocratic patrons in Florence, Venice, Bologna, and Rome. Among his most notable frescoes are those executed for the Sala dell' Udienza (1544–48) of the Vecchio Palace in Florence and those in the Farnese Palace in Rome (1555). Salviati drew his vocabulary of massive, heavily muscled figures from the work of Michelangelo. His historical and allegorical scenes are marked by richly embellished draperies and antique trappings. Salviati is a typical Mannerist in his depiction of closely packed figures caught in spirited but artificial poses.

Salviniales, plant order containing two families of tiny ferns that float on water (Salviniaceae and Azollaceae), each consisting of one genus. *Salvinia* (water spangle, or floating moss) has 10 species, and *Azolla* (mosquito fern) has 6 species. Roots are present in *Azolla*



Water spangle (*Salvinia*)
G.R. Roberts

but missing from *Salvinia.* The two families differ further in their leaf structure, *Azolla* having two rows of bilobed leaves, *Salvinia* having a whorl of three leaves, two of which are round and emergent while the third is submerged and finely divided to function as a root. *Azolla* and the blue-green alga *Anabaena azollae* maintain a symbiotic relationship: the alga provides nitrogen to the fern, and the fern provides a habitat for the alga. The species of the order are widely distributed, especially in warmer areas, and because of their delicate beauty are used to decorate aquariums and garden pools.

Salween River, Chinese NU CHIANG, or NU JIANG, major stream of Southeast Asia and the longest in Myanmar (Burma). Rising in the T'ang-ku-la Mountains, a range of eastern Tibet, the river flows generally south for about 1,500 miles (2,400 km) through Yunnan province, China, and eastern Myanmar, emptying into the Gulf of Martaban of the Andaman Sea at Moulmein. In its lower course the river forms the frontier between Myanmar and Thailand for about 80 miles (130 km).

Wild and picturesque in its upper reaches, the Salween flows through narrow, deep gorges

between high hills and cuts through the Shan Plateau of Myanmar. It is crossed by the Burma Road (Huiting Bridge) and by several road ferries in the Shan region. While the river is navigable for small craft in certain sections, dangerous rapids have impeded its use as a major waterway. Its major economic use is in floating teak logs from the forests of southeastern Myanmar to the sea. Hydroelectric power has been developed on the Pilu River, a right-bank tributary (via the Pawn River), while the Salween Rapids are potentially exploitable for power and irrigation. The Salween's lower course is navigable for less than 100 miles (160 km). At Moulmein the Salween forms a small alluvial delta with the Gyaing and Ataran rivers.

Salyut, any of a series of Soviet space stations that served as scientific laboratories and living quarters in Earth orbit for the crews aboard several Soyuz spacecraft. Soyuz craft and Progress cargo ferries routinely rendezvoused and docked with Salyut to transfer cosmonauts and supplies to the space station. The crews aboard Salyut were rotated periodically, enabling months-long habitations of the station.

Salyut 1, launched April 19, 1971, was the world's first space station. Salyut 2 broke up shortly after launch. Salyuts 3 and 5 were military space stations, while Salyuts 4 and 6 were basically for civilian purposes. Salyut 6 (launched 1977) and Salyut 7 (launched 1982) were of a new and more advanced design that featured docking ports at both the aft and forward ends, a new refueling system, and better living quarters for the crew.

Salzburg, *Bundesland* ("federal state"), west-central Austria. It is bordered by Bavaria (Germany) on the west and north and is bounded by the *Bundesländer* Oberösterreich on the north and east, Steiermark on the east, Kärnten on the south, and Tirol on the south and west. The province is drained by the Salzach, Enns, and Mur rivers and occupies an area of 2,762 square miles (7,154 square km). Nine-tenths of Salzburg *Bundesland* is situated among the Alps, and it contains some of the most beautiful mountain scenery in the world. The trough formed by the upper Salzach and upper Enns rivers separates the Tauern mountain ranges to the south from the moderately high Kitzbüheler Alps and, farther north, the Salzburg Limestone Alps, whose karst features include caves, notably the ice caves of the Tennen Mountains. The Flysch Alps north and east of the city of Salzburg are part of the Alpine Salzkammergut.

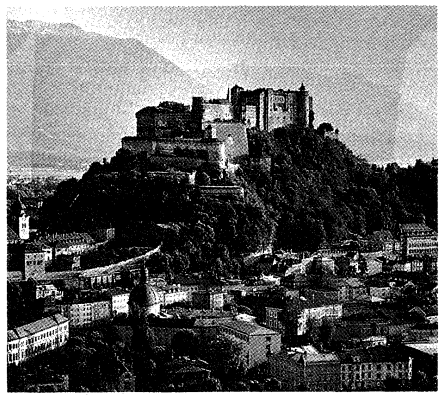
The region was widely settled in prehistoric times, both in the mountains and the Alpine foreland, because of its mineral resources. Copper mining (near Bischofshofen) in the Bronze Age and salt mining (Dürnberg, near Hallein) in the Iron Age were important for the whole of central Europe. The area was settled by Celts in the later Iron Age and by the Romans after AD 15. Juvavum (Salzburg) became a Roman municipium in approximately AD 50. Invaded by Germanic peoples in the 5th century, most of the region was then settled by the Bajuwaren (Bavarians). The territorial and political forerunner of modern Salzburg was the much larger state ruled from about 1278 by the prince-archbishops of the city of Salzburg (*q.v.*). Salzburg lost some of its possessions but was still larger than the present *Bundesland* when it was secularized in 1803, during the Napoleonic Wars. It passed permanently to Austria in 1816, losing some territory. An administrative district of Upper Austria until 1850, it then became a duchy and Habsburg crown land. In 1918 it became a *Bundesland,* a status that was restored in 1945 after it had been a *Reichsgau* ("Reich's district") during the Anschluss, or incorporation of Austria into Germany (1938–45). The archbishops of Salzburg retained their ecclesiastical authority after 1803 and retained their status and title of princes until 1951. They have held the honorary title *primus Germaniae* ("first in Germany") since the 17th century and have been entitled to wear cardinal's purple since 1184.

The state's population has increased since World War II, but its density is still one of the lowest in Austria. About nine-tenths of the inhabitants are Roman Catholic. The principal towns are Salzburg (the capital), Hallein, Badgastein, Saalfelden, Zell am See (*qq.v.*), and Sankt Johann.

Nearly one-half of the land surface is in farms and about one-third in forests. Cattle and dairy farming are extensive, with horse breeding in the Pinzgau (the valley of the upper Salzach), some arable farming (wheat, rye), and fruit growing on the Alpine foreland. Timber, wood products, and paper form the bulk of Salzburg's exports.

Salt from Dürnberg and copper from mines near Bischofshofen are still the major mineral resources. A large aluminum plant (using imported raw material) is at Lend, magnesite is mined at Leogang, and tungsten near Salzburg city. Reservoirs in the Tauern valleys are used for generating electric power. Industries, mainly in the Salzburg Basin, produce beer, textiles, clothing, leather, and music organs. The tourist trade, including winter sports, is a major source of income, with the main centres at Salzburg city (especially its music and drama festivals), Badgastein, and Zell am See. The state has good road and rail communications. Pop. (1988 est.) 442,301.

Salzburg, city, capital of Salzburg *Bundesland* ("federal state"), north-central Austria. It is situated in a level basin on both sides of the Salzach River near the northern foothills of the Alps and the Bavarian (German) border. It was originally the site of a Celtic settlement and later of the Roman town of Juvavum. By about 696 the Benedictine Abbey of St. Peter and the Nonnberg Nunnery had been founded there by St. Rupert. Salzburg was made a bishopric by St. Boniface in 739 and was raised to an archbishopric in 798. Its archbishops were acknowledged as princes of the Holy Roman Empire in 1278, and the city became the seat of their powerful ecclesiastical principality. Among the most notable of the prince-archbishops were Wolfdietrich von Raitenau (reigned 1587–1612), who brought Italian Renaissance architecture and styles to the city; Paris, Graf von Lodron (reigned 1619–53), who founded the city's university; and Leopold Anton von Firmian (reigned 1727–44).



Hohensalzburg fortress atop the Mönchsberg in Salzburg, Austria

Shostal Assoc.—EB Inc.

A unique combination of scenic Alpine landscape and architectural richness has led to Salzburg's reputation as one of the world's most beautiful cities. Because of the building activities of its later archbishops, little remains of its medieval architecture. Its chief glories are the episcopal buildings and the burghers' houses, displaying an Italian Renaissance and Baroque influence that earned Salzburg the designation of the "German Rome." In the centre of the older town on the left bank of the Salzach is the Residenzplatz with the archbishop's residence (1595–1619). Opposite is the Neugebäude (New Building; 1592–1602), with a carillon in its tower. The cathedral, or Dom, the first church in the Italian style on German soil, was built in 1614–28 on the site of an earlier basilica.

Near the Mönchsberg (Monks' Hill), a wooded ridge (1,617 feet [493 m]) overlooking the old town, is the Benedictine Abbey of St. Peter; most of its buildings date from the 17th and 18th centuries, and its church (1130–43) was remodeled in the Rococo style. North of the abbey is the Franciscan church with a nave (1221), a 15th-century Gothic choir, and Baroque chapels. Crowning Monks' Hill are the great fortress of Hohensalzburg (1077; altered to its present form *c.* 1500), St. George's Church (1501), and the Nonnberg Nunnery.

Among landmarks in the newer town (on the right bank of the Salzach) are St. Sebastian's Church (1505–12), with the graves of the wife and father of the composer Wolfgang Amadeus Mozart in the churchyard; the Holy Trinity Church (1694–1702); the Mozarteum (1910–14), comprising a music academy, concert halls, and Mozart archives; and Mirabell Castle (1606). On the city outskirts are the Capuchin Friary (1599–1602) and the castles of Leopoldskron (1736) and Hellbrunn (1613–19). The university (1623–1810) was reestablished in 1964. The Kollegien, or University Church (1694–1707), is a Baroque masterpiece of the architect Johann Bernhard Fischer von Erlach.

A music centre for centuries, Salzburg is most famous as the birthplace of Mozart, whose house, No. 9 Getreidegasse, is preserved as a museum, and as the site of the annual Salzburg Festival. There were music festivals in Salzburg at irregular intervals throughout the 19th century, and in 1917 Hugo von Hofmannsthal, Richard Strauss, and Max Reinhardt founded the Festival Theatre Committee, which mounted a festival at Salzburg on an annual basis. The Salzburg Festival now comprises recitals, concerts of orchestral and chamber music, church music, opera, and drama. The music of Mozart dominates the festival. The Festspielhaus (Festival Theatre), converted from the court stables built into the cliff of Monks' Hill, consists of the Rock Riding School (1693), an auditorium for open-air performances; two large indoor opera houses (1926, 1960); and the Winter Riding School, used as a reception hall.

Salzburg is the northwestern gateway to Austria and is an important road and rail junction with an international airport at Maxglan. It is one of Austria's chief tourist resorts and an international conference centre. The city has large breweries; its manufactures include musical instruments, hardware, textiles, and leather. Salzburg was the headquarters of the U.S. military forces in Austria from 1945 to 1956. Pop. (1986 est.) 137,833.

Salzgitter, city, Lower Saxony *Land* (state), north-central Germany, in the foothills of the Harz Mountains southwest of Brunswick. The area covers the largest deposit of iron ore in Germany, and in 1937 the former *Reichswerke* ("state works"), the Hermann Göring Reich Company for Ore Mining and Iron Smelting, was established to exploit this resource. In 1942 the old town of Salzgitter and 27 adjoining villages were incorporated into the existing municipality, known until 1951 as Watenstedt-Salzgitter. Watenstedt was chosen as the centre for the preparation of the

ore and for the metallurgical works, and an 11-mile (18-kilometre) branch canal for the transport of Ruhr coal was built from the adjoining district of Hallendorf to the Mittelland Canal. In 1938–40 and after World War II the districts of Lebenstedt, Salzgitter-Bad, Thiede, Gebhardshagen, and Hallendorf were developed as modern residential estates. The ore, with a comparatively low iron content, is mined around the Salzgitter ridge and Salzgitter-Bad. In addition to coking plants, blast furnaces, steel plants, and rolling mills, industries include the production of railway cars and wagons, trucks, machinery, radio and television sets, textiles, and pharmaceuticals. Much of the municipal land is agricultural (wheat, sugar beets, grazing). Salzgitter-Bad is a well-known spa with a brine spring from which salt has been extracted since *c.* 800. The district of Lebenstedt has the largest population and is the seat of the municipal administration. Pop. (1989 est.) 111,674.

Salzillo (y Alcaraz), Francisco, Salzillo also spelled ZARCILLO, SALSILLO, or SALCILLO (b. May 1707, Murcia, Spain—d. March 2, 1783, Murcia), sculptor, a prolific creator of figures for the Holy Week procession, consid-



"The Last Supper," polychrome wood sculpture by Francisco Salzillo, *c.* 1780; in the Salzillo Museum, Murcia, Spain

Photo Yan, Toulouse

ered by some authorities to be the greatest sculptor in 18th-century Spain and by others as merely an excellent folk artist.

Growing up in provincial Murcia, he received his training from his father, a Neapolitan sculptor who had a studio that produced religious statues. He entered a Dominican monastery as a youth, but on the death of his father in 1727 he left to take charge of the family studio. Remaining in Murcia all his life, he produced an enormous number of polychrome religious figures with the assistance of his brothers and sister.

In Salzillo's work the sacred persons are highly humanized, appealing to the popular audience that demanded pathos and sentimental realism. Much of his best work is in the Museo Salzillo, Murcia.

Salzkammergut, region, comprising parts of *Bundesländer* (federal states) Oberösterreich, Steiermark, and Salzburg, north-central Austria. The region consists mainly of the Traun River basin and is renowned for its lake and mountain scenery. Often called the Austrian "Lake District," it has more than 30 lakes, including the Atter, Traun, Mond, Wolfgang (Aber), and Hallstätter. The highest mountains in the region, the Dachstein Gruppe, lie to the south and rise as high as 9,826 feet (2,995 m); along with the Totes (Dead) Mountains and the Warscheneck, they are limestone massifs.

The district owes its name (meaning "salt chamber possessions") to the salt deposits at Hallstatt, Bad Ischl, and Bad Aussee, which have been mined since the Iron Age. Evaporation plants operate at the three original centres and at Ebensee and Gmunden. The region's timber is important for use in building construction and for paper and fibre making. Also of economic importance are cattle breeding and dairy farming, hydroelectric power (Vorderer Gosau Lake), and the manufacture of cement and ceramics (at Gmunden). But the major source of income is the tourist trade, with the main resorts at Gmunden, Bad Ischl, Sankt Wolfgang (*qq.v.*), and Bad Aussee.

Salzmann, Siegmund (Austrian writer): *see* Salten, Felix.

Sam Saen Thai, also spelled SAM SENE THAI, original name UN HEUAN (b. 1356—d. 1417), great sovereign of the Lan Xang kingdom of Laos, whose reign brought peace, prosperity, and stability to the kingdom.

The eldest son of Fa Ngum, founder of Lan Xang, Un Heuan was installed as king in 1373. While his father had been a conqueror, Un Heuan excelled in administration. He is remembered chiefly for his compilation of population registers in 1376, which inscribed the names of 300,000 able-bodied men available for military conscription. From the census comes his posthumous honorific, for "Sam Saen" denotes the number 300,000.

Sam Saen Thai enjoyed a peaceful reign. He undertook extensive public works and created a central administration. He assigned his sons to rule over various cities within the kingdom, and he cemented his relations with smaller surrounding vassal states by accepting daughters from their rulers as his concubines.

To make the best use of the Britannica, consult the INDEX *first*

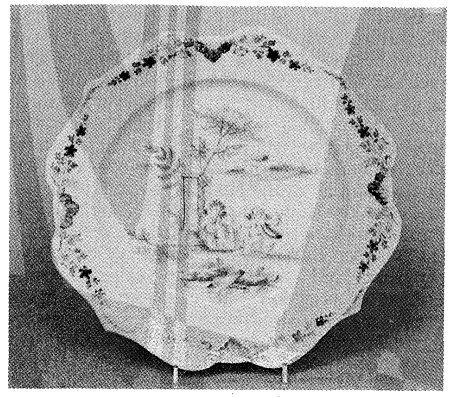
samāʿ (Arabic: "listening"), the Ṣūfī (Muslim mystic) practice of listening to music and chanting to reinforce ecstasy and induce mystical trance. The Muslim orthodox regarded such practices as un-Islāmic, and the more puritanical among them associated the Ṣūfīs' music, song, and dancing with drinking parties and immoral activities. The Ṣūfīs countered such attitudes by pointing out that Muḥammad himself permitted the Qurʾān (Muslim scripture) to be chanted and that the *adhān* (call for prayer) was also chanted in order to prepare for worship.

Ṣūfīs maintain that melodies and rhythms prepare the soul for a deeper comprehension of the divine realities and a better appreciation of divine music. Music, like other beautiful things, draws the Ṣūfī closer to God, who is the source of beauty. The Persian poet and mystic Jalāl ad-Dīn ar-Rūmī (d. 1273) stated that "*samāʿ* is the food of lovers (of God) since therein is the fantasy of composure: the fire of love is kindled by melodies."

Many Ṣūfīs have held that a true mystic does not lose himself in such forms as music but uses them only to bring himself into a spiritual realm, after which he must experience deeper meanings and realities. While Muslim fundamentalist legalists reproved *samāʿ* as an innovation (*bidʿah*), some Muslim scholars held that it was a useful innovation since it might bring souls nearer to God.

Many Ṣūfīs combined dancing with *samāʿ*, *e.g.*, the Mawlawīyah dervishes. Often Ṣūfīs requested that after their death there should be no mourning at their funerals, insisting instead that *samāʿ* sessions be held to celebrate their entrance into eternal life. The Ṣūfīs warned, nevertheless, that the full appreciation of *samāʿ* requires strong ascetic training. An individual must be pure in heart and strong in character before indulging in *samāʿ*; otherwise music and song would arouse his base instincts instead of elevating his spirituality. Some Ṣūfīs reject the practice of *samāʿ* altogether.

Samadet faience, tin-glazed earthenware made in the 18th century in Samadet, Landes,



Samadet faience plate, *c.* 1750; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London; photograph, EB Inc.

Fr., at a factory founded in 1732. It is delicately painted with such motifs as formal flowers and cupids, in pink, blue, yellow green, and purplish black on white.

samadhi, Sanskrit SAMĀDHI ("total self-collectedness"), in Hindu and Buddhist religion and philosophy, the highest state of mental concentration that a person can achieve while still bound to the body and which unites him with the highest reality. Samadhi is a state of profound and utterly absorptive contemplation of the Absolute that is undisturbed by desire, anger, or any other ego-generated thought or emotion. It is a state of joyful calm, or even of rapture and beatitude, in which one maintains one's full mental alertness and acuity. Samadhi is regarded in Hinduism and Buddhism as the climax of all spiritual and intellectual activity. The power to attain samadhi is a precondition of attaining release from the cycle of rebirths (*saṃsāra*). Hence the death of a person having this power is also considered a samadhi. By a further extension, the site where a person believed to be so empowered was cremated is in modern times also referred to as a samadhi; thus the site of Mohandas Gandhi's cremation in Delhi is officially named Gandhi's samadhi.

Samain (Celtic festival): *see* Samhain.

Samal, Muslim cultural-linguistic group of the Philippines, numbering about 324,000 in the late 20th century. They live in the southern islands of the Sulu Archipelago, southwest of Mindanao, mainly in the Tawitawi island cluster. Like other Filipino Muslims, the Samal differ markedly from the Christians, who constitute the vast majority of the country's population. Kinship solidarity is very strong, and married children often live with the parents of the wife or near them. Land is owned by the clan and controlled by local leaders known as *datu*s. The customs of marriage and the family are Islāmic.

The languages of all the Muslim groups are closely related to those of the central Philippines, which belong to the Austronesian (Malayo-Polynesian) family of languages.

The Sulu Muslims are farmers, growing rice, coconuts, fruit, cassava, and yams. Handicrafts are important; they include woodworking, metalworking, and textiles. The Samal are also boatbuilders.

Samal (ancient Hittite city-state): *see* Zincirli Hüyük.

Samaná, in full SANTA BÁRBARA DE SAMANÁ, city, northeastern Dominican Republic, on the southern shore of the Samaná Peninsula. The city was founded in 1756 by Spaniards from the Canary Islands. In 1825 there was a notable influx of black immigrants from the United States. Samaná serves as a commercial and manufacturing centre for the hinterland, which yields timber,

cacao, coconuts, rice, and marble. Tanning is also an important economic activity. Samaná has port facilities and is a beach resort. It is accessible by secondary highway. Pop. (1981) 5,023.

Samaná Bay, Spanish BAHÍA DE SAMANÁ, bay located in the northeastern Dominican Republic and lying along the Mona Passage joining the Atlantic Ocean and the Caribbean Sea. Bounded on the north by the Samaná Peninsula, the bay measures about 40 miles (65 km) east–west and 15 miles (25 km) north–south. Its well-protected deepwater anchorages make it one of the finest natural harbours in the West Indies. It is a fishing and tourist site.

Samana Cay, also called ATWOOD CAY, islet, eastern Bahamas, 22 miles (35 km) northeast of Acklins Island. About 10 miles (16 km) long and up to 2 miles (3 km) wide and bound by reefs, the verdant cay has long been uninhabited, but figurines, pottery chards, and other artifacts discovered in the mid-1980s have been ascribed to Lucayan Indians living on the cay about the time of Christopher Columbus' voyages. In October 1986 the National Geographic Society (U.S.), announcing completion of a five-year study, claimed that Samana Cay was the site of Columbus' first landfall in the New World on Oct. 12, 1492. (The claim opposed other views traditionally selecting San Salvador Island, or Watling Island—or, sometimes, other cays or islands—as the landing site.) The society adduced computer analyses of Columbus' transatlantic route and courses through the Bahamas and also cited scenic descriptions in Columbus' journal and other evidence.

Sāmānid DYNASTY (AD 819–999), first native dynasty to arise in Iran after the Muslim Arab conquest. It was renowned for the impulse that it gave to Iranian national sentiment and learning.

The four grandsons of the dynasty's founder, Sāmān-Khodā, had been rewarded with provinces for their faithful service to the ʿAbbāsid caliph al-Maʾmūn: Nūḥ obtained Samarkand; Aḥmad, Fergana; Yaḥyā, Shāsh; and Elyās, Herāt. Aḥmad's son Naṣr became governor of Transoxania in 875, but it was his brother and successor, Ismāʿīl I (892–907), who overthrew the Ṣaffārids in Khorāsān (900) and the Zaydites of Ṭabaristān, thus establishing a semiautonomous rule over Transoxania and Khorāsān, with Bukhara as his capital.

Under the loosely centralized feudal government of the Sāmānids, Transoxania and Khorāsān prospered, with a notable expansion of industry and commerce, attested by the use of Sāmānid silver coins as currency throughout northern Asia. The main cities of Samarkand and Bukhara became cultural centres. Persian literature flourished in the works of the poets Rūdakī and Ferdowsī, philosophy and history were encouraged, and the foundations of Iranian Islāmic culture were laid.

The most important contribution of the Sāmānid age to Islāmic art is the pottery produced at Nīshāpūr and Samarkand. The Sāmānids developed a technique known as slip painting: mixing semifluid clay (slip) with their colours to prevent the designs from running when fired with the thin fluid glazes used at that time. Bowls and simple plates were the most common forms made by Sāmānid potters. The potters employed stylized Sāsānian motifs such as horsemen, birds, lions, and bulls' heads, as well as Arabic calligraphic design. Polychrome pieces usually had a buff or red body with designs of several colours, bright yellows, greens, black, purples, and reds being the most common. Many pottery pieces were produced at Nīshāpūr, however, with only a single line on a white background.

The art of bronze casting and other forms of metalwork flourished at Nishāpūr throughout the Sāmānid period. Large bronze tableware with copper inlay produced there is of some note but is considered to be a decadent reflection of the style of the Sāsānian era.

Although few Sāmānid buildings have survived, a mausoleum of Ismāʿīl the Sāmānid (d. 907), still standing in Bukhara, shows the originality of the architecture of the era. The perfectly symmetrical mausoleum is constructed entirely of brick; brick is also used to form decorative patterns in relief, based on the position and direction of each architectural unit.

From the mid-10th century, Sāmānid power was gradually undermined, economically by the interruption of the northern trade and politically by a struggle with a confederation of disaffected nobles. Weakened, the Sāmānids became vulnerable to pressure from the rising Turkish powers in Central Asia and Afghanistan. Nūḥ II (976–997), to retain at least nominal control, confirmed Sebüktigin, a former Turkish slave, as semi-independent ruler of Ghazna (modern Ghaznī, Afg.) and appointed his son Maḥmūd governor of Khorāsān. But the Turkish Qarakhanids, who then occupied the greater part of Transoxania, allied with Maḥmūd and deposed the Sāmānid Manṣūr II, taking possession of Khorāsān. Bukhara fell in 999, and the last Sāmānid, Ismāʿīl II, after a five-year struggle against the Ghaznavid Maḥmūd and the Qarakhanids, was assassinated in 1005.

Samaniego, Félix María (b. Oct. 12, 1745, Laguardia, Spain—d. Aug. 11, 1801, Laguardia), poet whose books of fables for schoolchildren have a grace and simplicity that has won them a place as the first poems that Spanish children learn to recite in school.

Born into an aristocratic Basque family, Samaniego, during travels in France, early came under the influence of the French Encyclopédistes. Returning to his native country, he devoted the rest of his life to the welfare of his fellow Basques. He joined the Basque Society and taught at its seminary, composing the *Fábulas morales* (1781; "Moral Fables") for its students. They were an immediate success and were quickly established as part of the Spanish curriculum. The next year Samaniego became involved in a literary dispute with his former friend and fellow fabulist Tomás de Iriarte, and, because of an anonymous attack on Iriarte that contained criticisms of the church, Samaniego was imprisoned in a monastery in 1793.

Samantabhadra-caryā-praṇidhāna (Buddhist text): *see* Bhadracaryā-praṇidhāna.

Samar, island in the east-central part of the Philippines, the third largest (after Luzon and Mindanao). One of the Visayas group, Samar has an area of 5,050 square miles (13,080 square km). It lies between the Samar and Philippine seas and is separated from the Bicol Peninsula of Luzon (northwest) by the San Bernardino Strait. A bridge across the San Juanico Strait connects Samar with Leyte to the southwest. Samar lacks the high mountains that characterize most of the Visayas, but it is exceedingly hilly, with heights generally from 500 to 1,000 feet (150 to 300 m), culminating in Mount Capotoan (2,776 feet [846 m]). Lowlands are restricted to a coastal fringe and to small river floodplains and deltas. The major rivers—Ulut, Catubig, Palagap, Gandara, and Oras—are generally short and flow in a radial pattern. Frequent typhoons in late summer and autumn cause considerable damage.

The island's interior is sparsely settled, and its inhabitants practice shifting cultivation. Permanent settlements are generally coastal. Samarans are the sixth largest Filipino ethnolinguistic group and are also found on eastern Leyte. They are mostly Roman Catholics and cultivate rice and root crops (sweet potatoes, cassava). Coconuts and abaca are the main cash crops.

Samar is largely isolated from the main island shipping routes. Most of its internal trade is by coastal ships. Iron ore, extracted in the southeast, is shipped from the port of General MacArthur (Pambuhan Sur). There are deposits of coal, phosphate, and chromite. Samar is well forested, and there are logging and sawmill operations at the eastern coastal towns of Dolores, Taft, Borongan, and Oras. Catarman is the chief town on the northern coast. Catbalogan, the island's principal commercial centre, and Calbayog, a chartered city, are important western coastal ports and fishing towns. Pop. (1980) 1,200,592.

Samara River, also called SAMARKA, river in Orenburg and Kuybyshev *oblasti* (provinces), southwestern Russian Soviet Federated Socialist Republic, a left-bank tributary of the Volga. It rises in the southern Ural Mountains northwest of Pavlovka and flows 369 miles (594 km) generally west-northwest to join the Volga at Kuybyshev. The area of its drainage basin is 18,000 square miles (46,500 square km).

Samarai, town and port, on the island of Samarai, Papua New Guinea. It lies 3 miles (5 km) offshore from the southeasternmost extremity of New Guinea, in the southwestern Pacific. The island, which has an area of 54 acres (22 hectares), was visited in 1873 by the British navigator Captain John Moresby, who named it Dinner Island after he and his crew took a meal there. Bought from the indigenous populace by the London Missionary Society in the 1880s, Samarai was taken over by the British government in 1888. Before World War II it served as the principal port and chief mission station for most of the eastern portion of Papua and as a jumping-off place for miners heading for the goldfields of mainland New Guinea and the Louisiade Archipelago. Almost totally destroyed by Japanese bombing in 1942, the town has since been rebuilt. Samarai is an important commercial centre. Regular shipping from its island-sheltered anchorage takes copra, rubber, cocoa, and coffee 250 miles (400 km) west to Port Moresby. Pop. (1980 prelim.) 841.

Samaran, also called SAMAREÑO, or WARAY-WARAY, any member of a large ethnolinguistic group of the Philippines, living on Samar, eastern Leyte, and Biliran. Numbering about 2,700,000 in the late 20th century, they speak a Visayan (Bisayan) language of the Austronesian (Malayo-Polynesian) family. Most Samaran are farmers, living in small villages. Although the kinship system and family structure are almost identical with those of other Christian Filipino groups, the Samaran are considered to have retained more of the beliefs and folklore of pre-Christian times.

Samarang (Pacific Ocean): *see* Palmyra Atoll.

Samaria, Hebrew SHOMRON, the central region of ancient Palestine. Samaria extends for about 40 miles (65 km) from north to south and 35 miles (56 km) from east to west. It is bounded by Galilee on the north and by Judaea on the south; on the west was the Mediterranean Sea and on the east the Jordan River. The mountain ranges of southern Samaria continue into Judaea with no clearly marked division.

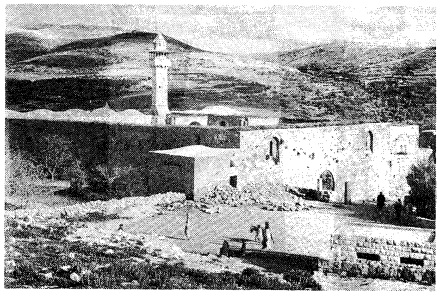
Ancient Shechem (near modern Nābulus), in the centre of Samaria, served as the crossroads and political centre of the region.

At the time of the Israelite conquest of Palestine, the strategic sites of the region of Samaria were in the hands of the Canaanites. Although the Israelites were able to win footholds in the hill country, some of the key Canaanite

strongholds in the neighbouring plains or valleys successfully resisted them until the days of King David (10th century BC). The region of Samaria was assigned to the house of Joseph, that is, to the tribe of Ephraim and to half of the tribe of Manasseh. After the death of King Solomon (10th century), the northern tribes, including those of Samaria, separated from the southern tribes and established the separate kingdom of Israel. Its capital first was at Tirzah (perhaps modern Tall al-Fāri'ah) and then, from the time of Omri (876–869 or *c.* 884–*c.* 872 BC), it was moved to the city of Samaria, then a new town built on a hilltop about seven miles northwest of Shechem. Although the northern kingdom was often stronger than Judah to the south and enjoyed greater economic development, it was crushed by Assyria in 722, and much of its population was carried into captivity.

In New Testament times Samaria was under Roman control and was to some extent a centre for Hellenistic culture. Jesus had little to do with the Samaritans, but, in the apostolic age, Greek-speaking Christians preached to them; this preaching marked a transition stage in the extension of the church into the gentile world. The Samaritan sect, which traces its origin back to the northern Israelite form of the Mosaic religion, still exists in small numbers at Nābulus (close to the site of Shechem) and accepts the Pentateuch as Scripture (*see* Samaritan).

Samaria, also called SEBASTE, modern SABASṬIYAH, ancient town in central Palestine, located on a hill northwest of the pass between Mt. Gerizim and Mt. Ebal in modern Israel. Excavations (1908–10; 1931–33; 1935)



12th-century church in Sabasṭiyah, modern village on the site of the ancient Samaria

Willem van de Poll—Bavaria-Verlag

revealed that the site had been occupied occasionally during the late 4th millennium BC. The city was not founded until about 880/879 BC, when Omri made it the new capital of the northern Hebrew kingdom of Israel and named it Samaria. It remained the capital until its destruction by the Assyrians in 722.

In New Testament times Samaria was rebuilt and greatly enlarged by Herod the Great (37–4 BC), who renamed the city Sebaste in honour of the Roman emperor Augustus (Greek Sebastos). Herod's city included an impressive temple to Augustus, strong fortifications, and many features of Hellenistic cities.

Some of the most important remains of the Israelite period include a valuable collection of ivory carvings, which were probably from the palace of King Ahab (*c.* 874–*c.* 853 BC), and a series of ostraca (pottery or limestone inscription fragments) from the time of King Jeroboam II (8th century BC).

Samarinda, *kotamadya* (city), capital of Kalimantan Timur *propinsi* (East Borneo province), southeastern Borneo, Indonesia. It is on the Sungai (river) Mahakam, about 30 mi (48 km) above the mouth of its broad delta opening onto Makasar Strait. Samarinda is the centre of the extensive timber and logging industries of East Kalimantan. An important regional trade centre, it is connected by road to the port of Balikpapan to the south. The Universitas Kalimantan Timur was established at Samarinda in 1962. Pop. (1980) 264,718.

Samaritan, member of a community of Jews, now nearly extinct, that claims to be related by blood to those Jews of ancient Samaria who were not deported by the Assyrian conquerors of the Kingdom of Israel in 722 BC. The Samaritans call themselves Bene-Yisrael (Children of Israel), or Shamerim (Observant Ones), for their sole norm of religious observance is the Pentateuch (first five books of the Old Testament). Other Jews call them simply Shomronim (Samaritans); in the Talmud (rabbinical compendium of law, lore, and commentary) they are called Kutim, suggesting that they are rather descendants of Mesopotamian Cuthaeans, who settled in Samaria after the Assyrian conquest.

Jews who returned to their homeland after the Babylonian Exile would not accept the help of the dwellers of the land, who were later identified as the Samaritans, in the building of the Second Temple of Jerusalem. Consequently, in the 4th century BC, the Samaritans built their own temple in Nābulus (Shechem), at the base of Mt. Gerizim, some 25 miles (40 kilometres) north of Jerusalem. The low esteem that Jews had for the Samaritans was the background of Christ's famous parable of the good Samaritan (Luke 10:25–37).

In the mid-1970s some 250 Samaritans were living in Nābulus, which is also the residence of the high priest; another 250 resided in Ḥolon, near Tel-Aviv, and maintained a synagogue. All live in semi-isolation, marrying only within their own community. They pray in Hebrew but adopted Arabic as their vernacular after the Muslim conquest of 636.

samarium (Sm), chemical element, rare-earth metal of transition Group IIIb of the periodic table, silvery white and relatively stable in air. Samarium was isolated as an impure oxide and spectroscopically identified as a new element (1879) by P.-É. Lecoq de Boisbaudran. Samarium occurs in many other rare-earth minerals but is almost exclusively obtained from monazite; it is also found in the products of nuclear fission. Ion-exchange techniques are used for commercial separation and purification. The metal is conveniently prepared by the thermoreduction of its oxide, Sm_2O_3, with lanthanum metal, followed by distillation of the samarium metal, one of the most volatile rare earth elements. Several allotropes (structural forms) exist; at room temperature the structure is rhombohedral.

Because of its high absorption cross section for thermal neutrons, samarium has been suggested for application in nuclear reactor control rods and for neutron shielding. Other uses are in special luminescent and infrared absorbing glasses, inorganic and organic catalysis, and in the electronics and ceramics industries. Samarium is a minor constituent of misch metal (a mixture of cerium and other rare-earth metals, used in ferrous and nonferrous alloys).

The seven naturally occurring isotopes of samarium are samarium-144 (3.09 percent), samarium-147 (14.97 percent), samarium-148 (11.24 percent), samarium-149 (13.83 percent), samarium-150 (7.44 percent), samarium-152 (26.72 percent), and samarium-154 (22.71 percent). All are stable except samarium-147, an alpha emitter.

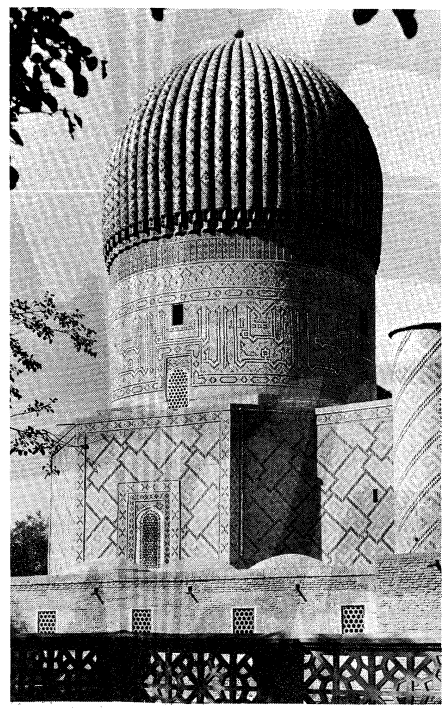
In addition to its more stable trivalent state, samarium, unlike most of the rare earths, has a +2 oxidation state. The Sm^{2+} ion is a powerful reducing agent that rapidly reacts with oxygen, water, or hydrogen ions. It can be stabilized by precipitation as the extremely insoluble sulfate $SmSO_4$. Other samarium(II) salts are $SmCO_3$, $SmCl_2$, $SmBr_2$, and $Sm(OH)_2$; they are reddish-brown in colour. Trivalent samarium behaves as a typical rare-earth element; it forms a series of yellow salts and solutions.

atomic number	62
atomic weight	150.350
melting point	1,072° C
boiling point	1,778° C
specific gravity	7.537 (25° C)
valence	2, 3
electronic config.	2-8-18-24-8-2 or $(Xe)4f^{6}5d^{0}6s^{2}$

Samarka River (Russian S.F.S.R.): *see* Samara River.

Samarkand, *oblast* (administrative region), central Uzbek Soviet Socialist Republic, with an area of 9,500 sq mi (24,500 sq km). It includes the middle reaches of the Zeravshan River, with the Nuratau and Aktau mountains to the north, the Karnabchul Steppe in the southwest, and the western end of the Zeravshan Mountains in the southeast. The climate is continental, with moderately cold winters and hot, dry summers with virtually no rainfall. The economy is mainly agricultural. Cotton is the chief crop in the irrigated zone in the Zeravshan Valley; fruit, grapes, and tobacco are also grown. Wheat is dry-farmed. Karakul sheep and other livestock are raised on the desert, foothill, and mountain pastures, and silkworm raising is important. Industry, chiefly light, is concentrated in the administrative centre, Samarkand; the other cities are Kattakurgan, Aktash, Dzhuma, Krasnogvardeysk, and Urgut. Uzbeks constitute more than three-quarters of the population, the majority of which is rural. There are also Russians, Tatars, and Tadzhiks. Pop. (1983 est.) 1,837,000.

Samarkand, city and administrative centre of Samarkand *oblast* (administrative region) in the Uzbek Soviet Socialist Republic, Soviet Union, and one of the oldest cities of Central Asia. In the 4th century BC, then known as Maracanda, it was the capital of Sogdiana and was captured (329) by Alexander the Great. The city was later ruled by Central Asian Turks (6th century AD), the Arabs (8th century), the Sāmānids of Iran (9th–10th centuries), and various Turkic peoples (11th–13th centuries) before it was annexed to the



The Gūr-e Amīr (mausoleum of Timur), Samarkand, Uzbek S.S.R.

By courtesy of the Society for Cultural Relations with the U.S.S.R., London

kingdom of Khwārezm (13th century) and destroyed by the Mongol conqueror Genghis Khan (1220). After it revolted against its Mongol rulers (1365), Samarkand became the capital of the empire of Timur (Tamerlane), who made the city the most important economic and cultural centre in Central Asia. Samarkand was conquered by Uzbeks in 1500 and became part of the khanate of Bukhara. By the 18th century it had declined, and from the 1720s to the 1770s it was uninhabited. Only after it became a provincial capital of the Russian Empire (1887) and a railroad centre did it recover economically. From 1924 to 1930 it was the capital of the Uzbek Soviet Socialist Republic, and after 1938 it was the administrative centre of the Samarkand oblast.

Samarkand consists of an old city dating from medieval times and a new section built after the Russian conquest of the area in the 19th century. The old city's plan consisted of streets converging toward the centre from six gates in the 5-mile- (8-kilometre-) long, 11th-century walls. The walls and gates were destroyed after the capture of the town by the Russians, but the plan of the medieval period is still preserved. The old city contains some of the finest monuments of Central Asian architecture from the 14th to the 20th century, including several buildings dating from the time when Samarkand was Timur's capital city. Among the latter structures are the mosque of Bībī-Khānom (1399–1404), a building commissioned by Timur's favorite Chinese wife; and Timur's tomb itself, the Gūr-e Amīr Mausoleum, built in about 1405. To the second half of the 15th century belongs the Ak Saray tomb with a superb fresco of the interior. The Rīgestān Square, an impressive public square in the old city, is fronted by several madrasahs (Islāmic schools): that of Timur's grandson, the astronomer Ulūgh Beg (1417–20); and those of Shirdar (1619–1635/36) and Tilakari (mid-17th century), which together border the square on three sides. Samarkand has several other mausoleums, madrasahs, and mosques dating from the 15th to the 17th century, though they are not as impressive as the structures from Timur's day. The main features of Samarkand's ancient buildings are their splendid portals, their vast coloured domes, and their remarkable exterior decorations in majolica, mosaic, marble, and gold. The newer, Russian section of Samarkand, construction of which began in 1871, has expanded considerably during the Soviet period, and public buildings, houses, and parks have been built. There are Uzbek and Russian theatres, a university (established 1933), and higher educational institutions for agriculture, medicine, and trade.

Samarkand derived its commercial importance in ancient and medieval times from its location at the junction of trade routes from China and India. The city's prosperity declined during the 17th and 18th centuries but increased with the coming of the railway in 1896. Samarkand then became an important centre for the export of wine, dried and fresh fruits, cotton, rice, silk, and leather. The city's industry is now mainly based on agriculture (*e.g.*, cotton ginning, silk spinning and weaving, fruit canning, and the production of wine, clothing, leather and footwear, and tobacco). The manufacture of tractor and automobile parts and cinema apparatus, however, is also important. Samarkand is the seat of a university (established 1933) and has higher educational institutions for agriculture, medicine, and trade. Pop. (1989 prelim.) 366,000.

Samarkand rug, handwoven floor covering once marketed through the ancient city of Samarkand in Central Asia (Uzbek S.S.R.) but produced by Kirgiz or Uzbek tribeswomen or in the towns of Khotan, Kashgar, and Yarkand, along the old Silk Road across Sinkiang (Chinese Turkistan). Except for their colouring, the general effect of these rugs is more Chinese than Middle Eastern. *See also* Kashgar rug; Khotan rug.



Samarkand rug from Kashgar, Sinkiang Uighur Autonomous Region, China, 19th century; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York City; photograph, Otto E. Nelson—EB Inc.

Samaroff, Olga, *née* HICKENLOOPER (b. Aug. 8, 1882, San Antonio, Tex., U.S.—d. May 17, 1948, New York, N.Y.), American pianist and educator.

She studied at the Paris Conservatoire with Élie Delaborde (she was the first woman to win a Conservatoire scholarship) and in Berlin with Ernst Jedliczka and Ernest Hutcheson. She made her debut in New York City in 1905. She then embarked on a concert career that lasted 20 years and carried her to the height of her profession. She later taught at the Juilliard School (1925–28) and at the Philadelphia Conservatory until 1938. From 1911 to 1923 she was married to the conductor Leopold Stokowski.

Sāmarrā', town, central Iraq. Located on the Tigris River, it is the site of a prehistoric settlement of the 5th millennium BC. The town was founded between the 3rd and 7th centuries AD. In 836, when the 'Abbāsid caliph al-Mu'taṣim was forced to leave Baghdad, he made Sāmarrā' his new capital. He built a palace and gardens, and under his successors the town grew until it stretched along the Tigris for 20 miles (32 km). In 892 the caliph al-Mu'tamid transferred the capital back to Baghdad, causing the subsequent decline of Sāmarrā'. By 1300 most of the town was in ruins; it has since revived.



The minaret al-Malwīyah and (right) ruins of the Great Friday Mosque, Sāmarrā', Iraq

Pier Giorgio Sclarandis—Black Star/EB Inc.

Sāmarrā' is a pilgrimage centre for Shī'ite Muslims. The Great Friday Mosque and the nearby Abu Dulaf mosque, both now in ruins, were built in the 9th century, when Sāmarrā' was the seat of the 'Abbāsid caliphate. The great minaret, al-Malwīyah, still stands. Pop. (1985 est.) 20,002.

Samāstipur, town, northern Bihār state, northeastern India, just south of the Burhi Gandak River. A major rail hub with workshops, it engages in agricultural trade. Sugar refining is the chief industry. The town has a hospital and tuberculosis clinic, and three religious fairs are held annually. Samāstipur was constituted a municipality in 1897. The assassination of the Indian railway minister there on Jan. 2, 1975, led to the declaration of emergency by Prime Minister Indira Gandhi. Pop. (1981) town, 36,395; metropolitan area, 47,232.

Samāwah, as-, city, southern Iraq. It is approximately 164 miles (266 km) south of Baghdad and is located on the Euphrates River. The city is the agricultural market centre of the locality, in which vineyards and orchards are cultivated. As-Samāwah has a large cement plant. Pop. (1985 est.) 75,293.

samba, ballroom dance of Brazilian origin, popularized in western Europe and the United States in the early 1940s. Characterized by simple forward and backward steps and tilting, rocking body movements, it is danced



Samba

Culver Pictures

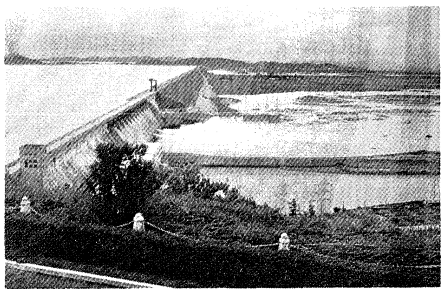
to music in $\frac{4}{4}$ time with syncopated rhythm. Couples in ballroom position dance in place or around the floor, but partners may separate to execute variant steps. The dance derives mainly from the maxixe (*q.v.*), a dance fashionable in about 1870–1914.

In Brazil, away from the ballrooms, an older, very African type of samba is also danced. Sometimes called batuque, it is a kind of group dance, done either in circles with a soloist or in double lines.

sambal, in Indonesian and Malaysian cuisine, a spicy relish served as a side dish. The basic *sambal* consists of fresh chilis, shrimp paste (*trassi*), lime juice, sugar, and salt. Though

most *sambals* are uncooked, a *sambal goreng* is fried. Numberless variations can be created by the addition of vegetables, fruits, meats, and additional seasonings, notably *ketjap manis*, a sweet, spiced soy sauce.

Sambalpur, town, northwestern Orissa state, eastern India. The town is a commercial centre and rail terminus on the Mahānadi River. It has some industry, including the milling of rice, weaving, and metalworking. There are



Hīrākud Dam near Sambalpur, Orissa, India
H. Miller—Shostal/EB Inc.

several colleges, a sacred Vaishnavite temple, and a ruined fort. The Hīrākud Dam (1957) lies on the Mahānandi River 8 miles (13 km) upstream from Sambalpur. Pop. (1981) town, 112,631; metropolitan area, 162,214.

sambar (*Cervus unicolor*), widely distributed deer, family Cervidae (order Artiodactyla), found from India and Nepal eastward through Southeast Asia. The sambar live in forests, alone or in small groups. A large, relatively long-tailed deer, it stands 1.2–1.4 m (47–55 inches) at the shoulder. The coat forms a ruff around its neck and is an unspotted, dark brown in colour. The male sambar bears long, three-tined antlers. Several races of sambar are recognized, among them the large Indian sambar (*C. u. niger*) and the smaller Malayan sambar (*C. u. equinus*).

Sambation, also spelled SANBATION, or SAMBATYON, legendary "Sabbath River" beyond which the Ten Lost Tribes of Israel were exiled by Shalmaneser, king of Assyria. Legends describe it as a roaring torrent (often not of water but of stones), the turbulence of which ceases only on the Sabbath, when Jews are not allowed to cross.

So firm was belief in the existence of the river that the ancient Jewish historian Flavius Josephus located it in Syria and Pliny in Judaea, while the Spanish-Jewish scholar Naḥmanides identified it with the River Habor (al-Khābūr River) of the Bible (II Kings 17:6). Rabbi Akiba ben Joseph also saw fit to mention it, as did the 17th-century Jewish scholar Manasseh ben Israel, who carefully studied Eldad ha-Dani's 9th-century account of his reputed discovery of the "sons of Moses" beyond the river.

Stories about the Ten Lost Tribes and reports of an independent Jewish kingdom in the East have stirred the imaginations of both Jews and Christians throughout the ages. From the Middle Ages to the 19th century the river was sought in India, Africa, China, Japan, and Spain. To discover it was to learn the fate or whereabouts of the Ten Lost Tribes.

Legends of the river produced a vast Jewish literature that eventually entered into Arabic and Christian writings. Among eastern European Jews, an unruly child was sometimes referred to as a "Sambation."

Sambhal, town, northwestern Uttar Pradesh state, northern India. It lies southwest of Morādābād town. Sambhal is an ancient settlement that was also important during Muslim rule and was one of Sikandar Lodī's provincial capitals in the late 15th and early 16th centuries. Situated at a rail terminus, it is a trade centre for agricultural produce. Its industries include sugar refining, handloom weaving, and calico printing. The town is the scene of annual Muslim and Hindu fairs. It contains a fort and other monuments. Pop. (1981) 108,232.

Sāmbhar Salt Lake, salt lake, the largest in India, situated in northwestern Rājasthān state. Approximately 90 square miles (230 square km) in area, it represents a depression of the Arāvalli Range. The soluble sodium compounds stored in the lake's underlying silt have been accumulated by the evaporation of water brought down annually by rivers in flood. Salt sheets, which from a distance resemble snow, often cover the lake's bed, which is usually dry in the hot months.

The lake is traditionally said to have been created in the 6th century by Śākambarī, a form of Durgā and the consort of Shiva (one of the three supreme gods of Hinduism). Its salt supply was worked by the Mughal dynasty (1526–1857); it was later owned jointly by the Jaipur and Jodhpur princely states. Salt-evaporation pans and refining works are located on the lake's eastern shore.

sambo, form of wrestling developed in the Soviet Union in the 1930s from elements of several Soviet regional styles. It is also practiced in Japan and Bulgaria. In 1964 it was recognized by the International Federation of Amateur Wrestling. It is similar to both judo and freestyle. Strangling, kicking, and scratching are among the few tactics forbidden.

Samborombón Bay, Spanish BAHÍA SAMBOROMBÓN, bay of the South Atlantic Ocean at the mouth of the Plata River, Argentina, located 100 miles (160 km) southeast of Buenos Aires. The bay arcs southwestward, southeastward, and then eastward for 85 miles (135 km) from Point Piedras to Point Norte of Cape San Antonio. The bay receives the Samborombón River from the northwest and the Salado River from the west, as well as several canals draining the bay's low, irrigated hinterland, which is part of the humid Pampa (a fertile plains area) and is noted for dairying.

Sambucuccio D'ALANDO (d. *c.* 1370), Corsican revolutionary who, in collaboration with Genoa, led an uprising against the feudal Cinarca family and their overlord, James (IV) of Aragon.

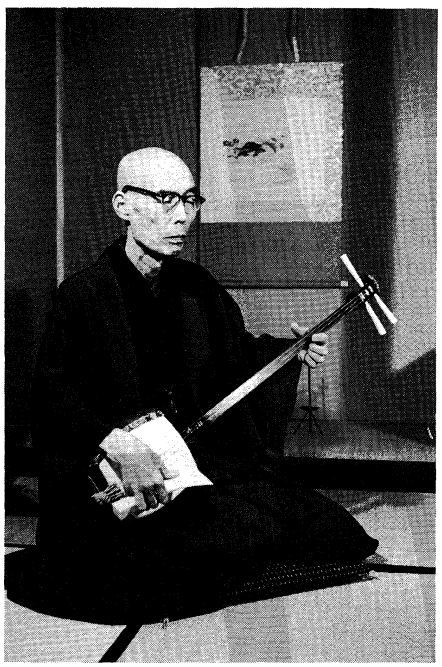
Sambucuccio was born to an obscure family and eventually became a soldier. His leadership of the Corsican revolt of 1356 against the pro-Aragonese nobles led to his appointment as governor. After destroying the castles of the feudal lords, he participated in an embassy to Genoa, then under a "popular" government, soliciting Genoese governorship of the island. In 1360 Giovanni Boccanegra, brother of the doge of Genoa, became governor of the northern and central areas of Corsica. When Boccanegra returned home after a two-year term, a revolt drove Sambucuccio to Genoa once more to seek aid; a new Genoese governor, sent at his request, was assassinated. After 1370 Sambucuccio disappeared from the scene, perhaps dying in an epidemic of the Black Death in that year.

Samch'ŏnp'o, city, in Kyŏngsang-namdo (province), southern South Korea. Islands such as the Ch'ŏngsan, Sinsu, and Nŭk screen the city's deepwater port. Its industries, which were traditionally based on fishing and fish processing, were diversified during the 1970s. Pottery and tile making are based on extensive kaolin (China clay) deposits in the vicinity. One of the main seafood plants (Korean: *miyok; Undaria pinnatfida*) consumed by Koreans is cultivated there. Thousands of cranes inhabit the island of Samhak southwest of the city. Pop. (1985 prelim.) 62,506.

Samhain, also spelled SAMAIN (Celtic: "End of Summer"), one of the most important and sinister calendar festivals of the Celtic year. At Samhain, held on November 1, the world of the gods was believed to be made visible to mankind, and the gods played many tricks on their mortal worshipers; it was a time fraught with danger, charged with fear, and full of supernatural episodes. Sacrifices and propitiations of every kind were thought to be vital, for without them the Celts believed they could not prevail over the perils of the season or counteract the activities of the deities.

Samil Independence Movement (Korea): *see* March First Movement.

samisen, also spelled SHAMISEN, long-necked, fretless Japanese lute with three strings; a small, square body with catskin front and back; and a curved-back pegbox with side pegs. It was derived from the similar Chinese *san-hsien,* the Ryukyu Islands version of which reached Japan in the 16th century, and



Samisen
By courtesy of Kokusai Bunka Shinkokai, Tokyo

is widely played in folk and art music as an accompaniment to lyric and narrative song and in the orchestra of the Kabuki dramas.

The normal tunings of the samisen are c–f–b♭, c–f–c′, or c–g–c′ (relative pitch, tuned to the singer's range). It is played with a large plectrum; different types of plectra produce distinct tone colours for specific types of music.

Samit Point, Khmer CHROŬY SAMIT, French POINTE SAMIT, headland and peninsula on the Gulf of Thailand, southwestern Kampuchea (Cambodia), forming the western enclosure of shallow Kâmpóng Saôm Bay. Behind the cape sits the town of Phumi Samit. On the opposite side of the bay sits the modern industrial town of Kâmpóng Saôm, which is the site of the principal deepwater port of Kampuchea.

samizdat (from Russian *sam,* "self," and *izdatelstvo,* "publishing"), literature secretly written, copied, and circulated in the Soviet Union and usually critical of practices of the Soviet government.

Samizdat began appearing following Stalin's death in 1953, largely as a revolt against official restrictions on the freedom of expression of major dissident Soviet authors. After the ouster of Nikita S. Khrushchev in 1964, samizdat publications expanded their focus beyond freedom of expression to a critique of

many aspects of official Soviet policies and activities, including ideologies, culture, law, economic policy, historiography, and treatment of religions and ethnic minorities. Because of the government's strict monopoly on presses, photocopiers, and other such devices, samizdat publications typically took the form of carbon copies of typewritten sheets and were passed by hand from reader to reader.

The major genres of samizdat include reports of dissident activities and other news suppressed by official media, protests addressed to the regime, transcripts of political trials, analysis of socioeconomic and cultural themes, and even pornography.

In its earliest days, samizdat was largely a product of the intelligentsia of Moscow and Leningrad. But it soon fomented analogous underground literatures throughout the constituent republics of the Soviet Union and among its many ethnic minorities.

From its inception, the samizdat movement and its contributors were subjected to surveillance and harassment by the KGB, the secret police. The suppression worsened dramatically in mid-1970, at the height of samizdat activity. Culminating in a show trial of Pyotr Yakir and Victor Krasin in August, 1973, the assault wounded the movement. But it survived, though reduced in numbers and deprived of many of its leaders.

Samizdat began to flourish again in the mid-1980s because of Soviet leader Mikhail Gorbachev's policy of *glasnost* ("openness"). KGB harassment virtually ceased, and as a result a variety of self-published journals proliferated, though their readership remained tiny. The Soviet government seemed to be moving toward an unofficial policy of tolerance of samizdat, although it retained its monopoly on printing presses and all other media outlets.

Saṃkhyā, also spelled SANKHYĀ, Sanskrit SAṂKHYA ("Enumeration," or "Number"), one of the six orthodox systems (darshans) of Indian philosophy (*q.v.*). Saṃkhyā adopts a consistent dualism of the orders of matter (prakriti) and soul, or self (purusha). The two are originally separate, but in the course of evolution purusha mistakenly identifies itself with aspects of prakriti. Right knowledge consists of the ability of purusha to distinguish itself from prakriti.

Although many references to the system are given in earlier texts, Saṃkhyā received its classical form and expression in the *Saṃkhyā-kārikās* ("Stanzas of Saṃkhyā") by Īśvarakṛṣṇa (*c.* 3rd century AD). Vijñānabhikṣu wrote an important treatise on the system in the 16th century.

In Saṃkhyā there is belief in an infinite number of similar but separate purushas ("selves"), no one superior to the other. Purusha and prakriti being sufficient to explain the universe, the existence of a god is not hypothesized. The purusha is ubiquitous, all-conscious, all-pervasive, motionless, unchangeable, immaterial, and without desire. Prakriti is the universal and subtle (*i.e.,* unmanifest) matter, or nature, and, as such, is determined only by time and space.

The chain of evolution begins when purusha impinges on prakriti, much as a magnet draws unto itself iron shavings. The purusha, which before was pure consciousness without an object, becomes focused on prakriti, and out of this is evolved *mahat* ("great one") or buddhi ("spiritual awareness"). Next to evolve is the individualized ego consciousness (ahankara, "I-maker"), which imposes upon the purusha the misapprehension that the ego is the basis of the purusha's objective existence.

The ahankara further divides into the five gross elements (space, air, fire, water, earth), the five fine elements (sound, touch, sight, taste, smell), the five organs of perception (with which to hear, touch, see, taste, smell), the five organs of activity (with which to speak, grasp, move, procreate, evacuate), and mind, or thought (*manas*). The universe is the result of the combinations and permutations of these various principles, to which the purusha is added.

Largely outside the above system stands that of the three primal qualities of matter that are called gunas ("qualities"). They make up the prakriti but are further important principally as physiopsychological factors. The highest one is sattva, which is illumination, enlightening knowledge, and lightness; the second is rajas, which is energy, passion, and expansiveness; the third is tamas ("darkness"), which is obscurity, ignorance, and inertia. To these correspond moral models: to tamas that of the ignorant and lazy man; to rajas that of the impulsive and passionate man; to sattva the enlightened and serene man.

Sammartini, Giovanni Battista, Sammartini also spelled SAN MARTINI, byname IL MILANESE (b. 1700/01, Milan—d. Jan. 15, 1775, Milan), Italian composer who was an important formative influence on the pre-Classical symphony and thus on the Classical style later developed by Joseph Haydn and Mozart.

The son of Alexis Saint-Martin, a French oboist, he spent most of his life in Milan, was organist at several churches there, and was organist at the convent of Santa Maria Maddalena from 1730 to 1770. He became known first as a composer of sacred music, but as early as 1734 he composed a four-movement symphony. He was one of the first to compose symphonies for concert performance; their ancestry was in the Italian opera overtures. As his orchestral and chamber music became known outside Italy, it attracted pupils to Milan, among them Christoph Gluck, who studied with him 1737–41.

Sammartini was a prolific composer; by some estimates, he produced 2,000 works. It is impossible, however, to decide whether certain works were composed by him or by his brother Giuseppe, or even by Giovanni Battista Martini (1706–84) or one of the numerous forgers who profited from the popularity of his genuine works. Sammartini's brother, Giuseppe Sammartini (*c.* 1693–*c.* 1750/51), was renowned as the finest oboist of his time and was also a prominent composer in England, where he spent his later years.

Sammatīya, ancient Buddhist school or group of schools in India that held a distinctive theory concerning the *pudgala,* or person. They believed that though an individual does not exist independent from the five skandhas, or components that make up his personality, he is at the same time something greater than the mere sum of his parts. The Sammatīya were severely criticized by other Buddhists who considered the theory close to the rejected theory of atman—*i.e.,* the supreme universal self.

The school apparently had popular support, for the Chinese pilgrim Hsüan-tsang described it in the 7th century as one of the four main Buddhist sects of that time. Its members were also known as Pudgalavādins ("Teachers of the Pudgala"). It had several subschools; the Vātsīputrīyas (presumably named after their teacher, Vātsīputra) are in some accounts referred to as the parent branch of which the Sammatīyas are an offshoot.

Sammu-ramat, Greek SEMIRAMIS (fl. late 9th century BC), Assyrian queen who became a legendary heroine.

Sammu-ramat was the mother of the Assyrian king Adad-nirari III (reigned 810–783 BC). Her stela (memorial stone shaft) has been found at Ashur, while an inscription at Calah (Nimrūd) shows her to have been dominant there after the death of her husband, Shamshi-Adad V (823–811 BC). Sammu-ramat was mentioned by Herodotus, and the later historian Diodorus Siculus elaborated a whole legend about her. According to him, she was born of a goddess, and after being married to an Assyrian officer, she captivated the king Ninus by her beauty and valour and became his wife. Soon afterward, when Ninus died, Sammu-ramat assumed power and reigned for many years. In that time she built Babylon and turned to the conquest of distant lands.

Samnān (Iran): *see* Semnān.

Samnite, a member of the ancient warlike tribes inhabiting the mountainous centre of southern Italy. These tribes, who spoke Oscan and were probably an offshoot of the Sabini, apparently referred to themselves not as Samnite but by the Oscan form of the word, which appears in Latin as Sabine (*q.v.*).

Four cantons formed a Samnite confederation: Hirpini, Caudini, Caraceni, and Pentri. The league probably had no federal assembly, but a war leader could be chosen to lead a campaign. Although allied with Rome against the Gauls in 354 BC, the Samnites were soon involved in a series of three wars (343–341, 316–304, and 298–290) against the Romans. The Samnites, though intermittently successful, were finally defeated and surrounded by Latin colonies.

Although reduced and depopulated, the Samnites later helped Pyrrhus and Hannibal against Rome. They also fought from 90 BC in the Social War and later in the civil war against Lucius Cornelius Sulla, who defeated them at the Battle of the Colline Gate (82 BC).

The longest and most important inscription of the Samnite dialect is the small bronze Tabula Agnonensis, which is engraved in full Oscan alphabet.

Samoa, group of islands and islets in the south-central Pacific Ocean about 1,600 miles (2,600 km) northeast of New Zealand. American Samoa (*q.v.*), a dependency of the United States, consists of the six islands east of the 171° meridian, including Tutuila. Western Samoa (*q.v.*), an independent nation (since 1962), consists of the nine islands west of the meridian, including Savai'i and Upolu.

Samory, in full SAMORY TOURÉ (b. *c.* 1830, near Sarranko, Upper Guinea [now in Guinea]—d. June 2, 1900, Gabon, French Congo), Muslim reformer and military adventurer who founded a powerful kingdom in West Africa and resisted French colonial expansion in the late 19th century.

A member of the Mandingo tribe, Samory in 1868 proclaimed himself a religious chief and led a band of warriors in establishing a powerful chiefdom in the Kankan region of Guinea. A gifted commander and administrator, he expanded his rule until at its height in the early 1880s it extended from the Upper Volta region in the west to the Fouta Djallon in the east.

Samory opposed French ambitions to build an empire in West Africa. He first fought the French in 1883, when they occupied Bamako on the Niger River. After the French carried out a successful offensive in 1886, Samory accepted their protection with the Niger as his frontier. After failing to conquer to the east at the expense of the King of Sikasso (in present-day Ivory Coast) in the late 1880s, he renewed his war with the French in 1891. When his forces were ejected from the Sudan by a military column, he tried to establish his kingdom in the upper Ivory Coast colony, where he pillaged Kong (1895) and Bondoukou (1898). Pursued by French troops, he was captured on the upper reaches of the Cavally River on Sept. 29, 1898. He died in exile.

Samos, Modern Greek SÁMOS, Greek island in the Aegean Sea, the closest one to the

mainland of Asia Minor, from which it is separated by the narrow Samos Strait. The 184-sq-mi (476-sq-km) island is wooded and mountainous; Mt. Kerketeus, the highest peak (4,701 ft [1,433 m]), forms the western tip of the island. The east coast is amply indented, but the smoother south coast has broad, deep plains except around the port of Tigáni, which is hemmed in by hills. With Ikaría and the Foúrnoi islands, it forms the *nomós* (department) of Sámos, whose capital, Vathí, is at the head of a narrow, deepwater bay on the north coast.

The island's earliest settlers were of obscure origins, but there is evidence of Early Neolithic occupancy on the south coast, near Tigáni. About the 11th century BC the Ionians appeared, and by the 7th century the island was one of the leading commercial centres of Greece, trading with Black Sea peoples, Egypt, Cyrene (Libya), Corinth, and Chalcis and becoming a bitter rival of Miletus.

The Samian landed oligarchy was overturned (in 540 BC) by the tyrant Polycrates, bringing on what was perhaps the golden age of Samos. He ruled in alliance with the Egyptian pharaoh and had a powerful fleet that blockaded the Persian-controlled mainland until his death *c.* 522. Darius of Persia then took Samos and partially depopulated it. In following decades the Samians alternately supported Persia and Athens, but after the defeat of Athens in the Peloponnesian War, Spartan hegemony replaced the Athenian. Briefly independent after 394, the island then fell alternately under Persian and Athenian sway, was caught up in rivalries between Asia Minor and Egypt during most of the 3rd century, and in 189 was recognized as a free territory by Rome and given to the kings of Pergamum in Asia Minor. In 133 and again in 88 it revolted against Rome and forfeited its autonomy.

Under Byzantine rule Samos was for a time head of the Aegean military district. After the 13th century it passed to a Genoese trading company, and in 1453 it fell to the Turks in such a depopulated condition that they settled Albanians and other peoples there. During the War of Greek Independence (1821–29) Samos revolted against Turkey and gained its freedom, but in 1832 it was handed back to Turkey to be administered by a Turkish-appointed Greek governor. Annexation to Greece came in 1912 after a brief bombardment by two Italian warships caused the Turks to evacuate.

The island remains fertile; land is devoted to vineyards, olive trees, and fruit, cotton, and tobacco production. Its wines are exported to western Europe. Near Tigáni, archaeologists uncovered the remains of a late 5th-century-BC temple and sanctuary of Hera. Samos was the birthplace of the philosopher and mathematician Pythagoras and the seat of a school of sculptors. Another Pythagoras, a Samian-born sculptor, achieved works cited by the ancient historians Pliny and Pausanias. Pop. (1981) 40,519.

Samos Tunnel, tunnel drilled on the Aegean island of Samos in the 6th century BC to carry water for the capital city of the tyrant Polycrates from springs on the far side of Mount Castro. It was built, according to Herodotus, by the engineer Eupalinus of Megara. Six feet (two metres) in diameter and more than 3,000 ft in length, it was drilled through the rock by teams of slaves using hammers and chisels. Advanced from two headings on opposite sides of the mountain, it failed to align with precision, but the junction was achieved by making a U-turn in the middle.

Samosata (Turkey): *see* Samsat.

Samosir, island in Danau (lake) Toba, Sumatera Utara *propinsi* (North Sumatra province), Sumatra, Indonesia. Approximately 200 sq mi (520 sq km) in area, the island occupies nearly half the lake and is joined to its western shore by an isthmus, at which point



Danau Toba (Lake Toba) and part of Samosir in central Sumatra, Indonesia
Don North—Nancy Palmer Agency

is the island's principal town, Pangururan. In the east, the island rises to 5,350 ft (1,630 m), but the level of the surrounding water is 2,989 ft. The mountain Dolok Pusubukit on the isthmus joining Samosir to the mainland is believed to have been the home of the first Batak, the mythical first ancestor of the Batak people, who inhabit much of Sumatera Utara. The Samosir Batak grow rice, raise cattle, fish in the lake, and raise shallots and garlic for sale. They are mainly Christian, with ancestor worship still important. The island contains many ancient megaliths; tourism is increasingly important to the eastern side of the island.

Samothrace, Modern Greek SAMOTHRÁKI, Greek island in the northern Aegean Sea off the Thracian coast, included in the *nomós* (department) of Évros. The 69-sq-mi (178-sq-km) island is geologically complex, consisting chiefly of ancient granites, clayey deposits, and softer volcanic materials. Hot springs are located near the north coast. Near its centre



Excavations at Palaepolis on Samothrace, Greece
Jim Goodwin—Photo Researchers

the island rises to 5,250 ft (1,600 m) in Korifí Fengári (Fenári Peak), the highest peak in the Aegean.

Samothrace's infertile, mountainous character precluded ancient political importance, but it was known for its association with the cult of the Cabeiri, attributed by Herodotus and others to the pre-Greek Pelasgian peoples (*see also* Cabeiri). Around 700 BC the Greeks arrived and instituted a complex pantheon, the Sanctuary of the Gods, which has been excavated since 1856. The island joined the Delian League *c.* 425 and in 340 fell under the control of Macedonia. About 170 the last Macedonian king, Perseus, was captured on Samothrace by the Romans, who made the island a free state. The ancient city was situated at Palaepolis near the north coast, below the present village of Samothráki. Most of the ruins are Hellenistic buildings of the 4th to 2nd century BC, but others date from the 7th century. The statue known as the "Nike of Samothrace" was found there in 1863. In the Middle Ages Samothrace was controlled by the Franks and Genoese until 1457, when it was taken over by the Turks. They held it until after World War I, when it was ceded to Greece. Pop. (1981) island, 2,871.

samovar, metal urn, often of brass, with a spigot near its base, widely used in the U.S.S.R., Mongolia, Egypt, Turkey, and Iran to boil water for tea. In traditional samovars water is heated by means of a vertical tube, containing burning charcoal, running up the middle of the urn. A filled teapot is set atop the chimney to steep. A lighter brew can be obtained by adding more water to the teacup from the spigot.

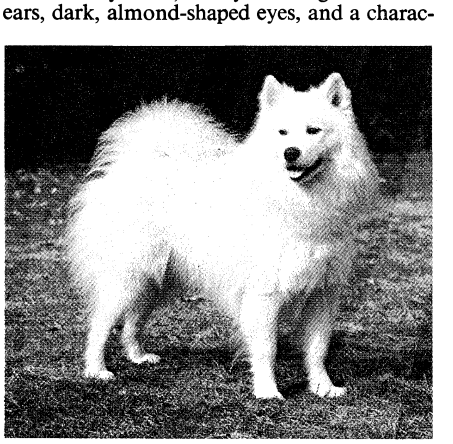
The samovar was a Russian invention of the mid-18th century that has become appreciated as an art object today. The first samovar works was founded by a metal craftsman, Ivan Lisitsin, in Tula. Many types—made from red, yellow, and green copper, silver, iron, and Tula steel—were available by the second half of the 19th century. There were chimneyless



Russian samovar, early 20th century; in the Carl Purcell Collection
Carl Purcell

samovars for coffee, dual samovars for coffee and tea, travelling samovars with screw-on legs and handles positioned close to square bodies, and silver samovars with sets of sugar bowls, cups, tongs, and spoons. Handles, spouts, and supports were engraved with flower, plant, and animal designs as well as trademarks, medals, and emblems of the manufacturer. Later types of samovars used kerosene as a fuel because of response to temperature control; others are heated electrically.

Samoyed, breed of working dog developed in Siberia, where it was kept by the Samoyed people as a sled dog and companion and as a herd dog for their reindeer. The Samoyed is a sturdily built, husky-like dog with erect ears, dark, almond-shaped eyes, and a charac-



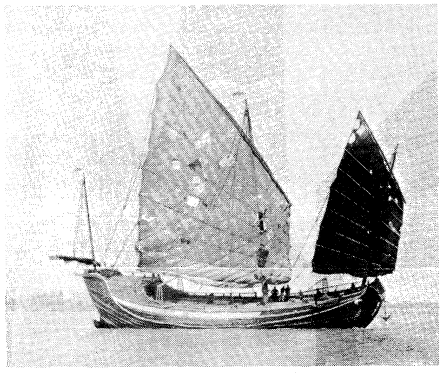
Samoyed
Sally Anne Thompson—EB Inc.

teristic "smile." Its long, heavy coat is white, cream-coloured, grayish yellow (biscuit), or white and biscuit. The Samoyed stands 19 to 24 inches (48 to 60 centimetres) and weighs 35 to 65 pounds (16 to 30 kilograms). It is often considered to be a gentle, loyal, and intelligent dog, a capable guard, and a good companion.

Samoyedic languages, group of languages spoken in Siberia and the Soviet Arctic that, together with the Finno-Ugric languages, constitute the family of Uralic languages (*q.v.*). There are five Samoyedic languages, which are divided into two subgroups—North Samoyedic and South Samoyedic. North Samoyedic consists of Nenets (Yurak), Enets (Yenisey), and Nganasan (Tavgi). South Samoyedic comprises Selkup and the practically extinct Kamas. None of these languages was written before 1930, and they are currently used only occasionally for educational purposes in elementary schools.

Samoyeds (people): *see* Nenets.

sampan, most common type of small boat in Chinese waters, constructed in a variety of designs. Some have sharp bows, and nearly all have large sterns, with the after portion of the gunwale and deck nearly always raised. Sampans are usually rigged for sailing, sometimes



Sampan
Brown Brothers

with two masts; otherwise they are rowed with large sweep-type oars. They are usually open or partly decked, with a shelter or cabin aft. In Japan, Hawaii, and Taiwan, a powered boat has been developed out of the traditional Japanese sampan, with a flat-bottomed midsection.

sampler, embroidered panel of linen on which various types of stitches are demonstrated. The earliest extant European examples date from the 16th century. The original purpose of the sampler, in the period before embroidery pattern books became available in 1523, was to demonstrate a repertory of embroidery stitches that might be used in the future. In the earliest dated specimen (1598), different motifs are arranged in a somewhat random fashion on linen. In the 17th century both the function of the sampler and its appearance changed. A school exercise rather than a repertory of stitches, it was dated and signed with the name of the pupil and sometimes of the teacher as well. It was, moreover, a work of art, executed as an end in itself. In the 17th century it was usual to work rows of stitches across the width of a long, oblong band; from the early 18th century onward, samplers tended to become square in shape and to show an overall design for arranging the component stitches, though the old form also persisted. Texts were embroidered, framed with a symmetrical arrangement of motifs; scenes with houses and people were worked, approximating embroidered pictures; and, in the latter part of the century, maps, almanacs, and the like were also represented. Nineteenth-century



Linen canvas sampler embroidered with coloured silks worked in cross, eyelet, stem, and satin stitches, Monmouth County, N.J., 1807; in the Philadelphia Museum of Art

By courtesy of the Philadelphia Museum of Art, the Whitman Sampler Collection given by Pet Incorporated; photograph, Alfred J. Wyatt

samplers continued on similar lines, mainly on canvas.

In all European countries in which embroidery was done and also in the U.S., samplers are to be found from the 18th and 19th centuries. Because most are dated, they form an unequalled source of information on the history of embroidery.

sampling, in statistics, process or method of drawing a representative group of individuals or cases from a particular population. Sampling and statistical inference are used in circumstances in which it is impractical to obtain information from every member of the population, as in biological or chemical analysis, industrial quality control, or in social surveys. The basic sampling design is simple random sampling, based on probability theory. In this form of random sampling, every element of the population being sampled has an equal probability of being selected. In a random sample of a class of 50 students, for example, each student has the same probability, $1/50$, of being selected. Every combination of elements drawn from the population also has an equal probability of being selected. Sampling based on probability theory allows the investigator to determine the likelihood that statistical findings are the result of chance. More commonly used methods, refinements of this basic idea, are stratified sampling (in which the population is divided into classes and simple random samples are drawn from each class), cluster sampling (in which the unit of the sample is a group, such as a household), and systematic sampling (samples taken by any system other than random choice, such as every tenth name on a list).

An alternative to probability sampling is judgment sampling, in which selection is based on the judgment of the researcher and there is an unknown probability of inclusion in the sample for any given case. Probability methods are usually preferred because they avoid selection bias and make it possible to estimate sampling error (the difference between the measure obtained from the sample and that of the whole population from which the sample was drawn).

sampo, mysterious object often referred to in the mythological songs of the Finns, most likely a cosmological pillar or some similar support holding up the vault of heaven. In a cycle of songs, referred to by such scholars as Matti Kuusi as the *sampo*-epic, the *sampo* is forged by the creator-smith Ilmarinen (*q.v.*) for Louhi, the hag-goddess of the underworld, then stolen back by Ilmarinen and the shaman-hero Väinämöinen. They are pursued by Louhi, and in the ensuing battle *sampo* is smashed into little pieces, which still preserve enough potency to provide for "sowing and reaping" and other forms of prosperity.

The comments of early informants reveal that the songs were part of a ritual cycle sung at a spring sowing ceremony to further the growth of grain. The conclusions of scholars such as E.N. Setälä, Uno Harva, and, more recently, Martti Haavio are more or less in agreement that *sampo* refers to the support holding up the firmament, a concept found in many early cosmologies. The name *sampo* may even be a cognate of words such as Sanskrit *skambha,* "pillar," and Altaic *sumbur,* the "world mountain." As the mythical *axis mundi,* around which the heavens revolve, all life is dependent on the *sampo,* which the Finnish songs depict as the source of all good.

sampradāya, in Hinduism, a traditional school of religious teaching, transmitted from one teacher to another. From about the 11th century onward, several sects emerged out of Vaiṣṇavism (worship of the god Vishnu), which continue to the present day. They include the Sanaka-sampradāya (also known as Nimbārkas, the followers of Nimbārka); the Śrī-sampradāya (or Śrīvaiṣṇavas, following the teaching of Rāmānuja); the Brahmā-sampradāya (or Mādhvas, the followers of Madhva); and the Rudra-sampradāya (or Viṣṇusvāmins, the followers of Viṣṇusvāmin). In each case the school is named after a distant and perhaps mythological founder, such as Śrī (the goddess Lakṣmī), from whom it has been transmitted through a succession of teachers to the earthly founders of the sects.

Sampson, Deborah (b. Dec. 17, 1760, Plympton, Mass., U.S.—d. April 29, 1827, Sharon, Mass.), U.S. soldier and one of the earliest female lecturers in the country.

After a childhood as an indentured servant, the venturesome Sampson decided to enter the Continental Army to participate in the Revolutionary War. Assuming a man's identity, she enlisted as "Robert Shurtleff" in the 4th Massachusetts Regiment in 1782. Nicknamed "Molly" because of her beardless features, she fought in numerous skirmishes and received both sword and musket wounds. A bout with fever uncovered her identity, and in 1783 she was discharged from the army.

In 1784 she married Benjamin Gannett, a Massachusetts farmer and soon thereafter was awarded a small pension by Congress. In 1802 she began to lecture on her experiences, concluding her highly romanticized speech by dressing in a soldier's uniform and performing the manual of arms. She was perhaps the first woman to lecture professionally in the United States. In 1838 Congress passed an act providing full military pension to her heirs.

A biography, *The Female Review* (1797), by Herman Mann, was reissued in 1866.

Sampson, William T(homas) (b. Feb. 9, 1840, Palmyra, N.Y., U.S.—d. May 6, 1902, Washington, D.C.), U.S. naval officer who, as head of the North Atlantic squadron, masterminded U.S. naval strategy during the Spanish–American War.

A graduate of the U.S. Naval Academy (1861), Sampson served in the Union naval forces during the Civil War, continued in the navy after 1865, was superintendent of the Naval Academy (1886–90), and chief of the Bureau of Ordnance (1893–97).

Following the outbreak of war with Spain in 1898, Sampson was named commander of the Atlantic squadron and was in command of the squadron when it blockaded the Spanish fleet in the harbour of Santiago de Cuba (May 29–July 3, 1898). When the Spanish ships

sought to escape Santiago (July 3) and were destroyed by the U.S. naval forces, Sampson was absent, conferring with Gen. William R. Shafter, commander of the U.S. land forces. His absence became the cause of a celebrated controversy as to whether Adm. Winfield S. Schley, who was in command during the battle, or Sampson, who had outlined the general battle plans, should receive credit for the victory. In 1899 Sampson was given the permanent rank of rear admiral.

saṃsāra (Sanskrit: "the running around"), in Indian philosophy, the central conception of metempsychosis. It refers in Hinduism and Jainism to the career of the soul, which, once it has fallen from its original state of self-consciousness and bliss, is born as any creature and continues to be reborn until it has found release (*mokṣa*) from the bonds of its past deeds (*karman*). Buddhism, which does not assume the existence of a permanent soul, accepts a semipermanent personality core that goes through the process of *saṃsāra.*

The Sāṃkhya school of Hindu philosophy has worked out certain details of this transmigration process. It assumes the existence of two bodies, a "gross" one (*sthūla*), which is the material body, and a "subtle" one, which is immaterial. When the gross body has perished, the subtle one survives and migrates to another one; this subtle body consists of the higher psychomaterial functions of *buddhi* ("consciousness"), *ahaṃkāra* ("I-consciousness"), *manas* ("mind as coordinator of sense impressions"), and *prāṇa* ("breath"), the principle of vitality.

The range of *saṃsāra* stretches from the lowliest insect (sometimes the vegetable and mineral kingdoms are included) to Brahmā, the highest of the gods, for they also are involved in transmigration. The rank of one's birth in the hierarchy of life depends on the quality of the previous life. After death the soul first goes for a sojourn to a heaven or hell until it has consumed most of its good or bad *karman.* Then it returns to a new womb, the remainder of its *karman* having determined the circumstances of its next life. In theory this allows for the possibility of remembering one's previous lives (*jātismara*), a talent that great saints possess or can cultivate. Typical of this belief are the so-called *Jātaka* stories, in which the Buddha gives accounts of his previous lives.

Samsat, historically SAMOSATA, village in Adıyaman *il* (province), southeastern Turkey, on the upper Euphrates River. In antiquity Samosata was a fortified city guarding an important crossing point of the river on the east–west trade route; as such it enjoyed considerable commercial and strategic importance. Probably of Hittite origin, the city was incorporated into the Assyrian Empire in 708 BC. Later it came under the Hellenistic kingdom of Commagene and served as its capital until it was surrendered to Rome in AD 72. Captured by the Sāsānian king of Persia, it fell to the invading Arabs *c.* 640. In the 10th century it briefly served as an administrative military district of the Byzantine Empire and was already in a state of decline when it came under the Seljuq Turks two centuries later. Samosata is also remembered as the birthplace of the writer Lucian (2nd century AD) and St. Lucian, who was martyred at Antioch in 312. Pop. (1980) 2,214.

saṃskāra, any of the personal sacraments traditionally observed at every stage of a Hindu's life, from the moment of conception to the final scattering of his funeral ashes. The observance of the *saṃskāras* is based on custom fully as much as on texts such as the *Gṛhya-sūtras*, the epics, or the *Purāṇas* and differs considerably according to region, caste, or family. The rites are usually performed by the father, in the home, and are the more carefully observed in the case of male children. The most generally accepted list of 16 traditional *saṃskāras* begins with the prenatal ceremonies of *garbhādhāna* (for conception); *puṃsavana* (to favour a male birth); and *sīmantonnayana* ("hair-parting," to ensure safe delivery). The rites of childhood begin before the severing of the cord, with the ceremony of *jātakarman* (birth); followed at a later date by *nāmakaraṇa* (name-giving); *niṣkramana* (the child's first view of the Sun); *annaprāśana* (first feeding of solid food); *cūḍākaraṇa* (first tonsure of the boy's head); and *karṇavedha* (boring of the ears for the wearing of ornaments). The educational *saṃskāras* can commence as early as the fifth year with the *vidyārambha* (the learning of the alphabet). The *upanayana* (*q.v.*; initiation) confers the sacred thread on male children of the three upper social classes; the *vedārambha* signals the beginning of the student's study of the Vedas (sacred scriptures); the *keśānta,* or *godāna* (first shaving of the beard), marks the approach of manhood; and the *samāvartana* (returning home from the house of the guru) or *snāna* ("bathing"), the completion of his student life. The sacrament of marriage, the next stage in a man's life, is known as *vivāha.* The final *saṃskāra* to be performed for a man is the *antyeṣṭi* (*q.v.*), the funeral rite.

In modern times the full *saṃskāras* are not generally performed, despite the efforts of the Arya Samaj, a late 19th-century reform movement that tried to revive their popularity. At present the ceremonies most commonly observed are those of initiation, marriage, and death.

Samson, Hebrew SHIMSHON, Israelite hero portrayed in an epic narrative in the Old Testament (Judg. 13–16). He was a Nazirite (*q.v.*) and a legendary warrior whose incredible exploits hint at the weight of Philistine pressure on Israel during much of the early, tribal period of Israel in Canaan (1200–1000). The Book of Judges ranks him with other divinely inspired warriors who delivered the community to establish themselves as its judges.

The Old Testament narrative, only alluding to Samson's "twenty years" activity as a judge, presents a few episodes, principally concerned with the beginning and the end of his activity. Before his birth his parents, peasants of the tribe of Dan at Zorah, near Jerusalem, learned through a theophany (manifestation of a divinity) that he was to be dedicated to the life of a Nazirite; *i.e.,* one set aside for God by a vow to abstain from strong drink, from shaving or cutting the hair, and from contact with a dead body.

Samson possessed extraordinary physical strength, and the moral of his saga relates the disastrous loss of his power to the violation of his Nazirite vow. Credited with remarkable exploits—*e.g.,* the slaying of a lion and moving the gates of Gaza—he first broke his religious promises by feasting with a woman from the neighbouring town of Timnah, who was also a Philistine, one of Israel's mortal enemies. Other remarkable deeds follow; *e.g.,* his decimating the Philistines in a private war. On another occasion he repulsed their assault on him at Gaza, where he had gone to visit a harlot. He finally fell victim to his foes through love of Delilah, a woman of the valley of Sorek, who beguiled him into revealing the secret of his strength: his long Nazirite hair. As he slept, Delilah had his hair cut and betrayed him. He was captured, blinded, and enslaved by the Philistines, but in the end he was granted his revenge; through the return of his old strength, he demolished the great Philistine temple of the god Dagon, at Gaza, destroying his captors and himself (Judg.16:4–30).

With his life revolving around his relations with Philistine women, Samson is depicted in the Book of Judges as being ruled by passion, which, although the cause of his downfall, nevertheless provided the means (in his frenzied force) with which he struggled for the vindication of Israel's God, Yahweh. His death in the temple is presented not as suicidal but, according to the general interpretation of biblical scholars, as a return to the original mission (as "judge" and Nazirite) that he had temporarily abandoned.

The cycle of the Samson stories is regarded by most liberal critics, and even by some Jewish interpreters in the Talmudic period (from the 1st century AD), as legendary or epical. More conservative exegetes, while admitting the unlikeliness of the events and the folkloristic style of the text, nevertheless claim to identify a core of historical truth in the saga, albeit embellished by popular imagination and augmented in rabbinical literature. Samson, accordingly, was taken by the editor of Judges as illustrating his general thesis—that, when the Israelites were unfaithful to Yahweh, they were oppressed and, when they appealed to him, they were liberated.

To make the best use of the Britannica, consult the INDEX *first*

Samsun, historically AMISUS, city, capital of Samsun *il* (province), northern Turkey. The largest city on the southern coast of the Black Sea, Samsun lies between the deltas of the Kızıl and Yeşil rivers. Amisus, which stood on a promontory just northwest of the modern city centre, was founded in the 7th century BC; after Sinop it was the most flourishing Milesian colony on the Euxine (Black) Sea. After Alexander the Great's conquest of Asia Minor in the 4th century BC, it came under the kings of Pontus and continued to prosper until burned down by its defenders when captured by the Romans in 71 BC.

Known as Amisos under the Byzantines, it was renamed Samsun by the Seljuq Turks when they took it in the second half of the 12th century. Under Seljuq rule, it surpassed Sinop as a centre of trade between Europe and Central Asia; a large trading colony of Genoese was established there. Taken by the Ottoman sultan Bayezid I at the end of the 14th century, it reverted to the Turkmen Candar principality after Ottoman defeat at the hands of the conqueror Timur (Tamerlane) in 1402. The city was burned by the Genoese before the Ottomans recaptured it in 1425. The landing of Mustafa Kemal (later called Atatürk) at Samsun on May 19, 1919, to organize national resistance marked the beginning of the Turkish War of Independence and heralded the establishment of the republic in 1923.

A broad avenue lined with government offices, hotels, and shops traverses modern Samsun east–west along the coast. The city is the metropolitan centre for a fertile agricultural hinterland and the main outlet for the trade of the middle Black Sea coast. Its growth during the later 19th century is associated with the development of tobacco growing in adjoining Bafra *ilçe* (district) and the use of modern ships on the Black Sea. Its well-protected harbour, modernized and expanded in the 1960s, is the nation's largest port on the Black Sea littoral. Exports include tobacco and wool from the interior and cigarettes, fertilizer, and textiles from the city's factories. Samsun is the terminus of a railway line from inner Anatolia, through which iron ore is brought from Divriği. The city has air services to Istanbul and Ankara and is also linked by major roads with Ankara and Sivas. Samsun is the site of the May 19 University, founded in 1975.

Samsun *il,* with an area of 3,975 sq mi (10,296 sq km), is drained by the Kızıl and Yeşil rivers. A densely populated, fertile region, it

is one of the principal sources of Turkish tobacco. Pop. (1980) city, 198,749; (1983 est.) *il,* 1,068,000.

Samt-e Junūbī (Afghanistan): *see* Paktīā.

Samt-e Mashreqi (Afghanistan): *see* Nangarhār.

Samudra Gupta (d. *c.* AD 380), Indian regional emperor from *c.* AD 330 to *c.* 380, the epitome of an "ideal king" of the "golden age of Hindu history," as the period of the imperial Guptas (AD 320–510) has often been called. Son of King Candra Gupta I and the Licchavi princess Kumāradevī, he is pictured as a muscular warrior, poet, and musician who displayed "marks of hundreds of wounds received in battle." In many ways he personified the Indian conception of the hero.

Chosen as emperor by his father over other contenders, he apparently had to repress revolts in his first years. On pacifying the kingdom, probably then reaching from what is now Allahābād to the borders of Bengal, he began a series of wars of expansion from his northern base near what is now Delhi. In the southern Pallava kingdom of Kāñchipuram, he defeated King Viṣṇugopa, then restored him and other defeated southern kings to their thrones on payment of tribute. Several northern kings were uprooted, however, and their territories added to the Gupta Empire. At the height of Samudra Gupta's power he controlled nearly all the valley of the Ganges and received homage from rulers of parts of east Bengal, Assam, Nepal, the eastern part of the Punjab, and various tribes of Rājasthān. He exterminated 9 monarchs and subjugated 12 others in his campaigns.

From inscriptions on gold coins and on the Aśoka pillar in the fort at Allahābād, Samudra Gupta is shown especially devoted to the Hindu god Vishnu. Reviving the ancient Vedic horse sacrifice, probably at the conclusion of his fighting days, he distributed large sums for charitable purposes during these ceremonies. A special gold coin he issued commemorated this ceremony, while another showed him playing the harp; all were of high gold content and excellent workmanship.

Since he was a member of the influential Brahman class, it is reasonable to assume that he supported caste distinctions, and the Guptas may have been responsible for the emergence of Brahmanism as a theological system as well as a code of social behaviour carried into present Hindu society.

Samuel, Hebrew SHMU'EL (fl. *c.* 11th century BC, Israel), religious hero in the history of Israel, represented in the Old Testament in every role of leadership open to a Jewish man of his day—seer, priest, judge, prophet, and military leader. His greatest distinction was his role in the establishment of the monarchy.

Biblical accounts of his life. Information about Samuel is contained in the First Book of Samuel. The ancient designation of the two books of Samuel does not indicate that he is the author (in fact, his death is related in I Sam. 25) or the hero of the books; indeed, it is difficult to deduce what the title was intended to mean.

Samuel, the son of Elkanah (of Ephraim) and Hannah, was born in answer to the prayer of his previously childless mother. In gratitude she dedicated him to the service of the chief sanctuary of Shiloh, in the charge of the priest Eli; as a boy Samuel received a divine oracle in which the fall of the house of Eli was predicted (I Sam. 1–3). When he became an adult, Samuel inspired Israel to a great victory over the Philistines at Ebenezer (chapter 7). The proposal of the elders of Israel to install a king was indignantly rejected by Samuel as infidelity to Yahweh, the God of Israel (chapter 8). By the revelation of Yahweh, however, he anointed Saul king and installed him before all Israel (chapters 9–10). Saul was vindicated as king by his leadership of Israel in a campaign against the Ammonites (chapter 11); after this, Samuel retired from the leadership of Israel (chapter 12). He reappeared, however, to announce the oracle of Yahweh rejecting Saul as king, once for arrogating to himself the right of sacrifice (chapter 13) and a second time for failing to carry out the law of the ban—a primitive institution by which persons or objects were devoted to the deity, normally by destruction—against the Amalekites (chapter 15). By the oracle of Yahweh, Samuel secretly anointed David as king (chapter 16). He then faded into the background, appearing at the sanctuary of Naioth (chapter 19). He died, and his ghost was evoked by a necromancer, or sorceress, at the request of Saul; he then announced a third time the rejection of Saul (chapter 28).

Conflicting traditions about Samuel. Samuel thus appears as a leader in all Israel; his leadership is exercised in war and law, but his authority is basically religious, mostly prophetic, although with some features of priestly authority. He appears at first as being hostile to the monarchy and then as being favourable to it. He is the spokesman of Yahweh in the election both of Saul and of David. Yet, the picture is not entirely straightforward, and a close examination of the material, as conducted by a large number of critical historians, reveals inconsistencies that raise questions about both the history of Samuel and the sources in which this history has been preserved. The same examination reveals that none of the material in its present form was contemporary with the events; if one source is taken as controlling, then the other materials lose all historical value.

The two major divergences lie in those passages that critics call the "pro-monarchic" source (I Sam. 9:1–10:16) and the "anti-monarchic" source (I Sam. 8 and 10:17–27). The word source here means tradition rather than a hypothetical document that can be reconstructed. In the pro-monarchic account of the rise of Saul, Samuel is an obscure village seer (with distinct evidence of occult practices). The institution of the monarchy and the election of the king occur according to the will of Yahweh as revealed to Samuel. The story of the anointing, however, has no story of accession to complete it; instead, there is the account of Saul's victory over the Ammonites. Examination discloses that this is still another account of Saul's rise without an anointing story; Saul is chosen king as the judges—the leaders of the Israelites during their conquest of the land of Canaan—were chosen, by a charismatic display of military courage and leadership. Samuel was very probably intruded into this narrative.

The anti-monarchic account presents a different kingship, a different Saul, and a different Samuel. Samuel is a figure known through "all Israel" (a term of uncertain meaning at this period); his authority rests on his position as judge. The institution of kingship comes not from divine revelation but from the request of the elders of Israel, and this request is treated by Samuel as rebellion against Yahweh. The king is chosen not by divine election but by lot, implying that no special qualities were required, and the bashful candidate has to be summoned from a hiding place. This story is related to the account of Samuel as judge in chapters 7 and 12, and he is clearly presented as the last of the judges; it is indicated that the system of the judges was rejected by the Israelites not because of its failure but because of their worldliness. This tradition has two questionable features: Samuel is the only judge who is a permanent magistrate as well as a military leader, and his victory over the Philistines in chapter 7 cannot be historical.

The story of the birth and vocation of Samuel is regarded by critics as legendary because of a number of obviously unhistorical features. The narrative is the major piece in establishing the role of Samuel as a prophet, but it is questionable whether the "prophet" as a distinct religious figure had emerged at this early date. The story is also at the root of the priestly role imposed on Samuel at a later date in I Chronicles 6; but this is an effort to explain in terms of the later priesthood the sacred functions performed by Samuel.

There are also two traditions in the account of the rejection of Saul by Samuel. The first story (I Sam. 13) is motivated by Saul's assumption of the prerogatives of the priesthood. It is quite unlikely that either the powers of the king or the prerogatives of the priest were as closely defined as this in the early period. The second story (chapter 15) is motivated by the failure of Saul to observe the ethic of the holy war. This story does not exhibit the same improbability. It seems that there was a firm tradition of a split between the two men but an inexact memory of the details of the incident.

Significance. There must have been some reason why Samuel was important enough to be remembered for a major role in the establishment of the monarchy. Yet, his roles as prophet, seer, and judge are all incredible in certain respects, apart from the fact that each of them is considerable. The problem may be resolved by identifying a role for Samuel that receives only passing mention because it no longer existed when this material was written. This is his leadership of the sons of the prophets, a group of young men organized for ecstatic worship. Indications are that they were a group of fanatical religious and national conservatives. That they were young and active gave Samuel a base of power that was physical as well as moral. As conservatives, they must have been torn between the threat to Israel posed by the Philistines and the promise that the new political system, alien to religious and national traditions, offered against this threat. This internal division in Israel is reflected in the person of Samuel, who stood with most Israelites on both sides of the question.

(J.L.McK.)

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Samuel (d. Oct. 6, 1014, Prilep, Macedonia), tsar of Western Bulgaria, or Macedonia, from 980; his realm was successor to the First Bulgarian Empire.

Ruling originally in Macedonia, Samuel then conquered independent Serbia and further extended his power into northern Bulgaria, Albania, and northern Greece. He established his capital at Ochrida (now Ohrid, Yugos.) and revived the Bulgarian Patriarchate. In the 980s he defeated the Byzantine emperor Basil II Bulgaroctonus near Sofia, but from 997 the intermittent struggle with the Byzantines went against him. Finally, on July 29, 1014, Basil overwhelmed Samuel in the Battle of Belasitsa. At Basil's order, the Bulgarian prisoners (said to number 15,000) were blinded and returned to Samuel, who fainted from shock and soon died. He was succeeded by his son Gavril (murdered in 1015) and a nephew Ivan (killed in battle in 1018), after which Bulgaria became a Byzantine province.

Samuel OF NEHARDEA, also called SAMUEL YARḤINA'AH (the Astronomer), or MAR SAMUEL (b. *c.* 177, Nehardea, Babylonia—d. *c.* 257), Babylonian amora (scholar), head of

the important Jewish academy at Nehardea. His teachings, along with those of Rav (Abba Arika, head of the academy at Sura), figure prominently in the Babylonian Talmud.

What is known about Samuel's life is a combination of speculation and legend. According to one tradition he may have been a disciple of the Palestinian scholar Judah ha-Nasi, one of the compilers of the Mishna. About Samuel's accomplishments much is recorded: he was an astronomer, a physician, and an authority on civil law, and he served as a district judge. In the latter capacity he was renowned for his integrity and for his consistently fair resolutions to the disputes brought before his court. Samuel held that in civil matters the law of the state in which they reside is legally binding upon the Jews from a religious perspective. This principle created the theoretical basis for the existence of Jews in exile throughout the Diaspora. Among his many scholarly contributions perhaps the most significant were his textual explanations of the Mishna, noted for their lucidity.

Samuel, books of, two Old Testament books that, along with Deuteronomy, Joshua, Judges, and I and II Kings, belong to the tradition of Deuteronomic history first committed to writing about 550 BC, during the Babylonian Exile. The two books, which were originally one, are principally concerned with the origin and early history of the monarchy of ancient Israel. The work bears the name of Samuel apparently because he is the first of its principal figures and was instrumental in the selection of the first two kings. I Samuel treats Samuel as prophet and judge and Israel's principal figure immediately before the monarchy, and Saul as king. II Samuel presents David as king.

There are numerous parallels, repetitions, and discrepancies within the books of Samuel. Different accounts are given of the origin of the monarchy (I Sam. 9:1–10:16 and I Sam. 8; 10:17–27); there are two accounts of the rejection of Saul as king (I Sam. 13:8–14 and I Sam. 15:10–31) and two more of David's introduction to Saul (I Sam. 16 and I Sam. 17). One account of the slaying of Goliath attributes the act to David (I Sam. 17) and the other to Elhanan (II Sam. 21:19). Some scholars assume that the books of Samuel were composed from two or three continuous sources; others suggest a compilation of independent narratives of varying lengths. The latter view has gained the wider acceptance. The longest independent narrative, an excellent example of historical writing, is the "court history of David" (II Sam. 9–20; I Kings 1–2). The several independent narratives and fragments were presumably collected by the Deuteronomic historian and joined together in the production of his work (Deuteronomy, Joshua, Judges, I and II Samuel, I and II Kings). The author exercised considerable care in his use of traditional material, for everything is made to serve in an overall theological perspective. The conflicting accounts of the origin of the monarchy, reflecting pro- and anti-monarchical attitudes, are intentionally held in tension as a backdrop for the divine promise to the house of David in II Sam. 7, guaranteeing its permanence and warning that the iniquity of any reigning king will bring the punishment of Yahweh. The rest of the history is shaped to illustrate the validity of these claims.

The promise in II Sam. 7 that divine favour will rest permanently on the Davidic dynasty is crucial for understanding the writer's theological motivation for producing his history in the exilic period. He hoped for a restoration of his people and was convinced that one of the conditions for such a restoration was to recognize the divine legitimation of the house of David. He was also convinced that the kings of a restored Davidic monarchy would prosper in proportion to the degree of their faithfulness to the Law of Moses.

Samuel (of Mount Carmel and of Texteth), Herbert Louis Samuel, 1st Viscount (b. Nov. 6, 1870, Liverpool—d. Feb. 5, 1963, London), British statesman and philosopher, one of the first Jewish members of the British Cabinet (as chancellor of the duchy of Lancaster, 1909–10). He was perhaps most important as first British high commissioner for Palestine (1920–25), carrying out that delicate assignment with varying but considerable success.



Herbert Louis Samuel, 1929
BBC Hulton Picture Library

Samuel was a social worker in the Whitechapel slum district of East London when elected to the House of Commons as a Liberal in 1902. As parliamentary undersecretary to the Home Office (1905–09), he was responsible for legislation (1908) that established juvenile courts and the "Borstal" system of detention and training for youthful offenders. Twice postmaster general (1910–14, 1915–16), he recognized the postal trade unions and nationalized the telephone services. In January 1916 he became home secretary in Herbert H. Asquith's coalition ministry, but he resigned in December when David Lloyd George formed his coalition government.

Although his five-year administration in Palestine was occasionally disturbed by turmoil brought about by both Jewish and Arab nationalist dissension, Samuel greatly improved the economy of the region and strove for harmony among the religious communities. Returning to Great Britain, he presided (1925–26) over the royal commission on the coal industry and helped to settle the general strike of May 1926. Reentering the House of Commons in 1929, he joined Ramsay MacDonald's national coalition government in 1931 as home secretary, but, as a confirmed free trader, he resigned in September 1932 in protest against import tariffs. He was leader of the Liberal Party from 1931 to 1935, but his actions widened the division within the Liberal Party, which ceased to be an important factor in national elections. Created viscount in 1937, he led the Liberals in the House of Lords (1944–55).

As president (1931–59) of the British (later Royal) Institute of Philosophy, Samuel interpreted philosophy to the public in such books as *Practical Ethics* (1935) and *Belief and Action* (1937; new ed. 1953). A biography by John Edward Bowle, *Viscount Samuel,* appeared in 1957.

Samuel ben Judah ibn Tibbon: *see* ibn Tibbon, Samuel ben Judah.

Samuel ha-Nagid, Arabic ISMAIL IBN NAGRELA (b. 993, Córdoba, Spain—d. 1055/56, Granada), Talmudic scholar, grammarian, philologist, poet, warrior, and statesman who for two decades was the power behind the throne of the caliphate of Granada.

As a youth, he received a thorough education in all branches of Jewish and Islāmic knowledge and mastered Arabic calligraphy, a rare achievement among Jews. When Córdoba was sacked in 1013 by the Berbers, a north African people believing in Islām, Samuel fled to Málaga, at that time part of the Muslim kingdom of Granada.

His unusual linguistic and calligraphic skills caught the attention of the Granadan vizier, who employed him as his private secretary. Samuel soon became an invaluable political adviser to the vizier, who, at his death, commended Samuel to the caliph Ḥabbūs. The caliph made Samuel the new vizier, and as such he assumed direction of Granada's diplomatic and military affairs.

Ḥabbūs died in 1037. Although his elder, pleasure-loving son then assumed the throne, Samuel was the caliph in fact if not in actuality. He steered Granada through years of continuous warfare and actively participated in all major campaigns. His influence became so great that he was even able to arrange for his son Joseph to succeed him as vizier.

Samuel was also *nagid* (Hebrew: "chief") of Granadan Jewry. As such he appointed all the judges and headed the Talmudic academy. He is generally believed to be the author of *Mevo ha-Talmud* ("Introduction to the Talmud"), a long-lived Talmudic manual. He also wrote a concordance to the Bible, encouraged learning in all fields, and became a respected, even revered figure among both Arabs and Jews.

Samuelson, Paul (Anthony) (b. May 15, 1915, Gary, Ind., U.S.), U.S. economist awarded the Nobel Prize for economics in 1970.

Samuelson was educated at the University of Chicago and at Harvard, where he obtained his Ph.D. in 1941. He was a professor of economics at the Massachusetts Institute of Technology from 1940. Samuelson also served as a government economic advisor on several occasions.

Samuelson was an economic theorist of outstanding calibre, having made contributions to many parts of economic theory through the employment of a powerful mathematical technique, using it essentially as a puzzle-solving device. His *Foundations of Economic Analysis* (1947) is perhaps his only comprehensive treatise; it provides the foundation for the pervading theme of Samuelson's work, the universal nature of optimizing behaviour as the key to economic theory. Samuelson pursued this path in the development of the central body of economic theory stemming from the general equilibrium theory of Léon Walras. This took him into such diverse fields as the dynamics and stability of economic systems, the incorporation of the theory of international trade into that of general economic equilibrium, the analysis of public goods, and capital theory. Of particular influence has been his mathematical formulation of the interaction of multiplier and accelerator effects and, in consumption analysis, his development of the theory of revealed preference.

Samuelson had a lucid prose style. His introductory textbook on economics was a best-seller for a work in that genre and is considered something of a classic. He also co-authored a work on linear programming.

Samuelsson, Bengt Ingemar (b. May 21, 1934, Halmstad, Swed.), Swedish biochemist, co-recipient with fellow Swede Sune K. Bergström and Englishman John Robert Vane of the 1982 Nobel Prize for Physiology or Medicine. The three scientists were honoured for their isolation, identification, and analysis of numerous prostaglandins, which are biochemical compounds that influence blood pressure, body temperature, allergic reactions, and other physiological phenomena in mammals. Samuelsson was the first to describe the process of prostaglandin formation.

He graduated from the University of Lund, where Bergström was one of his professors. He continued his studies at the Karolinska Institute, Stockholm, earning doctorates in biochemistry in 1960 and medicine in 1961. He remained at the Karolinska Institute as a member of the faculty, eventually succeeding Bergström as dean of the medical faculty.

Samugarh, Battle of (May 29, 1658), decisive struggle in a contest for the throne between the sons of the Mughal emperor Shāh Jahān after the emperor's serious illness in September 1657. The battle was fought between the princes Aurangzeb and Murād Bakhsh, third and fourth sons of the emperor, on the one side, and the eldest son and heir apparent, Dārā Shikōh, on the other. Dārā had retreated to Samugarh about 10 miles (16 km) east of Āgra (Shāh Jahān's residence), south of the Yamuna River, after Aurangzeb had turned the line of the Chambal River by finding a little-known and unguarded ford. Dārā's army of about 60,000 was the larger, but Aurangzeb's was more experienced.

The battle was fought at the height of the North Indian hot weather and was decided by Dārā's descent from his elephant at a critical moment, which his troops mistook to indicate his death. After the battle Aurangzeb imprisoned his brother Murād and Shāh Jahān, while Dārā, after a long pursuit and a second defeat, was executed in 1659.

samūm, English SIMOOM, small and extremely hot and dry local wind in Arabia and the Sahara. Its temperature often reaches 55° C (about 130° F), and its humidity sometimes falls under 10 percent. Intensive ground heating under a cloudless sky causes the *samūm*. The Arabic word means "poison wind" and refers to the wind's tendency to cause heatstroke.

samurai, member of the Japanese warrior caste. The term samurai was originally used to denote the aristocratic warriors (*bushi*), but it came to apply to all the members of the warrior class that rose to power in the 12th century and dominated the Japanese government until the Meiji Restoration in 1868. Emerging from provincial warrior bands, the samurai of the Kamakura period (1192–1333), with their military skills and deep pride in their stoicism, developed a disciplined culture distinct from the earlier, quiet refinement of the imperial court. During the Muromachi period (1338–1573) under the growing influence of Zen Buddhism, the samurai culture produced many such uniquely Japanese arts as the tea ceremony and flower arranging that continue today. The ideal samurai was supposed to be a stoic warrior who followed an unwritten code of conduct, later formalized as Bushidō (*q.v.*), which held bravery, honour, and personal loyalty above life itself; ritual suicide by disembowelment (seppuku) was institutionalized as a respected alternative to dishonour or defeat.

In the early part of the Tokugawa period (1603–1867), the samurai, who accounted for less than 10 percent of the population, were made a closed caste as part of a larger effort to freeze the social order and stabilize society. Although still allowed to wear the two swords emblematic of their social position, most samurai were forced to become civil bureaucrats or take up some trade during the 250 years of peace that prevailed under the Tokugawa shogunate (military dictatorship). Moreover, the rise of the cities and the expansion of a merchant economy during early 18th-century Japan led to the flowering of a vibrant urban culture, which eventually superseded the austere life-style of the samurai. At the same time, the economic position of the samurai, who lived primarily on fixed stipends, was being eroded. In spite of their high social rank, a growing number of samurai families suffered impoverishment by the end of the Tokugawa period.

Lower-ranking samurai, eager for advancement and realizing a new sense of national purpose in the face of encroachment by the Western powers during the mid-19th century, took part in the movement against the Tokugawa regime that resulted in the Meiji Restoration of 1868. The samurai class lost its privileged position when feudalism was officially abolished in 1871. Discontented former samurai rose in rebellion several times during the 1870s, but these revolts were quickly suppressed by the newly established national army.

Samut Prakan, also spelled SAMUTPRAKEN, town, south-central Thailand, on the Gulf of Thailand. Samut Prakan (sometimes called Paknam) lies at the mouth of the Chao Phraya River and serves as a lower port of Bangkok, 12 miles (19 km) north, with which it is linked by road and railway. The adjacent gulf coastline is marshy and most settlements are inland. Rice cultivation and fishing are economically important. Pop. (1986 est.) 69,218.

Samut Sakhon, also spelled SAMUT SAKORN, or SAMUT SAKHORN, town, south-central Thailand. The fishing port of Samut Sakhon is located on the Gulf of Thailand at the mouth of the Tha Chin River. It is a rice-milling centre and is linked to nearby Bangkok by road, railway, and canal. The town is also called Tha Chin, or Tachin. Fishing, salt production, market gardening for the nearby urban market, and rice farming are major activities in the locality. Pop. (1986 est.) 53,274.

Samut Songkhram, town, south-central Thailand. It lies along the Gulf of Thailand southwest of Bangkok. The town is a fishing port on the northwestern coast of the Gulf of Thailand at the mouth of the Mae Klong River. It is also a collecting point for coconuts and rice. Locally known as Mae Klong, it is linked to Bangkok by railway. Pop. (1986 est.) 35,477.

Saṃvara (Sanskrit: "Union"), Chinese SAN PA-LO, in northern Buddhism, a fierce protective deity. Like Heruka and Hevajra, he is an emanation of the Buddha Akṣobhya and wears a figure of that god in his headdress. Saṃvara is widely worshiped as a *yi-dam* (tutelary, or guardian, deity) in Tibet and China and is said to be incarnated in each successive grand lama of Peking. He is represented in art as blue in colour, with four heads, each of which has a third eye and an angry expression. Two of his 12 arms are crossed on his breast; one holds the four-faced head of Brahmā, his distinctive symbol; and others embrace his shakti (female consort), Vajravārāhī.

saṃvṛti-satya (Sanskrit: "the empirical truth"), in Buddhist thought, the truth based on the common understanding of ordinary people. It refers to the empirical reality usually accepted in everyday life and can be admitted for practical purposes of communication. It is distinct from the ultimate truth (*paramārtha-satya*), which lies beneath empirical phenomena and is beyond verbal expression. This ultimate truth is that of universal emptiness (sunyata), regarded as the true nature of the phenomenal world, which has no independent substantiality.

To assert the truth of sunyata, Nāgārjuna, the 2nd/3rd-century founder of the Mādhyamika (Middle View) school, expounded the two aspects of truth: the empirical truth (*saṃvṛti-satya*) and the ultimate real truth (*paramārtha-satya*). Ultimate truth is beyond word and thought and can be positively grasped only by intuition. Empirical truth, on the other hand, is based upon knowledge of the external world by means of verbal designation. In the final analysis, however, phenomenal existence has no independent substantiality corresponding to the words used to describe it. Such existence, as asserted by realists, is merely fictitious.

The Mādhyamika doctrine of the two aspects of truth had a great influence upon other philosophical schools, including non-Buddhist traditions. Śankara, the 8th-century Hindu philosopher of the Advaita Vedānta school, among others, adopted the doctrine into his system, which led his opponents to call him a crypto-Buddhist.

San, also called BUSHMEN, an indigenous people of southern Africa, related to the Khoikhoin, or Hottentots. They live chiefly in Botswana, Namibia, and northwest South Africa. Bushmen is an anglicization of the Dutch, or Afrikaner, name for them; *san* (plural) or *sa* (singular) is the Khoi name, which is now favoured by anthropologists.

Formerly, the San were thought to be readily identifiable by physical features, language, and culture. First, by the physical reckoning, the San were identified entirely from external features: light-coloured skin with a tendency to wrinkle; dark hair, tightly coiled in small spirals; small, broad heads; flattish faces and broad noses; prominent buttocks. None of these features, however, is exclusive to the San; and in other, not directly observable features (such as blood-groups), the San have been shown to be similar both to the Khoikhoin and to the Bantu-speaking peoples. Second, the relations among the San languages are unclear, and some San even speak Khoi languages. Third, most of the surviving San have been restricted—by European settlement or by pressure from tribal Africans of other stock—to unattractive semiarid areas, so that many of them have to work, temporarily or permanently, for wages on European farms or to continue in a longstanding kind of client relationship with the other Africans (especially the Tswana), whom they serve as hunters, cattle herders, or labourers in return for provision of food, livestock, clothing, and tobacco. Therefore they no longer fit easily into a distinct cultural category.

Nevertheless, a San culture did once exist, and among some groups still exists. It centred on the band, which might comprise several families (totaling between 25 and 60 persons). The elementary family within the band is composed of husband, wife, and their dependent children, but it is occasionally enlarged by polygynous marriage. Often all band members are related. Considerable interaction through trade, visiting, and particularly marriage may take place between bands; and kinship, both real and fictional, ramifies widely, thus facilitating the frequent movement of people from band to band, so that the composition of any particular band may fluctuate considerably in time. Each band is an autonomous, somewhat leaderless unit within its own territory, and in most bands influence rather than authority is exercised in particular situations by skilled hunters or older men.

The individual shelters of the San are lightweight, semicircular structures of branches laced with twigs and thatched with grass; their equipment is portable; their possessions few and light. Woods, reeds, and animals (and, formerly, stone) are the main raw materials from which their skin clothing, carrying bags, water containers, and hunting weapons are made. For hunting they use bows and poisoned arrows, snares, throwing sticks, and sometimes spears. They have probably always fed on game, wild vegetables, fruits, nuts, and insects; as game becomes less plentiful, they are forced to rely increasingly on gathering or, ultimately, into abandoning their old means of subsistence altogether.

The religions of two San groups, the !Kung

and the G/wi, seem to be similar, in that both groups believe in two supernatural beings, one of which is the creator of the world and of living things, whereas the other has lesser powers but is partly an agent of sickness and death. The !Kung and the G/wi also believe in spirits of the dead but do not practice the cult of ancestors familiar among the Bantu.

In the late 20th century some 42,000 San lived in the western Kalahari districts of Botswana. Namibia had about 35,000, and it is estimated that another 9,000 lived in southeastern Angola. A small number were nomadic.

San, Saya, Saya also spelled HSAYA, original name YA GYAW (b. Oct. 24, 1876, East Thayetkan, Shwebo district, Burma [Myanmar]—d. Nov. 16, 1931, Tharrawaddy), leader of the anti-British rebellion of 1930–32 in Burma (Myanmar).

Saya San was a native of Shwebo, a centre of nationalist-monarchist sentiment in north-central Burma that was the birthplace of the Konbaung (or Alaungpaya) dynasty, which controlled Myanmar from 1752 until the British annexation in 1886. He was a Buddhist monk, physician, and astrologer in Siam (Thailand) and Burma before the rebellion. Saya San joined the extreme nationalist faction of the General Council of Burmese Associations led by U Soe Thein. Saya San organized peasant discontent and proclaimed himself a pretender to the throne who, like Alaungpaya, would unite the people and expel the British invader. He organized his followers into the "Galon Army" (Galon, or Garuḍa, is a fabulous bird of Hindu mythology), and he was proclaimed "king" at Insein, near Rangoon (Yangon), on Oct. 28, 1930.

On the night of December 22/23 the first outbreak occurred in the Tharrawaddy district; the revolt soon spread to other Irrawaddy delta districts. The Galon army rebels, like the Boxers of China, carried charms and tattoos to make themselves invulnerable to British bullets. Armed only with swords and spears, Saya San's rebels were no match for British troops with machine guns.

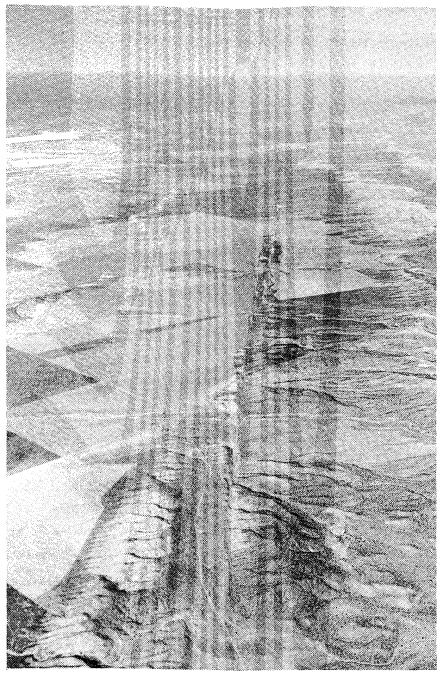
As the revolt collapsed, Saya San fled to the Shan Plateau in the east. On Aug. 2, 1931, however, he was captured at Hokho and brought back to Tharrawaddy to be tried by a special tribunal. Despite the efforts of his lawyer, Ba Maw, he was sentenced to death in March 1931 and was hanged at Tharrawaddy jail. The revolt was crushed, but more than 10,000 peasants were killed in the process.

Although Saya San's revolt was basically political (it was the last genuine attempt to restore the Burmese monarchy) and possessed strong religious characteristics, its causes were basically economic. The peasants of southern Burma had been dispossessed by Indian moneylenders, were burdened with heavy taxes, and were left penniless when the price of rice dropped in an economic depression. Widespread support for Saya San betrayed the precarious and unpopular position of British rule in Burma.

San Agustín de Talca (Chile): *see* Talca.

Ṣān al-Ḥajar al-Qiblīyah (Egypt): *see* Tanis.

San Andreas Fault, major fracture of the Earth's crust, trending northwestward through southern and northern California, U.S., for 650 miles (1,050 km) and passing seaward in the vicinity of San Francisco. Movement along this transform fault is of the strike-slip type and is characterized by occasional large earthquakes originating near the surface along the path of the fault. The disastrous San Francisco quake of 1906 and the less serious earthquake of 1989 were both caused



San Andreas Fault looking northwest from Elkhorn Hills, California

John S. Shelton and Robert C. Frampton

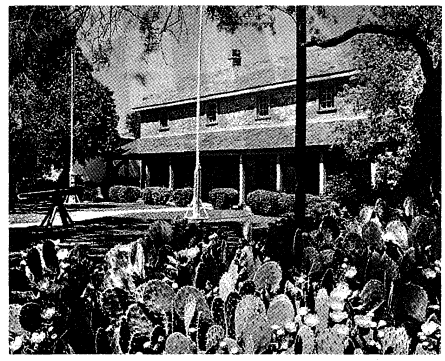
by movement along the fault. According to the theory of plate tectonics, the San Andreas results from the abutment of two major plates of the Earth's crust, namely the Northern Pacific and the North American. Along the fault, the Northern Pacific plate is sliding past the North American plate in a northerly direction, at a relative movement of about 1 cm (0.4 inch) per year over geologic time, though the rate of movement has been 4 to 6 cm (1.6 to 2.4 inches) per year over the past century. Parts of the fault line moved as much as 6.4 m (21 feet) during the 1906 earthquake. The San Francisco Bay Area Rapid Transit System (BART) bored a tunnel right through the fault zone, and various cities, towns, and housing developments lie on or near it.

San Andres Mountains, segment of the southern Rocky Mountains, extending southward for 150 miles (241 km) through Socorro, Sierra, and Dona Ana counties in southern New Mexico and parallel to the Rio Grande. Salinas Peak (9,040 feet [2,755 m]) is the highest point in the range. The mountains are dry and barren and include the White Sands Missile Range, where the world's first atomic bomb was exploded on July 16, 1945, at Trinity Site. The White Sands National Monument lies just to the east.

San Andrés Tuxtla, formerly LOS TUXTLAS, city, southeastern Veracruz *estado* ("state"), south-central Mexico. It lies on the slopes of San Martín volcano, along the Tuxtla River, at an elevation of 1,181 feet (360 m) above sea level. The town was founded by Ixtlecos Indians in 1664, after the eruption of the volcano, and was made a city in 1893. Corn (maize), high-quality tobacco, sugarcane, and fruits all flourish in the hot, rainy climate, but San Andrés Tuxtla is best known as the centre of Mexico's most important bean-growing region. Cattle are also raised in the vicinity, and handicrafts made of palm fronds are manufactured in the city. It is a rail terminus and is on the coastal highway linking Veracruz, to the northwest, and Coatzacoalcos, to the southeast. The city also has an airfield. Pop. (1980) 40,412.

San Andrés y Providencia, island intendency, Colombia, consisting of the Andrés and Providencia islands and several small keys in the Caribbean Sea, 440 miles (710 km) northwest of Cartagena, Colom., and 110 miles (180 km) off the coast of Nicaragua. Three of the keys are also claimed by the United States. The islands were settled in 1629 by English Puritans and later by planters, woodcutters, and black slaves from Jamaica. They were awarded to Spain in 1786 and became part of Colombia in 1822. The intendency has an area of 17 square miles (44 square km). The population remains English-speaking and Protestant. The main industry is tourism. San Andrés produces coconuts, copra, and oranges; Providencia relies on subsistence agriculture. The islands are served by several international airlines. Pop. (1985) 35,936.

San Angelo, city, seat (1875) of Tom Green county, west-central Texas, U.S. It lies 91 miles (146 km) southwest of Abilene. Founded in 1869 near Fort Concho (now a museum) at the confluence of the North, South, and Middle Concho rivers, it was first known as Over-the-River but was renamed Santa Angela (later masculinized) for a sister-in-law of Bart J. DeWitt, one of the founders. The rivers have there been impounded (for irrigation and flood control) to form Twin Buttes Reservoir and other lakes. The city is a major wool and mohair market and holds a wool pageant each June. Livestock raising is important, and a stock show and rodeo are held annually. Angelo State University was opened



Fort Concho Museum, San Angelo, Texas

By courtesy of the Texas Highway Department

as a state college in 1928. Goodfellow Air Force Base and light-industrial development help to diversify the city's economic structure. San Angelo's manufactures include petroleum products, meat and dairy products, cottonseed products, shoes, boots, saddles, Western-style jewelry, printing and binding, metal products, and stone, clay, and glass products.

The town of Paint Rock, 30 miles (50 km) east of San Angelo, was named for the approximately 1,500 Indian pictographs on a nearby river bluff; the pictographs date from prehistoric times to the appearance of Christian missions in the vicinity. Inc. 1903. Pop. (1988 est.) city, 87,113; metropolitan area (MSA), 99,300.

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San Antonio, city, seat (1837) of Bexar county, south-central Texas, U.S., at the headwaters of the San Antonio River on the Balcones Escarpment. One of the largest cities in Texas, it is the focus of a metropolitan area that includes Universal City, Castle Hills, Alamo Heights, Leon Valley, Schertz, and Windcrest. It was founded May 1, 1718, when a Spanish military expedition from Mexico established a presidio (garrison) and a mission on the site of a Coahuiltecan Indian village. The site, on the river's west bank, was a stopping place on the trail through the Texas wilderness to French trading posts in Louisiana. In 1731



San José Mission, near San Antonio, Texas
George Curtsinger

settlers from the Canary Islands laid out a town near the Spanish presidio, and together with the Mission San Antonio de Valero (also established in 1718 across the river) it became known as San Antonio de Béjar (Béxar). The mission, called the Alamo (Spanish: "cottonwood tree"), was secularized in 1794 and became a military post.

At the time of the Mexican Revolution of 1821, San Antonio was, along with Goliad and Nacogdoches, one of three established Spanish communities in Texas. In August of that year, Stephen F. Austin arrived in the city, then seat of the Spanish government in Texas, and obtained a permit for the admission of 300 U.S. families into the territory. During the Texas Revolution (1836), the high moment in Texan history was the siege of the Alamo, when its defenders were massacred by Mexican troops under General Santa Anna. At that time it was still the foremost city of Texas, with 2,500 inhabitants. During the last decades of the 19th century San Antonio, as the starting point for the Chisholm Trail, became a major cattle centre, where herds were assembled for the overland drives to the railheads in Kansas.

The city's modern character is flavoured with Spanish influence. It is 150 mi (241 km) from the Mexican border at Laredo, on one of the most travelled routes to Mexico. Much of its population is of Spanish-Mexican descent, and many are Spanish-speaking or are bilingual.

Military installations largely account for San Antonio's rapid growth after 1940. Ft. Sam Houston (1879), inside the city, is the headquarters of the 5th Army and site of the Academy of Health Sciences, the army's basic school for medical personnel. Also in the city is the Air Force Aerospace Medical Center. Nearby are four air bases. Kelly, the oldest (established 1917), was the advanced flight-training centre of the Air Force but is now concerned with logistics, security, and other services. Adjacent to Kelly is Lackland, a training base for recruits and officer candidates. Randolph Air Force Base, 19 mi northeast, is headquarters of the Air Training Command. Brooks, 7 mi south-southeast, is the site of the Aerospace Medical Division for postgraduate training and advanced research. San Antonio's economy is now well balanced between government, business, manufacturing, education, and tourism.

The city is the seat of St. Mary's University (1852), Trinity University (1869), Incarnate Word College (1881), Our Lady of the Lake University (1896), San Antonio College (1925), and the University of Texas at San Antonio (1973). Tourist sites include the Alamo and other Franciscan missions (notably San José [1720], a few miles south), the reconstructed Spanish Governor's Palace, La Villita (a section of reconstructed Spanish settlement), and the formally channelled and landscaped San Antonio River, which winds through the downtown area. HemisFair, San Antonio's 1968 world's fair, linked to the central city by canal, is now used as an exhibit–meeting–cultural–sporting-events complex; its Institute of Texan Cultures traces nationalities of Texas. San Fernando Cathedral (completed 1873) is the seat of a Roman Catholic archbishopric. The Marion Koogler McNay Art Institute contains a notable collection of modern French paintings, and the Witte Memorial Museum houses Texan artifacts. The city's annual fiesta is held in April. Inc. 1809. Pop. (1980) city, 785,410; (1982 est.) metropolitan area (SMSA), 1,141,000.

San Antonio, Cape, Spanish CABO SAN ANTONIO, cape, Pinar del Río province, western Cuba. Forming the westernmost extremity of the island, its point juts out between the Golfo (gulf) de Guanahacabibes on the north and Ensenada (bay) de Corrientes on the south. Approximately 150 mi (240 km) to the west, across the Yucatán Channel, lies Cabo Catoche, on Mexico's Yucatán Peninsula. A lighthouse is situated on Cabo San Antonio.

San Antonio de Ibarra (Ecuador): *see* Ibarra.

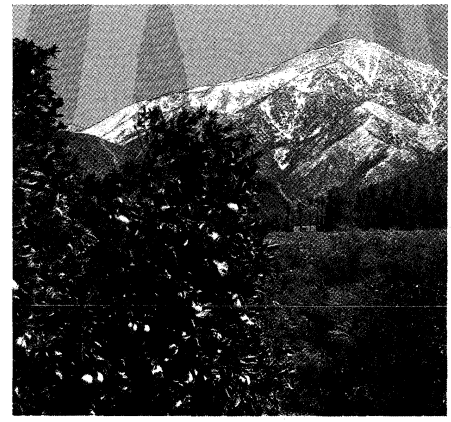
San Antonio de los Baños, city, west central La Habana province, west central Cuba. Lying on the Río San Antonio de los Baños, the settlement prospered and became a health resort because of its thermal springs. It is also a commercial and manufacturing centre for the surrounding agricultural lands, which produce tobacco, sugarcane, and pineapples. Cigars, clothes, and yeast are manufactured, and a sugar refinery is located nearby. Havana, 20 mi (32 km) to the northeast, can be reached by railroad and highway. The city has a military airport. Pop. (1981 prelim.) 28,137.

Articles are alphabetized word by word, not letter by letter

San Antonio Zoological Garden and Aquarium, one of the finest animal collections in the southwestern United States. Founded in 1914, the zoo and accompanying aquarium are located in San Antonio, Texas, and occupy a 20-hectare (50-acre) site with natural springs and rock cliffs. Here more than 2,600 specimens of approximately 700 terrestrial and aquatic species are bred and exhibited. The zoo's bird collection is one of the largest in North America. It includes the first flamingo colony to breed in captivity and a pair of the endangered whooping crane. The zoo also has 30 species of rare antelope. Another notable feature is the zoo's African animal exhibit, composed of outdoor enclosures that simulate the natural habitat of the specimen displayed (*e.g.,* Mt. Kenya and the North African highlands).

San Bernardino, central city of the San Bernardino–Riverside–Ontario metropolitan complex, seat (1853) of San Bernardino County, southern California, U.S., at the base of the San Bernardino Mountains. The site, which was named by Spanish missionaries for St. Bernardino of Siena, was sold to Mormons who laid out a town in 1852. It developed as a trade centre chiefly for the surrounding citrus groves and vineyards. Aerospace and electronic industries, the Kaiser Steel Corporation (Fontana plant), Santa Fe Railroad shops, and Norton Air Force Base are now the economic mainstays. San Bernardino Valley (junior) College was established in 1926 and California State College at San Bernardino in 1960. The city is headquarters for the San Bernardino National Forest and the distribution point for the Lake Arrowhead resort area. The National Orange Show is an annual (March) event. Inc. city, 1869. Pop. (1980) city, 118,057; (1982 est.) Riverside–San Bernardino metropolitan area (SMSA), 1,679,800.

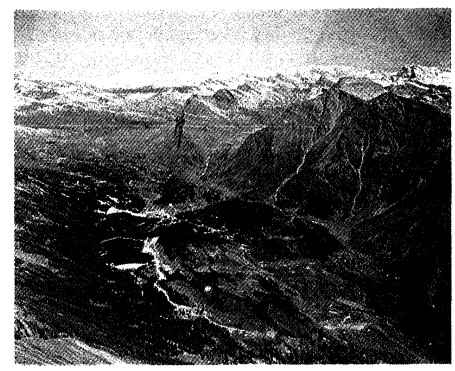
San Bernardino Mountains, segment of the Pacific Coast Ranges, extending southeastward for 55 mi (90 km) from Cajon Pass to San Gorgonio Pass in southern California, U.S.



The snow-capped San Bernardino Peak seen from an orange grove near the city of San Bernardino, southern California
Josef Muench

The two main peaks, San Bernardino (10,630 ft [3,240 m]) and San Gorgonio (11,502 ft; highest point in southern California), lie east of the city of San Bernardino. Much of the range is embraced by a division of the San Bernardino National Forest, where the main activities are tourism and outdoor recreation. The mountains also serve as an important watershed for the surrounding area.

San Bernardino Pass, German SANKT BERNHARDINPASS, Italian PASSO DI SAN BERNARDINO, mountain pass (6,775 ft [2,065 m]), in the Lepontine Alps of Graubünden canton, southeastern Switzerland. Although



San Bernardino Pass, Switzerland
Photo Research International

the pass was not mentioned until 941, it is believed to have been in use since prehistoric times. The road over the pass connects the villages of Splügen and Hinterrhein in the Hinterrhein River Valley to the north with the towns of Mesocco and Bellinzona in the Moesa River Valley to the south. The village of San Bernardino (just south of the pass) is a popular year-round resort. A tunnel 4 mi (6 km) long beneath the pass was opened in 1967, making travel through the region much easier. The pass was named for St. Bernardino of Siena, who preached in the area early in the 15th century.

San Blas, traditional region, eastern Panama, stretching about 100 miles (160 km) along the Caribbean Sea from the Colombian border to the Gulf of San Blas. The narrow strip of land includes the San Blas (formerly Mulatas) Archipelago. Agriculture—chiefly coconuts, yams, and plantains—and fishing are the principal economic activities in San Blas. The population consists largely of Cuna Indians. Transportation in the region is almost entirely by water or by air.

San Buenaventura (California, U.S.): *see* Ventura.

San Carlo alle Quattro Fontane (Italian: "Saint Charles at the Four Fountains"), also called SAN CARLINO, influential Baroque church in Rome that was designed by Francesco Borromini. It was commissioned in 1634 and was built during 1638–41, except for the tall facade, which was added in about 1667. Built to fit in a cramped and difficult site, the church has an unusual and somewhat irregular floor plan in the shape of a Greek cross defined by convex curves. The facade is similarly undulating in plan, and this effect was subsequently adopted by other Baroque architects in their church designs. The unifying design feature in the interior is the use of the triangle (a motif for the Trinity).

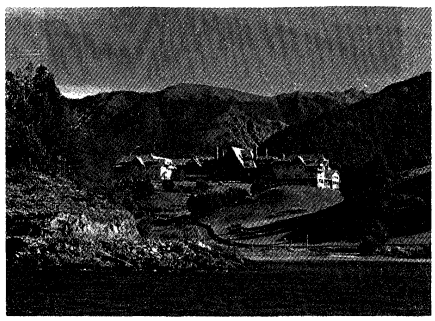
San Carlos, city, south-central Nicaragua. It lies at the extreme southeastern corner of Lake Nicaragua near the Costa Rican border, where the San Juan River begins its journey to the Caribbean Sea. With its strategic location, San Carlos served as a fort to guard against pirate attacks during the colonial period. Although the city was severely damaged by fire in 1948, it is still a port and commercial centre of some note; lumbering and livestock raising is carried on in the vicinity. San Carlos is accessible by road from Los Chiles, Costa Rica, and small steamers ply the lake and river. Pop. (1985 est.) 5,103.

San Carlos, chartered city, northeastern Negros island, Philippines. Set in an area of concentrated sugarcane production, it is the site of a large mill established in 1912. Frequent ferry service across Tanon Strait from Toledo on the island of Cebu brings large numbers of migrant workers to the surrounding sugar plantations. The city has deepwater port facilities and also has an airport. Inc. city, 1960. Pop. (1980) 91,627.

San Carlos, chartered city, west-central Luzon, Philippines. Founded in 1587 by Dominicans, it was named in 1718 for Saint Charles Borromeo. San Carlos was organized as a city in 1966. It is a pottery-making centre and also produces articles made from bamboo. Rice and corn (maize) are the major crops grown in the surrounding area. It is situated along the Manila-North Railroad, 10 miles (16 km) southeast of Lingayen. Pop. (1980) 101,243.

San Carlos, city, capital of Cojedes state, northwestern Venezuela. The city lies on the Tirgua River, at the base of the central highlands and near the Llanos (plains) region. Founded in 1678 by Capuchin missionaries, San Carlos served as capital of Falcón state prior to the separation of Cojedes and Portuguesa states. It is the commercial and marketing centre of an agricultural and pastoral region in which corn (maize), sugarcane, and rice are cultivated; cattle raising is also important. San Carlos is on the highway linking Acarigua, in Portuguesa state, 55 miles (90 km) to the west-southwest, and Valencia, capital of Carabobo state, 60 miles (95 km) to the northeast. Pop. (1987 est.) 51,524.

San Carlos de Bariloche, also called BARILOCHE, resort town, Río Negro province,



Hotel near Lake Nahuel Huapí in San Carlos de Bariloche, Arg.
Jerry Cooke—Photo Researchers

western Argentina. It lies on the southeastern shore of Lake Nahuel Huapí, in the Andean lake district. Chalet-type building construction, introduced in 1905 by Swiss immigrants, provides an appropriate setting for skiing in the winter months on the slopes of the nearby V. López and Otto peaks, while the many lakes and streams afford opportunities for fishing. The picturesque scenery of the area, designated as a national park (1934), inspired the setting for Walt Disney's film *Bambi*. Tourism is the main economic activity. Bariloche was the scene of a meeting in 1960 between President Dwight D. Eisenhower of the United States and President Arturo Frondizi of Argentina that resulted in the Declaration of Bariloche, a pledge of friendship between the two nations. Pop. (1980 prelim.) 48,222.

San-ch'ung, *shih* (municipality), T'ai-pei *hsien* (county), northern Taiwan. It lies west of Taipei city, in the northern part of the western coastal plain. Situated on the western bank of the Tan-shui River, the city developed as a major commercial centre for a surrounding fertile agricultural region that produces rice, sugarcane, and tea. Food canning, woodworking, and chemical, textile, and machinery manufacturing are the major industries in the municipality, and clay and coal are extracted nearby. San-ch'ung is a western suburb and serves as a residential area for Taipei city, to which it is linked by the T'ai-pei Bridge across the Tan-shui River. The North-South freeway and the West Line railway connect San-ch'ung with Chi-lung (Keelung) to the northeast and with Pan-ch'iao to the south. Grass Mountain Park, 8 miles (13 km) north of San-ch'ung, is a major tourist attraction. Pop. (1985 est.) 353,957.

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San Clemente, city, Orange County, southern California, U.S. It lies along the Pacific Ocean, midway between San Diego and Los Angeles. Founded in 1925 as a real-estate development, the site was named for offshore San Clemente Island, which was named by the Spanish explorer Sebastián Vizcaíno to honour St. Clement. Chiefly residential, the city gained national prominence in 1969 when President Richard M. Nixon purchased property there for use as a summer White House. Nearby are San Clemente State Beach, San Onofre Nuclear Generating Station and Information Center, and Camp Pendleton (a U.S. Marine base). Inc. 1928. Pop. (1985 est.) 30,748.

San Cristóbal, in full BENEMÉRITA DE SAN CRISTÓBAL, city, south-central Dominican Republic. It is situated in the coastal lowlands close to the Caribbean Sea. Founded by Spaniards in 1575, when gold was discovered in the area, it was the site of the signing of the Dominican Republic's first constitution, in 1844, and of the birth of dictator Rafael Trujillo Molina. San Cristóbal is now a prosperous commercial centre for its agricultural hinterland, which produces rice, coffee, sugarcane, fruit, potatoes, tubers, and livestock. The city lies on the paved highway linking Santo Domingo, the national capital, with Comendador, near the Haitian border. Pop. (1981 prelim.) 58,520.

San Cristóbal, also called MAKIRA, formerly CRISTOVAL, island in the Solomon Islands, southwestern Pacific Ocean, 40 miles (64 km) southeast of Guadalcanal. The island is about 80 miles (130 km) long, has a maximum width of 25 miles (40 km), and has an area of 1,206 square miles (3,125 square km). It is fairly rugged, with a central mountain rising to 4,100 feet (1,250 m). Islets off the northern coast are Uki Ni Masi Island and the Olu Malau Islands (Three Sisters Islands); Santa Ana and Santa Catalina islands are off the southeastern tip. San Cristóbal has several copra plantations and trading stations. Kirakira on the north coast is the largest settlement. The island is sometimes called Makira, which is the name of a mission post and harbour on the northwest coast. Pop. (1986 est.) San Cristóbal and adjacent islands, 20,100.

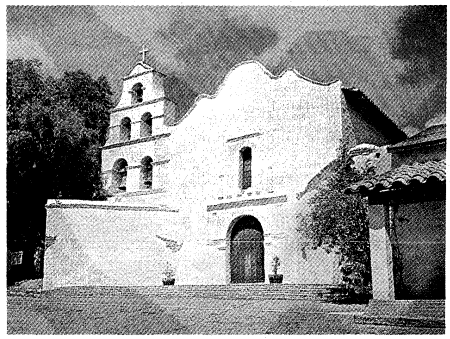
San Cristóbal, city, capital of Táchira state, western Venezuela. Situated in an isolated intermontane basin of the Mérida Mountains, at 2,700 feet (820 m) above sea level, the city occupies three sloping alluvial terraces overlooking the Torbes River. Founded in 1561, it retains a colonial atmosphere despite its being the largest of the cities in the so-called Andean Region of Venezuela. It was heavily damaged by an earthquake in 1875. The commercial centre for the surrounding agricultural lands, which produce corn (maize), cassava, pineapple, sugarcane, and coffee, San Cristóbal has some industry, including textile mills, tanneries, a shoe factory, cigarette factories, and a cement plant. It is also an outstanding transportation centre that is served by several main roads, including the Pan-American Highway, which runs 500 miles (800 km) northeast to Caracas. Pop. (1987 est.) 234,905.

San Cristóbal de Las Casas, city, central Chiapas state, southeastern Mexico. It is situated on the central plateau of Chiapas, at 6,900 feet (2,100 m) above sea level. Founded *c.* 1527 as Villa Real, the settlement was renamed on five occasions before acquiring its present name, which honours Bartolomé de Las Casas, the first bishop of Chiapas. Many colonial buildings remain in the city, the most notable of which is Santo Domingo church (1560). The city served as the state capital from its founding until 1892, when its administrative functions were transferred to Tuxtla, 35 miles (60 km) to the west. Agriculture, principally the cultivation of wheat, potatoes, and corn (maize), together with forestry provide much of the city's income. Tanning, distilling, flour milling, canning, lumbering, and handicrafts are the principal industries. It is located on the portion of the Pan-American Highway linking Mexico City with Guatemala City, and it has an airfield. Pop. (1980) 60,550.

San Cristóbal Island, also called CHATHAM ISLAND, one of the easternmost of the Galápagos Islands in the eastern Pacific Ocean. San Cristóbal Island lies approximately 600 miles (965 km) west of Ecuador. Originally named by English pirates for William Pitt, earl of Chatham, its official Ecuadorian name is Isla San Cristóbal. With an area of 195 square miles (505 square km), San Cristóbal is the most populated and fertile island of the archipelago. Volcanic in origin, with its highest point 4,490 feet (1,369 m), San Cristóbal is the only island of the Galápagos group that has a regular water supply (from rainwater that gathers in broken craters). The settlements

of San Cristóbal (the nominal capital of the Galápagos) and Puerto Baquerizo are located on Bahía de Naufragio (Wreck Bay). Charles Darwin, the English naturalist, landed at San Cristóbal in 1835 and compiled data that he later incorporated into his *Origin of Species.* A monument to Darwin was erected in 1935. Formerly a penal colony, Puerto Baquerizo is now an Ecuadorian military base and the export centre for the island's products, including sugar, coffee, cassava, cattle, fish, and lime. Pop. (1980 est.) 2,781.

San Diego, Pacific port, city, and important U.S. military and naval base, seat (1850) of San Diego County, southern California, U.S., on San Diego Bay (bridged to Coronado). Sighted in 1542 and named San Miguel by



Mission San Diego de Alcalá, San Diego, Calif.
Ray Atkeson—EB Inc.

Juan Rodríguez Cabrillo, the area was renamed San Diego de Alcalá de Henares in 1602 by Sebastián Vizcaíno. Gaspar de Portolá founded a presidio there on July 16, 1769, and on the same day Father Junípero Serra dedicated the first of the California missions (restored, 1931). Settlement was confined inside the presidio walls until control was assumed by Mexico in 1834 and a pueblo was built. After American conquest (1846) the village was incorporated in 1850 as Old Town but lost its charter two years later. The new city of San Diego was laid out 3 mi (5 km) south of the presidio by Alonzo E. Horton in 1867 and growth was assured by the promotion of its salubrious climate and the arrival of the Santa Fe Railroad in 1884.

Landlocked San Diego Bay (22 sq mi [57 sq km]), a natural deepwater harbour sheltered by overlapping peninsulas (Point Loma, west; Coronado, east), is home port for a commercial fishing fleet, headquarters of the 11th U.S. Naval District, and a base of operations for Army, Marine, and Coast Guard installations. The bay, one of the great natural harbours of the world, is a first port of call for coastal and foreign shipping. It functions as an oulet for large amounts of cotton grown in the Imperial Valley. Industrial development is dominated by aerospace, electronics, and shipbuilding, and the city is the main commercial outlet for the farm produce of southern California. Equable climate and recreational facilities have encouraged a considerable tourist trade. Before World War II, climatic factors attracted San Diego's principal industry, aircraft construction, and later stimulated an increase of management personnel and the establishment of important new industries, such as electronics and rocketry. San Diego is one of the leading agricultural counties in the United States in the value of production. Citrus, avocado, truck garden crops and livestock are the major products. Nearby beach resorts, Mission Bay Aquatic Park, restored Old Town, Cleveland National Forest (headquartered in the city), and Mexican border attractions help make tourism a major economic factor. Balboa Park contains the San Diego Zoo, one of the world's largest.

California State University at San Diego (1897); the University of San Diego (1949); California Western University (founded in 1924 as Balboa University); the University of California and San Diego (established in 1958 and including the Scripps Institution of Oceanography, founded in 1903); and two junior colleges serve the city. Cabrillo National Monument was established in 1913 and includes Point Loma Lighthouse (built in 1855). Inc. 1850. Pop. (1980) city, 875,504; metropolitan area (SMSA), 1,861,846; (1982 est.) 1,961,800.

San Diego Zoological Garden, largest animal collection in the world. This municipal zoo, located in San Diego, Calif., U.S., was founded in 1922 and is administered by the city's zoological society. It occupies a 40.5-hectare (100-acre) site in Balboa Park amid high mesas that are divided by steep canyons. This terrain is ideal for the zoo because hoofed stock can be paddocked on the mesas and carnivores kept in barless grottoes in the canyons. Another noteworthy feature of the zoo is its landscaping. More than 2,500 species of exotic plants are maintained on the grounds, adding atmosphere and frequently providing an element of the natural diet for various animal species. The zoo is famous for its breeding colony of koalas, the only one outside of Australia. The koalas thrive largely because their sole food, eucalyptus, grows abundantly on the zoo grounds. The zoo also maintains successful breeding groups of bonobos (pygmy chimpanzees), Galapagos tortoises, okapis, and bongo antelopes. It has many interesting exhibits, including a large bald eagle flight aviary and a walk-through tropical rain forest. In addition, the zoo serves as a repository for the studbooks of the orangutan and the Arabian oryx.

In 1972 the San Diego Zoological Society opened the San Diego Wild Animal Park as a complement to the San Diego Zoo. The park is situated on 728 hectares (1,800 acres) in the San Pasqual Valley in the northern part of the city. A series of moats is used to separate species that are incompatible, and an 8-kilometre (5-mile) monorail system enables visitors to view the various habitat groups, which include those of Asia and East and South Africa. Among the many animal species in the park are the endangered Arabian oryx, addax, and Eld's deer, as well as the largest captive herd of white rhinoceroses outside of South Africa.

San Diegueño (people): *see* Diegueño.

San Felipe, capital of San Felipe province, Valparaíso region, central Chile, on the Río Aconcagua, in the Vale of Chile, at 2,087 ft (636 m) above sea level. Founded in 1740 as San Felipe el Real, it is the centre of an agricultural (alfalfa, grapes, fruits, vegetables, and cereals) and mining (copper and gold) area. It is connected by the Transandine Railway with Valparaíso, 80 mi (130 km) southwest, and by rail and road to Mendoza, Arg., and Santiago. San Felipe is a major centre of trade between Chile and Argentina. Pop. (1982 prelim.) 31,779.

San Felipe, historic town, Austin County, southeastern Texas, U.S., on the Brazos River, 45 mi (72 km) west of Houston. Known as the "birthplace of Anglo-American settlement in Texas," it was founded in 1823 as headquarters for the colony of Steven F. Austin (the father of Texas), who there first employed the Texas Rangers as a defense force. In 1829 the colony, then known as San Felipe de Austin, was where the first English newspaper in Texas, the *Gazette,* was published and where one of the first English-language schools was opened. Conventions petitioning for independence from Mexico were held in the Town Hall (now demolished) in 1832 and 1833, and at the Consultation of 1835 several Anglo-American municipalities met to plan a provisional government and organize the Texas Revolution. In March 1836 San Felipe was burned by retreating Texans under Capt. Mosely Baker, prior to occupation by General Santa Anna's invading Mexican army. The town was rebuilt after the Texan victory at San Jacinto (April 1836) but declined after Belleville became officially established as the county seat in 1848. The Steven F. Austin State Park, near an old ferry crossing on the river, includes a replica of Austin's log home and a well dug by the colonists. San Felipe remains a small farming community with narrow roads that bear the names given by the colonists in the 1820s. Pop. (1980) 532.

San Felipe, city, capital of Yaracuy state, northwestern Venezuela, on the flanks of the eastern portion of the Segovia Highlands, 1,800 ft (550 m) above sea level. San Felipe is a commercial and manufacturing centre in the fertile Río Yaracuy Valley. Much of the sugarcane, cotton, cacao, corn (maize), fruit, rice, and hides produced there are sent to Barquisimeto or exported via Puerto Cabello. Sugar mills and distilleries are located in the city, and there are copper deposits in the vicinity. San Felipe is on the Pan-American Highway, 50 mi (80 km) northeast of Barquisimeto and 50 mi west-southwest of Puerto Cabello. Pop. (1981 est.) 56,000.

San Felipe de Puerto Plata (Dominican Republic): *see* Puerto Plata.

San Fernando, *cabecera* (principal built-up area) and *partido* (political subdivision) of Gran (Greater) Buenos Aires, Arg., north of the city of Buenos Aires, in Buenos Aires province, on the Río de la Plata estuary. Colonization of the area began with the second and permanent founding of Buenos Aires (1580). During this period the region was known as Costa de Monte Grande. In 1780 the parish of Nuestra Señora del Puerto de Las Conchas (Our Lady of the Port of the Shells) was established. A settlement, founded in 1806 as San Fernando de Buena Vista, later became a part of the *partido* established in 1821.

The *partido* covers 357 sq mi (924 sq km) and is the largest in Gran Buenos Aires. It is separated into two noncontiguous regions. The much smaller and southernmost of these is totally within the Gran Buenos Aires urban area and is bordered by the Río Luján and the Río de la Plata (northeast) and the *partidos* of San Isidro (southeast) and Tigre (southwest and northwest). The larger, northern region lies totally outside the urban area to the north of Tigre *partido,* and comprises the marshy deltaic mouth of the Río Paraná. Besides the *cabecera,* San Fernando, the major localities are Victoria and Virreyes.

The town of San Fernando was given city status in 1909. It is a river port and centre for cattle raising. Industries in the present-day *partido* process dairy products, fish, and fruit. Furniture is manufactured from lumber produced by the region's sawmills, and paper products are made. Quarrying is also important.

The southern region of San Fernando has become part of the north-northwestern suburban area of Gran Buenos Aires. The density of development (374 persons per sq mi [145 persons per sq km]) is the lowest of all the *partidos* because of the relatively unpopulated northern region. Three railway lines, the national highway system, and a local airport connect the southern portion of the *partido* to other parts of Argentina. The sparsely populated marshlands of the northern region have few transportation and communication links. Pop. (1980) *partido,* 133,624.

San Fernando, capital of Colchagua province, O'Higgins region, central Chile, lying on

the Rapel River, at 1,112 feet (339 m) above sea level, in a fertile longitudinal valley. Founded in 1742, it became the provincial capital in 1840. San Fernando's rodeos rank among Chile's best, for the city is in the heart of *huaso* ("cowboy") country. In addition to livestock, the surrounding region yields wheat, forage crops, rice, legumes, and grapes. San Fernando is on the Pan-American Highway and on Chile's main longitudinal railroad, both of which have branches running 60 miles (97 km) westward to the coastal resort of Pichilemu. Pop. (1987 est.) mun., 49,810.

San Fernando, town, west-central Luzon, Philippines. Located on a bay of the South China Sea formed by a peninsula that ends in San Fernando Point, it served a tobacco- and rice-growing region as the northern terminus of the Philippine National Railway until the line was extended to Bacnotan in 1955. The town is on Luzon's main western coastal highway. Its outport, Poro, is the only national port of entry in northern Luzon; imported goods are received, and the region's commercially bundled tobacco leaves are exported. The city has a modern cathedral (1976) and a Chinese pagoda; nearby to the south are the ruins of a church built in 1674. Pop. (1989 est.) 82,797.

San Fernando, town, Cádiz *provincia,* in the *comunidad autónoma* ("autonomous community") of Andalusia, southwestern Spain, situated on a rocky island surrounded by salt marshes that line the southern shore of the Bay of Cádiz, south of Cádiz city. Founded in 1776, it was known as Isla de León until renamed (1813) in honour of Ferdinand VII during the Spanish War of Independence (Peninsular War). San Fernando is a Spanish naval headquarters; to the northeast are La Carraca arsenal and dockyard (founded 1790) and an observatory dating from the 18th century. Landmarks in the town include the 18th-century town hall, the Panteón de Marinos (1850), and a Roman bridge rebuilt in the 15th century. Salt is produced, stone is quarried, and there are some light industries. Pop. (1981) 78,845.

San Fernando, city and port of Trinidad island, in the Trinidad and Tobago group in the southern Caribbean. It lies at the western end of the Central Range of hills on the flat, shallow coast of the Gulf of Paria, 36 miles (58 km) south of Port-of-Spain. Trinidad's second largest city, its chief function is that of an administrative and trading centre for the southern half of the island. The city was once part of a settlement of Carib Indians and later a Capuchin mission. Its original site was part of a 1786 land grant. The city, named for King Ferdinand II the Catholic, of Aragon, was destroyed by fire in 1818. Rebuilt, it reached its present boundaries by 1846. It became a borough in 1853 and a city in the 1980s. The economy is based on its central position in the rich oil fields discovered in 1900. There is a large population of East Indians. Pop. (1987 est.) 33,100.

San Fernando, city and enclave within the city of Los Angeles, southern California, U.S., in the northeastern San Fernando Valley. Named for the Mission San Fernando Rey de España (established 1797 by Father Fermín de Lasuén), it was promoted in 1874 by two land developers, G.K. Porter and Senator Charles Maclay (who also founded a college of theology there in 1887). The San Fernando Reservoir (just northwest) is the southern terminus of the Los Angeles (Owens River) Aqueduct (1913), which irrigated the valley and gave the city a citrus economy. Later, diversified industries developed, chiefly electronics and clothing manufacture. Los Angeles Mission College was opened there in 1975. Inc. 1911. Pop. (1988 est.) 21,170.

San Fernando de Apure, city, capital of Apure *estado* ("state"), west-central Venezuela, on the Apure River. A Llanos (plains) port, it is vulnerable to flooding during the rainy season, despite its great distance from the sea, because it has an elevation of only 200 feet (60 m). Live cattle, beef, and cattle hides are the city's leading products. It is a port of call for small boats on both the Orinoco and the Apure rivers. A highway from Maracay in the central highlands reaches the Apure River opposite San Fernando. The city is not served by railroad but is an important air-traffic centre; much beef is flown into the heavily populated central highlands, particularly during flood seasons. Pop. (1989 est.) 84,179.

San Fernando de Montecristi (Dominican Republic): *see* Montecristi.

San Fernando del Valle de Catamarca (Argentina): *see* Catamarca.

San Fernando Valley, valley in southern California, U.S., lying northwest of downtown Los Angeles, bounded by the San Gabriel (north and northeast), Santa Susana (north), and Santa Monica (south) mountains, and the Simi Hills (west). The valley, originally an agricultural area, occupies 260 square miles (670 square km) and is the location of several Los Angeles suburban residential communities including Encino, North Hollywood, San Fernando, Studio City, Tarzana, Van Nuys, and Woodland Hills. Primary drainage is provided by the Los Angeles River. Several water-storage reservoirs and a large flood-control dam and reservoir are located there.

San Francesco, Franciscan monastery and church in Assisi, Italy, begun after the canonization in 1228 of St. Francis of Assisi and completed in 1253. The crypt was added in 1818, when the tomb of St. Francis was opened. The lower church is where the saint is buried, and it has frescoes by Giunta Pisano, Cimabue, Giotto, Pietro Lorenzetti, Simone Martini, and Andrea da Bologna. The upper church has frescoes representing stories of the life of St. Francis by Giotto and his followers, as well as wall paintings of Old and New Testament scenes by Cimabue, Pietro Cavallini, and Jacopo Torriti.

San Francisco, city, northeastern Córdoba *provincia,* north-central Argentina, on the border of Santa Fé *provincia* at the northern edge of the Pampa. Founded in 1886 and given city status in 1915, it has been a railroad centre since the 19th century and is a commercial and manufacturing centre for an agricultural (grain and flax) and pastoral area. Major products include linseed oil, batteries, leather goods, shoes, dairy products, agricultural tools, and frozen meat. San Francisco is linked by railroad and highway to Córdoba, the provincial capital, and to Buenos Aires. Pop. (1980) Greater San Francisco, 58,616.

San Francisco, byname FRISCO, city and port, coextensive with San Francisco county, northern California, U.S., located at the northern end of a peninsula between the Pacific Ocean and San Francisco Bay. San Francisco is a cultural and financial centre of the western United States and one of the country's most cosmopolitan cities.

A brief treatment of San Francisco follows. For full treatment (including a map), *see* MACROPAEDIA: San Francisco.

San Francisco lies on extremely hilly terrain. The largest of the city's hills are Twin Peaks, Mount Davidson, and Mount Sutro, all more than 900 feet (270 m) in height. The best known are Nob Hill, where the wealthy "nobs" built extravagant mansions in the 1870s, and Telegraph Hill, which once looked down on the Barbary Coast.

San Francisco is rainy and mild in winter, sunny and mild in spring, foggy and cool in summer, and sunny and warm in fall. The average mean minimum temperature is 51° F (11° C), the average mean maximum 63° F (17° C). The mean rainfall, almost all of which occurs between November and April, is about 21 inches (533 mm).

Economic life in San Francisco is dominated by service industries, many of which are geared toward the city's large numbers of tourists. Finance and international trade also constitute important parts of the economy. Three of the country's largest banks are headquartered there: Bank of America and the Wells Fargo and Crocker National banks. San Francisco is also the seat of the Pacific Stock Exchange. Imports and exports passing through the San Francisco Customs District make the combined ports of San Francisco Bay—San Francisco, Oakland, Alameda, Sacramento, and Stockton—one of the most active international ports in the country.

San Francisco's population is highly diverse, both ethnically and socially. The city has large communities of Asians, Italians, blacks, and Hispanics. Each of the city's neighbourhoods has its own distinctive character. The central business district has an impressive array of high-rise buildings, including the 52-story Bank of America building and the 48-story Transamerica Corporation building, with a spire that resembles an elongated pyramid. San Francisco's Chinatown, said to be the largest Chinese community outside Asia, is renowned for its colourful shops and restaurants. Other major neighbourhoods include Japan Town, the Fillmore district, Russian Hill, and the Mission district, the latter the home of Spanish-speaking immigrants from Mexico and Central America. The Marina district, in the northern part of the city, was heavily damaged during the earthquake of Oct. 17, 1989.

Universities in the Bay Area include the University of California, located across the bay in Berkeley, and Stanford University, down the peninsula in Palo Alto. Within San Francisco, institutions of higher education include San Francisco State University (formerly San Francisco State College) and the University of San Francisco, a Jesuit institution.

San Francisco has a well-developed transportation system. A rapid-transit system known as BART (Bay Area Rapid Transit), which opened in 1972, operates for a total of 75 miles (120 km) between San Francisco and the East Bay cities of Oakland and Berkeley. For automobile transportation, San Francisco is connected to the East Bay by the 8.25-mile-(13-kilometre-) long San Francisco–Oakland Bay Bridge (damaged in the earthquake of 1989) and to Marin county on the north by the famous Golden Gate Bridge. The city is also served by a major international airport, located 7 miles (11 km) south of the city–county limits. Area city, 46 square miles (120 square km); (1982 est.) San Francisco metropolitan area, 2,482 square miles (6,428 square km). Pop. (1988 est.) city, 753,927; San Francisco PMSA, 1,590,100; San Francisco–Oakland–San Jose CMSA, 6,041,800.

San Francisco Bay, large, nearly landlocked bay indenting western California, U.S. It is a drowned river valley, paralleling the coastline, and is connected with the Pacific Ocean by a strait called the Golden Gate, which is spanned by the Golden Gate Bridge. San Francisco Bay is 60 miles (97 km) long and 3 to 12 miles (5 to 19 km) wide and is one of the world's finest natural harbours. Treasure, Yerba Buena, Angel, and Alcatraz islands lie in it, and several bridges connect its eastern and western shores. Around the bay are San Francisco, Oakland, and a band of contiguous metropolitan subcentres linked by the Bay Area Rapid Transit System (BART).

San Francisco Conference, formally UNITED NATIONS CONFERENCE ON INTERNATIONAL ORGANIZATION (April 25–June 26, 1945), international meeting that established the United Nations. The basic principles of a worldwide organization that would embrace the political objectives of the Allies had been proposed at the Dumbarton Oaks Conference (*q.v.*) in 1944 and reaffirmed at the Yalta Conference (*q.v.*) in early 1945.

The conference was attended by delegations from the 46 nations that had signed the 1942 Declaration of the United Nations, which set forth the Allied aims in World War II, but the leading roles were taken by the foreign ministers of the so-called Big Four nations: U.S. Secretary of State Edward Stettinius, Anthony Eden of Great Britain, V.M. Molotov of the U.S.S.R., and T.V. Soong of China. Five more members were proposed. The Ukrainian and Belorussian Soviet Socialist Republics were accepted—despite some Western objections that they were not independent countries—as were Argentina and Denmark. The Soviet-backed Lublin government in Poland was rejected because its legitimacy was not recognized by the other Allies. (Later, Poland was admitted and allowed to be considered an original member, bringing the total to 51.)

Substantive work in drawing up the United Nations' charter was carried out by four commissions with representatives from all participating states, each assisted by two or more technical committees. The conference was dominated by discussions of the extent of the Big Four's powers as permanent members of the United Nations' Security Council. All of the Security Council's decisions in non-procedural matters (such as enforcing measures against breaches of the peace, admitting new members, and so on) could be vetoed by any of the council's four permanent members. The smaller or less powerful nations at the conference accordingly sought to whittle down the Big Four's powers on the council. They sought to restrict the veto powers of the council; to increase the powers of the General Assembly; and to give the General Assembly the power to interpret the United Nations' charter. The smaller nations were generally unsuccessful in all these aims, and the Big Four (subsequently the Big Five, with France's inclusion on the Security Council) retained their supremacy in the United Nations.

The San Francisco Conference concluded with the signing of the Charter of the United Nations by 50 nations on June 26.

San Francisco de Macorís, city, north-central Dominican Republic, on a tributary of the Camú River. Founded in 1777, it is situated in the fertile La Vega Real region. The city is a commercial and processing centre for the cacao, coffee, fruits, rice, beeswax, and hides produced in the hinterland. It is served by a short local railroad and by several secondary highways. Pop. (1983 est.) 67,000.

San Francisco de Quito, Villa de (Ecuador): *see* Quito.

San Francisco del Rincón, city, western Guanajuato *estado* ("state"), north-central Mexico. It lies in the basin of the upper Turbio River, at an elevation of 5,781 feet (1,762 m). Although primarily an agricultural centre trading in corn (maize), beans, wheat, and guavas, the city has some industry. Straw hats, rebozos (shawls), flour, and chicle are the principal products. The main Mexico City–Ciudad Juárez railroad passes within a few miles of the city, and a highway leads northeast to León. Pop. (1980) 40,943.

San Francisco Gotera, city, eastern El Salvador, on the Río Grande de San Miguel. Formerly called Gotera, its name was modified in 1887 to honour Francisco Morazán, the former Central American president. It is an agricultural and livestock-trading centre. Gold and silver are mined nearby at El Divisadero. Pop. (1985 est.) 15,113.

San Francisco–Oakland Bay Bridge: *see* Bay Bridge.

San Francisco Peaks, three summits (Humphreys, Agassiz, and Fremont peaks) on the rim of an eroded extinct volcano 10 miles (16 km) north of Flagstaff in the Colorado Plateau in north-central Arizona, U.S. Humphreys Peak (12,633 feet [3,851 m]) is



San Francisco Peaks, Arizona
David Muench—EB Inc.

the state's highest point, from which places more than 150 miles (240 km) distant have been seen. In the 17th century, members of the Spanish mission at Oraibi named the summits after the founder of their order, St. Francis of Assisi. The snow-covered peaks are in the Coconino National Forest and support tourism and lumbering activities.

San Fructuoso (city, Uruguay): *see* Tacuarembó.

San Gabriel, city, Los Angeles county, southern California, U.S. It lies in the San Gabriel Valley, east of downtown Los Angeles. Mission San Gabriel Arcangel, founded in 1771 by Father Junípero Serra and the fourth in the California chain of 21 missions, was moved 4.5 miles (7 km) to its present site in 1775. The fortresslike mission church resembling the Córdoba Mosque (Spain) formed the nucleus of a mixed-farming and citrus-growing community. Laid out during the land boom of the 1880s, the city was incorporated in 1913. Pop. (1988 est.) 34,500.

San Gabriel Mountains, segment of the Pacific Coast Ranges, extending eastward for about 60 miles (100 km) from Newhall Pass, north of San Fernando, to Cajon Pass in southern California, U.S. Many peaks in the San Gabriel chain exceed 9,000 feet (2,700 m), including the twin peaks of North Baldy (9,131 feet) and Mount Baden-Powell (9,389 feet), about 65 miles (105 km) northeast of Los Angeles, and Mount San Antonio, or "Old Baldy" (10,080 feet), the highest point. The range also includes Mount Wilson (5,710 feet), with its famous astronomical observatory, just northeast of Pasadena; favourable weather allows its use for about 300 days a year. The mountains are largely within the Angeles National Forest. The southern foothills, which enter residential and agricultural communities of Los Angeles and San Bernardino counties, are noted for citrus-fruit production.

San Gabrielino (people): *see* Gabrielino.

San Germán, town, western Puerto Rico, in the semiarid foothills of the Cordillera Central. The original San Germán, founded in 1511 on the western coast, was pillaged by French corsairs in 1528, 1538, and 1554, and in 1570 the residents moved to the hills. There they established Nueva Villa de Salamanca, on the Guanajibo River, which in time assumed the name of the original village. Until the 17th century, San Germán rivaled San Juan; since then it has declined in importance and has retained much of its colonial appearance. The modern town is a centre for needlework and art. The 17th-century Porta Coeli (Gate of Heaven), one of the oldest churches in the Western Hemisphere, has been converted to a museum of religious art. In 1912 the Polytechnic Institute of Puerto Rico, later renamed the Inter-American University, was established in San Germán; it houses the International Institute of Music, which sponsors a summer music festival. The surrounding area produces sugarcane, coffee, fruits, and tobacco. Pop. (1980) 13,054.

San Gimignano, town, Siena *provincia,* Toscana (Tuscany) *regione,* central Italy. It lies northwest of Siena. Originally called "City of Silva," it later took its name from the Bishop of Modena (d. 397), who liberated the town from a barbarian invasion. An independent republic in the Middle Ages, San Gimignano was dominated by two powerful, continually feuding families, the Ardinghelli (Guelf) and the Salvucci (Ghibelline). In 1352, its finances exhausted, the city placed itself under Florence.

San Gimignano is rich in Gothic architecture and is one of the best-preserved Italian medieval towns, with city walls, gates, and 14 of its famous old towers remaining intact. These towers, characteristic of San Gimignano, once numbered 72; they were built by leading families vying with each other for prestige. Most of the towers fell because of insecure foundations. The town's most notable monuments are the Palazzo del Popolo (1288–1323), containing the civic museum and picture gallery; the Collegiata (the former cathedral, consecrated in 1148), decorated with numerous frescoes; and the church of Sant' Agostino (1280–98), containing frescoes by Benozzo Gozzoli depicting scenes from the life of St. Augustine. San Gimignano is an important tourist centre and is noted for its wines. Pop. (1988 est.) mun., 7,109.

San Giorgio Maggiore, architecturally influential church in Venice, designed in 1566 by Andrea Palladio and finished in 1610 by Vincenzo Scamozzi. The church stands on the island of San Giorgio Maggiore, opposite the monumental basilica of St. Mark (San Marco), and is one of the first sights of Venice visible to the traveler approaching by sea.

Palladio's facade shows a characteristically Mannerist arrangement of classical elements, dominated by a central pediment that is flanked by the two halves of a broken pediment. The building is also notable for its spacious, light-filled interior.

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San Giovanni Rotondo, town, Foggia *provincia,* Puglia (Apulia) *regione,* southeastern Italy, on the Promontorio (promontory) del Gargano below Monte Calvo, just north-northeast of Foggia city. It is said to be built over a ruined temple of Jupiter and derives its name from an ancient circular (*rotundus*) baptistery. The church of Sant' Onofrio dates from the 13th century. After World War II, the town became world famous for the pilgrimages made there to honour Padre Pio da Pietrelcina, a stigmatic, of the convent of Santa Maria delle Grazie. The Fiorello La Guardia hospital, named for the former mayor of New York City and internationally financed, was built for the relief of sick pilgrims. Local commerce is largely agricultural, though bauxite

mines are nearby. Pop. (1987 est.) mun., 22,970.

San Giuliano Terme, formerly (until 1935) BAGNI SAN GIULIANO, town, Pisa *provincia,* Toscana (Tuscany) *regione,* central Italy. The town lies at the foot of Mount Pisano and has been famous since Roman times for its mineral springs (Aquae Calidae Pisanorum). The town was destroyed (1404–06) during battles between the Pisans and the Florentines. It was visited in 1820 by the English poet Percy Bysshe Shelley, who is commemorated in a local plaque and bust. Local products include cotton goods and lamps. Pop. (1987 est.) mun., 26,831.

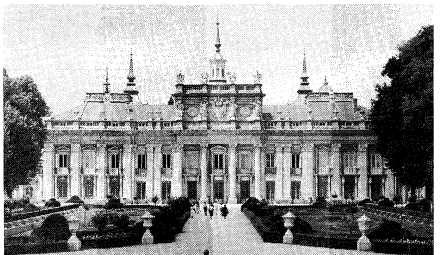
San Guan (Chinese mythology): *see* San Kuan.

san-hsien, Pinyin SANXIAN, any of a group of long-necked, fretless Chinese lutes having three strings, a square resonator with snakeskin front and back, and a curved-back pegbox with three lateral, or side, tuning pegs. The instrument, a chordophone usually played with a broad plectrum, is popular in theatrical accompaniment, ballad-singing accompaniment, and the orchestra. The largest *sanhsien* is about 1.2 m (4 feet) long, has a compass of three octaves, and is plucked with the fingernails of the right hand.

San-hsien performance is characterized by powerful resonant rolls and chords and large glissandos on the fingerboard. In the 20th century, the musicians Bai Feng-yan (1899–1975) and Li Yi (b. 1932) elevated the *sanhsien* to an important solo instrument.

San Ignacio, formerly EL CAYO, or CAYO, town, west-central Belize (formerly British Honduras). It lies along the Belize River, near the Guatemalan border. With Benque Viejo del Carmen, which is about 8 miles (13 km) southwest, it traditionally dealt in chicle and lumber, but these products have now largely been replaced by cattle and corn (maize), beans, and rice. Some trade is carried on with Guatemala. Its inhabitants are mostly Maya Indians, mestizos, and a substantial number of Mennonites, whose first settlement there dates from 1958. Pop. (1980) town, 5,616.

San Ildefonso, town, Segovia *provincia,* in the *comunidad autónoma* ("autonomous community") of Castile-Leon, central Spain. The town is surrounded by a dense forest and lies at the foot of the Peñalara mountains, just southeast of Segovia city. Founded by Henry IV (*c.* 1450) as a summer retreat, the town was



Royal Palace at San Ildefonso, Spain
Authenticated News

given to the Hieronymite monks in 1477 by the Catholic monarchs Ferdinand and Isabella. It was subsequently sold by them in 1720 to Philip V, the first Bourbon king of Spain, who planned to build a summer palace there that would rival those at Versailles, Fr., and Parma, Italy.

The palace's original design, by a Spanish artist, Teodoro Ardemans, was in the simple and austere style of the 16th-century architect Juan de Herrera, but this was modified by French and Italian artists, notably Filippo Juvarra and Giovan Battista Sacchetti. The palace chapel, with a fine dome and two towers, has frescoes by Francisco Bayeu y Subias and contains the tomb of Philip V and his wife, Isabella Farnese. The gardens, laid out by the French landscape architect Etienne Boutelou, have numerous fountains. The royal apartments contain a splendid collection of tapestries, some Flemish and some with designs taken from works by Francisco Goya. The palace was damaged by fire in 1918 but still retains its interest for tourists.

A royal glass factory was established in La Granja in 1728. La Granja was the scene of many important events in Spanish history, including Philip V's abdication (1724), the signing of various treaties (notably in 1796, whereby Spain was tied to the French Republic), and the promulgation by Ferdinand VII of the Pragmatic Sanction (1830), revoking the Salic Law (code of the Salian Franks), which prohibited female heirs from succeeding to the throne. Pop. (1981) 4,588.

San Isidro, quarter and *distrito* ("district") of southern Lima–Callao metropolitan area, Peru, and one of Lima's most elegant suburbs, with large homes set in lush gardens. The area is dotted with numerous parks, the largest of which is the Bosque El Olivar ("olive grove"). Nearby is the private Universidad "Inca Garcilaso de la Vega" (1964). San Isidro is also the location of the Women's University of the Sacred Heart (1962). In the western sector are the Lima Golf Club; the small pre-Inca ruin of Huallamarca, the artifacts of which are displayed in an adjoining museum; and many luxurious high-rise apartment buildings. In the eastern sector, a residential area has been founded on the grounds of the former Limatambo airport and the Ministry of Government and Police has moved into the old terminal. San Isidro has no central business district; retail and service establishments are scattered throughout the district, and there are several large shopping centres. Pop. (1981 prelim.) district, 73,016.

San Isidro, *cabecera* (county seat) and *partido* (county) of Gran (Greater) Buenos Aires, Arg. It lies north of the city of Buenos Aires, in Buenos Aires *provincia,* on the Río de la Plata estuary. Colonization of the area began with the second and permanent founding of Buenos Aires (1580). During this period the region was known as Costa de Monte Grande. A settlement grew around the chapel of San Isidro Labrador, which was built by Domingo Acassuso in 1706. In 1784 the *partido* was established, coinciding with the area of the parish; and later, in 1816, the *partido* and settlement were both named in honour of San Isidro Labrador.

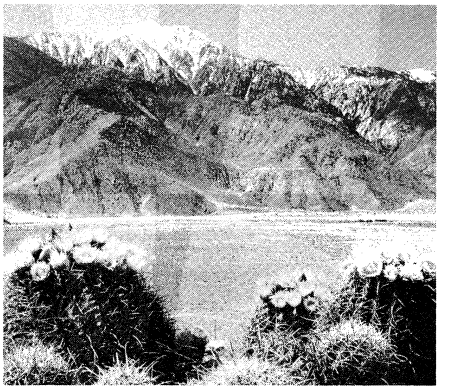
The *partido* covers 19 square miles (48 square km) and is bordered by the Río de la Plata (northeast) and the *partidos* of Vicente López (southeast), General San Martín (southwest), and San Fernando (northwest). Besides the *cabecera* of San Isidro, the major localities in the *partido* are Boulogne, Beccar, Martínez, and Acassuso.

Industries in the *partido* freeze meat and produce dairy products, tires, paper, ceramics, and other items. The city is known as a resort for golfing, yachting, swimming, and fishing. Many colonial structures still stand among the modern residences and other buildings of the city. A modern turf racetrack attracts many residents and tourists.

With the growth of the national capital, San Isidro has been absorbed into the north-northwestern suburban area of Gran Buenos Aires. The *partido* is totally within the Gran Buenos Aires urban area, and its population density is greater than the majority of the *partidos.* Three railway lines and the national highway system serve the *partido.* Pop. (1980) *partido,* 289,170.

San Jacinto, Battle of (April 21, 1836), defeat of a Mexican army of about 1,500 troops under General Antonio López de Santa Anna by about 800 men (mostly recent arrivals in Texas) led by General Sam Houston. The outcome assured the success of American settlers in Texas in their war for independence from Mexico. Along the San Jacinto River, near the site of what was to be the city of Houston, Houston's men, after days of retreat, took the Mexican fortified position by surprise, shouting "Remember the Alamo, remember Goliad" (the scenes of their previous defeats by Santa Anna); in less than a half hour, they killed about 600 Mexicans and wounded 200 more. Within 24 hours, 700 more were captured, including Santa Anna, who was freed after he came to terms with Houston to end the war. Six of Houston's men were killed, about 30 wounded.

San Jacinto Mountains, segment of the Pacific Coast Ranges in southern California, U.S. The mountains extend south-southeastward for about 30 miles (50 km) from San Gorgonio Pass to the northern end of the Santa Rosa Mountains. San Jacinto Peak (10,804 feet [3,293 m]) is the highest point; the city of Palm Springs lies at its eastern base. The range is largely within conservation areas, including the Mount San Jacinto State Park and a division of the San Bernardino Na-



The snow-capped San Jacinto Peak, San Jacinto Mountains, southern California; spiny barrel cactus is in the foreground
Josef Muench

tional Forest. The mountains attract tourists, provide outdoor recreation, and serve as an important watershed for the surrounding area.

San Joaquin River, river in central California, U.S. It is formed by forks rising in the Sierra Nevada and flows southwest and then north-northwest past Stockton to join the Sacramento River above Suisun Bay after a course of 350 miles (560 km). It is dammed for hydroelectric power (impounded thereby are Florence, Shaver, and Huntington lakes). Its valley is the southern part of the Central Valley and is one of the most productive agricultural regions in the United States.

San José, capital of Costa Rica. Situated in a broad, fertile valley 3,800 feet (1,160 m) above sea level, it was called Villa Nueva when it was settled in 1736. San José developed slowly as a tobacco centre in the Spanish colonial era. In 1823 the national capital was transferred there from nearby Cartago. In the 1840s the town became the centre of coffee production, which remained the chief source of Costa Rica's income throughout the 19th century.

The political, social, and economic centre of Costa Rica, San José grew rapidly in the 20th century, both in population and in area. Major parts of the built-up area were developed in a grid pattern. After 1950 the number

of industrial establishments in the city more than doubled. A transportation hub, San José is an important point on the Pan-American Highway and is the junction of the Northern Railway from Limón and the Pacific Railway from Puntarenas. There are two airports, one international, one domestic.

The city is the site of the University of Costa Rica (1940), the National University (1973), a 19th-century cathedral, and the imposing national theatre, which is modeled after the Paris Opéra. There is a small park named after the U.S. president John F. Kennedy. Several collections of pre-Columbian goldwork and a binational cultural centre and library are



San José cathedral, Costa Rica
Charles May—Shostal/EB Inc.

among the historical and cultural attractions in the city. Pop. (1984) 241,464.

San Jose, chartered city, north-central Luzon, Philippines. Situated in foothills near the source of the Chico River, it is a trading centre in the region known as the nation's most important rice granary. About 9 miles (15 km) east of the city is the Pantabangan Dam (1974), which provides water for local irrigation and hydroelectric power to Manila. The city is on the main highway from Manila to Aparri on the northern coast of Luzon and has an airfield. Inc. city, 1969. Pop. (1980) 64,254.

San Jose, city, seat (1850) of Santa Clara County, west-central California, U.S. It lies in the Santa Clara Valley along the Coyote and Guadalupe rivers, 50 miles (80 km) southeast of San Francisco. The first civic settlement in California, it was founded by José Joaquin Moraga in 1777 as a Spanish military-supply base and was named Pueblo de San José de Guadalupe. During the Spanish colonial and Mexican periods it supplied wheat, vegetables, and cattle to the military garrisons at Monterey and San Francisco. After the American occupation of California in 1846, San Jose briefly became the new state's first capital, and the first state legislative assembly convened there in December 1849. (The state capital was moved to Vallejo in 1852.) In 1850 San Jose became the first chartered city in California, by which time it had become a bustling trade depot for the goldfields. In 1864 the coming of the railroad from San Francisco gave San Jose improved trade connections and enabled the produce of nearby farms to be readily shipped to San Francisco. The Santa Clara Valley thus soon developed into a fruit-growing region specializing in plums and apricots.

Until 1940 most of the city's industries were concerned with dried-fruit processing and the manufacture of orchard supplies and agricultural equipment. During and after World War II, however, there was a meteoric growth in its manufacture of such durable goods as electrical machinery, aircraft parts, and motor vehicles. Large aerospace and business-equipment firms located plants in the area, and the rise of the computer-manufacturing centre known as Silicon Valley farther north in the Santa Clara Valley meant a spectacular burst of growth for San Jose. The city annexed land at a rapid rate, and during the period from 1960 to 1980 its population more than tripled. The city is still a processing and distribution centre for a rich agricultural area producing fruit and wine, while its extremely diverse industries include the manufacture of electronic, computer, and aerospace components; auto parts; food-processing machinery; and a variety of household and consumer goods. The city continues to develop with the urban growth of the San Francisco Bay area.

Among the city's cultural attractions are the Municipal Rose Garden, the Rosicrucian Egyptian Museum, and the municipal recreation area known as Alum Rock Park. The University of Santa Clara and Stanford University are nearby. California State University, San Jose, was established in 1857 and San Jose City (junior) College in 1921. Pop. (1986 est.) city, 722,560; metropolitan area (PMSA), 1,401,600.

San José, in full SAN JOSÉ DE MAYO, city, southern Uruguay. It lies northwest of Montevideo along the San José River. It originated in 1783, when Eusebio Vidal, acting under orders of the viceroy, Don Juan José de Vertíz, organized the Pago (district) de San José, naming it for the river that ran through the territory. The city developed within the Pago, which was created as a haven for Spanish colonists from the ill-fated Patagonian settlements. It served briefly as the provisional capital of Uruguay during the 1825 uprising against Brazil.

An agricultural and industrial centre, San José specializes in meat and dairy products, leather goods, clothing, furniture, and automobile parts. A farm machinery school is located in San José. The city's Basilica Cathedral, built in 1857–74 in the Baroque style, has an imposing clock tower. Pop. (1975 prelim.) 28,427.

San José de las Lajas, city, north-central La Habana *provincia,* west-central Cuba. It is known primarily as a commercial and manufacturing centre for the surrounding agricultural and pastoral lands, which feature dairying and sugarcane growing, but thermal springs have made it a health resort as well. A rail junction, it is also accessible by highway from Havana, which lies 20 miles (32 km) to the northwest. Pop. (1986 est.) 55,400.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

San José del Guaviare, *cabecera* (county seat) of Guaviare *comisaría* ("commissariat"), southeastern Colombia. It lies along the right bank of the Guaviare River, in a transition area between the Llanos (grassland plains) to the north and tropical, semideciduous rainforests to the south. Despite its isolation from neighbouring economic centres, San José del Guaviare has surpassed in population and economic importance the town of Mitú, which lies 200 miles (320 km) southeast.

The principal economic activities are cattle raising and farming. An unimproved road extends between San José del Guaviare and northern points such as Bogotá. Pop. (1985) 31,082.

San Jose scale (*Aspidiotus perniciosus*), one of the most destructive scale insects (order Homoptera), first discovered in North America at San Jose, Calif., in 1880 but probably a native of China. The yellow-coloured females are covered with a gray circular scale (a protective waxy shell which they secrete) about 1.5 mm (0.06 inch) in diameter, elevated in the centre and surrounded by a yellow ring. After mating, the female produces living young. There may be two to six generations per year.

Sometimes San Jose scales become so numerous that they overlap and completely cover



San Jose scale (*Aspidiotus perniciosus*)
William E. Ferguson

tree branches; in time they may kill a tree. A lime-sulfur spray was once used as a control measure, but an oil spray is now far more effective.

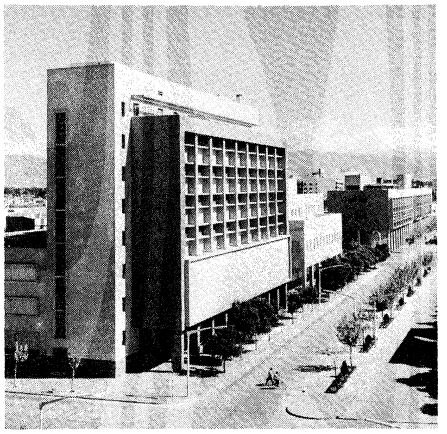
San Juan, *provincia,* west-central Argentina. It is separated from Chile on the west by the Andean cordillera, whose peaks average between 14,800 and 16,400 feet (4,500 and 5,000 m) in elevation. The province occupies an area of 34,614 square miles (89,651 square km). Snow-fed rivers from the Andes dissect its mountainous western terrain. Three main rivers, the Bermejo, Jáchal, and San Juan, all used for irrigation, discharge into marshes in the semiarid southeastern portion of the *provincia.*

San Juan was settled in the late 16th and early 17th centuries by small numbers of Spanish agriculturists, Dominicans, and Jesuits from Chile. A part of the old Cuyo region, it remained a sparsely populated area exporting wine and dried fruits that were produced in its irrigated valleys. In 1776 control over San Juan passed from the Chilean captaincy general to the Río de la Plata viceroyalty. San Juan declared its own status as a *provincia* in 1825. The *provincia* was the epicentre of severe earthquakes in 1776, 1944, and 1977.

Grapes grown for both the table and wine occupy half of the cultivated land; olives, apples, barley, and onions are also raised, together with sheep and cattle. San Juan is rich in copper reserves but exploitation is limited. Economic activity in the city of San Juan (*q.v.*), the capital of the *provincia,* and other urban centres is concentrated on food processing. The *provincia* is linked to Chile, with which much of its trade is carried on, by one local road across the Andes. Pop. (1986 est.) 520,000.

San Juan, city, capital of San Juan *provincia,* west-central Argentina. It lies along the San Juan River and is enclosed by Andean foothills on three sides. Founded in 1562 by Juan Jufré y Montesa, governor of the captaincy general of Cuyo, the city was moved in 1593 to its present site, 2 miles (3 km) south, because of floods; it is now protected by an embankment. Because it was on the fringe of Spanish-held territory, it was originally named San Juan de la Frontera. Early in the 18th century, Jesuits built a cathedral and a convent, both of which were destroyed, along with most of the city's other buildings, in a severe earthquake in 1944. Reconstruction has given San Juan a modern appearance.

The processing of meat, wines, fruits, and grains is the main economic activity. San Juan was the birthplace of Domingo Sarmiento (Argentine educator and president from 1868



Avenida Central, San Juan city, Arg.
Shostal—EB Inc.

to 1874), and his home, which contains a museum and library, was declared a national monument in 1910. Pop. (1980) 117,731.

San Juan, province, western Dominican Republic. Created in 1938 as Benefactor province, it lost much territory when San Rafael (now La Estrelleta) province was created out of it in 1942; the remaining 1,375 sq mi (3,561 sq km) took the name San Juan in 1961. Much of San Juan's land lies in the fertile Valle de San Juan, bounded on the north by the mountains of the Cordillera Central and on the south by the Sierra de Neiba. The land is irrigated by waters from the Yaque del Sur River. Rice, corn (maize), coffee, bananas, sugarcane, potatoes, and chick peas are cultivated; lumbering is another economic activity. The main highway linking Santo Domingo with Comendador, near the Haitian border, traverses the province, passing through San Juan (*q.v.*) city, the provincial capital. Pop. (1981) 239,957.

San Juan, in full SAN JUAN DE LA MAGUANA, city, capital of San Juan province, southwestern Dominican Republic, on the Río San Juan, an affluent of the Yaque del Sur River, northwest of Santo Domingo city. The Spanish explorer Diego Velázquez founded San Juan in 1508 by royal decree on the site of the Taino Indian capital, in Maguana province, then ruled by Chief Caonabo. The settlement floundered until 1764, when an influx of ranchers revitalized the area. During the early 19th century, San Juan witnessed a series of Dominican–Haitian battles, followed by Creole uprisings for independence from Spain. The Battle of Santomé (1844), which achieved Dominican independence, was fought nearby and is commemorated by a monument. In addition to cattle, the economic activities of the city focus on the production of rice, coffee, corn (maize), fruit, and potatoes. Pop. (1981) 49,764.

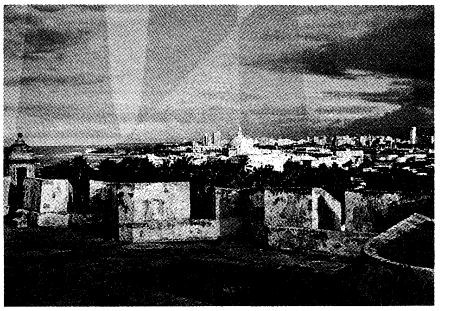
San Juan, capital and largest city of Puerto Rico, located on the northern coast of the island on the Atlantic Ocean. It is a major port and tourist resort of the West Indies.

In 1508 Juan Ponce de León founded the original settlement, Caparra, behind the almost landlocked harbour just to the west of the present metropolitan area. In 1521 unhealthful conditions forced the removal of the settlement to two rocky islets at the harbour entrance. In 1533 the Spanish began massive fortifications; El Morro castle was constructed on a high bluff on one of the islets, and the fortress of San Cristóbal was built to the east. The settlement was originally known as Puerto Rico, the island as San Juan, but over the centuries, common usage brought about a reversal of the names.

During the early 16th century, San Juan was the point of departure for Spanish expeditions to charter or settle unknown parts of the New World. Its fortifications repulsed the English navigator Sir Francis Drake in 1595, as well as later attackers but the Earl of Cumberland captured it briefly in 1598. In 1885 there was an uprising against Spanish administration, and in 1898 the city fell to the United States after a naval bombardment.

In the 20th century the city expanded rapidly beyond its walled confines, known as Old San Juan, to incorporate suburban Miramar, Santurce (the chief residential suburb), and Condado, along the coast, as well as industrial Hato Rey, with its large sports stadium, and the town of Río Piedras, immediately to the southeast. By 1980 the San Juan metropolitan area included the surrounding municipalities to the east and west and had about one-third of Puerto Rico's population. In a move to decentralize the old city, many government offices and agencies were moved across the bay, but La Fortaleza (1533; rebuilt 1639–40) still functions as the governor's palace, the oldest executive mansion in continuous use in the Western Hemisphere.

The largest industrial and processing centre of the island, the metropolitan area has facilities for petroleum and sugar refining, brewing, and distilling and produces cement, pharmaceuticals, metal products, tobacco, and clothing. The port of San Juan is one of the busiest in the Caribbean. San Juan is the country's financial capital, and many U.S. banks and corporations maintain offices or distributing centres there.



San Cristóbal fortress, San Juan, Puerto Rico
Walter Aguiar—EB Inc.

San Juan's international airport, just east of the city proper, is the busiest terminal in the Caribbean, and the area's resort hotels are among the largest and most luxurious in Latin America. In contrast to this prosperity is the historic squalor of San Juan's shanty towns and squatter villages, which have frustrated efforts of the commonwealth government to upgrade them or relocate their inhabitants.

The main campus of the University of Puerto Rico is located in the Río Piedras barrio (ward) of San Juan. The university became the home in 1956, of the Casals Festival, founded by the Spanish cellist Pablo Casals. The medical campus and other facilities of the university are also located in San Juan. The city's other educational institutions include the University of the Sacred Heart (1935) and a campus of the Inter-American University of Puerto Rico.

San Juan is the oldest city under the U.S. flag. Much of Old San Juan, a small area partially enclosed by walls, has been restored. Ponce de León is buried in the San Juan Cathedral, begun in 1521 and rebuilt in 1540 and again in 1802. Other sites of historic interest include San José Church, begun in 1532 and the oldest church in continuous use in the Western Hemisphere; La Casa Blanca, built at the seawall in the harbour in the early 16th century and owned by Ponce de León's family until the late 18th century; La Casa del Libro, a rare-book library; and La Casa de Callejón, with museums of colonial architecture and of the Puerto Rican family. The San Juan National Historic Site includes the El Morro and San Cristóbal fortifications. Pop. (1980) city, 424,600; mun., 434,849; metropolitan area, 1,086,376.

San Juan Bautista, capital, Misiones department, southern Paraguay. It lies in the lowlands near the Río Tebicuary. In addition to its administrative functions, San Juan Bautista is the commercial and manufacturing centre for the agricultural and pastoral hinterland, which is utilized primarily for cattle ranching and maté (tea) growing. There are schools of commerce and agriculture and a branch of the Bank of Paraguay. The city is located just off the main highway linking Asunción and Encarnación; a branch road leads through San Juan Bautista to Pilar. Pop. (1982 prelim.) 6,972.

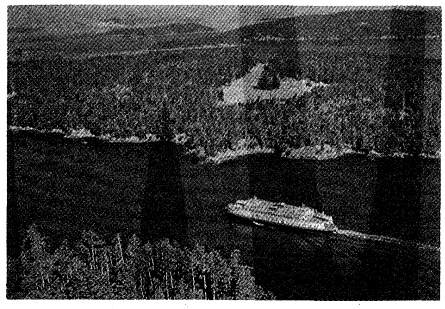
San Juan Capistrano, city, Orange County, southern California, U.S., near the Pacific coast, halfway between San Diego and Los Angeles. Settlement developed around the Mission San Juan Capistrano, the seventh in the California chain of 21 Franciscan missions, founded in 1776 by Father Junípero Serra, and named for St. John (San Juan) of Capistrano, the crusader. The mission, constructed 1797–1806, was badly damaged by an earthquake of 1812 which wrecked its cruciform church and killed 29 people. The church remains a crumbled ruin with arches, quadrangle, and garden; there has, however, been some restoration of the mission buildings including the adobe Serra Chapel (still in use). The mission has gained fame through its swallows which reputedly fly off on St. John's Day (October 23) and return "miraculously" to their mission nests on St. Joseph's Day (March 19). Their departure and return are celebrated by fiestas. The city (Inc. 1961) is populated in part by descendants of early Spanish-Mexican-Indian settlers, and there has been some modern residential development. Pop. (1980) 18,959.

San Juan de Ciénaga (Colombia): *see* Ciénaga.

San Juan de los Morros, city, capital of Guárico state, central Venezuela, on the southern slopes of the central highlands. It was named the state capital in 1934, replacing Calabozo. A health resort, it is known for its natural hot springs and its annual cock-fighting tournament. In addition, it is a commercial and manufacturing centre, dealing in cattle and livestock products, cotton, corn (maize), coffee, and tobacco. Deposits of helium, argon, neon, and krypton gas are located in the vicinity. A highway leads to the city from Maracay in Aragua state, 35 mi (55 km) to the northwest. Pop. (1981 est.) 53,000.

San Juan del Monte, town, Rizal province, central Luzon, Philippines, an eastern residential and industrial suburb of Manila. Located south of Quezon City and north of Mandaluyong, it is on the San Juan and Pasig rivers just above their junction. San Juan del Monte is near the site of the battle of Pinaglabanan (1896), which marked the beginning of the armed revolutionary movement against Spanish colonialism in the Philippines. Pop. (1980) 130,088.

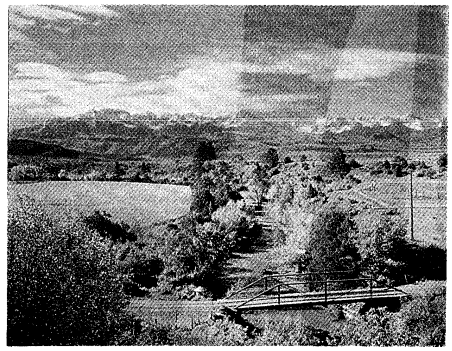
San Juan Islands, archipelago of 172 islands (largest of which are Orcas, San Juan, and Lopez) comprising San Juan County, northwestern Washington, U.S., in upper Puget Sound, at the Canadian border, south of the Strait of Georgia and east of Juan de Fuca Strait. Part of a submerged mountain chain, they were explored (1790–92) and named by the Spanish Francisco Eliza expedition. Visited by George Vancouver in 1792, the main islands were occupied for a time by the Hudson's Bay Company. Following the bloodless "Pig War" of 1859 (precipitated by a marauding British pig in an American



Ferryboat in Wasp Passage, San Juan Islands, Washington
Bob and Ira Spring—EB Inc.

potato patch), San Juan Island was occupied by both British and American forces for 12 years. San Juan Island National Historic Park, divided into English and American camps, commemorates this period. The islands were awarded to the United States (1872) after settlement of a boundary dispute. Orcas Island includes Moran State Park and Mt. Constitution (2,400 ft [730 m]), highest point on the islands. Linked by ferry services, the islands have had extensive summer resort development. Friday Harbor, largest town and county seat, is the base for a fishing fleet and site of the University of Washington Oceanographic Laboratory. Pop. (1980) 7,838.

San Juan Mountains, segment of the southern Rockies, extending southeastward for 150 mi (240 km) from Ouray, in southwestern Colorado, U.S., along the course of the Rio



The valley of the Uncompahgre River, which rises in the San Juan Mountains (background), western Colorado
Ben Walker—EB Inc.

Grande to the Chama River, in northern New Mexico. Many peaks in the northern section exceed 14,000 ft (4,300 m), including Mts. Eolus, Sneffels, Handies, Sunshine, Wetterhorn, Redcloud, San Luis, and Windom, with Uncompahgre Peak (14,309 ft) being the highest. Few summits in New Mexico reach 11,000 ft. Composed mainly of volcanic rocks, which are highly mineralized in the north, the mountains serve as a source for headstreams of the Rio Grande and San Juan River and are embraced by Uncompahgre, San Juan, Rio Grande, and Carson national forests. Early Spanish explorers used Cumbres Pass (10,025 ft; near the New Mexico border), which is now crossed by road, as is Wolf Creek Pass (10,850 ft).

San Juan River, Spanish RÍO SAN JUAN, also called DESAGUADERO, river and outlet of Lake Nicaragua, issuing from the lake's southeastern end at San Carlos and flowing along the Nicaragua–Costa Rica border into the Caribbean Sea at San Juan del Norte. It receives the San Carlos and Sarapiquí rivers during its 124-mi (199-km) southeasterly course through tropical forests, and near its mouth it forms three arms, the Juanillo Menor to the north, the Río Colorado to the south, and the San Juan proper. Navigation is impeded by rapids at Toro, El Castillo, and Machuca and is limited to boats with a shallow draft. During the migrations to California from the eastern United States between 1850 and 1870, travellers transferred at San Juan del Norte from Atlantic steamers to small boats, which went up the river and across Lake Nicaragua; they then travelled overland to the Pacific port of San Juan del Sur. Along with the lake it has been considered as a possible canal route between the Caribbean and the Pacific.

San Juan River, river in the southwestern United States, rising in the San Juan Mountains of southern Colorado, on the west side of the Continental Divide. It then flows southwest into New Mexico, past Farmington, northwest into Utah, and west to the Colorado River near Rainbow Bridge National Monument in southeastern Utah. The river is 360 mi (580 km) long and is not navigable. Its chief tributaries are the Animas, Los Pinos, Piedra, La Plata, and Mancos rivers, all in northwestern New Mexico. In that area, where the river valley widens, there is some irrigated farming. The section of the river where the boundaries of New Mexico, Utah, Arizona, and Colorado meet and where the San Juan enters the Colorado Plateau, into which it has carved numerous S-shaped canyons more than 1,000 ft (300 m) deep, is known as the Goosenecks. From there the river flows in a relatively straight canyon to the Colorado. The Navajo Dam on the San Juan in northwestern New Mexico is part of the Upper Colorado River Storage Project.

San Justo, *cabecera* (principal built-up area) of La Matanza *partido* (political subdivision), Gran (Greater) Buenos Aires, Arg. It lies directly southwest of the city of Buenos Aires, in Buenos Aires province. In 1856 the *poblador* (person granted land as an incentive to settle an area) of San Justo, José Gorsch, donated the land for the founding of the town on behalf of the Justo Villegas family. On December 25 of the same year, the town of San Justo was founded. In 1860 the first church was established in the town.

The town of San Justo was declared a city in 1955. By this time it had become an important industrial centre, manufacturing plows, automobile accessories, paper, and rubber goods. On agricultural lands farther west and south, wheat, corn (maize), barley, and alfalfa are grown and livestock is raised.

San Justo, and La Matanza *partido* in particular, experienced rapid growth in the 1960s and 1970s

San Kuan, Pinyin SAN GUAN, in Chinese mythology, the Three Officials: T'ien Kuan, official of heaven who bestows happiness; Ti Kuan, official of earth who grants remission of sins; and Shui Kuan, official of water who averts misfortune. The Chinese theatre did much to popularize T'ien Kuan by introducing a skit before each play called "The Official of Heaven Brings Happiness." Reflecting a Taoist principle that held heaven, earth, and water to be three transcendent powers, Chang Heng (2nd century AD) proposed that the confession of sins be written in triplicate, one to be burned for heaven, another buried in earth, and the third sunk in water.

San languages, also called BUSHMAN, Khoisan languages spoken by San tribesmen in southern Africa. The San languages are often divided by scholars into three groups: Northern San, including !Khung and //Kh'au-//'en (//Aũ//ẽ or Auen); Southern San, including /'Auni, //Ng–!Ke, and ≠Khomani; and Central San, including Naro, /Guikhoe, and //Ganakhoe. Although scholars formerly believed the San languages to belong to a different language family from the Khoikhoin (Hottentot) languages, increasing knowledge of these languages has led most scholars to include them all in the Khoisan language family. The Central San languages are especially closely related to the Khoikhoin languages, with which they are often placed in a Central Khoisan, or Khoi, group. Some scholars consider Northern San and Southern San to be separate branches of the Khoisan language family and call them North Khoisan and South Khoisan, respectively; other scholars group them together as the San branch of the Khoisan family.

The most striking feature of the San languages, as of all Khoisan languages, is their extensive use of click sounds. Some San languages have a greater variety of clicks than do the Khoikhoin languages; in addition to the dental click (written as *c* or /), the palatal or cerebral click (written as *q* or !), the alveolar click (written as *v* or ≠), and the lateral click (written as *x* or //), the San languages also have a labial click (written as ʘ) that sounds much like a kiss, as well as a guttural click (written as ǀ) and a semi-labial click (written as ǂ).

Although the Central San languages distinguish gender, as do the Khoikhoin languages, the Northern and Southern San languages have no system of gender inflection except infrequently in pronouns, and, in the Southern San group, distinctions of number are usually not expressed.

San Leandro, city, Alameda County, western California, U.S., adjoining Oakland (south), forms part of the East Bay metropolitan strip characterized by suburban developments, commercial trading centres, and waterfront industries. Once part of Rancho San Leandro (1839), it was known as Squatterville when prospectors settled there after the 1849 Gold Rush. Laid out in 1855, it began as a horticultural centre and was the county seat until 1872. It is adjacent to Metropolitan Oakland International Airport. Inc. city, 1872. Pop. (1980) 63,952.

San Lorenzo, city and port accessible to oceangoing vessels, southeastern Santa Fe province, northeastern Argentina, on the Río Paraná. The settlement grew up around a monastery, which the Argentine liberator José de San Martín used as headquarters during the 1813 Battle of San Lorenzo. It was given city status in 1944. The city's economic base is varied, with petrochemical works that are among the largest in Argentina. It is a trade and manufacturing centre for the agricultural hinterland, in which corn (maize), flax, wheat, sugarcane, and sunflowers are cultivated. The numerous manufacturers produce gasoline, foodstuffs, glass, paper, ceramics, construction materials, and other goods. San Lorenzo, located 14 mi (23 km) north of the city of Rosario, is an integral part of Greater Rosario. Pop. (1980) 78,983.

San Lorenzo, Pacific port city, Valle department, southern Honduras, situated on the northern shore of the Gulf of Fonseca. The shallow waters of the gulf long precluded development of the port, but construction of major roads nearby and the inconvenience of the old port at Amapala fostered the project. Construction began in 1977; a deep channel was dredged to enable oceangoing vessels to berth beside port facilities. Cargo-handling capacity was designed for 1.1 million tons per year upon completion. Industries in the city include a sawmill that processes pitch pine for export, a barbed-wire plant for domestic ranch fencing, a textile mill, a vegetable oil processing plant, and a dairy. Fishing in the Gulf of Fonseca was threatened in the late 1970s by pollution of the Choluteca River, which flows into the gulf. San Lorenzo is served by the Inter-Ocean Highway, which links it to the In-

ter-American Highway, Tegucigalpa and the interior, and the Caribbean coast. An airport at Amapala on Tigre Island also serves San Lorenzo. Pop. (1975 est.) 9,261.

San Lorenzo, early Renaissance-style church designed by Brunelleschi and constructed in Florence from 1421 to the 1460s, except for the facade, which was left uncompleted. Also by Brunelleschi is the Old Sacristy (finished in 1428).

The New Sacristy, more commonly called the Medici Chapel, is largely the work of Michelangelo, as are the celebrated Medici Tombs it houses. Michelangelo also designed the Laurentian Library, which is located off the cloister. The tombs of the grand dukes of Tuscany line the walls of the Baroque Chapel of the Princes, which was begun in 1604 according to plans of Ferdinand I de' Medici.

San Lorenzo, Treaty of: *see* Pinckney's Treaty.

San Lucas, Cape, Spanish CABO SAN LUCAS, extreme southern tip of the Baja California peninsula, Mexico. The rocky headland forms the southern extremity of the Sierra de San Lazaro and includes the western shore of San Lucas Bay. The isolated town of San Lucas lies 2 miles (3 km) north of the cape.

San Luis, *provincia,* west-central Argentina, separated from Mendoza *provincia* (west) by seasonal rivers having headwaters in the Andes. San Luis is a transitional area, occupying 29,633 square miles (76,748 square km), that incorporates drier sections of the Pampa (south and east) and pre-Andean hills, mountains, and salt flats (north). Its Sierra de San Luis, with elevations exceeding 6,900 feet (2,100 m), dominates the mid-north, and salt flats make up stretches of the northwest.

The historical development of San Luis was slowed because it lacked the abundant meltwater from the snow-capped Andes (to the west) or the increased rainfall of the more humid Pampa (to the east).

Between 1594, the date of the first settlement, and the mid-18th century, Spaniards coming from Chile had difficulty in establishing permanent settlements in the face of hostile Indian attacks. Part of the historic Cuyo *región,* San Luis passed in 1776 from the jurisdiction of the Chilean captaincy general to that of the Río de la Plata viceroyalty. It was created a *provincia* in 1832.

Cattle raising and irrigated farming of corn (maize), sorghum, and sunflowers, as well as of figs and asparagus, are important economic activities in the basins of the Quinto and Conlara rivers in northeastern San Luis *provincia.* Some lumbering also occurs in the Sierra de San Luis, and tungsten (wolfram), basalt, and salt are mined and granite and onyx are quarried. The irrigated agriculture in the central Quinto and Conlara basins provides the basis for the food-processing industries of Villa Mercedes and the provincial capital city, San Luis. Pop. (1986 est.) 234,000.

San Luis, city, capital of San Luis *provincia,* west-central Argentina, on the Chorrillos River, near the southern end of the foothills of the Sierra de San Luis. Founded in 1594 by order of the governor of Chile, it was abandoned during wars with the Araucanian Indians. Refounded in 1596, it was, until the mid-19th century, a frontier settlement subject to Indian attacks and cattle raids by vaqueros (cowboys) from Mendoza and San Juan *provincias.* Its economic activities today are mainly based on irrigated agriculture and include meat-packing and food processing. The reservoirs created by dams in the foothills are popular with boaters and anglers. Green onyx is quarried nearby. Pop. (1980) 70,632.

San Luis, city, central Santiago de Cuba *provincia,* eastern Cuba. Lying on the northern slopes of the Sierra Maestra, San Luis is both a rail junction and a commercial and manufacturing centre for the agricultural hinterland, which produces sugarcane, coffee, and various fruits. Coffee roasting and sugar refining are carried on in and near the city; manganese deposits are found in the vicinity. Guantánamo, 50 miles (80 km) to the east, and Palma Soriano, 13 miles (21 km) to the west, are accessible by highway and railroad. Pop. (1987 est.) 38,374.

San Luis, in full SAN LUIS RÍO COLORADO, city, northwestern Sonora *estado* ("state"), Mexico, lies on the Mexico–United States border, south of Yuma, Ariz., and 2.5 miles (4 km) from the Colorado River. The city has grown prosperous as a port of entry and as the commercial and manufacturing centre of a large, irrigated agricultural area, yielding mainly wheat and cotton. Highways link the city to Mexicali and Sonoita (both in Sonora state), as well as to Yuma. Pop. (1980) 76,684.

San Luis Obispo, city, seat (1850) of San Luis Obispo county, western California, U.S., on San Luis Obispo Creek at the base of the Santa Lucia Mountains, 20 miles (32 km) east of the Pacific Ocean and 80 miles (130 km) northwest of the city of Santa Barbara. It grew up as a farming centre around the mission of San Luis Obispo de Tolosa (for St. Louis, bishop of Toulouse), founded in 1772 by Junípero Serra as the fifth in the California chain of 21 missions. After 1894 it became a railroad division point. Oil, pumped and refined locally, is shipped through Port San Luis (9 miles [14 km] southwest), on the Pacific coast. Light manufacturing, wineries throughout the county, and tourism are other economic factors. It is the home of the California Polytechnic State University, San Luis Obispo (1901), and Cuesta College (1963). Inc. 1856. Pop. (1987 est.) 38,161.

San Luis Potosí, inland-plateau *estado* ("state"), northeastern Mexico. It is bounded north by Coahuila; east by Nuevo León, Tamaulipas, and Veracruz; south by Hidalgo, Querétaro, and Guanajato; and west by Zacatecas. Although the surface (24,351 square miles [63,068 square km]) is generally level and the mean elevation is about 6,000 feet (1,800 m), rainfall is light and uncertain and drainage is poor. The soil is fertile, however, and in favourable seasons large crops are cultivated in the uplands and in the lower tropical valleys. Livestock raising is important, and hides, tallow, and wool are exported. Lumber is also exported to a limited extent. In addition, some of the richest silver mines in Mexico are located in San Luis Potosí. The state has good transportation networks; the major highway and railroad leading from Piedras Negras to Mexico City via Monterrey pass through San Luis Potosí city, the *estado* capital. Pop. (1987 est.) 1,985,000.

San Luis Potosí, city, capital of San Luis Potosí *estado* ("state"), northeastern Mexico. Situated on the central plateau, it has an elevation of 6,158 feet (1,877 m) above sea level, which gives it a temperate climate. Founded as a Franciscan mission in 1583 and made a city in 1658, San Luis Potosí was the centre of the region's colonial administration and played an important part in the political disorders following Mexico's independence. For a brief time in 1863 it was the seat of Benito Juárez' government, and it was there that Francisco I Madero drew up his Plan of San Luis Potosí (1910), which contained the political and social goals for the Mexican Revolution.

The city is the hub of a rich silver-mining and agricultural region and is a leading manufacturing and metal smelting and refining centre. It is known for its Spanish Baroque-style cathedral, the state capitol, and several



The cathedral and Plaza des Armas, San Luis Potosí, Mex.
Art Resource—EB Inc.

churches. The Autonomous University of San Luis Potosí was founded there in 1923. It is on major highway and railroad routes and possesses an airport. Pop. (1980) 338,000.

San-lun, school of Chinese Buddhism derived from the Indian Mādhyamika school. *See* Mādhyamika.

San Marco Basilica, Italian BASILICA DI SAN MARCO, English SAINT MARK'S BASILICA, church in Venice that was begun in its original form in 829 (consecrated in 832) as an ecclesiastical structure to house and honour the remains of St. Mark that had been brought from Alexandria. St. Mark thereupon replaced St. Theodore as the patron saint of Venice, and his attribute of a winged lion in time became the official symbol of the Venetian Republic. San Marco Basilica, built beside the Palazzo Ducale, or Doges' Palace, also served as the doge's chapel. It did not become the cathedral church of Venice until 1807.

The first basilica was burned in 976 during a popular revolt against the doge Pietro Candiano IV but was restored under his successor, Doge Domenico Contarini (d. *c.* 1070); the present basilica was completed in 1071. The plan is a Greek cross, and the building is surmounted by five domes. The design is distinctly Byzantine, and it is likely that both Byzantine and Italian architects and craftsmen were employed in the construction and decoration. Over the centuries, additions of sculpture, mosaics, and ceremonial objects have increased the church's richness. The famed four bronze horses on the west facade gallery, for example, were brought to Venice at the time of the Fourth Crusade (1204) from Constantinople, where they had been part of a Greco-Roman triumphal quadriga (a sculpture of a car or chariot drawn by four horses abreast). Though originally placed in the Arsenal, they were set up in the mid-13th century on the exterior of San Marco. They were removed to Paris by Napoleon but were returned in 1815.

The interior is decorated throughout with mosaics on gold ground and with many varieties of marble; the floor is of inlaid marble and glass. In the restricted light their colours glow. The screen separating the choir from the nave has marble statues, masterpieces of Venetian Gothic sculpture by Jacobello and Pier Paolo dalle Masegne.

The Campanile, separated from the church, was originally begun under the doge Pietro Tribuno (d. 912). It was adapted into its present familiar form early in the 16th century. In 1902 it collapsed but by 1912 had been rebuilt on its original site.

San Marcos, city, seat (1848) of Hays county, south-central Texas, U.S., on the San Marcos River, 31 miles (50 km) southwest of Austin. Franciscan missionaries probably first

saw the river on St. Mark's Day in 1709. The original Spanish settlement, Villa de San Marcos de Neve, established in 1807 at the Camino Real river crossing, was abandoned in 1812. Resettled by Anglo-Americans in 1846 and laid out in 1851, it developed as an agricultural and ranching centre. It was chartered as a city in 1877, and its growth was boosted by the foundation there of Southwest Texas State University (1899). The city's small farm-based industries and light manufacturing are augmented by tourism. Notable tourist attractions include Aquarena Springs (including hanging gardens, submarine theatre, and caves) at the headwaters of the San Marcos River, the Wonder World Cave, and the annual (June) Texas Water Safari. Pop. (1988 est.) 30,099.

San Marcos, Castillo de (national monument, Florida, U.S.): *see* Castillo de San Marcos National Monument.

San Marcos of Lima, Main National University of, Spanish UNIVERSIDAD NACIONAL MAYOR DE SAN MARCOS DE LIMA, coeducational state-financed institution of higher learning situated at Lima, the capital of Peru. The university was founded in 1551 by royal decree and confirmed by a papal bull of 1571. At the time the Peruvian republic was established (1824), it was closed, not to be reopened until 1861; in 1874 it became an autonomous institution. It was reorganized in 1946 and again in 1969, when the old organization by faculties was replaced by a full complement of modern academic programs. There are institutes of economic research, of pathology, of biochemistry and nutrition, of tropical medicine, of the biology of the Andes, and of natural resources.

San Marino, officially MOST SERENE REPUBLIC OF SAN MARINO, Italian SERENISSIMA REPUBLICCA DI SAN MARINO, small republic situated on the slopes of Mount Titano, on the Adriatic side of central Italy between the Romagna and the Marche regions and surrounded on all sides by the Republic of Italy.



San Marino

The republic's area of 23.5 square miles (61 square km) makes it the smallest independent state in Europe after Vatican City and Monaco and, until the independence of Nauru (1968), the smallest republic in the world.

The territory has an irregular rectangular form with a maximum length of 8 miles (13 km), northeast to southwest. It is crossed by the Marano and Ausa (Aussa) streams, which flow into the Adriatic Sea, and by the stream of San Marino, which falls into the Marecchia River. The landscape is dominated by the huge, central limestone mass of Mount Titano (2,424 feet [739 m]); hills spread out from it on the southwest, whereas the northeastern part gently slopes down toward the Romagna plain and the Adriatic coast. The silhouette of Mount Titano, with its three summits crowned by ancient triple fortifications, may be seen from many miles away.

The climate is mild and temperate, with maximum temperatures of 79° F (26° C) in summer and 19° F (−7° C) in winter. Annual rainfall ranges between about 22 inches (560 mm) and 32 inches (800 mm). Vegetation is typical of the Mediterranean zone, with variations due to elevation, and includes olive, pine, oak, ash, poplar, fir, and elm and many kinds of grasses and flowers. Besides domestic and farmyard animals, moles, hedgehogs, foxes, badgers, martens, weasels, and hares are found. Indigenous birds and birds of passage are plentiful.

The Republic of San Marino traces its origin to the early 4th century AD when, according to tradition, St. Marinus and a group of Christians settled there to escape persecution. By the 12th century San Marino had developed into a commune ruled by its own statutes and consuls. The commune was able to remain independent despite encroachments by neighbouring bishops and lords, largely because of its isolation and its mountain fortresses. Against the attacks of the Malatesta family, who ruled the nearby seaport of Rimini, San Marino enjoyed the protection of the rival family of Montefeltro, who ruled Urbino. By the middle of the 15th century it was a republic ruled by a Grand Council—60 men taken from the Arengo, or assembly of families. Warding off serious attacks in the 16th century (including an occupation by Cesare Borgia), San Marino survived the Renaissance as a relic of the self-governing Italian city-states. Rule by an oligarchy and attempts to annex it to the Papal States in the 18th century marked the decline of the republic.

When Napoleon invaded Italy he respected the independence of the republic and even offered to extend its territory (1797). The Congress of Vienna (1815), at the end of the Napoleonic Wars, also recognized its independent status. During the 19th-century movement for Italian unification, San Marino offered asylum to revolutionaries, among them Giuseppe Garibaldi. After Italy became a national state, a series of treaties (the first in 1862) confirmed San Marino's independence.

The San Marino constitution, originating from the Statutes of 1600, provides for a parliamentary form of government. The Great and General Council (Parliament) has 60 members, elected every five years by all adult citizens. It has legislative and administrative powers and nominates every six months the two captains regent (*capitani reggenti*), who hold office for that period and may not be elected again until three years have elapsed. The Great and General Council is headed by the captains regent, who are heads of state and of the administration. The Congress of State, a council of ministers, is composed of 10 members, elected by the Great and General Council from among its members, and constitutes the central organ of executive power. Each member has charge of a ministerial department.

The territory has no mineral resources, for the centuries-long quarrying of Mount Titano's stone and the craft that depended upon it have become exhausted. The republic's economy, therefore, relies entirely upon its inhabitants' enterprise. Its principal resources include industry, tourism, commerce, agriculture, and crafts. Manufacturing produces building materials, paints and varnishes, paper, metalwork, textiles, clothing, furniture, rubber and leather footware, ceramics, china, food and confectionery products, liqueurs, cosmetics, and sanitary articles.

Tourism is the sector of greatest expansion, and it makes a major contribution to the inhabitants' income. Alongside traditional excursion tourism, a convention-type tourism, based on the development of modern hotel facilities, and residential tourism are growing.

Agriculture, although no longer the principal economic resource in San Marino, has not shown any major decrease in production: wheat, corn (maize), and barley are the chief crops; dairying and livestock also are important.

Traditional craft products of San Marino include articles in ceramics and wrought iron and modern and reproduction furniture. Fine printing, particularly of postage stamps, is a useful source of revenue.

Although traces of human presence from both prehistoric and Roman times exist in the territory, Mount Titano and its slopes are known to have been populated, with certainty, only after the arrival of St. Marinus and his followers. A sizable element of San Marino's population now consists of non-San Marino citizens and, in a strong majority, Italians. More than 20,000 San Marino citizens, or Sammarinesi, are resident abroad, principally in Italy, the United States, France, and Argentina. Almost all of San Marino's citizens are Roman Catholics. The official language is Italian. A widely spoken dialect has been defined as Celto-Gallic, akin to the Piedmont and Lombardy dialects as well as to that of Romagna.

Social programs for the citizens of San Marino are extensive. The state finds employment for those who cannot find work with private concerns. Against a social security contribution, all citizens receive free, comprehensive medical care and assistance in sickness, accident, and old age, as well as family allowances. The state aids home ownership through its buildings schemes. Education is free up to 14 years of age. For higher level schooling, the state grants aid to students attending universities and institutions outside San Marino.

The capital, San Marino, is set high on the western side of Mount Titano, beneath the fortress crowning one of its summits, and is encircled by triple walls. Borgo Maggiore, farther down the slope, was for centuries San Marino's commercial centre, and Serravalle, beneath its castle of the Malatesta family, is agricultural and industrial. Most of San Marino's landscape is agricultural in character, but industrial concerns have intruded on the centuries-old forms of agricultural life.

A network of roads connects San Marino with the surrounding regions of Italy. Motor-coach services connect San Marino city with Rimini and, in summer, directly with the Adriatic coast. The capital is reached from Borgo Maggiore by means of a cable railway. Pop. (1988 est.) 22,304.

San Marino, residential city, Los Angeles county, southern California, U.S., southeast of Pasadena. In 1903 Henry Edwards Huntington purchased the San Marino Ranch and founded the community. His estate, deeded to the public, includes the Huntington Library (with rare English and American literary and historical collections including a Gutenberg Bible), Art Collections (where Gainsborough's "Blue Boy" and Sir Thomas Lawrence's "Pinkie" are displayed), and Botanical Garden (with specimens of unusual flora). El Molino Viejo (1812), a grist mill and San Marino's oldest building, is preserved. Inc. 1913. Pop. (1988 est.) 14,384.

San Martín (Argentina): *see* General San Martín.

San Martín, *departmento* (formed 1906) of northeastern Peru, located in the Río Huallaga Basin. Named for the liberator José de San Martín, it occupies an area of 20,197 sq mi (52,309 sq km). The chief centre of settlement

is around the departmental capital of Moyobamba (*q.v.*). Most of the inhabitants are farmers, whose products include coffee (flown to Lima), rice, cotton, beans, corn (maize), and bananas. San Martín contains such little-developed mineral resources as petroleum, clay, and salt. The warm, rainy climate supports dense forests, which are a source of rubber, balata, vanilla, and cabinet woods. San Martín is connected by the Marginal Highway to Amazonas *departamento* to the northwest and Huánuco *departamento* to the south. Pop. (1988 est.) 429,500.

San Martín, José de (b. Feb. 25, 1778, Yapeyú, viceroyalty of Río de la Plata [now in Argentina]—d. Aug. 17, 1850, Boulogne-sur-Mer, Fr.), Argentine soldier, statesman, and national hero who helped lead the revolutions against Spanish rule in Argentina (1812), Chile (1818), and Peru (1821).



José de San Martín, detail of a portrait by F. Bouchot; in the West Point Museum, New York

Courtesy, West Point Museum Collections, United States Military Academy

Early life and career. San Martín's father, Juan de San Martín, a professional soldier, was administrator of Yapeyú, formerly a Jesuit mission station in Guaraní Indian territory, on the northern frontier of Argentina. His mother, Gregoria Matorras, was also Spanish. The family returned to Spain when José was six. From 1785 to 1789 he was educated at the Seminary of Nobles in Madrid, leaving there to begin his military career as a cadet in the Murica infantry regiment. For the next 20 years he was a loyal officer of the Spanish monarch, fighting against the Moors in Oran (1791); against the British (1798), who held him captive for more than a year; and against the Portuguese in the War of the Oranges (1801). He was made captain in 1804.

The turning point in San Martín's career came in 1808, following Napoleon's occupation of Spain and the subsequent patriotic uprising against the French. For two years he served the Seville junta that was conducting the war on behalf of the imprisoned Spanish king Ferdinand VII. He was promoted to the rank of lieutenant colonel for his conduct in the Battle of Bailén (1808) and was elevated to command of the Sagunto Dragoons after the Battle of Albuera (1811). Instead of taking up his new post, he sought permission to go to Lima, the capital of the viceroyalty of Peru, but traveled by way of London to Buenos Aires, which was the principal centre of resistance in South America to the Seville junta. There, in the year 1812, San Martín was given the task of organizing a corps of grenadiers against the Spanish royalists centred in Peru who threatened the revolutionary government in Argentina.

One explanation for this startling change of allegiance on the part of a soldier who had sworn fealty to Spain is that it was prompted by British sympathizers with the independence movement in Spanish America and that San Martín was recruited through the agency of James Duff, 4th Earl of Fife, who had fought in Spain (and who caused San Martín to be made a freeman of Banff, Scot.). In later years, San Martín averred that he had sacrificed his career in Spain because he had responded to the call of his native land, and this is the view taken by Argentinian historians. Undoubtedly, peninsular Spanish prejudice against anyone born in the Indies must have rankled throughout his career in Spain and caused him to identify himself with the creole revolutionaries.

In the service of the Buenos Aires government, San Martín distinguished himself as a trainer and leader of soldiers, and, after winning a skirmish against loyalist forces at San Lorenzo, on the right bank of the Paraná (Feb. 3, 1813), he was sent to Tucumán to reinforce, and ultimately replace, General Manuel Belgrano, who was being hard pressed by forces of the viceroy of Peru. San Martín recognized that the Río de la Plata provinces would never be secure so long as the royalists held Lima, but he perceived the military impossibility of reaching the centre of viceregal power by way of the conventional overland route through Upper Peru (modern Bolivia). He therefore quietly prepared the masterstroke that was his supreme contribution to the liberation of southern South America. First, he disciplined and trained the army around Tucumán so that, with the assistance of gaucho *guerrilleros,* they would be capable of a holding operation. Then, on the pretense of ill health, he got himself appointed governor intendant of the province of Cuyo, the capital of which was Mendoza, the key to the routes across the Andes. There, he set about creating an army that would link up with the soldiers of the patriotic government in Chile and then proceed by sea to attack Peru.

Campaign across the Andes. To his disappointment, when the first stage of this plan was nearing completion, loyalist forces recaptured Chile (although the Chilean liberator, Bernardo O'Higgins, was able to escape to Mendoza). This made it necessary for San Martín to fight his way across the formidable barrier of the Andes. This was accomplished between Jan. 18 and Feb. 8, 1817, partly by a double bluff, which caused the Spanish commander to divide his forces in order to guard all possible routes, and more especially by careful generalship that ensured the maximum concentration of force at the enemy's weakest point, backed by adequate supplies. San Martín's skill in leading his men through the defiles, chasms, and passes—often 10,000 to 12,000 feet (3,000 to 4,000 m) above sea level—of four Andean cordilleras has caused him to be ranked with Hannibal and Napoleon. On February 12 he surprised and defeated the royalists at Casas de Chacabuco and took Santiago, where he refused the offer of the governorship of Chile in favour of Bernardo O'Higgins (who became supreme director) because he did not wish to be diverted from his main objective, the capture of Lima. Nevertheless, it took him more than a year to clear the country of royalist troops. He finally routed the remaining 5,300 on April 5, 1818, at the Battle of Maipú.

The next stage of San Martín's plan involved the creation of the Chilean navy and the accumulation of troop ships. This was accomplished, despite a shortage of funds, by August 1820, when the rather shoddy fleet, consisting mainly of armed merchant ships, under the command of Thomas Cochrane (later 10th Earl of Dundonald), left Valparaíso for the Peruvian coast. Cochrane, whom San Martín found a cantankerous colleague, had failed the year before to take the chief port, Callao, which was well-defended. The port was therefore blockaded, and the troops were landed to the south near Pisco; from this point they could threaten Lima from the landward side. True to his cautious nature, San Martín resisted the temptation to assault the capital, which was defended by a superior force, and waited for almost a year, until the royalists, despairing of assistance from Ferdinand VII (who had since been restored to the Spanish throne), withdrew to the mountains. San Martín and his army then entered Lima, the independence of Peru was proclaimed on July 28, 1821, and the victorious revolutionary commander was made protector.

San Martín's position was nevertheless insecure. He had broken with his supporters in Buenos Aires when, against their wishes, he insisted on pressing on to Lima; he was unsure of the loyalty of the Peruvian people and of the backing of some of his officers, many of whom suspected him of dictatorial or monarchical ambitions; and he lacked the forces to subdue the royalist remnants in the interior. Moreover, Simón Bolívar, who had liberated the northern provinces of South America, had annexed Guayaquil, a port and province that San Martín had hoped would opt for incorporation in Peru. He therefore decided to confront Bolívar.

Meeting with Bolívar. The two victorious generals met, ostensibly on equal terms, on July 26, 1822, at Guayaquil. What passed between them in their secret discussions is unknown, but what is clear is that San Martín hurried back to Lima, a disappointed man. There, seriously ill, faced by recriminations and overt disaffection, he resigned the protectorship on September 20. The rest of his life was spent in exile with his daughter, in Brussels, Paris, and Boulogne-sur-Mer, wisely avoiding any further involvement in the anarchic situations that marred the early history of the newly independent nations. He died in Boulogne-sur-Mer in 1850.

Assessment. San Martín's contribution to the cause of independence was his military skill. The boldness of his plan to attack the viceroyalty of Lima by crossing the Andes to Chile and going on by sea, as well as the patience and determination with which he executed it, was undoubtedly the decisive factor in the defeat of Spanish power in southern South America. Whether at Guayaquil he consciously made a great renunciation of personal ambition so that Bolívar, and with him the cause of independence, might triumph, or whether he went into voluntary exile because Bolívar made it clear that he was not prepared to help Peru so long as San Martín remained in control, remains an unresolved historical problem. (J.C.J.M.)

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San Martín, Juan Zorrilla de: *see* Zorrilla de San Martín, Juan.

San Martín del Rey Aurelio, *municipio* ("municipality"), Oviedo *provincia,* Asturias *comunidad autónoma* ("autonomous community"), northwestern Spain. It lies in the mountains known as the Cordillera Cantábrica, just southeast of Oviedo city. The municipality takes its name from the tomb of Aurelio, an 8th-century king of Asturias, in the parish church of San Martín village. It is a coal-mining and stock-raising region with Sotrondio as its chief population centre. Pop. (1981) 25,233.

San Martini, Giovanni Battista: *see* Sammartini, Giovanni Battista.

San Mateo, city, San Mateo County, western California, U.S., on the west shore of San Francisco Bay (there bridged to Hayward). Site of a mission hospice (built in 1793) on San Mateo Creek, it comprised the "estates" of successful gold prospectors. It was laid out in 1863 and connected by railroad to San Francisco. Its growth as a planned community corresponded with the urban development of the bay area. The College (junior) of San Mateo was founded in 1922. The city is the site of the Bay Meadows Race Track. Inc. city, 1894. Pop. (1980) 77,561.

San-men-hsia, Pinyin SANMENXIA, new city in western Honan Province (*sheng*), China. It is a county-level municipality (*shih*) in Lo-yang Prefecture (*ti-ch'ü*). The city was established in 1957 and takes its name from the Sanmen Gorge on the Huang Ho (Yellow River), the site of a great dam and hydroelectric installation on which work was begun in the 1950s. The gorge is some 20 mi (30 km) east of San-men-hsia. There the Huang Ho narrows to flow between steep cliffs, and the current is further impeded by two rocky islands—Kuei-men Tao and Shen-men Tao—which divide the stream into three channels, known as the Gate of Ghosts (Kuei Men), the Gate of the Spirits (Shen Men), and the Gate of Man (Jen Men). Below these the river is somewhat obstructed by three smaller islands—Ti-chu Rock, Chang-kung-shih Tao, and Shu-chuang-t'ai—the last two being connected by extensive sandbanks on the northeast bank below the rapids.

From earliest times this difficult passage, known as Ti-chu, has formed the main obstacle to navigation on the Huang Ho. Of the three channels, only the Gate of Man on the eastern bank was normally passable by ships, while the Gate of Ghosts was completely impassable. Under the Former Han dynasty (206 BC–AD 8), when the Imperial capital was at Ch'ang-an (modern Hsi-an) in Shensi Province on the Wei Ho (river), various attempts were made to widen the channel and thus permit river traffic to pass from the grain-rich eastern plain to the capital, but all ended in failure. When, under the T'ang dynasty (618–907), Ch'ang-an once again became capital of a united empire, the need to overcome the obstacles became even more acute. During the late 7th and early 8th centuries, tracking paths were built on the cliffs of the north bank, many of them supported on trestles built into the bank, to enable ships to be hauled up the rapids. In the 730s, when the transportation system was improved, an attempt was made to construct a road through the hills on the north bank suitable for cart traffic, thus connecting transshipment granaries above and below the rapids. In 743 an attempt was made to cut a completely new channel—remnants of which exist today—to the west of the Gate of Man. This channel, however, known as K'ai-yüan-hsin Ho (the New River of the K'ai-yüan period [713–741]), was rapidly blocked by silt. As a result of the failure of attempts to make the San-men passable to shipping, transport from the Wei Valley to the plain generally continued to travel overland from Lo-yang along the Ku Shui Valley to Shan-hsien—roughly the route followed in modern times by the Lung-hai Railway.

In 1955, under a multipurpose plan for the permanent control of the Huang Ho, it was decided to build an enormous dam 295 ft (90 m) high across the river at San-men to act as a flood-control, silt-retention, and water-storage project and also to feed a hydroelectric station joined by a high-tension grid to the rapidly expanding industrial bases of Hsi-an, T'ai-yüan, Lo-yang, and Cheng-chou. The dam has formed a reservoir of 1,350 sq mi (3,500 sq km), which reaches up the Huang Ho to the region of Lin-chin, Shansi, and well up the valleys of the Lo Ho and Wei tributaries to the west. Its completion will flood a densely populated area and require the resettlement of some 600,000 persons. About 250,000 people had been affected by the 1970s, and most of Ling-pao County to the west of San-men-hsia had been submerged. Han-k'u Kuan, the historic pass from the east of the gorge to the approaches to metropolitan Hsi-an, has become a small island in the lake.

The formation of the dam has made it possible to regulate the flow of floodwater into the eastern plain and to maintain the water level of the Huang Ho during the winter drought while also making navigation and irrigation possible. The enormous silt load of the Huang Ho is now mostly deposited in the new lake, which will itself probably silt up within 50 to 70 years. The San-men Dam was designed with Soviet aid and was to be equipped with Soviet generating equipment. As a result of the withdrawal of Soviet aid in 1960, however, the San-men installations remained incomplete 20 years later. Pop. (mid-1970s est.) 50,000–100,000.

San Miguel, *cabecera* (principal built-up area) of General Sarmiento *partido* (political subdivision), Gran (Greater) Buenos Aires, Arg., northwest of the city of Buenos Aires, in Buenos Aires province. The early settlement of the area centred on the agricultural plantation of San Jose del Pilar, founded by Adolfo Sordeaux in 1862. Ten years later Sordeaux established the town of San Miguel. In 1889 it became the capital of the newly created *partido* of General Sarmiento.

The first astronomical observatory in Argentina was founded in 1935 in San Miguel. The city is the home of a Jesuit seminary and an agricultural experimental station. Dairying is important in the lands west of San Miguel, which were formerly devoted to beef-cattle ranching. San Miguel, and General Sarmiento *partido* in particular, experienced rapid growth in the 1960s and 1970s. Two major railways, running west-northwest from Buenos Aires, and the national highway system serve San Miguel.

San Miguel, department, east central El Salvador; formed in 1875, it has an area of 802 sq mi (2,077 sq km), extending from the Pacific Ocean on the south to the Honduran border on the north. It has lowlands along the Río Grande de San Miguel but is largely mountainous, with some of the country's highest relief, including San Miguel Volcano (6,985 ft [2,129 m]). Cotton and grain are the economic mainstays, with corn (maize), sorghum, and henequen (a fibre for twine) of lesser importance. Stock raising and dairying (cheese and butter) are also carried on. Chief towns are the departmental capital, San Miguel (*q.v.*), and Chinameca. Fighting between leftist guerrillas and government troops disrupted the department during the early 1980s. Pop. (1981 est.) 434,047.

San Miguel, capital of San Miguel department, east central El Salvador, at the foot of San Miguel and Chinameca volcanoes. Founded in 1530 by Spanish settlers near the west bank of the Río Grande de San Miguel, it was badly damaged by a severe earthquake in 1917. It was rebuilt and has become the third largest city of El Salvador. San Miguel's position east-southeast of San Salvador on the Inter-American Highway, a section of the Pan-American Highway, and on the International Railways of Central America make it the most important commercial centre of eastern El Salvador. Industries include the production of textiles, rope, and leather goods. Henequen (a fibre for twine), grain, coffee, cotton, and sugarcane are grown in the surrounding agricultural area. San Miguel has modern municipal buildings, an 18th-century cathedral, and a branch of the University of El Salvador. The town's industries suffered disruptions during the early 1980s because of fighting between government troops and leftist guerrillas. The



The cathedral at San Miguel, El Salvador
Ewing Galloway

ruins of an ancient Indian town are nearby. Pop. (1982 est.) mun., 164,848.

San Miguel de Allende, city, east central Guanajuato state, north central Mexico. It lies on a small tributary of the Río de la Laja, 6,135 ft (1,870 m) above sea level and 32 mi (52 km) by highway north of Celaya. The first settlement in Guanajuato, it was founded in 1542 by the Franciscan monk Juan de San Miguel, a benefactor of the Indians, and named for him and for a native son, Ignacio Allende, a hero of the revolution against Spain. Irrigated by waters from the upper Río Lerma system, surrounding farmlands produce corn (maize), beans, wheat, quinces, and peaches. Tin is mined in the vicinity. Tourism is important, and the city has attracted as residents many U.S. citizens who attend the city's school of fine arts, established in 1938 by the artists Stirling Dickinson, of the United States, and Cossio de Pomar, of Peru. It is also known for its churches and numerous colonial buildings. The city can be reached by highway from Querétaro, 39 mi to the southeast, and the main Mexico City–Nuevo Laredo railroad passes 2 mi west of the city. Pop. (1970) 24,286.

San Miguel de Tucumán, city, capital of Tucumán province, northwestern Argentina, on the Río Salí, at the foot of the scenic Sierra del Aconquija. It was originally founded in 1565 by the Spanish colonial governor Diego de Villarroel at Ibatín on the Río del Tejar (now Pueblo Viejo on the Río Pueblo Viejo, a tributary of the Río Salí). After several floods, one disastrous, in 1850, the capital was moved to its present location (some 60 mi (96 km) northeast, upstream on the Salí and away from its banks. The city occupied a key position on the route from Córdoba to the Spanish silver mines in Bolivia and conducted a thriving wagon and harness trade; it was also a centre of a livestock industry that supplied draft animals for the mines of Peru. In 1776, with the creation of the viceroyalty of La Plata, control of Tucumán passed from Peru to Buenos Aires. On Sept. 24, 1812, Gen. Manuel Belgrano's forces decisively defeated Spanish royalist troops just north of the city. On July 9, 1816, a convention of delegates from the United Provinces of the Río de la

Plata met at San Miguel de Tucumán and signed the declaration of independence from Spain.

The arrival of railways (1876) and the introduction of sugarcane in the early 19th century stimulated the city's commercial growth. Sugar has remained the economic mainstay, but, in an effort to diversify the economy, the government of Pres. Juan Carlos Onganía (1966–70) closed several of the sugar mills and



The cathedral at San Miguel de Tucumán, Arg.
Art Resource—EB Inc.

constructed new industries. The city is known as the "garden of the republic" because of its mild climate and rich flora, and tourism has become an important source of income. Notable landmarks include the house of Bishop Colombres (who introduced sugarcane to the area), the colonial cathedral, the Casa de Gobierno (Government House, site of the independence convention), and various museums. The National University of Tucumán was established in 1914. Pop. (1980) 392,751.

San Miguel del Padrón, city, Ciudad de la Habana province, west central Cuba. For many years a small commercial and manufacturing centre in a sugar-growing and dairying district, San Miguel del Padrón became, with the expansion of Havana city, a functional part of the Havana Metropolitan Area. Major avenues and a railroad lead to downtown Havana, 10 mi (16 km) to the northwest. Pop. (1981 prelim.) 134,730.

San min chu-i (Chinese political philosophy): *see* Three Principles of the People.

San-ming, Pinyin SANMING, city in west central Fukien Province (*sheng*), China. It is a county-level municipality (*shih*) and the administrative centre of San-ming Prefecture (*ti-ch'ü*). San-ming is situated on the Sha Hsi (river), a southern tributary of the Min Chiang (river), the valley of which provides the chief southwest to northeast route through central Fukien. Westward and southwestward routes fan out into the mountainous interior of Fukien, and to the south there is a good route via the valley of the Chiu-lung Chiang to Amoy. Situated in a sparsely populated inland district with vast stretches of virgin forest, San-ming remained a small local market centre until 1956, when the opening of the railway linking it to Kiangsi Province in the north and Amoy in the south brought about considerable growth. The presence of excellent iron ore and coal at Lung-yen and Chang-p'ing on the railway to the south led to the establishment of an iron and steel plant there in the late 1950s. Pop. (mid-1970s est.) 10,000–50,000.

San Miniato al Monte, also called SAN MINIATO, three-aisled basilican church in Florence completed in 1062. It is considered one of the finest examples of the Tuscan Romanesque style of architecture.

The black and white marble panels used to ornament both the interior and the exterior, as well as the painted timber truss roof, are notable decorative features. It was begun after 1018 by Bishop Hildebrand, and the facade was finished in the 12th century.

San Murezzan (Switzerland): *see* Sankt Moritz.

San Nicolás de los Arroyos, city and port accessible to oceangoing vessels, northern Buenos Aires province, Argentina, on the western bank of the Río Paraná. It was founded in 1748 as San Nicolás de Bari y de los Arroyos by Don Rafael Aguiar and was declared a city in 1819. The Pact of San Nicolás (May 1852), signed by delegates from the United Provinces of the Río de la Plata, called for a constitutional congress to be held in Santa Fe and named Gen. Justo José de Urquiza provisional director of the Argentine Confederation.

The city's economy is based on its river trade in grains, iron ore and coal, and manufactured goods. The city's state-owned blast furnace produces much of the steel for the domestic market, and a large thermoelectric station provides power to the city of Buenos Aires and Santa Fe province. Pop. (1980) 96,313.

San pa-lo (in Buddhism): *see* Saṃvara.

San Pablo, chartered city, Laguna province, southwestern Luzon, Philippines. Originally the site of a Spanish military and missionary post, it was incorporated in 1940. It has an area of more than 50 sq mi (130 sq km) and includes 43 villages, in addition to its administrative centre. Seven small crater lakes are within the city, which is almost surrounded by quiescent volcanic cones. Copra and dried coconut are processed there. Manufactures include shoes, clothing, and transport equipment. San Pablo is a regional market served by the Manila Railroad and several major roads. Pop. (1980) 131,655.

San Pedro, in full SAN PEDRO DE LAS COLONIAS, city, southwestern Coahuila state, northeastern Mexico. It is located on one of the irrigation canals of the Río Nazas, near the Laguna (lagoon) de Mayrán, 3,619 ft (1,103 m) above sea level, 35 mi (60 km) by highway north of Torreón. In the vast surrounding farmlands, referred to as the Laguna District, cotton, cereals (especially wheat), grapes, fruits, and vegetables are cultivated. Industrial activities include cotton ginning, flour milling, vegetable-oil distilling, and tanning. Goods are exported by railroad and highway. Pop. (1980) 35,879.

San Pedro, department, central Paraguay. The territory comprises 7,723 sq mi (20,002 sq km) and drains toward the Paraguay River, which forms a western boundary 100 mi (160 km) long. A well-watered lowland of savanna and forest, San Pedro is traversed by the Rio Jejuí Guazú and other tributaries of the Paraguay River. One of Paraguay's principal producers of maté (tea), San Pedro accommodates lumbering, cattle raising, and agriculture. Limestone is quarried for cement in the southern Sierra (mountains) de San Joaquin, and the department contains iron-ore deposits. San Pedro is the largest town and the departmental capital. Nueva Germania town, northeast of San Pedro city, was founded in 1886 by Germans seeking to create a Nietzschean socialist utopia. Most transportation is by river, but highways connect San Pedro's important cities with Asunción. Pop. (1982 prelim.) 191,812.

San Pedro, capital, San Pedro department, central Paraguay, in the lowlands between the Jejui Guazú and Paraguay rivers. In addition to its administrative functions, San Pedro, founded in 1786, is the commercial and manufacturing centre for the hinterland, the major yields of which are lumber, maté (tea), cattle and other livestock, and oranges. Sawmills and plants for extracting fruit oil are located in the city. Also located there are a church, government delegation, courthouse, commerce school, liberal arts college, teachers college, and branch of the Bank of Paraguay. San Pedro is accessible by road from Asunción. Pop. (1982 prelim.) 3,515.

San Pedro, main unit of the Port of Los Angeles (the other units are Wilmington and Terminal Island), southern California, U.S., on the southeastern slopes of Palos Verdes Peninsula, overlooking Los Angeles Harbor (a section of San Pedro Bay) from the west. Its recorded history dates from 1542 when its open roadstead, bordered by mud flats, was travelled by the Spanish explorer Juan Rodríguez Cabrillo. Laid out in 1882 and incorporated as a city in 1888, San Pedro, despite its shallow waters, soon became a port. After it was annexed with adjacent Wilmington (originally New San Pedro) by Los Angeles in 1909, work began in earnest to deepen and transform its roadstead by dredging into one of the world's largest man-made harbours. Breakwaters were extended, terminals built, and modern port facilities now handle much of the harbour commerce. Along its waterfront are shipyards, dry docks, fish canneries, and oil refineries. Fort MacArthur Military Reservation and Cabrillo Beach (with a notable marine museum) are on Point Fermin at the peninsula's southern tip.

San-Pédro, port town of Sassandra *département,* southwestern Ivory Coast, situated about 40 mi (65 km) southwest of the departmental capital, Sassandra, on the Gulf of Guinea. Until the mid-1960s, San-Pédro was a tiny fishing village of fewer than 100 inhabitants, but following the start of port construction there in 1968, it rapidly grew into a major town. Upon completion of the port in 1970, San-Pédro became the nation's second largest port (after the capital, Abidjan). Exports consist mainly of wood products, which also constitute the town's largest industry. San-Pédro serves as a shipping point in the government project to develop and export the rich forest resources of the southwestern Ivory Coast. Pop. (1975) 27,616.

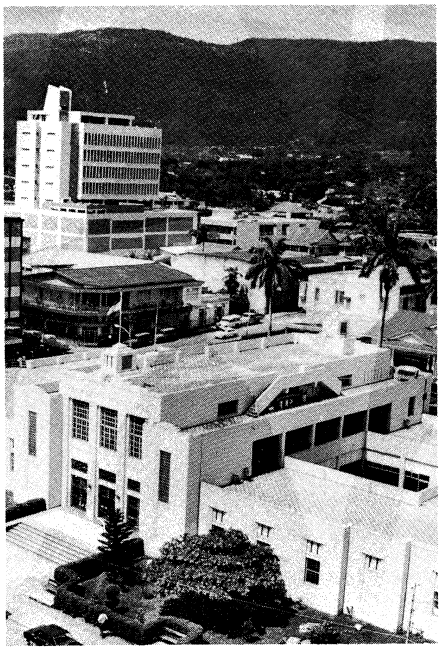
San Pedro de Durazno (city, Uruguay): *see* Durazno.

San Pedro de Macorís, province, southeastern Dominican Republic, bounded on the south by the Caribbean Sea. Established in 1908, the province occupies 450 sq mi (1,166 sq km), including a wide strip of the southern coastal plain and part of the rolling interior that slopes gently southward from the centre of the nation. It is the republic's leading sugar producer, accounting for one-fourth of the national output. Cattle raising is important in the drier parts, and lumbering of tropical hardwoods is also significant. Paved and secondary highways traverse the province, centring upon San Pedro de Macorís (*q.v.*) city, the provincial capital. Pop. (1981) 152,890.

San Pedro de Macorís, city, capital of San Pedro de Macorís province, southeastern Dominican Republic, at the mouth of the wide estuary of the Río Macorís. The chief city of the southeastern region, it has an economy centred on the sugar industry. Its modern port handles much of the nation's exports, including sugar, molasses, cattle, and timber. Industries include corn milling, the manufacture of clothing, and soap and alcohol distilling. The

Universidad Central del Este was founded in 1970. It is located on the main highway linking Santo Domingo with Higüey. Pop. (1981) 78,562.

San Pedro Sula, capital, Cortés department, northwestern Honduras, in the Ulúa River Valley, 37 mi (60 km) inland by highway and railroad from Puerto Cortés, on the Gulf of Honduras. The city, founded in 1536 by the Spanish, has been almost completely rebuilt. It is the centre of an important agricultural



The Palacio Municipal (foreground), San Pedro Sula, Honduras
Plessner International

area that produces bananas for export and sugarcane, rice, corn (maize), sweet potatoes, cassava, and livestock for domestic consumption. It is also a commercial, financial, and distributing centre for northern and western Honduras. The nation's chief industrial centre, San Pedro Sula has plants that manufacture foodstuffs, animal feed, textiles, clothing, hats, beer, soap, processed lumber, paper, furniture, plastics, paints, cement, glass, metalware, electrical appliances, bicycles, pharmaceuticals, chemicals, and a variety of other products. Hurricane Fifi in 1974 badly damaged the agricultural hinterland and certain industries. An industrial free trade zone opened in 1976. The city is a centre for highways and railroads and has an international airport. Pop. (1983 est.) 362,513.

San Rafael, city, central Mendoza province, western Argentina, near the eastern base of the Andes on the Río Diamante. It originated around Fuerte (fort) de San Rafael, built in 1805 at the frontier roughly marking the southern limits of European colonization. Pacification of area Indians in about 1870 enabled the city to be developed as the centre of an agricultural area producing grapes, fruits (peaches, plums, pears and apricots), and grains. Contemporary local enterprises include wineries, meat-packing plants, canneries, and dairies. Deposits of petroleum and uranium southwest of San Rafael are exploited, and dams to the west along the Diamante and Atuel rivers provide local irrigation water and hydroelectric power to the city of Mendoza. Pop. (1980 prelim.) 70,477.

San Rafael, city, seat (1893) of Marin County, on the northwestern shore of San Francisco Bay, western California, U.S. It developed around the Mission San Rafael Arcangel (1817; restored) as a ranch town. Growth was sustained by the arrival of the San Francisco and North Pacific Railroad (now Northwestern Pacific, 1884) and the founding of Dominican College of San Rafael (1890). Improved accessibility to San Francisco (15 mi [24 km] southeast) and the East Bay cities via the Golden Gate and Richmond–San Rafael bridges encouraged light industrial development. To the north is the Frank Lloyd Wright Civic Center (an arched structure spanning four hills, designed by Wright). Pop. (1980) 44,700.

San Rafael Mountains, segment of the Pacific Coast Ranges, extend southeastward for about 50 mi (80 km) from the Cuyama River to near the Santa Barbara–Ventura County line, western California, U.S. Several peaks exceed 6,000 ft (1,800 m), including San Rafael Mountain (6,596 ft) and Big Pine Mountain (6,940 ft), the highest point. The range lies within the Los Padres National Forest.

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San Rafael National Park, Spanish PARQUE NACIONAL DE TURISMO LAGUNA SAN RAFAEL, national park in Aisén region, southern Chile, on the Pacific coast. Established in 1945, it occupies an area of 2,300 sq mi (5,900 sq km). One of its great attractions is Laguna San Rafael (Lake San Rafael), a fjord more than 10 mi (16 km) long between Península de Taitao and the mainland, into which Ventisquero (glacier) San Rafael flows. Created to preserve native fauna and flora from extinction, the park also has considerable scientific interest to volcanologists. Its windswept canyons and numerous lakes make the area a promising tourist and recreation centre. Access is by sea and river.

San Remo, town, Imperia province, Liguria region, northwestern Italy, the chief resort of that part of the Italian Riviera known as the Riviera dei Fiori, east of Nice, Fr. A year-round health resort since 1861, its repute was greatly increased by the visit of Frederick III of Germany in 1887–88. The old town on the hillside has steep, narrow streets with 13th-century houses, the 12th-century cathedral of S. Siro, and the sanctuary of the Madonna della Costa (15th–17th century). The new town on the coast is characterized by handsome villas and hotels, gardens and scenic promenades, and the casino. The small seaport is sheltered by a 4,000-ft- (1,200-m-) long mole and overlooked by the old Genoese Fort of Santa Tecla. San Remo has the most important flower market in Italy and exports blooms to continental Europe. Olives and lemons are also cultivated. Pop. (1981 prelim.) mun., 62,711.

San Remo, Conference of (April 19–26, 1920), international meeting convened at San Remo, on the Italian Riviera, to decide the future of the former territories of the Ottoman Turkish Empire, one of the defeated Central Powers in World War I; it was attended by the prime ministers of Great Britain, France, and Italy, and representatives of Japan, Greece, and Belgium.

The conference approved the final framework of a peace treaty with Turkey which was later signed at Sèvres, on Aug. 10, 1920. The Treaty of Sèvres abolished the Ottoman Empire, obliged Turkey to renounce all rights over Arab Asia and North Africa, and provided for an independent Armenia, for an autonomous Kurdistan, and for a Greek presence in eastern Thrace and on the Anatolian west coast, as well as Greek control over the Aegean islands commanding the Dardanelles. Rejected by the new Turkish nationalist regime, the Treaty of Sèvres was replaced in 1923 by the Treaty of Lausanne, which voided previous Allied demands for Kurdish autonomy and Armenian independence but did otherwise recognize Turkey's current boundaries.

During the Conference of San Remo, two "A" mandates were created out of the old Ottoman province of Syria: the northern half (Syria and Lebanon) was mandated to France, the southern half (Palestine) to Great Britain. The province of Mesopotamia (Iraq) was also mandated to Great Britain. Under the terms of an "A" mandate the individual countries were deemed independent but subject to a mandatory power until they reached political maturity. When King Faysal of Damascus opposed the French mandate over Syria, he was expelled by the French Army.

An Anglo-French oil agreement was also concluded at the San Remo conference (April 24–25), providing France with a 25 percent share of Iraqi oil and favourable oil transport terms and stipulating in return the inclusion of Mosul in the British mandate of Iraq.

The conference also dealt with Franco-German tensions in the Ruhr Valley relating to the terms of the Versailles treaty; it refused to allow Germany to increase the size of its army.

San Salvador, department, central El Salvador, extending from near the Pacific coast on the south to the deep Río Lempa Valley on the north, with an area of 342 sq mi (886 sq km). In the west is the massive San Salvador Volcano, 6,430 ft (1,960 m) high; part of Lake Ilopango lies in the east. During the Spanish colonial era, San Salvador occupied a larger area and developed as a province; it was raised to the rank of *intendencia* (province) in 1786 but was reduced to its present size in 1859 when it was reorganized as a department. Sugarcane, coffee, grain, tobacco, and fruits are grown, and livestock and poultry raising have some importance. Considerable manufacturing is concentrated in and around the departmental and national capital, San Salvador. Pop. (1981 est.) 979,683.

San Salvador, capital of El Salvador, on the Río Ace Chaute in the Valle de las Hamacas (Valley of the Hammocks) at an altitude of 2,238 ft (682 m). San Salvador Volcano is 7 mi (11 km) west-northwest. Founded near Suchitoto in 1525 by the Spanish conquista-



Presidential palace, San Salvador city, El Salvador
Ewing Galloway

dor Pedro de Alvarado, it was moved 20 mi southwest to its present site in 1528 and was declared a city in 1546. San Salvador served as capital of the colonial province of Cuscatlán and as capital (1834–39) of the United Provinces of Central America; it has been the Salvadorean capital since 1839. Ruined by earthquakes in 1854, 1873, and 1917 and by heavy floods in 1934, it has been reconstructed with modern government buildings and scenic parks and plazas. There are no colonial buildings remaining in the city.

San Salvador is the nation's leading financial, commercial, and industrial centre; transportation is also focussed there, with railroads and

highways linking it with the Pacific ports of Acajutla, La Unión (Cutuco), and La Libertad. Manufactures include textiles, clothing, leather goods, wood products, pharmaceuticals, cigarettes, and cigars; meat-packing and liquor distilling are also important.

The city has a small cathedral and several libraries and is the site of the National Museum of Science and Industry (1883) and the National Museum of El Salvador (1940; with numerous Mayan relics). The National University of El Salvador was founded there in 1841 as Colegio de la Asunción. San Salvador is also the seat of the Central American University of "José Simeón Cañas" (1965). During the late 1970s the city became the focus of violence between the government and left-wing political groups.

Among the city's rapidly growing suburbs are Mejicanos, Villa Delgado, and Soyapango. A new international airport was built at nearby Comalpa in the late 1970s. Lake Ilopango, a summer resort area, is 12 miles (19 km) east. Pop. (1985 est.) 459,902.

San Salvador de Jujuy, city, capital of Jujuy *provincia,* northwestern Argentina. It lies between the Xibi-xibi and Grande rivers, overlooking the valley of Jujuy at 4,131 feet (1,259 m) above sea level. It was founded in 1593 by Francisco de Argañarás y Murguia, a colonial soldier, after the consolidation of Spanish power over the local Omaguaca Indians. Jesuits and Franciscans established churches and

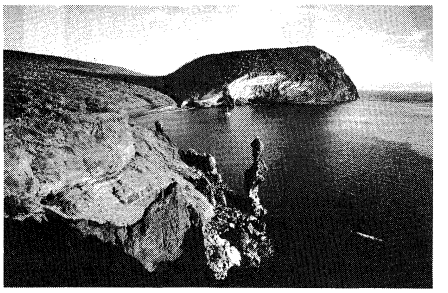


The cathedral at San Salvador de Jujuy, Arg.
Art Resource—EB Inc.

libraries there, as well as *reducciones* (work missions) for the Indians, and the city became a regional cultural centre. Its economy is basically agricultural (sheep raising, sugar, and fruit growing), and tourism, promoted by the outstanding pre-Columbian and colonial art and architecture, is also important. Historic landmarks include the cathedral (begun 1606), which contains many 18th-century art treasures, and the Government House, where the original national flag is kept. The city is linked by rail to Bolivia and to the rest of Argentina by air and rail. Pop. (1980) 124,487.

San Salvador Island, also called WATLING ISLAND, or WATLING'S ISLAND, one of the islands of The Bahamas in the West Indies. San Salvador is believed by many scholars to be the island of Guanahani, where Columbus made his first landing in the New World on Oct. 12, 1492. (Some scholars assert, however, that the island of Guanahani is actually Samana Cay, 65 miles [105 km] southeast of San Salvador.) San Salvador is about 13 mi (21 km) long and 5 miles (8 km) wide. It was formerly called Watling's Island after a famous buccaneer. Pop. (1980 prelim.) 804.

San Salvador Island, also called JAMES ISLAND, one of the Galápagos Islands, in the eastern Pacific Ocean, about 600 miles (965 km) west of Ecuador. Its relief is dominated



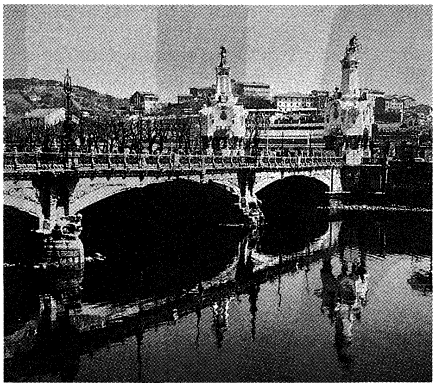
Buccaneer Cove, San Salvador Island, Galápagos Islands
© Nicholas deVore III—Bruce Coleman Inc.

by two volcanoes, the larger rising to 1,700 feet (520 m), that form the mass of the island's area of 203 square miles (526 square km). Originally named for England's King James II, who was previously the duke of York, the island was also formerly called York and Santiago. It served as a food cache for pirates and during the 19th century was visited by both Charles Darwin and the American novelist Herman Melville. It is noted for its flamingo colony. The island is populated by humans only on a temporary basis.

San Sebastián, town, capital of Guipúzcoa *provincia,* in the Basque Country *comunidad autónoma* ("autonomous community"), north-central Spain. It is a fashionable seaside resort at the mouth of the canalized Urumea River on the Bay of Biscay, east of Bilbao, near the French frontier.

First mentioned in a document of 1014, it was granted a charter of rights and privileges by Sancho the Wise of Navarre in about 1160–90. In 1813 the town burned after Anglo-Portuguese troops took it from the French during the Peninsular War. It was formerly the summer residence of the Spanish royal court. Its old Basque name is Donostia. The old town and harbour occupy an isthmus between the mainland and Mount Urgull, on whose summit stands the 16th-century Mota Castle. The well-planned modern town extends across both banks of the Urumea and to the broad beaches on La Concha bay, site of the famous regattas that take place on the Feast of Saint Sebastián (January 20). In the old town are the Gothic church of San Vicente (1507), the Baroque church of Santa María (1743–64), and the former convent of San Telmo (1531–51), now a museum with a Basque ethnographic section. The new town has the notable neo-Gothic cathedral of El Buen Pastor (The Good Shepherd).

Aside from tourism, the chief sources of income are fishing and the manufacture of cement, chemical and metallurgical products, phonograph records, beer, and chocolate. La



Maria Cristina Bridge across the Río Urumea, San Sebastián, Spain
J. Allan Cash—Ostman Agency

Concha beaches attract thousands of visitors annually, as do annual international jazz and film festivals. Pop. (1986 est.) 175,507.

San Severo, city and episcopal see, Foggia *provincia,* Puglia (Apulia) *regione,* east-central Italy. It lies in the north of the Puglia Tableland, just north of Foggia city. A flourishing market centre in the 12th century, it was owned by a succession of feudal rulers before passing to the Kingdom of Naples and, in 1860, to the Kingdom of Italy. It was badly damaged by an earthquake in 1627, and little remains of the medieval city. There are several Baroque churches. San Severo is a commercial, industrial (mainly agricultural products), and communications centre for the surrounding region. Pop. (1987 est.) mun., 55,239.

San Simeon, village, San Luis Obispo County, southwestern California, U.S. It lies along the Pacific Ocean overlooking a bay on San Simeon Point. Part of the old Rancho San Simeon (belonging to the Mission San Miguel), it lends its name to the famed domain of publisher William Randolph Hearst. The vast local estate (245,000 acres [99,148 hectares], developed in the 1860s by Senator George Hearst from his Piedro Blanca Rancho, was inherited by his son, William Randolph, who in 1922 began construction of La Casa Grande, an immense Spanish castle on La Cuesta Encantada ("Enchanted Hill") as a home and retreat. The site's embellishment continued for 18 years with numerous subsidiary buildings, Italian gardens, statuary, pools, fountains, and priceless art treasures garnered by Hearst's agents worldwide. The architect of the building complex was Julia Morgan. The estate includes a lavish theatre, three palatial guest houses (one of which has Cardinal Richelieu's bed), and a Greek temple. Of the original holdings, 123 acres (50 hectares), including the castle complex, passed into public domain in 1958 as the Hearst-San Simeon State Historical Monument. According to Hearst's wishes, the bequest was named for his mother, Phoebe Apperson Hearst, philanthropist and art collector.

San Stefano, Treaty of (March 3 [Feb. 19, Old Style], 1878), peace settlement imposed



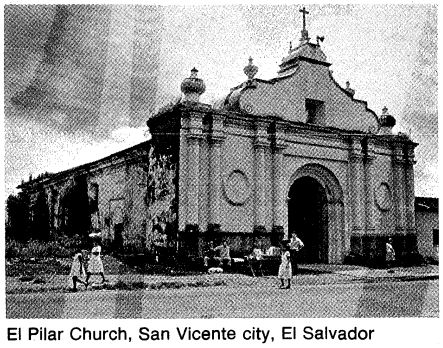
Greater Bulgaria (entire white land area) as proposed by the Treaty of San Stefano, March 3, 1878

on the Ottoman government by Russia at the conclusion of the Russo-Turkish War of 1877–78; it provided for a new disposition of the European provinces of the Ottoman Empire that would have ended any effective Turkish control over the Balkans if its provisions had not later been modified. Its most important provision established an independent Bulgarian principality, which included most of Macedonia and extended to the Danube and from the Aegean to the Black Sea. The independence of Serbia, Montenegro, and Ro-

mania was recognized. The boundaries of Serbia and Montenegro were extended so as to be contiguous, while Romania was compelled to cede southern Bessarabia to Russia, receiving the Dobrudja from Turkey in exchange. Bosnia-Hercegovina was to be autonomous. Parts of Asiatic Turkey were ceded to Russia, and the Ottoman sultan gave guarantees for the security of his Christian subjects.

The treaty was opposed by Austria-Hungary, which disliked encouragement of Slav nationalism, and by the British, who feared the new Bulgarian state would become a Russian satellite and a threat to Istanbul. The treaty was modified by the terms of the Treaty of Berlin signed four months later on July 13.

San Vicente, city, south-central El Salvador. It lies along the Accihuapa River at the northeastern foot of San Vicente Volcano (7,155 feet [2,181 m]), in a region of hot springs and geysers. Founded in 1635, on the site of Tehuacán, an ancient Indian settlement, it



El Pilar Church, San Vicente city, El Salvador
Walter Aguiar—EB Inc.

has served as both the national capital (1834–39) and the seat of the national university (1854–59). The city was partially destroyed by an earthquake in 1936 but was rebuilt. San Vicente is a service centre for an area producing grain, sugarcane, and coffee. Industries include sugar milling and the manufacture of textiles and clothing. Notable landmarks include El Pilar colonial church and nearby Amapulapa Park, a national recreation area. Pop. (1985 est.) 27,205.

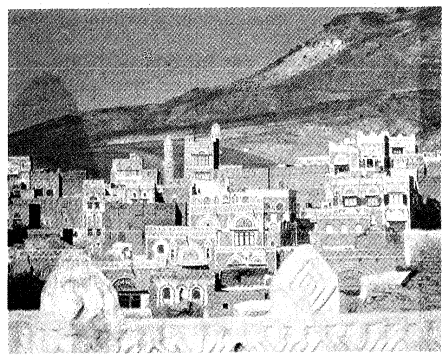
Ṣan'ā', also spelled SANAA, or SANA, city and capital of Yemen. It is situated at the western foot of Mount Nuqum, at an elevation of about 7,700 feet (2,350 m) above sea level, in the western part of the country. Ṣan'ā' has for many centuries been the chief economic, political, and religious centre of the Yemen Highlands. It occupies the site of the ancient pre-Islāmic stronghold of Ghumdān, which tradition dates to the 1st century AD. Ṣan'ā' was converted to Islām by 'Alī, fourth caliph and son-in-law of Muḥammad, in 632. The city's history as a Muslim centre is one of sporadic rivalry between the heterodox Zaydī imams (leaders) and rival dynasties; the Zaydī imamate, whose original capital was at Ṣa'dah in the north, lasted, with frequent interruptions, from 860 to 1962. There was a sharp decline in the city's fortunes in the 12th–15th century, as successive conquerors of Yemen set up their capitals in other cities. 'Abd al-Wahhāb ibn Ṭāhir of the Ṭāhirid dynasty (reigned 1478–88), however, embellished the city with many fine mosques and *madārīs* (Islāmic theological schools).

Nominally under Ottoman sovereignty from 1516, Ṣan'ā' was effectively controlled by the imams from the early 17th century to 1872; only then did the Ottomans succeed in capturing and holding the city. Civil strife between the Ottomans and the imams was endemic until a treaty of 1913 gave the latter almost total autonomy. Ṣan'ā' became the national capital of independent Yemen after Ottoman defeat in World War I. Under the imam Aḥmad (reigned 1948–62), the capital was moved south to Ta'izz, but Ṣan'ā' again became the capital with the establishment (1962) of the Yemen Arab Republic (San'ā'). When the latter state merged with the People's Democratic Republic of Yemen (Aden) in 1990, San'ā' became the unified nation's capital.

The old city is surrounded by a stout wall 20–30 feet (6–9 m) high, pierced by numerous gates. Most notable architecturally is the Yemen Gate (Bāb al-Yaman), renamed Liberty Gate after the revolution of 1962. In the centre of the old city is the seven-story Republican Palace, formerly the palace of the imam. The principal old suqs (marketplaces) are in the eastern section; there, too, are most of Ṣan'ā"s more than 40 mosques. Especially notable is the Jāmi' al-Kabīr, or Great Mosque, with a local kaaba, or sacred shrine, which once rivaled that of Mecca in Zaydī veneration. The newer sections of Bi'r al-'Azab, Bi'r al-Bahaymī, and Bi'r ash-Shams are in the western part of the city. There, too, was the Qā' al-Yahūd (lowland of the Jews). In this walled-off ghetto, traditional crafts, such as fine gold and silver metalwork and embroidery, were practiced. Virtually all of the capital's Jews left the country to settle in Israel in 1949–50, dealing an almost fatal blow to the handicraft economy.

Ṣan'ā"s traditional isolation has been mitigated by a modern all-weather road to the port of al-Ḥudaydah to the southwest; the road was built by the People's Republic of China and opened in 1961. Another good highway leads to Ta'izz, which is linked to the old port of Mocha (al-Mukhā), now little-used.

In addition to the city's function as a regional trade centre, modern industry has been stimulated by foreign assistance; a cotton textile mill built by the Chinese (opened 1966) is particularly important. Many of the city's residents are government workers. New residential quarters have been built outside the old city walls. Ṣan'ā"s international airport is at ar-Raḥabah, about 12 miles (20 km) west. In the northwestern environs is the former weekend palace of the imam; the structure is perched on a steep rock outcrop overlooking



Part of the western section of Ṣan'ā', in Yemen, with Mount Nuqum in the background
Art Resource—EB Inc.

the Wadi Dharr. The garden suburb of Rawḍah, due north of Ṣan'ā', has a fine mosque in the Moorish style. Many houses and public buildings in and around the capital were damaged in the civil war of 1962–70. The University of Ṣan'ā' was established in 1970. Pop. (1986) 427,185.

Sanaga River, stream in central Cameroon. Its most important headstreams—the Lom and the Djerem—meet to form the Sanaga about 56 miles (90 km) north-northwest of Bertoua. The river then flows about 325 miles (525 km) southwest across the central plateau past Nanga-Eboko, Monatélé, and Edéa. It broadens to a wide estuary that roughly bisects Cameroon's Atlantic coastline, 30 miles (48 km) south of Douala.

Falls and rapids are found along much of its upper course. Edéa, at the head of steamboat navigation, is the site of a hydroelectric dam that harnesses the energy of the 60-foot (18-metre) falls on the river to generate electricity for Edéa and Douala. A dam and reservoir at Mbakaou regulate water flow.

Sanā'ī, pseudonym of ABŪ AL-MAJD MAJDŪD IBN ĀDAM, also spelled ABŪ'L-MAJD MAJDŪD IBN ĀDAM (d. 1131?, Ghazna [now Ghaznī], Afg.), Persian poet, author of the first great mystical poem in the Persian language, whose verse had great influence on Persian and Muslim literature.

Little is known of Sanā'ī's early life. He was a resident of Ghazna and served for a time as poet at the court of the Ghaznavid sultans, composing panegyrics in praise of his patrons. At some point he underwent a spiritual conversion and, abandoning the court, went to Merv (near modern Mary, Turkmen S.S.R.), where he pursued a life of spiritual perfection. He returned to Ghazna years later but lived in retirement, resisting the blandishments of his Ghaznavid patron Bahrām Shāh.

Sanā'ī's best-known work is the *Ḥadīqat al-ḥaqīqah wa sharī'at aṭ-ṭariqah* ("The Garden of Truth and the Law of the Path"). Dedicated to Bahrām Shāh, this great work, expressing the poet's ideas on God, love, philosophy, and reason, is composed of 10,000 couplets in 10 separate sections. The first section was translated in English as *The Enclosed Garden of Truth* (1910).

Sanā'ī's work is of major importance in Persian-Islāmic literature, for he was the first to use such verse forms as the *qaṣīdah* (ode), the *ghazal* (lyric), and the *masnavī* (rhymed couplet) to express the philosophical, mystical, and ethical ideas of Ṣūfism (Islāmic mysticism). His divan, or collected poetry, contains some 30,000 verses.

Sanandaj, city, northwestern Iran, at an elevation of 4,990 feet (1,521 m). It was called Sisar, meaning "thirty heads," in the itineraries of Ibn Khurdazib and Qudameh. The population is mostly Kurds and a few Armenians. During the Iran-Iraq War, the city was attacked by Iraqi planes and also saw disturbances by Kurds. Industries produce carpets, processed hides and skins, milled rice, and sugar. Woodworking, cotton weaving, and the making of metalware and cutlery constitute the handicrafts. Roads link Sanandaj with Marīvān, Saqqez, Bāneh, and Bījār. The city has a fortress built during 'Abbāsid rule (AD 750–1258) and a government telegraph station. Pop. (1986 prelim.) 204,537.

Sănătescu, Constantin (b. 1885—d. Nov. 8, 1947, Bucharest, Rom.), Romanian military officer and statesman who was prime minister of Romania's first liberation government following an antifascist coup of Aug. 23, 1944.

From 1925 to 1928 Sănătescu was military attaché at Paris and London. Raised to the rank of general in 1935, he was named deputy chief of the general staff two years later and, after the outbreak of World War II, led the Romanian delegation to Moscow (1940).

Following the overthrow of the pro-German military dictatorship of General Ion Antonescu (Aug. 23, 1944), Sănătescu was immediately charged with the formation of a provisional government by King Michael. He looked to the United States for support of his "democratic" regime and established his administration as uncompromisingly hostile to the growth of communist influence in Romania. Under increasing pressure from the Soviet Union and Romanian communists, however, he was forced to re-form his cabinet (Nov. 4, 1944) and finally to resign (Dec. 2, 1944). He subsequently retired from public life.

Sanatruces, also called ARSHAKAN (fl. 1st century BC), king of Parthia from 76/75 to 70/69 BC, who restored unity to his kingdom.



Sanatruces, coin, 1st century

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

Sanatruces may have been a son of Mithradates I (reigned 171–138), the Parthian king who had established the kingdom's power. Following the death of King Mithradates II in 88 BC, dynastic struggles troubled Parthia, and the Armenians took advantage of the situation to invade the kingdom. Sanatruces sought refuge with the Sacaraucase, a Scythian tribe. Despite his 80 years, he was chosen as the prince best suited to deal with the dynastic question; he was made king of Parthia to clear up the succession and reunify the kingdom. On his death Sanatruces was succeeded by his son.

Sanbation (Jewish legendary river): *see* Sambation.

Sanborn, Franklin Benjamin (b. Dec. 15, 1831, Hampton Falls, N.H., U.S.—d. Feb. 24, 1917, Plainfield, N.J.), American journalist, biographer, and charity worker.

A descendant of an old New England family (its progenitor first immigrating in 1632), Sanborn attended Phillips Exeter Academy and Harvard College (B.A., 1855). In 1855 he settled in Concord, Mass., then an intellectual centre, and also became active in the Abolitionist cause, becoming John Brown's New England agent. He tried to dissuade Brown from attempting the raid that led to Harper's Ferry, but he nevertheless aided the firebrand with funds. The U.S. Senate early in 1860 tried—through a summons and then orders for arrest—to get him to testify about his role, and for two months he was partly on the run, until the Massachusetts Supreme Court protected him from seizure.

He had already begun a career in journalism, and in 1863 he became an editor of the *Boston Commonwealth;* in 1867 he joined the staff of the *Springfield Republican* (Springfield, Mass.), with which he remained until 1914. Concurrently, from 1863 to 1888 he served several times on the state board of charities, working for prison reform, care of the insane, and other welfare measures.

In his years at Concord, he came to know many of the luminaries of literary New England. Among his many writings are *Henry D. Thoreau* (1882), *The Life and Letters of John Brown* (1885), *A. Bronson Alcott: His Life and Philosophy,* 2 vol. (1893; with W.T. Harris), *Ralph Waldo Emerson* (1901), *Hawthorne and His Friends* (1908), *Recollections of Seventy Years,* 2 vol. (1909), and *The Life of Henry David Thoreau* (1917).

Sancerre, town, Cher *département,* central France, on a hilltop overlooking the Loire River, about 26 miles (42 km) northeast of Bourges. It is at the centre of a small but renowned white-wine district; the slopes below the town are planted with some 700 acres (280 hectares) of Sauvignon vines, and the hills of 12 surrounding towns are similarly clad in vines. Sancerre itself contains a network of twisting streets (with many 15th- and 16th-century houses) running to a cylindrical keep of the 15th century, the Tour des Fiefs ("Tower of Fiefs"), all that remains of an ancient castle.

From 1037 to 1152 the title of count of Sancerre was held by the counts of Champagne; from 1152 to 1640 it had its own counts, who were descended from Theobald IV of Champagne. During the religious wars it was a stronghold of Protestantism (sometimes being called the "Little Rochelle") and in 1573 was besieged by Roman Catholic forces, who did not succeed in capturing it until after nearly eight months of siege. In 1640 Sancerre became the property of Henri II de Bourbon, 3e prince de Condé, whose descendants possessed it until the Revolution of 1789. Pop. (1982) 2,286.

Sanches, Francisco, Sanches also spelled SANCHEZ (b. *c.* 1550, probably Braga, Port., or Túy, Spain—d. *c.* Nov. 26, 1623, Toulouse, Fr.), physician and philosopher who espoused a "constructive Skepticism" that rejected mathematical truths as unreal and Aristotle's theory of knowledge as false.

Sanches received a medical degree at Montpellier (1574) and taught philosophy at the University of Toulouse before becoming professor of medicine in 1612. In *Quod Nihil Scitur* (1581; "Why Nothing Can Be Known"), a famous Skeptical tract, Sanches explained that true knowledge is impossible because sense faculties are unreliable and cannot reach the true nature of things; that, moreover, the world is in constant flux, and (because all things are related) no one thing can be understood without understanding all other things, their causes, the causes of their causes, and so forth; and that reliable knowledge is exhaustive and belongs to God alone.

Sanchez, Sonia (Benita), original name WILSONIA DRIVER (b. Sept. 9, 1934, Birmingham, Ala., U.S.), American poet, playwright, and educator noted for her black activism.

Sanchez' mother died when she was an infant, and her father brought the family to Harlem, New York City, when she was nine. She received a B.A. degree (1955) in political science from Hunter College in Manhattan and briefly studied poetry writing at New York University.

In the 1960s she was introduced to the political activism of the times and published poetry in such journals as the *Liberator,* the *Journal of Black Poetry, Black Dialogue,* and *Negro Digest.* Her first book, *Homecoming* (1969), contained much invective against "white America" and "white violence"; thereafter she continued to write on what she called the "neoslavery" of blacks, socially and psychologically unfree. Much of her verse is written in American black speech patterns, eschewing traditional English grammar and pronunciations. Over the years Sanchez also joined other activists in promoting "black studies" in schools, in agitating for the rights of African countries, and in sponsoring various other causes, such as that of the Nicaraguan Sandinistas. In 1972 she joined the Nation of Islam (popularly known as the Black Muslims). From 1966 she taught in a succession of five universities, finally assuming a permanent post as resident poet and member of the English faculty at Temple University (Philadelphia) in 1975.

Sánchez Coello, Alonso (b. 1531/32, Benifayó, near Valencia, Spain—d. Aug. 8, 1588, Madrid), painter who was one of the pioneers of the great tradition of Spanish portrait painting. The favourite portrait painter of King Philip II, he introduced into Spanish portraiture a specifically Spanish character that endured until Velázquez came to the court in the 1620s.

After spending his childhood in Portugal, he was sent by the Portuguese king John III to



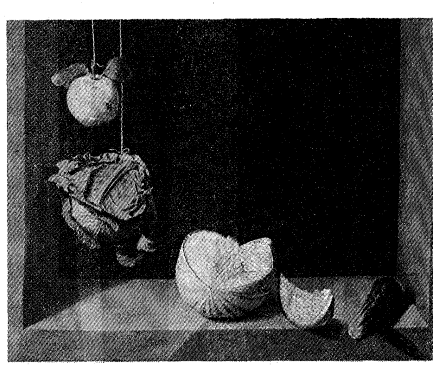
Elizabeth of Valois, queen of Spain, oil painting by Alonso Sánchez Coello, *c.* 1560; in the Kunsthistorisches Museum, Vienna

By courtesy of the Kunsthistorisches Museum, Vienna

study under Anthonis Mor (Anthony More) in Flanders. Returning to Portugal in 1550, he served as a court painter to John. In 1555 he moved to the Spanish court of Philip II, having been recommended by the widow of John III, Juana, who was the sister of the Spanish king. He spent the remainder of his life at the court, becoming a personal favourite of the king and acquiring honours and wealth.

Sánchez Coello produced both portraits and religious paintings. The religious works, many of which were created for El Escorial, are conventional and undistinguished. It is for his portraits that he is remembered. They are marked by an ease of pose and execution, a dignity and sobriety of representation, and a warmth of colouring. Although influenced by the paintings of both Mor and Titian, these portraits display an original talent and reflect admirably the modesty and formality of the Spanish court. Paintings of Philip II (*c.* 1575) and Infanta Isabel Clara Eugenia (1579), both in the Prado, Madrid, are two of his finest works.

Sánchez Cotán, Juan (b. 1561, Orgaz, Spain—d. Sept. 8, 1627, Granada), painter



"Quince, Cabbage, Melon, and Cucumber," oil painting by Juan Sánchez Cotán, 1602; in the Fine Arts Gallery of San Diego, Calif.

By courtesy of the Fine Arts Gallery of San Diego, Calif., gift of Misses Anne R. and Amy Putnam, 1945

who is considered one of the pioneers of Baroque realism in Spain. A profoundly religious man, he is best known for his still lifes, which in their visual harmony and illusion of depth convey a feeling of humility and mystic spirituality.

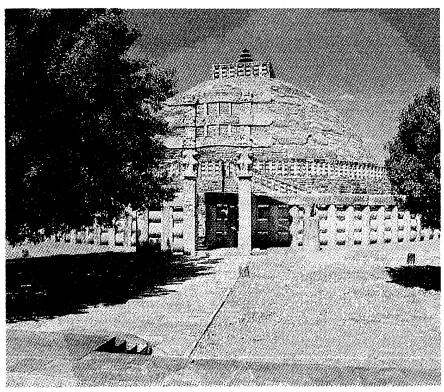
A student of the famous still-life painter Blas del Prado, Sánchez was early influenced by the spirit of Catholic mysticism that dominated the intellectual life of Toledo at the time. Entering a monastery in Segovia in 1603 as a Carthusian lay brother, he was transferred to Granada in 1612 and remained there until his death.

Although he painted other subjects, it is for his still lifes that Sánchez is remembered. They are marked by a detailed realism and a sense of volume and depth. His concern with the relationships among objects and with achieving the illusion of reality through the use of light and shadow was a major influence on the work of Francisco de Zurbarán and other later Spanish painters.

Sánchez de Bustamante y Sirvén, Antonio: *see* Bustamante y Sirvén, Antonio Sánchez de.

Sánchez Muñoz, Gil (antipope): *see* Clement (VIII).

Sānchi, also spelled SĀÑCĪ, historic site, west-central Madhya Pradesh state, central India, just west of the Betwa River. On a flat-topped sandstone hill, rising 300 feet (90 m) above the surrounding country, stands the best-preserved group of Buddhist monuments in India. Most noteworthy is the Great Stupa, discovered in 1818. It was probably begun by the emperor Aśoka in the mid-3rd century BC and later enlarged. Solid throughout, it is enclosed by a massive stone railing pierced by four gateways on which are elaborate carvings depicting the life of the Buddha. The stupa itself consists of

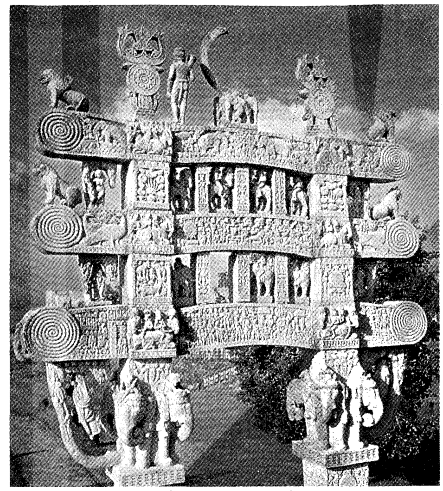


The south gateway (*toraṇa*) and the Great Stupa (stupa No. 1), Sānchi, Madhya Pradesh, India

Milt and Joan Mann—CAMERAMANN INTERNATIONAL

a base bearing a hemispherical dome (*aṇḍa*) representing the dome of heaven enclosing the Earth; it is surmounted by a squared rail unit, or *harmikā,* the world mountain, from which rises a mast (*yaṣṭi*) to symbolize the cosmic axis. The mast bears umbrellas (*chatras*) that represent the various heavens (*devaloka*). Other remains include several smaller stupas, an assembly hall (*caitya*), an Aśokan pillar with inscription, and several monasteries (4th–11th century AD). Several relic baskets and more than 400 epigraphical records have also been discovered.

Sānchi sculpture, early Indian sculpture that embellished the 1st-century-BC gateways of the Buddhist relic mound called the Great Stupa (stupa No. 1) at Sānchi, Madhya Pradesh, which is one of the most magnificent monuments of its time. The region of Sānchi, however, like the great centres at Sārnāth and Mathura, had a continuous artistic history from the 3rd century BC to the 11th century AD.



Architraves of the north gateway (toran) to the Great Stupa (stupa No. 1) at Sānchi, Madhya Pradesh, India

Art Resource—EB Inc.

Sānchi is the site of three stupas: stupa No. 1, an Aśokan foundation enlarged in succeeding centuries; No. 2, with railing decorations of the late Śuṅga period (*c.* 1st century BC); and No. 3, with its single toran (ceremonial gateway) of the late 1st century BC–1st century AD. Other features of interest include a commemorative pillar erected by the emperor Aśoka (*c.* 265–238 BC); an early Gupta temple (temple No. 17), early 5th century, with a flat roof and pillared portico; and monastic buildings ranging over several centuries.

The four torans of the Great Stupa added in the 1st century BC are the crowning achievements of Sānchi. Each gateway is made up of two square posts topped by capitals of sculptured animals or dwarfs, surmounted by three architraves, which end in spirals not unlike the rolled ends of scrolls. On the topmost crossbar were placed originally the trident-like symbol of the triratna and the wheel of the law. The crossbars and the intervening square dies between them are covered with relief sculpture depicting the events of the Buddha's life, legends of his previous births (*Jātaka* stories), and other scenes important to early Buddhism (such as the emperor Aśoka's visit to the Bo tree), as well as auspicious symbols. Inscriptions give the names of the donors of the relief; one commemorates the gift of the ivory workers of Vidisha and has given rise to the suggestion that there the tradition of working in ivory may have been translated into stone. The reliefs are deeply carved, so that the figures seem to swim against a sea of dark shadow cast by the strong Indian sun. The panels, which employ the device of continuous narration, are crowded, rich, and brimming with life. The Buddha is depicted throughout in symbolic form, by a wheel, an empty throne, or a pair of footprints.

Set in the angle between the pillar and the lowest crossbar of the gateways are magnificent figures of female yakshas (earthly spirits). They serve no true architectural purpose, yet their pose, with leg thrusting against the post and arms entwined in the branches of a tree, is appropriate to the space they fill. A damaged torso of a Sānchi yaksha is preserved at the Museum of Fine Arts, Boston. The sculptural treatment shows considerable advance over similar yaksha figures at Bhārhut (stupa of the mid-2nd century BC, in Madhya Pradesh). There is much smoother movement in the flexed bodies and more attention given to the open space around the figure. The fertility aspect of the union of maiden and tree is emphasized in the heavy breasts and hips and the transparent draperies. The smooth modeling and roundness of forms combine to give the yaksha figures a wonderful vitality and a sense of "swelling from within" characteristic of the finest Indian sculpture of all periods.

Sancho, name of rulers grouped below by country and indicated by the symbol •.

Aragon

• **Sancho Ramírez** (b. before 1045—d. July 6, 1094, Huesca, Aragon), king of Aragon from 1063 to 1094 and of Pamplona (or Navarre; as Sancho V Ramírez) from 1076 to 1094, the son of Ramiro I of Aragon.

After the murder of Sancho IV of Navarre, Sancho Ramírez, with Navarrese consent, became king of Navarre, forestalling the ambition of Alfonso VI of Castile to annex that kingdom. Sancho's main importance was as king of Aragon. After his father's death (1063) fighting the Moors at Graus, the papacy organized three international crusades against Spanish Islām (1063, 1073, and 1087). They all failed, but Sancho reconquered many places from his own resources, notably in the regions of Huesca and Monzón; at the end of his reign Aragon began to edge toward the Mediterranean coast. Sancho placed his kingdoms under the feudal protection of the Holy See in 1089. He died of wounds during the siege of Huesca (1094).

Castile and Leon

• **Sancho I,** byname SANCHO THE FAT, Spanish SANCHO EL CRASO (d. 966/967), king of the Spanish state of Leon from 956, a younger son of Ramiro II.

After succeeding his brother, Ordoño II, Sancho was overthrown by a revolt of his nobles and replaced by his cousin Ordoño IV. Sancho sought help from the Umayyad caliph ʿAbd ar-Raḥmān III, who helped him regain his throne in 960.

• **Sancho II,** byname SANCHO THE STRONG, Spanish SANCHO EL FUERTE (b. *c.* 1037—d. Oct. 6/7, 1072, Zamora, Leon), king of Castile from 1065 to 1072, the eldest son of Ferdinand I.

He was allocated the kingdom of Castile in his father's will, Leon and Galicia being given to his brothers. He refused to accept this division and dispossessed García of Galicia by force (1071). Alfonso VI of Leon, defeated at Golpejera on the Carrión River in January 1072, had to seek refuge with the Moorish king of Toledo. Sancho's triumph was short-lived, for he was killed while besieging the rebel fortress-city of Zamora, held by his sister Urraca in Alfonso's name.

• **Sancho III,** byname SANCHO THE DESIRED, Spanish SANCHO EL DESEADO (b. *c.* 1134—d. Aug. 31, 1158, Toledo, Castile), king of Castile from 1157 to 1158, the elder son of the Spanish emperor Alfonso VII.

His father's will partitioned the realm between his two sons, Sancho III receiving Castile and Ferdinand II receiving Leon. After a military show of force, Sancho was able to reaffirm by treaty the vassalage of Aragon and Navarre won by his imperial father, but, after reigning but one year and 11 days, he died.

• **Sancho IV,** byname SANCHO THE BRAVE, Spanish SANCHO EL BRAVO (b. 1257—d. April 25, 1295, Toledo, Castile), king of Castile and Leon from 1284 to 1295, second son of Alfonso X. Though ambitious and ruthless, he was also an able politician and a cultivated man.

In 1275 his elder brother, Fernando de la Cerda, was killed, leaving a son, Alfonso de la Cerda, heir to Alfonso X. Sancho, supported by the nobles and the military orders, sought recognition as heir instead of his nephew and took up arms against the king. After some years of strife he succeeded in making good

his usurpation on his father's death (April 1284). Support for Alfonso de la Cerda came from factions at home and from France and Aragon. Sancho finally removed this threat by arranging a marriage (1291) between his eldest daughter, Isabel, and James II of Aragon. Despite these political troubles he succeeded in defeating an invasion of Andalusia by the king of Fès (1290). Sancho owed much to his ablest supporter, Lope Díaz de Haro, whom he killed in anger during an argument at Alfaro (1288). He also depended greatly on his warrior-queen, María de Molina, who served as regent for his son Ferdinand IV.

NAVARRE

• **Sancho I Garcés** (d. 925), king of Pamplona (Navarre) from 905. He expanded his kingdom south of the Ebro River and maintained its independence in spite of the sack of his capital in 924 by the Umayyad caliph ʿAbd ar-Raḥmān III of Córdoba.

• **Sancho II Garcés,** also called SANCHO ABARCA (d. *c.* 994), king of Pamplona (Navarre) from 970, Count of Aragon, and a son of García I (or II). He was defeated by the Moors in 973 and 981 when allied with Castile and Leon. He then submitted to the caliphate, one of his daughters marrying the chief minister of Córdoba, Abū ʿĀmir al-Manṣūr, and becoming a Muslim. Sancho visited Córdoba in 992 to pay homage to al-Manṣūr.

• **Sancho III Garcés,** byname SANCHO THE GREAT, Spanish SANCHO EL MAYOR, or EL GRANDE (b. *c.* 992—d. Oct. 18, 1035), king of Pamplona (Navarre) from about 1000 to 1035, the son of García II (or III).

Sancho established Navarrese hegemony over all the Christian states of Spain at a time when the caliphate of Córdoba was in a state of turmoil. Sancho was uninterested in a crusade against the Moors, but he was interested in the expansion of Pamplona, which he began by the seizure of the ancient Frankish counties of Sobrarbe and Ribagorza (1016–19). A skilled politician, Sancho pursued his aims more by subversion than by force of arms. He persuaded the Count of Barcelona, Berenguer Ramón I, to accept him as overlord. Gascony did likewise, giving him direct sovereignty over Labourd. As a consequence of his marriage (1010) to Munia, daughter of Count Sancho García (d. 1017) of Castile, Sancho secured his own acceptance as count when Sancho García's son, the child Count García, was assassinated (1029). He then took up Castilian irredentist claims in eastern Leon and occupied the Leonese capital, where he was crowned (1034)—taking the imperial title. Sancho, who introduced some feudal practices into his new dominions, also encouraged the Cluniac reformers and established much closer contacts generally between Christian Spain and trans-Pyrenean Europe. In his will, however, he deliberately destroyed the empire he had created: he divided it into four kingdoms and left these to his four sons, thus making inevitable the fratricidal wars that followed his death. Sancho created the kingdom of Aragon and was responsible for the elevation of Castile from county to kingdom, though he transferred some Castilian territory to Pamplona, which he left to his eldest son, García III (or IV).

• **Sancho IV** (b. *c.* 1038—d. 1076, Peñalén, Navarre [Spain]), king of Pamplona (Navarre) from 1054 to 1076, son of García III (or IV).

Sancho had to contend with Castilian irredentism and Aragonese ambition. His act of persuading the Moorish king of Saragossa to become his vassal offended Alfonso VI of Castile, who invaded Pamplona (1074) and conspired with Sancho's brothers and magnates to assassinate him at Peñalén. The kingdom of Pamplona was then occupied by Sancho Ramírez of Aragon, with Navarrese approval.

• **Sancho V Ramírez:** *see* Sancho Ramírez (Aragon).

• **Sancho VI,** byname SANCHO THE WISE, Spanish SANCHO EL SABIO (d. June 27, 1194), king of Navarre (Pamplona) from 1150 and son of García IV (or V) the Restorer.

Sancho was the first to be called king of Navarre; previous kings were known as kings of Pamplona. In 1151 Castile and Aragon signed at Tudillén a treaty for the partition of Navarre. By skilled diplomacy Sancho avoided the destruction of his kingdom, accepting Alfonso VII of Castile as his overlord and marrying Alfonso's daughter. He himself intervened in Castilian affairs during the minority (1158–70) of Alfonso VIII. In 1176 both countries submitted their longstanding territorial disputes to Henry II of England as arbiter, who assigned Rioja to Castile. Sancho accepted this decision. He was a legislator of importance, conceding many municipal *fueros* (charters) and protecting Jews and immigrants (*francos*) from the north.

• **Sancho VII,** byname SANCHO THE STRONG, Spanish SANCHO EL FUERTE (b. 1154—d. April 7, 1234, Tudela, Navarre [Spain]), king of Navarre (Pamplona) from 1194 to 1234, the son of Sancho VI.

Sancho was a swashbuckling but enigmatic personality who offended the Holy See by his friendship with the Muslims; he was in Africa in the service of the Almohads (1198–*c.* 1200). His absence cost Navarre the provinces of Álava and Guipúzcoa, seized by Castile (1200). In 1212, however, Sancho fought with the allied Christian army that crushed the Almohads at Las Navas de Tolosa. Like his predecessor, Sancho granted many municipal *fueros* (charters). He received (1196) the feudal homage of the Viscount of Tartas (Gascony), took the burgesses of Bayonne under his protection (1204), and became Lord of Ostabat (near Mauléon) in 1228. On his death, he was buried in the collegiate church at Roncesvalles, which he had built. Sancho was the last Spanish-descended king of Navarre for 200 years, for the crown went to Theobald the Troubadour, Count of Champagne, and thereafter remained in French hands.

PORTUGAL

• **Sancho I,** byname SANCHO THE FOUNDER, or THE POPULATOR, Portuguese SANCHO O FUNADOR, or O POVOADOR (b. 1154, Coimbra, Port.—d. March 26, 1211), second king of Portugal (1185–1211), son of Afonso I.

Sancho's reign was marked by a resettlement of the depopulated areas of his country, by the establishment of new towns, and by the rebuilding of frontier strongholds and castles. To facilitate his plans, he encouraged foreign settlers and enlisted bishops, religious orders, and nobles in his colonization projects, granting vast territories to the military orders (the Hospitalers, the Templars, the Orders of Calatrava and Santiago). After an invasion by the Almohad prince Abū Yūsuf Yaʿqūb al-Manṣūr, Sancho used the help of a passing crusader fleet to capture Silves from the Moors (1189), but lost it (1191) and other lands south of the Tagus River when al-Manṣūr again attacked. Sancho quarreled both with his bishops and with Rome over the payment of tribute.

• **Sancho II,** byname SANCHO THE COWLED, or THE CAPUCHED, Portuguese SANCHO O CAPELO, or O ENCAPUCHADO (b. 1207, Coimbra, Port.—d. Jan. 4, 1248, Toledo, Castile [Spain]), fourth king of Portugal, son of Afonso II and of Urraca, who was the daughter of Alfonso VIII of Castile.

Factions were so fostered during Sancho's minority that his later government was never anything more than a series of vain attempts to achieve political stability in the kingdom. Renewing the struggle against the Moors, he took Tavira and Cacela (1238–39), thereby extending Portuguese sovereignty over a large part of the Algarve. But from 1240 onward internal disorders increased, and Pope Innocent IV's recognition of the king's political incapacity to govern led to Sancho's deposition (1245) and the entrusting of the administration to his brother Afonso (later Afonso III). Sancho retired to Toledo (1247), where he died the next year.

Sanchuniathon (fl. 14th/13th century BC?), ancient Phoenician writer. All information about him is derived from the works of Philo of Byblos (flourished AD 100). Excavations at Ras Shamra (ancient Ugarit) in Syria in 1929 revealed Phoenician documents supporting much of Sanchuniathon's information on Phoenician mythology and religious beliefs. According to Philo, Sanchuniathon derived the sacred lore from inscriptions on the Ammouneis (*i.e.,* images or pillars of Baal Amon), which stood in Phoenician temples.

Sancroft, William (b. Jan. 30, 1617, Fressingfield, Suffolk, Eng.—d. Nov. 24, 1693), archbishop of Canterbury, leader of a group of seven bishops who were imprisoned for opposing policies of the Roman Catholic king James II (reigned 1685–88).



Sancroft, detail of a chalk portrait by Edward Lutterel, *c.* 1688; in the National Portrait Gallery, London
By courtesy of the National Portrait Gallery, London

In 1651 Sancroft was dismissed as a fellow at the University of Cambridge for refusing to take an oath of allegiance to the government of the Commonwealth. After the Restoration of King Charles II (1660), he was made a royal chaplain, and from 1664 to 1677 he served as dean of St. Paul's Cathedral in London. In 1678 he became archbishop of Canterbury.

Sancroft, however, felt he could not remain silent in the face of what he considered King James II's attempts to undermine the Anglican church. With six other bishops he petitioned James for permission not to distribute and read his unconstitutional second Declaration of Indulgence (April 1688), which removed restrictions against Catholics and Dissenters. James responded by imprisoning the bishops in the Tower of London and bringing them to trial on charges of seditious libel. Their acquittal (June 30) was greeted with widespread popular rejoicing. After James was overthrown by William of Orange in November–December 1688, Sancroft—despite his opposition to James—rejected William's claim to the throne. Consequently, he was dismissed from his bishopric in 1690.

Sancti Spíritus, *provincia,* south-central Cuba, bounded by Nicholas Channel to the north, the Caribbean Sea to the south, Villa Clara and Cienfuegos to the west, and Ciego de Ávila to the east. Part of former Las Villas province until 1976, the province has an area of 2,588 sq mi (6,704 sq km). Plains

along the northern coast become hills in the centre and culminate, in the southwest, in the Sierra de Sancti Spíritus and the eastern extension of the Sierra de Trinidad. Sugarcane, tobacco, rice, and fruits are the major agricultural products; cattle are also important. Oil was struck at Jatibonico in 1954, and it remains Cuba's largest petroleum producer; serpentine and manganese are mined near Fomento. Trinidad is the major industrial centre, with sugar refineries, dairies, sawmills, and cigar and cigarette factories. Sancti Spíritus city, the provincial capital, lies on the central highway and major railway. Pop. (1983 est.) 405,034.

Sancti Spíritus, city, capital, Sancti Spíritus province, central Cuba. Founded in 1516 on the Río Tuinicú, the settlement was moved to the banks of the Río Yayabo in 1524. It is the oldest city of interior Cuba, and narrow, crooked streets, old churches, and plazas preserve its colonial atmosphere. The city serves as the commercial centre of a fertile agricultural region that produces sugarcane, tobacco, and dairy products. It lies on the central highway, about 30 mi (50 km) from its port, Trinidad. Pop. (1981 prelim.) 79,542.

sanction, in the social sciences, a reaction (or the threat or promise of a reaction) by members of a social group indicating approval or disapproval of a mode of conduct and serving to enforce behavioral standards of the group. Punishment (negative sanction) and reward (positive sanction) regulate conduct in conformity with social norms (*see* norm). Sanctions may be diffuse—*i.e.,* spontaneous expressions by members of the group acting as individuals—or they may be organized—*i.e.,* actions that follow traditional and recognized procedures. Sanctions therefore include not only the organized punishments of law but also the formal rewards (*e.g.,* honours and titles) and the informal scorn or esteem by members of a community.

In societies without formal legal institutions, such as courts of law, sanctions are often imposed directly by the wronged individual or group. Reaction is in a socially approved manner and in a form considered proportional to the injury. This may include ridiculing, duelling, injuring, seizing of property, or killing the offender or a member of his group. Among the Eskimo, for example, the appropriate punishment for a man who steals another man's wife is to be ridiculed in a nasty song made up by the injured man. Social context, as well as the kind of offense, determines the type of sanction invoked: legal, religious, and moral sanctions can all operate. A breach of norms committed within a kin group may call for religious sanctions, although the same deed involving different kin groups would invoke jural sanctions.

Sanctions, in addition to functioning as a mechanism of social control, also serve to integrate a society, affirming social beliefs and restating their validity when breached.

Sanctis, Francesco De: *see* De Sanctis, Francesco.

Sanctorius (Italian physician): *see* Santorio Santorio.

sanctuary, in religion, a sacred place, set apart from the profane, ordinary world. Originally, sanctuaries were natural locations, such as groves or hills, where the divine or sacred was believed to be especially present. The concept was later extended to include man-made structures; *e.g.,* the tabernacle (tent) of the ancient Hebrews, the later Jerusalem Temple, the sacred lodge of the Algonkin and Sioux, or, especially, sacred parts of such structures. Sanctuaries were reserved for special religious functions, and a state of purity was required of participants. Special taboos and rules prevented the profanation of sanctuaries. It was because of this special sacred quality and the protection that it afforded that the sanctuary became a place of asylum for criminals. In addition to the fear of shedding blood in a holy place, a dominant motive in protecting the fugitive was the fear of the evil magic force that would emanate from his curse, believed dangerous to gods as well as to men.

Christian sanctuaries, first recognized by Roman law toward the end of the 4th century, developed through recognition of the office of bishop as intercessor. Sanctuary privileges were gradually extended to wider areas of and around churches. Justinian, however, limited the privilege to persons not guilty of serious crimes. In the Germanic kingdoms, a fugitive was usually surrendered to authorities after an oath had been taken not to put him to death.

In English common law a person accused of a felony might take refuge in a sanctuary; once there, he had a choice between submitting to trial or confessing the crime to the coroner and swearing to leave the kingdom (abjuration of the realm) and not return without the king's permission. If he would neither submit to trial nor abjure the realm after 40 days, he was starved into submission.

Besides the general sanctuary that belonged to every church and that afforded temporary protection, there developed, on obscure grounds, a number of sanctuaries based upon royal charters. In at least 22 places throughout England, the king's process did not run, the coroner could not enter, and the fugitive could remain for life. The local lords regulated the activities of the fugitives and exacted oaths of fealty from them.

Henry VIII abolished many sanctuaries and substituted seven "cities of refuge." An act of James I in 1623 abolished sanctuary in cases of crime, but the privilege lingered on for civil processes in certain districts that had formerly been sanctuaries and became haunts of those resisting arrest. Sanctuary was not completely eliminated until the 18th century. In continental Europe the right of sanctuary (called asylum), though much restricted in the 16th century, survived until the French Revolution.

The institution of sanctuary, whatever its origin and meaning, appears to have performed a social function. Although often abused, it prevented excessive use of capital punishment and safeguarded against uncontrolled blood vengeance and execution without trial. The sanctuary was also the source of parliamentary immunities and the custom of diplomatic asylum in embassies.

sanctuary knocker, also called SANCTUARY RING, in architecture, knocker on the outer door of a Christian church. The sanctuary knocker could be a simple metal ring, which accounts for its other name of sanctuary ring, or it could be highly ornamental, as in the Norman example at Durham cathedral in England, dating from the turn of the 12th century. According to the ecclesiastical law of the Middle Ages, a fugitive had only to touch the sanctuary knocker in order to be immune from arrest.



Sanctuary knocker, the north door of Durham cathedral, England, early 12th century
A.F. Kersting

Sancy diamond, fiery stone of Indian origin that is shaped like a peach pit and weighs 55 carats. It has a long history and has passed through many royal families. Purchased in Constantinople about 1570 by Nicolas Harlay de Sancy, the French ambassador to Turkey, it was lent to the French kings Henry III and Henry IV. Later it was purchased by Queen Elizabeth I of England and descended to the Stuarts. After the flight of James II from England to France in 1688, it reappeared among the French crown jewels of Louis XIV and was stolen with these in 1792. It reappeared in 1828, when it was purchased by the Russian prince Demidov, in whose family it remained until 1900. Later it became the property of Lady Nancy Astor.

sand, mineral, rock, or soil particles that range in diameter from 0.02 to 2 millimetres (0.0008–0.08 inch). Most of the rock-forming minerals that occur on the Earth's surface are found in sand, but only a limited number are common in this form. Although in some localities feldspar, calcareous material, iron ores, and volcanic glass are dominant constituents of sand, quartz is by far the commonest, for several reasons: it is abundant in rocks, is comparatively hard, has practically no cleavage so that it is not readily worn down, is nearly insoluble in water, and does not decompose. Most quartzose sands contain a small quantity of feldspar, as well as small plates of white mica, which, though soft, decompose slowly.

All sands contain small quantities of heavy rock-forming minerals, including garnet, tourmaline, zircon, rutile, topaz, pyroxenes, and amphiboles. In some shore and river sands these heavier constituents, as well as some of the heavy native elements, become concentrated as a result of sorting by currents and the removal of the lighter constituents. Such placer sands may be economically valuable deposits worked for diamonds and other gemstones, gold, platinum, tin, monazite, and other ores. Greensands, widely distributed over the floor of the ocean and found in ancient strata on the continents, owe their colour to the presence of glauconite, a potash-bearing mineral; these sands are used for water softeners.

In the pottery and glassmaking industries very pure quartzose sands are used as a source of silica. Similar sands are required for lining the hearths of acid-steel furnaces. Molds used in foundries for casting metal are made of sand with a clay binder. Quartz and garnet sands are used extensively as abrasives. Ordinary sands find a multitude of other uses; *e.g.,* in the preparation of mortar, cement, and concrete.

Sand, George, pseudonym of AMANDINE-AURORE-LUCILE (LUCIE) DUDEVANT, *née* DUPIN (b. July 1, 1804, Paris—d. June 8, 1876, Nohant, Fr.), French Romantic writer, noted both for her so-called rustic novels and numerous love affairs.

She was brought up at Nohant, near La Châtre in Berry, the country home of her grandmother. There she gained the profound love and understanding of the countryside that were to inform most of her works. In 1817 she was sent to a convent in Paris, where she acquired a mystical fervour that, though it soon abated, left its mark.

In 1822 Aurore married Casimir Dudevant. The first years of the marriage were happy enough, but Aurore soon tired of her well-intentioned but somewhat insensitive husband and sought consolation first in a platonic

friendship with a young magistrate and then in a passionate liaison with a neighbour. In January 1831 she left Nohant for Paris, where she found a good friend in Henri de Latouche, the director of *Le Figaro,* who accepted some of the articles she wrote with Jules Sandeau under the pseudonym Jules Sand. In 1832 she adopted a new pseudonym, George Sand, for *Indiana,* a novel in which Sandeau had had no part. This novel, which brought her immediate fame, is a passionate protest against the social conventions that bind a wife to her husband against her will and an apologia for a heroine who abandons an unhappy marriage and finds love. In *Valentine* (1832) and *Lélia* (1833) the ideal of free association is extended to the wider sphere of social and class relationships. *Valentine* is the first of many Sand novels in which the hero is a peasant or a workman.

Meanwhile, the list of her lovers was growing; eventually it included, among others, Prosper Mérimée, Alfred de Musset, and Frédéric Chopin. Yet it would be a mistake to accept the popular impression of her as a nymphomaniac who changed her philosophy and politics to suit the views of each successive lover. When she thought she had found something approaching perfection in a man, she lived with him for years, caring for him with a love that was more that of a mother than of a mistress: she stayed eight years with Chopin, for example, until he left her after a quarrel. She remained impervious to Musset's skeptical views and Chopin's aristocratic prejudices, while the man whose opinions she adopted wholeheartedly, the philosopher Pierre Lerous, was never her lover. The fact remains, however, that most of her early works, including *Lélia, Mauprat* (1837), *Spiridion* (1839), and *Les sept Cordes de la lyre* (1840), show the influence of one or another of the men with whom she associated.

Eventually, she found her true form in her rustic novels, which drew their chief inspiration from her lifelong love of the countryside and sympathy for the poor. In *La Mare au diable* (1846), *François le Champi* (1848), and *La Petite Fadette* (1849), the familiar theme of George Sand's work—love transcending the obstacles of convention and class—in the familiar setting of the Berry countryside, regained pride of place. These rustic tales are probably her finest works. In later life she produced a series of novels and plays of impeccable morality and conservatism. Probably the only later works that are likely to endure are her autobiography, *Histoire de ma vie* (1854-55; "Story of My Life"), and *Contes d'une grand'mère* (1873; "Tales of a Grandmother"), stories she wrote for her grandchildren.

When, after a peaceful old age, she died, she was mourned as a great writer, but, with a few exceptions, her works soon fell into neglect. It is said that she wrote too much and too quickly; certainly she wrote with astonishing fluency. It is also said that as a writer she was an idealist, that in her memoirs she shut her eyes to the unpleasant aspects of reality while in her novels she created characters of unbelievable innocence and charm. She was, however, a born storyteller, and, with her childlike optimism and ingenuous faith in life, it was natural that her stories should be fairy tales, her peasants good and kind, her endings happy. "The novel," she declared, "need not necessarily be the representation of reality."



George Sand
By courtesy of the Musee Carnavalet, Paris

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sand bug (crustacean): *see* mole crab.

sand crab: *see* ghost crab.

Sand Creek Massacre, also called CHIVINGTON MASSACRE (Nov. 29, 1864), controversial surprise attack upon a surrendered, partially disarmed Cheyenne Indian camp in southeastern Colorado Territory by a force of about 1,200 U.S. troops, mostly Colorado volunteers, under Colonel John M. Chivington. The camp contained several hundred Cheyenne and a few Arapaho. The Cheyenne chief Black Kettle had been negotiating for peace and had camped near Fort Lyon with the consent of its commander, Major Scott Anthony. As the attack began, Black Kettle raised the U.S. flag as well as a white flag, but anywhere from 150 to 500 Indians were massacred, including many women and children. Chivington was at first acclaimed for his "victory," but he was subsequently discredited when it became clear that he had perpetrated a massacre. The incident was a chief cause of the Arapaho-Cheyenne war that followed and had far-reaching influence in the Plains Indian wars of the next decade.

sand cricket: *see* Jerusalem cricket.

sand devil: *see* dust devil.

sand dollar, any of the invertebrate marine animals of the order Clypeastroida (class Echinoidea, phylum Echinodermata) that has a flat, disk-shaped body. It is a species of cake urchin (*q.v.*), intermediate between sea urchins and heart urchins. The sand dollar is particularly well adapted for burrowing in sandy substrates. Very small spines used for digging and crawling cover the entire surface of its body and are appressed backwards toward the posterior anus. The mouth is located in the centre of the body's underside. The upper surface exhibits pentaradiate symmetry, with a pattern of five "petals" spreading out from the centre. Some species found stranded on the shores of North America have five or six slots, or lunules, through the test (external skeleton). Most sand dollars measure from 5 to 10 cm (2 to 4 inches) in diameter. Species of comparable size occur in shallow coastal waters throughout the rest of the world, except in Europe and Antarctica.

sand dune, hill, mound, or ridge of sand or other loose material that is formed by wind action. The existence of dunes is a direct function of the ability of wind to transport unconsolidated material. Dunes are commonly associated with desert regions where windblown sand occupies extensive areas. It has been estimated, for example, that sand deposits in the Sahara (desert) cover about 7,000,000 square km (2,700,000 square miles). In the recent geological past, desert areas may have been even larger during dry periods in the Pleistocene glaciation. At that time great areas of loess (windblown silt) were deposited across North America, Europe, and Asia. Dunes are also associated with coasts where beach sands may be reworked by the wind.

A brief treatment of sand dunes follows. For full treatment, *see* MACROPAEDIA: Continental Landforms.

The term desert can also apply to very cold regions. Thus large areas of dunes are found in nonglacial Antarctica. Although sand grains are the primary constituents of dunes, the wind can transport and deposit clay particles or other unconsolidated materials, should the right conditions prevail.

Dune sand is moved in two ways. First, by the process of saltation, the wind lifts up sand grains and carries them for a short distance before dropping them. If the sand is being blown across a stony surface, the grains may bounce up to a height of a few metres. Otherwise they move only a few centimetres above the ground surface. The second mode of movement occurs when the saltating grains hit the ground again and by the force of their impact push other grains forward. This movement is termed surface creep.

The simplest way in which a dune forms is when an obstacle, be it a rock or a plant, impedes airflow and causes sand to pile up on its downwind side, rather in the way that a snowdrift forms. Gradually the dune grows, presenting even more of an obstruction to the wind-bearing sand and catching saltating grains in the leeward wind shadow.

As the dune becomes larger it begins to move slowly downwind and adopts a more asymmetrical shape. As the dune intrudes more and more into the airflow, the wind speed is actually increased on the dune's windward side, and saltating grains are moved upward and over the dune crest, where they fall on the upper portion of the leeward slope, creating a steeper slip face. Dune sand grains tend to have diameters of less than 1 mm (0.04 inch) and an angle of repose of about 35°. When the steepening upper section of the slip face reaches or passes this angle, the slope gradually becomes unstable. Eventually the sand slides down the slip face and the dune advances.

The initiation of dunes by obstacles does not explain how dunes form on smooth, level surfaces and build up sand seas consisting of regular mounds. One suggestion is that such dune formation results from frictional drag between the air and the ground and that the dunes form in much the same way that sand ripples do on a riverbed or beach.

A basic distinction is made between barchan and seif dunes. The barchan is one of the classic desert landforms. It is a crescent-shaped dune with the horns of the crescent stretching out in the leeward direction. Barchan dunes may reach more than 27 m (90 feet) in height. It has been suggested that barchans approach an equilibrium form in which the length and width are equal and height is approximately a tenth of this dimension.

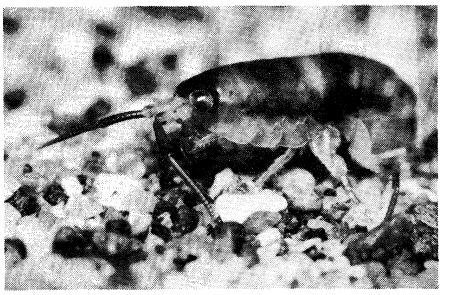
Seif dunes are long ridges of sand. In general they are aligned in the direction of the prevailing wind. The slip face of such dunes are probably formed by eddies. The depressions between seif dune ridges are swept clear of sand by the winds. The ridges run for long distances, sometimes several kilometres. Their height appears to be about one-sixth of the width of the dune's base.

Although barchan and seif dunes are the main types, other forms of dune are recognized. In areas where there is plenty of sand available, barchans may coalesce to form a "sea" of transverse dunes, in which the crescentic ridges are not so obvious. Parabolic dunes form where vegetation cover has been broken and the wind hollows out a depression. Although they are roughly crescentic in plan, the horns trail to windward and the slip face is on the outside of the crescent. As they move downwind they create a hairpin shape.

A final dune form, noted in the Middle East and the Sahara, is the star, or pyramidal, dune. Its shape in plan is of a many-pointed star with steep ridges rising from the points to the central summit. It has been suggested that such sand mountains do not move and that they have come to serve as landmarks for generations of desert travellers.

sand eel: *see* sand lance.

sand flea, also called SAND HOPPER, BEACH FLEA, or BEACH HOPPER, any of several terrestrial crustaceans of the family Talitridae (order Amphipoda) that are notable for their hopping ability. The European sand flea (*Talitrus saltator*), which is about 1.5 centimetres (0.6 inch) long, lives on sand beaches near the high-tide mark, remaining buried in the sand during daytime and emerging at night to forage for food. Like other sand fleas, it feeds on organic debris.



Sand flea (*Orchestia*)
Larry West—Full Moon Studio

The long-horned sand flea (*T. longicornis*), which is found on the Atlantic coast of North America from New England to the Gulf of Mexico, is named for its antennae, which are as long as the body. It grows to 2.5 centimetres (1 inch) long, and is waxy white. In habit it resembles *T. saltator.*

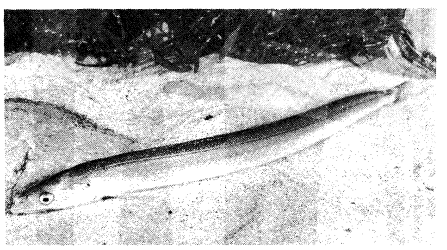
The common sand flea (*Orchestia agilis* or *O. platensis*), which is found on the coast of Europe and on the eastern Atlantic coasts of the Americas from Greenland to Argentina, is about 1 centimetre (0.4 inch) in length and is mostly dark brown or gray; the tail is bluish, and the antennae are reddish brown. It lives in damp sand.

sand fly, any insect of the family Phlebotomidae (sometimes considered part of the family Psychodidae) of the order Diptera. The aquatic larvae live in the intertidal zone of coastal beaches, in mud, or in wet organic debris.

Sand flies are of considerable medical importance: around the Mediterranean and in southern Asia, *Phlebotomus* transmits the pappataci fever virus; and in parts of South America, Africa, and Asia it carries the protozoan parasites causing kala azar, Oriental sore, espundia, and bartonellosis. The name sand fly is also used for certain species of the black fly and biting midge (*qq.v*) families.

sand fly fever: *see* pappataci fever.

sand lance, also called SAND EEL, any of about 18 species of marine fishes of the familes Ammodytidae and Hypotychidae (order Perciformes). Sand lances are slim, elongated, usually silver fishes especially abundant in northern seas. Although eel-like in shape and movement, they are not true eels. The species range from about 20 to 46 centimetres (8 to 18 inches) in length and are characterized by a forked tail, a long head, and a long dorsal fin. They live in schools, often under the sand below the surf. They are of little use to man but are a very important food for predacious fishes and sea birds.



European sand lance (*Ammodytes lanceolatus*)
Jacques Six

sand painting, also called DRY PAINTING, type of art that exists in highly developed forms among the Navajo and Pueblo Indians of the American Southwest and in simpler forms among several Plains and California Indian tribes. Although sand painting is an art form, it is valued among the Indians primarily for religious rather than aesthetic reasons. Its main function is in connection with healing ceremonies.

Sand paintings are stylized, symbolic pictures prepared by trickling small quantities of crushed, coloured sandstone, charcoal, pollen, or other dry materials in white, blue, yellow, black, and red hues on a background of clean, smoothed sand. About 600 different pictures are known, consisting of various representations of deities, animals, lightning, rainbows, plants, and other symbols described in the chants that accompany various rites. In healing, the choice of the particular painting is left to the curer. Upon completion of the picture, the patient sits on the centre of the painting, and sand from the painting is applied to parts of his body. When the ritual is completed, the painting is destroyed.

For years the Indians would not allow permanent, exact copies of sand paintings to be made. When the designs were copied in rugs, an error was deliberately made so that the original design would still be powerful. Today many of the paintings have been copied both to preserve the art and for the record.

Where the same name may denote a person, place, or thing, the articles will be found in that order

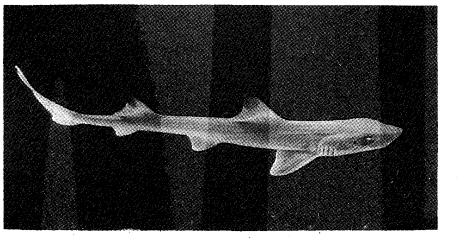
sand rat, any of several species of small rodents more commonly known as gerbil (*q.v.*) and mole rat (*q.v.*).

sand reed (grass): *see* beach grass.

Sand River and Bloemfontein conventions (1852 and 1854, respectively), conventions between Great Britain and the Voortrekkers, or Afrikaners who made the Great Trek in South Africa; it guaranteed their right to govern themselves without the interference of Great Britain. These conventions reversed Sir Harry Smith's policy in 1848 of annexing the trekker republics in the interior of South Africa. Though the conventions contained clauses against slavery, they also cancelled previous British treaties with African chiefdoms and forbade the supply of arms and ammunition to Africans but not to Afrikaners, thus effectively shifting the balance of power on the Highveld in favour of whites. Despite its withdrawal from the interior until the 1870s, Britain retained a degree of control over the landlocked republics by dominating the coastline.

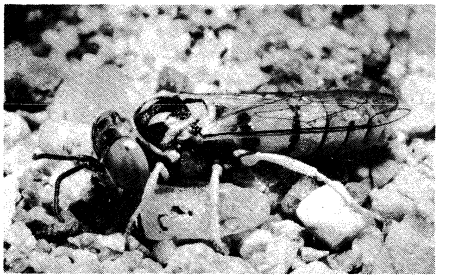
sand sea (desert region): *see* erg.

sand shark, any of about six species of sharks of the genus *Odontaspis* (*Carcharias* of some authorities) and the family Odontaspididae (or Carchariidae). Sand sharks are found in shallow water, usually at or near the bottom, along tropical and temperate coastlines of all oceans. They range from about 3 to 6 metres (10 to 20 feet) in length and are brown or gray above, paler below. Voracious, but generally sluggish, they have long, slim, pointed teeth and prey on fishes and invertebrates. Two species, the sand tiger (*O. taurus*), of the Atlantic, and the gray nurse (*O. arenarius*), of Australia, are potentially dangerous.



Sand shark (*Odontaspis*)
Grant Heilman—EB Inc.

sand wasp, any member of the insect tribe Bembicini of the family Sphecidae (order Hymenoptera). Sand wasps are solitary, stout-bodied insects about 2 to 2.5 centimetres (about 0.8 to 1 inch) long. They are most easily recognized by an elongated, triangular labrum, a beaklike mouthpart. Their nests are sand burrows, many of which are often clustered together. The larvae feed mainly on other insects caught by the parents.



Sand wasp (*Microbembex monodonta*)
William E. Ferguson

The horse-guard (*Bembix carolina*) of the southern United States often hunts for flies around horses. It is about 2.5 cm in length and is black with yellow or yellowish-green markings. *Microbembex monodonta* is found along the seashore. Many sand wasps are black with white, yellow, or green markings.

Sandage, Allan Rex (b. June 18, 1926, Iowa City, Iowa, U.S.), U.S. astronomer who discovered the first quasi-stellar radio source (quasar), a starlike object that is a strong emitter of radio waves. He made the discovery in collaboration with the U.S. radio astronomer Thomas A. Matthews.

Sandage became a member of the staff of the Hale Observatories (now the Mount Wilson and Palomar Observatories), in California, in 1952 and carried out most of his investigations there. Pursuing the theoretical work of several astronomers on the evolution of stars, Sandage, with Harold L. Johnson, demonstrated in the early 1950s that the observed characteristics of the light and colour of the brightest stars in various globular clusters indicate that the clusters can be arranged in order according to their age. This information provided insight into stellar evolution and galactic structure.

Later, Sandage became a leader in the study of quasi-stellar radio sources, comparing accurate positions of radio sources with photographic sky maps and then using a large optical telescope to find a visual starlike source at the point where the strong radio waves are being emitted. Sandage and Matthews identified the first of many such objects in 1961. Sandage later discovered that some of the remote, starlike objects with similar characteristics are not radio sources. He also found that the light

from a number of the sources varies rapidly and irregularly in intensity.

Sandakan, largest town and principal port of Sabah state, East Malaysia (North Borneo), on an inlet of the Sulu Sea, near the mouth of the Sungai (River) Kinabatangan, on the heavily indented east coast. The capital of British North Borneo (now Sabah) until 1947, it is the commercial heart of the state.

Founded in 1874 as Elopura, the port's development depended on trade in jungle products such as timber, rattan, birds' nests, dammar, and coconuts. Its commercial links have historically been with Hong Kong, Japan, and Australia. Hemmed in by highlands, much of central Sandakan has been built on land reclaimed from the sea since the early 1920s.

Chinese (mainly Cantonese from Hong Kong) dominate the town, where their characteristic three-to-four-story concrete shop houses intermingle with taller office buildings. Oceangoing ships of more than 11,000 tons are unable to penetrate its harbour because of the silt and sandbars deposited around the entrance by the Kinabatangan. Nevertheless, the spacious harbour (20 mi [32 km] long by 3 to 10 mi [5 to 16 km] wide) has become the outlet of Sabah's booming post-World War II trade in timber, copra, and manila hemp. Most of the logs are loaded via lighters onto ships anchored beyond the mud bars; a large wharf handles ships of shallow draft. Large oil-palm and cocoa estates have been established in the area. Other activities include boatbuilding, cutch extraction, freezing, and prawn packing.

Sandakan has an airport and is linked by road to Kota Kinabalu, the state capital, via Ranau. Nearby Red Hill offers a panoramic view of the harbour, including Pulau Berhala, an island retreat for swimming, fishing, and diving. At Sapulut there is a sanctuary for the orangutan, the manlike ape of Borneo. The large Gomantong Caves are inhabited by swiftlets (whose nests are collected for birds' nest soup, a Chinese delicacy) and a large colony of bats. Pop. (1980) 70,420.

sandal, type of footwear consisting of a sole secured to the foot by straps over the instep, toes, or ankle. The oldest known example of a sandal, dating from around 2000 BC, is made of woven papyrus and comes from Egypt. In



Sandal, marble sculpture, Roman, date unknown; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York City, Fletcher Fund, 1928

ancient Egypt, only important personages wore sandals, which were made of leather or wood as well as papyrus. The ancient Greeks generally went barefoot indoors but out-of-doors wore sandals that had leather, matting, or felt soles with thongs that were tied in a variety of ways. Gilded sandals sometimes were worn by those of high rank, and women's sandals sometimes had ornamental pieces on the instep. Except for slaves, who were forbidden to wear them, the Romans generally wore sandals indoors. A variety of decoration and design was developed in Rome, where large guilds of shoemakers were established; patricians' sandals, for example, were red with a moon-shaped ornament on the back.

In modern times, sandals have been extremely popular, especially in warm climates. With the growth of mass shoe manufacturing, sandals have been produced in a variety of styles and materials; from the mid-20th century many have also been made by hand. The term sandal has also been used to refer to a woman's low-cut shoe or light slipper.

Sandalwood (Indonesia): *see* Sumba.

sandalwood, any semiparasitic plant of the genus *Santalum* (family Santalaceae), especially the fragrant wood of the true, or white, sandalwood, *Santalum album.* The approximately 10 species of *Santalum* are distributed throughout southeastern Asia and the islands of the South Pacific.

Many other woods are used as substitutes for true sandalwood. Red sandalwood is obtained from the reddish-coloured wood of *Pterocarpus santalinus,* a Southeast Asian tree of the pea family (Fabaceae). This species may have been the source of the sandalwood used in King Solomon's temple.

A true sandalwood tree grows to a height of about 10 metres (33 feet); has leathery leaves in pairs, each opposite the other on the branch; and is partially parasitic on the roots of other tree species. Both tree and roots contain a yellow aromatic oil, called sandalwood oil, the odour of which persists for years in such articles as ornamental boxes, furniture, and fans made of the white sapwood. The oil is obtained by steam distillation of the wood and is used in perfumes, soaps, candles, incense, and folk medicines. Powdered sandalwood is used in the paste applied to make Brahman caste marks and in sachets for scenting clothes.

Sandalwood trees have been cultivated since antiquity for their yellowish heartwood, which plays a major role in many Oriental funeral ceremonies and religious rites. The trees are slow growing, usually taking about 30 years for the heartwood to reach an economically useful thickness.

Sandalwood English (language): *see* Melanesian Pidgin.

sandarac, also spelled SANDARACH, brittle, faintly aromatic, translucent resin, usually available in the form of small, pale yellow, dusty tears; it is used as incense and in making a spirit varnish for coating paper, leather, and metal. The initial film is brittle, but it can readily be modified to yield elastic films by adding elemi, an oleoresin. Sandarac is obtained from the African sandarac tree, *Tetraclinis articulata,* or from cypress pines, genus *Callitris,* that grow in Australia, North Africa, and North America.

Sandawe, a people living near Kondoa, Tanzania, between the Bubu and Mponde rivers, and speaking one of the three branches of the Khoisan, or click, languages. The Sandawe have been known to anthropologists and linguists since 1894.

Many aspects of their culture show the influence of their Bantu neighbours. Their isolated wooden houses with roofs of clay are built in the lee of the wind. The staple food is millet, supplemented with fat, milk, and butter, meat being rarely eaten. Their traditional clothes were of *hika*-grass, feathers, and hides, and the dominant cosmetic practices include shaving of hair, earlobe piercing, and face tattooing.

The Sandawe cultivate the soil with a mattock, fertilize with manure, and keep cattle, sheep, and goats. The men clear the land, tend the animals, and hunt, while the women do the cultivation and food gathering.

Households, each comprising a nuclear family, are organized into patrilineal exogamous clans that form the basis for autonomous local communities. Marriage, which is monogamous and requires bridewealth, is forbidden with parallel cousins and preferred with the maternal uncle's daughter. Residence is patrilocal, often after an initial period near the wife's parents.

Sanday, Edgar: *see* Faure, Edgar(-Jean).

Sanday, William (b. Aug. 1, 1843, Holme Pierrepont, Nottinghamshire, Eng.—d. Sept. 16, 1920, Oxford), New Testament scholar, one of the pioneers in introducing to English students and the Anglican world the mass of work done by continental scholars in biblical criticism, particularly through his principal writings, *Commentary on Romans* (1895, with Arthur C. Headlam), and *Outlines of the Life of Christ* (1905).

Educated at Repton and Balliol College, Oxford, Sanday became a scholar of Corpus Christi in 1863. He was a fellow and lecturer at Trinity in 1866 and was ordained in 1867. In 1876 he was appointed principal of Hatfield Hall, Durham, in 1882, Ireland professor of exegesis at Oxford, and in 1895, Lady Margaret professor of divinity and canon of Christ Church.

sandbar, also called OFFSHORE BAR, submerged or partly exposed ridge of sand or coarse sediment that is built by waves offshore from a beach. The swirling turbulence of waves breaking off a beach excavates a trough in the sandy bottom. Some of this sand is carried forward onto the beach and the rest is deposited on the offshore flank of the trough. Sand suspended in the backwash and in rip currents adds to the bar, as does some sand moving shoreward from deeper water. The bar's top is kept below still-water (half-wave height) level by the plunge of the waves breaking over it. Bars and troughs are most pronounced in the heavy surf of the stormy season; they also migrate shoreward in gentle seas and seaward in high seas. Thus, although sandbars have greatest relief in the stormy season, they are more submerged.

Bay-mouth bars may extend partially or entirely across the mouth of a bay; bay-head bars occur at the heads of bays, a short distance from shore.

Barrier bars or beaches are exposed sandbars that may have formed during the period of high-water level of a storm or during the high-tide season. During a period of lower mean sea level they become emergent and are built up by swash and wind-carried sand; this causes them to remain exposed. Barrier bars are separated from beaches by shallow lagoons and cut the beach off from the open sea. They occur offshore from coastal plains except where the coasts are rocky; where the tidal fluctuation is great (more than 2½ metres [8 feet]); or where there is little wave activity or sand. Barrier bars are common along low coasts, as off the shores of the Gulf of Mexico, where they parallel straight beaches. They often are cut by tidal inlets and are connected by underwater tidal deltas; they convert irregular shorelines to nearly straight ones.

sandbox tree, either of two species of large trees (*Hura crepitans* and *H. polyandra*) in the spurge family (Euphorbiaceae). They are among the largest trees of tropical America and are interesting for their pumpkin-shaped seed capsules that explode with a loud report, scattering the seeds. Sandbox trees are sometimes grown as boulevard trees but have disadvantages in their poisonous leaves, bark, and seeds and the explosions of their capsules,



Sandbox tree (*Hura crepitans*)
Walter Dawn

which have force enough to injure persons or livestock. *H. crepitans* is native through most of tropical America; *H. polyandra,* with white rather than red stamen clusters, is native from Mexico to Costa Rica. It is nearly 30 m (100 feet) tall with a girth of more than 1 m (3.3 feet). The trunk is studded with short, conical prickles. The long-stalked, dark-green leaves cover a round-crowned, high-branching tree. The globose seed capsules, grooved into 15 sections, are 7.6 cm (3 inches) in diameter and were used in colonial British West Indies as sandboxes for blotting ink. Some Mexican groups mix the poisonous latex with sand to stupefy fish.

sandbur, any grass of the genus *Cenchrus* (family Poaceae), consisting of about 20 to 25 species native to warm, sandy areas of North America, North Africa, Asia, Europe, and the South Pacific. A sandbur usually is a shallow-



Coast sandbur (*Cenchrus incertus*)
Miles C. Labrum

rooted, spreading, weedy annual or perennial less than 100 cm (40 inches) tall.

Sandbur flower spikelets are enclosed in rounded, sharp-spined burs that detach readily from the plant when ripe, often catching in the coats of or scratching the faces of grazing animals. The plants can be used for forage before the burs form.

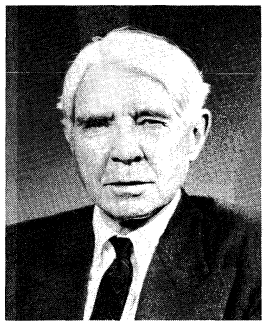
Sandburg, Carl (b. Jan. 6, 1878, Galesburg, Ill., U.S.—d. July 22, 1967, Flat Rock, N.C.), American poet, historian, novelist, and folklorist.

From the age of 11, Sandburg worked in various occupations—as a barbershop porter, a milk truck driver, a brickyard hand, and a harvester in the Kansas wheat fields. When the Spanish-American War broke out in 1898, he enlisted in the 6th Illinois Infantry. These early years he later described in his autobiography *Always the Young Strangers* (1953).

From 1910 to 1912 he acted as an organizer for the Social Democratic Party and secretary to the mayor of Milwaukee. Moving to Chicago in 1913, he became an editor of *System,* a business magazine, and later joined the staff of the *Chicago Daily News.*

In 1914 a group of his *Chicago Poems* appeared in *Poetry* magazine (issued in book form in 1916). In his most famous poem, "Chicago," he depicted the city as the laughing, lusty, heedless "Hog-butcher, Tool-maker, Stacker of Wheat, Player with Railroads, and Freight-handler to the Nation." Sandburg's poetry made an instant and favourable impression. In Whitmanesque free verse, he eulogized workers: "Pittsburgh, Youngstown, Gary, they make their steel with men" (*Smoke and Steel,* 1920).

In *Good Morning, America* (1928) Sandburg seemed to have lost some of his faith in democracy, but from the depths of the Great

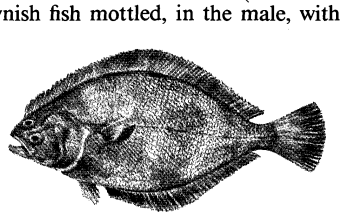


Sandburg, 1949
By courtesy of the Illinois State Historical Library, Springfield

Depression he wrote a poetic testament to the power of the people to go forward, *The People, Yes* (1936). The folk songs he sang before delighted audiences were issued in two collections, *The American Songbag* (1927) and *New American Songbag* (1950). He wrote the popular biography *Abraham Lincoln: The Prairie Years,* 2 vol. (1926), and *Abraham Lincoln: The War Years,* 4 vol. (1939; Pulitzer Prize in history, 1940).

Another biography, *Steichen the Photographer,* the life of his famous brother-in-law, Edward Steichen, appeared in 1929. In 1948 Sandburg published a long novel, *Remembrance Rock,* which recapitulates the American experience from Plymouth Rock to World War II. *Complete Poems* appeared in 1950. He wrote four books for children—*Rootabaga Stories* (1922); *Rootabaga Pigeons* (1923); *Rootabaga Country* (1929); and *Potato Face* (1930).

sanddab, any of certain edible, American Pacific flatfishes of the genus *Citharichthys* (family Bothidae). As in other flatfishes, sanddabs have both eyes on the same side of the head; as in other bothids, the eyes are usually on the left side. The most common species of sanddab is the Pacific sanddab (*C. sordidus*), a brownish fish mottled, in the male, with dull



Pacific sanddab (*Citharichthys sordidus*)
Painting by Richard Ellis

orange. It grows to about 40 cm (16 inches) and 1 kg (2 pounds).

The name is also sometimes used for the American plaice, known in Europe as the rough dab (*see* plaice), and various other flatfishes.

Sandeau, Léonard-Sylvain-Julien, also called JULES SANDEAU (b. Feb. 19, 1811, Aubusson, Fr.—d. April 24, 1883, Paris), prolific French novelist, best remembered for his collaborations with more famous writers.

As a young man, Sandeau became the lover of Amandine-Aurore-Lucie Dudevant (later known as George Sand) and worked with her on the novel *Rose et Blanche* (1831; "Red and White"), which was published under the pseudonym Jules Sand. At the end of 1832, she broke off the affair and adopted the pen name George Sand. Sandeau's most successful novel was *Mademoiselle de la Seiglière* (1848), a tale of the conflict between love and class consciousness, written in a mannered style, now read mainly for its portrayal of society during the reign of Louis-Philippe. He also wrote a good deal for the theatre. He met with considerable success with dramatizations of a number of his novels, and he collaborated with Émile Augier on several plays, including the famous *Gendre de Monsieur Poirier* (1854; "Son-in-Law of Monsieur Poirier"), which advocated the fusion of the new prosperous middle class and the dispossessed nobility.

Sandefjord, town, Vestfold *fylke* (county), southeastern Norway. Located near the mouth of the Oslo Fjord at the head of Sandefjord Fjord, an inlet of the Skagerrak, Sandefjord was established in the 14th century, and it received its charter in 1845. In the early 1900s it became one of the world's major whaling centres, but emphasis has shifted to shipping and industrial works such as machine shops and chemical works. An international statistical bureau is located there to keep track of the destruction of whales on a worldwide basis and to develop plans for conservation of endangered whale species. West of the town is Gokstad, in which King Olaf of Vestfold was buried in the 9th century. A Viking ship was unearthed in Sandefjord in 1880. Pop. (1987 est.) mun., 35,453.

Sandeman, Robert (b. April 29, 1718, Perth, Perthshire, Scot.—d. April 2, 1771, Danbury, Conn. [U.S.]), British minister and leader of the Glasite (later called Sandemanian) sect, dissenters from the established Presbyterian Church.

From 1736 to 1744 Sandeman was a linen manufacturer. He married (1737) Catherine, daughter of John Glas, who founded the Glasites. Sandeman became an elder (1744) and served Glasite congregations in Perth, Dundee, Edinburgh, and London. His controversial *Letters on Theron and Aspaslio. Addressed to the Author* was published in Edinburgh (1757).

In 1764 he sailed to New England, where he and his associates helped establish churches in several towns. He settled in 1767 in Danbury, Conn., which became the sect's principal centre. Strongly opposed by New England ministers, in 1770 he successfully resisted an order from Danbury officials to leave town.

Sandeman was regarded as the principal exponent of Glas's views, which he developed toward a strict primitive Christianity that exposed them to the charge of antinomianism. In his epitaph, Sandeman expressed this distinctive doctrine on the nature of faith: "That the bare death of Jesus Christ without a thought or deed on the part of man is sufficient to present the chief of sinners spotless before God."

Sandemanian, original name GLASITE, member of a Christian sect founded in about 1730 in Scotland by John Glas (1695–1773), a Presbyterian minister in the Church of Scotland.

Glas concluded that there was no support in the New Testament for a national church because the kingdom of Christ is essentially spiritual. He also believed that the Christian church could not be built or upheld by political and secular weapons but only by the word and spirit of Christ. Deposed for his beliefs from the Church of Scotland in 1730, Glas established his own church, first in Dundee, Scot., and then in Perth. Robert Sandeman, Glas's son-in-law, came to be the recognized leader of the sect, whose members were called Sandemanians in England and America.

The Sandemanian churches attempted to conform to primitive Christianity as understood by them. Each congregation had several elders, pastors, or bishops, who were chosen according to St. Paul's instructions, as interpreted by the Sandemanians, without regard to education or occupation. The Lord's Supper (communion) was observed weekly, and each Sunday noon a feast was held that was attended by every member. Foot washing was also practiced. They believed that the accumulation of wealth was unscriptural and improper.

Several churches were founded in Scotland, England, and America, but the sect gradually declined. Some scholars believe that Thomas and Alexander Campbell, the founders of the Disciples of Christ (Christians), were influenced by the Sandemanians.

Sandemose, Aksel (b. March 19, 1899, Nykøbing, Mors Island, Den.—d. Aug. 6, 1965, Copenhagen), Danish-born Norwegian experimental novelist whose works frequently elucidate the theme that the repressions of society lead to violence.

Sandemose went to sea in his teens, jumped ship in Newfoundland, and worked in a lumber camp before returning to Denmark to write stories influenced by Jack London and Joseph Conrad.

In 1929 he settled in Norway and during the 1930s published a series of partly autobiographical novels, bitterly castigating the convention-ridden, small-town society of his Danish childhood and drawing on violent episodes from his later wanderings. Included among these works are *En sjømann går iland* (1931; "A Sailor Disembarks"), *En flyktning krysser sitt spor* (1933; *A Fugitive Crosses His Tracks*), and *Der stod en benk i haven* (1937; "A Bench Stood in the Garden"). Later novels include *Der svundne er en drøm* (1946; "The Past Is a Dream"), *Varulven* (1958; *The Werewolf*), and its continuation, *Felicias Bryllup* (1961; "Felicia's Wedding"). In these works,



Sandemose

By courtesy of the Royal Norwegian Embassy, New York

the dualism of good and evil was a recurrent theme.

Sander, August (b. Nov. 17, 1876, Herdorf, near Cologne—d. April 20, 1964, Cologne), German photographer who attempted to produce a comprehensive photographic document of the German people.

The son of a mining carpenter, Sander apprenticed as a miner in 1889. Acquiring his first camera in 1892, he took up photography as an avocation and, after military service, took it up professionally. By 1904 he had his own studio in Linz, and, after his army service in World War I, he settled permanently in Cologne, where in the 1920s his circle of friends included photographers and painters dedicated to what was called the New Realism, or New Objectivity.

At the Cologne Kunstverein exhibition in 1927, Sander showed 60 photographs of "Man in the Twentieth Century," and two years later he published one volume of *Antlitz der Zeit* ("Face of Our Time"), the first of what was projected to be a series offering a sociological pictorial survey of the class structure of Germany—peasants, workers, students, artists, politicians. When the Nazis came to power in 1933, however, he was subjected to official disapproval, and the plates for *Antlitz der Zeit* were seized and destroyed. (His son, a Socialist, was jailed and died in prison.) Sander turned to less controversial rural landscapes and nature subjects. Late in World War II he restarted his portrait survey, but most of the negatives were destroyed either in bombing raids or, later in 1946, by looters. Throughout the remainder of his life he nevertheless continued on a number of projects and books. The Federal Republic of Germany awarded him the Order of Merit in 1960.

sanderling (*Calidris alba;* sometimes *Crocethia alba*), abundant shorebird, a worldwide species of sandpiper belonging to the family Scolopacidae (order Charadriiformes). Sanderlings nest on barrens near the sea around the



Sanderling (*Calidris alba*)

Eric Hosking from The National Audubon Society Collection/Photo Researchers/EB Inc.

North Pole, and they winter on sandy beaches virtually everywhere. About 20 cm (8 inches) long, sanderlings are rusty-backed in summer but are the whitest of sandpipers in winter. The long, white wing stripe is more showy than in other small species.

Sanders, Harland, byname COLONEL SANDERS (b. Sept. 9, 1890, near Henryville, Ind., U.S.—d. Dec. 16, 1980, Shelbyville, Ky.), American business executive, a dapper self-styled Southern gentleman whose white hair, white goatee, white double-breasted suits, and black string ties became a trademark in countries worldwide for Kentucky Fried Chicken.

Sanders, who quit school in seventh grade, held a variety of jobs before opening (1929) Sanders' Cafe in the rear of a service station in Corbin, Ky. The cafe, which offered family-style dinners, soon gained a large clientele; and in 1935 Sanders received his honorary colonel's title from the governor of Kentucky. He perfected his recipe for "finger lickin' good chicken" in 1939 by using a secret blend of 11 spices and a pressure cooker to seal in flavour and moisture. After selling his restaurant, Sanders took to the road armed with his recipe but signed up only five restaurants in two years. By 1964, however, there were more than 600 franchises in the United States and Canada, and Sanders was making $300,000 a year.

In the same year, Sanders signed most of his fast-food empire over to John Brown of Kentucky and Jack Massey of Tennessee, providing that he received $2,000,000, a lifetime salary of $40,000 a year, and a seat on the board of directors. In 1971 the company, which boasted 3,500 franchises and $700,000,000 a year in business, was acquired by Heublein Corporation. Sanders remained active as an official ambassador and appeared in advertisements and commercials for the company even as a nonagenarian.

Sanders, Nicholas, Sanders also spelled SANDER (b. *c.* 1530, Surrey, Eng.—d. 1581, Ireland), English Roman Catholic scholar, controversialist, and historian of the English Reformation.

He was educated at Winchester and New College, Oxford, at which university he became a lecturer in canon law. He left England shortly after the accession of Elizabeth I in order to be free to practice Roman Catholicism and by 1561 had been ordained priest at Rome. He was one of the theologians for Stanislaus Cardinal Hosius, prince-bishop of Ermeland, one of the five papal legates at the renewed sessions of the Council of Trent. Sanders' immense reputation among the English Roman Catholic exiles in the Low Countries, however, caused the cardinal to allow him to go to Louvain, where Sanders became professor of theology and was soon busy controverting the claims of Anglican divines, especially Bishop John Jewel.

Of Sanders' many books, the best known was a history of the English Reformation written in Latin, left unfinished at his death, and published with additions by a fellow exile, Father Edward Rishton, at Cologne in 1585. Many editions and translations followed rapidly; eventually it was put into English by David Lewis as *The Rise and Growth of the Anglican Schism* (1877).

The later part of Sanders' life was occupied in promoting a military invasion of England for the restoration of Roman Catholicism. Lengthy and unsatisfactory negotiations for this purpose in both Rome and Madrid culminated in his landing in Ireland in 1579 as a papal agent to promote rebellion. He failed and died there.

Sanders, Otto Liman von: *see* Liman von Sanders, Otto.

Sanderson, Frederick William (b. May 13, 1857, Brancepeth, Durham, Eng.—d. June 15, 1922, London), English schoolmaster whose reorganization of Oundle School had considerable influence on the curriculum and methods of secondary education.

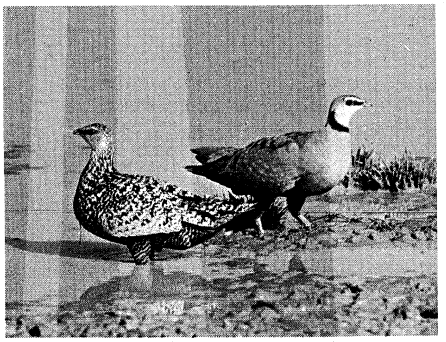
In 1889 Sanderson became senior physics master at Dulwich College, London. In 1892 he was appointed headmaster of Oundle, near Peterborough, Northamptonshire, at a critical time in the fortunes of the school. He transformed Oundle by completing an ambitious building program that included laboratories, workshops, a foundry, an observatory, an experimental farm, and a spacious library. The science and engineering departments he established attracted many boys who had been uninterested in classics. In 1905 the students built a reversing engine for a 4,000-horsepower marine engine, and during World War I the school's workshops were made into munitions shops. *The Story of a Great Schoolmaster* (1924), by H.G. Wells, is an account of Sanderson's life and influence.

sandfish, any of several unrelated marine fishes found along sandy shores. Sandfishes, or beaked salmon, of the species *Gonorhynchus gonorhynchus* (family Gonorhynchidae) live

in shallow to deep Indo-Pacific waters and can burrow rapidly in sand. They are slender fishes up to 37.5 cm (15 inches) long and have pointed snouts; the mouth, preceded by a whiskerlike barbel, is underneath. These sandfishes are considered a delicacy in some areas.

The small, scaleless northern Pacific sandfishes of the family Trichodontidae (order Perciformes) have vertical mouths and fringed lips. Often, they lie partly buried. There are two genera, *Trichodon* and *Arctoscopus;* members of the latter genus are eaten in Japan.

sandgrouse, any of 16 species of birds of Asian and African deserts, constituting the family Pteroclidae (or Pterocletidae) and usually treated as a suborder, Pterocletes, of the pigeon order, Columbiformes. According to



Yellow-throated sandgrouse (*Pterocles gutteralis*)
Simon Trevor—Bruce Coleman Ltd.

some systems of classification, however, they belong subordinally near to the plovers in the order Charadriiformes.

Sandgrouses are about 22 to 40 cm (about 9 to 16 inches) long and have gray or brown plumage, pointed wings, short legs, and (in most species) pinlike central tail feathers. They fly swiftly and walk rapidly. As game birds they are hard to kill because of their tough skin and thick feathering. Like pigeons, sandgrouse mate for life. The female lays two or three elongated dark-coloured eggs in a depression in the ground; males incubate by night. The chicks can leave the nest almost as soon as hatched but receive much parental care.

Sandgrouse of the genus *Pterocles* are baretoed; those of *Syrrhaptes* lack the hind toe and have the front toes feathered.

Sandhurst, town ("parish"), Bracknell district, county of Berkshire, England. It is situated 9 miles (14 km) north of the town and military camp of Aldershot. Sandhurst, which lies some 30 miles (48 km) west-southwest of London, is best known for the nearby Royal Military Academy.

Most of the potential regular officers for the British army undergo a course of general and military education as officer cadets at the academy, commonly called Sandhurst. This academy is heir to the functions performed up to 1939 by both the Royal Military Academy (founded 1799) at Woolwich, London, and the Royal Military College at Sandhurst. The latter was established by royal warrant in 1802 at Great Marlow, largely as a result of the efforts of Colonel J.G. Le Marchant and General Francis Jarry, an exiled French officer, who had organized a training school for officers at High Wycombe three years earlier. The Royal Military College was moved to Sandhurst in 1812.

After World War I the length of the course was fixed at 18 months, and officers were trained for commissions in all branches of the British and Indian armies except the artillery, engineers, and signals, which were separately provided for at Woolwich.

In order to educate and train all regular army officers on a common basis, the authorities planned to amalgamate the Royal Military Academy and the Royal Military College at Sandhurst in 1940. World War II intervened, and Sandhurst became the location of an Officer Cadet Training Unit until the present Academy came into being in 1947.

Most cadets enter the academy at 18½–19½ years of age after passing the competitive army entrance examination and doing a short period of army training in the ranks. Other cadets come from Welbeck College, Worksop, Nottinghamshire, established by the War Office in 1953 for boys of about 16½ who intend to obtain commissions in technical arms. Although the number varies, generally about one-tenth of the cadets are from Commonwealth overseas territories.

At the end of the course (comprising six terms of 12–13 weeks each), commissions are allotted in the arms of the service according to existing vacancies. First choice of regiment is usually given to those high up in the order of merit, which is determined by a formula combining educational achievement with an assessment of personal qualities.

Prime Minister Winston Churchill and General Bernard Law Montgomery were trained at Sandhurst. Pop. (1981) 14,080.

Sandia Mountains, range in central New Mexico, U.S., northeast of Albuquerque and east of the Rio Grande. Largely within a part of the Cibola National Forest, the mountains extend southward for 30 miles (48 km) and are continued by the Manzano Mountains. They rise to 10,678 feet (3,255 m) in Sandia Crest, which is topped by television towers. The Sandia Peak Aerial Tramway and Ski Area provide year-round recreational facilities with a November-April ski season. A cave in the mountains has yielded artifacts of the so-called "Sandia Man" (25,000 BC). In Pueblo mythology the Sandias were sacred, marking the southern boundary of the Tiwa-speaking Indian territory.

Sandinista, member of SANDINISTA NATIONAL LIBERATION FRONT, Spanish FRENTE SANDINISTA DE LIBERACIÓN NACIONAL (FSLN), one of a Nicaraguan group that overthrew President Anastasio Somoza Debayle in 1979, ending 46 years of dictatorship by the Somoza family. The Sandinistas governed Nicaragua from 1979 to 1990.

Named for César Augusto Sandino, a hero of Nicaraguan resistance to U.S. military occupation (1927–33), the FSLN was founded in 1962 by Carlos Fonseca Amador, Silvio Mayorga, and Tomás Borge Martínez as a revolutionary group committed to socialism and to the overthrow of the Somoza family. Over the next 10 years the FSLN organized political support among students, workers, and peasants. By the mid-1970s its attacks on the Nicaraguan National Guard from sanctuaries in Honduras and Costa Rica were serious enough that Somoza unleashed bloody reprisals against the Sandinistas. Fonseca and Mayorga were killed, and the FSLN split into three *tendencias,* or factions, that differed over whether the group should organize revolutionary cells only in the cities, continue to gradually accumulate support throughout the country, or coalesce with other political groups in the growing rebellion. The Nicaraguan revolution of 1978–79 reunited the Sandinistas under the third *tendencia,* headed by Daniel and Humberto Ortega Saavedra, and the FSLN, now numbering about 5,000 fighters, defeated the National Guard and overthrew Somoza in July 1979.

A nine-member National Directorate, composed of three *comandantes* from each faction, was then set up to lead the FSLN and set policy for a governing junta that was headed by Daniel Ortega. Once in power in Nicaragua, the FSLN organized itself into local and regional committees and built up support through mass organizations of workers, young people, and other groups. To fight off the attacks of the counterrevolutionary forces known as the *contras,* who were based in Honduras and were in part armed and financed by the United States, Humberto Ortega created the 50,000-strong Sandinista Popular Army, and Tomás Borge organized a secret-police force to guard against espionage and dissent. The resignations of various non-Marxist members of the Sandinista leadership, chiefly over issues of political rights, pushed the party and Nicaragua progressively to the left, and both became dependent on the support of the Soviet Union and Cuba.

The Sandinista government confiscated the Somoza family's vast landholdings and nationalized the country's major industries, but the central planning typical of Soviet-style socialist economies was never adopted, and small and medium-sized private farms and businesses were tolerated. Having committed itself to political pluralism, the FSLN grudgingly tolerated moderate opposition groups and agreed to elections only after considerable pressure at home and abroad. In 1984 the FSLN won more than 60 of 96 seats in a new National Assembly and sent Daniel Ortega to the presidency in an election that was widely criticized for its lack of safeguards for opposition parties. In 1990, however, the Nicaraguan populace, weary of war and economic depression, voted for the 14 parties of the United Nicaraguan Opposition, which formed a government while the Sandinistas relinquished power. Though reduced to an opposition party, the FSLN retained a considerable power base in the country's army and police forces.

Sandino, César Augusto, also called AUGUSTO CÉSAR SANDINO (b. 1893—d. Feb. 23, 1934), Nicaraguan guerrilla leader, one of the most controversial figures of 20th-century Central American history. In Nicaragua he became a popular hero and gave his name to the Sandinistas, a revolutionary group that formed the government from 1979 to 1990.

Sandino first gained national recognition in 1926, when he took up arms in support of Vice President Juan Bautista Sacasa's claim to the presidency. Upon the intervention of U.S. Marines in 1927, Sandino withdrew with several hundred men to the mountains of northern Nicaragua, and his success in eluding capture by the U.S. forces and the Nicaraguan National Guard attracted widespread sympathy for him throughout the hemisphere. The resulting anti-American feeling was partly responsible for President Franklin D. Roosevelt's "Good Neighbor Policy," an announced reformulation of U.S. foreign relations with Latin America. Following the withdrawal of the Marines in January 1933 and the inauguration of Sacasa as president, Sandino was invited to meet with Anastasio Somoza, the head of the National Guard, for an apparent peace conference but was abducted and murdered instead by National Guardsmen.

Sandnes, town, Rogaland *fylke* (county), southwestern Norway. Located at the head of Ganda Fjord, which is a branch of Bokna Fjord, Sandnes is the chief port for the surrounding Jæren agricultural region. It has excellent road and rail connections with Stavanger and the remainder of southern Norway. The town produces textiles, bicycle and boating products, construction materials, and ceramic tiles. Pop. (1989 est.) mun., 43,548.

Sandomierz, town, Tarnobrzeg *województwo* (province), southeastern Poland. It is situated on the left bank of the Vistula River above the latter's confluence with the San River. First mentioned in 1097, Sandomierz gained early importance because of its geographic position astride the trade route between the Baltic and

Black seas and Ruthenia. It was the 12th-century capital of the Sandomierz principality and received municipal rights in 1286. Devastated by Tatar invasions in the late 13th century, the town was rebuilt by King Casimir III the Great of Poland in the 14th. Sandomierz developed economically and became one of the largest towns in Poland in the 16th century, but in the 17th century it was ruined by the plague, fires, and prolonged wars. It passed to Austria in 1772 and was returned to Poland in 1918.

The town has many old buildings, including the Romanesque Church of St. James, a 14th-century Gothic cathedral with Byzantine murals, and Opatów Gate, part of the old fortifications. The town has a modern sulfur-processing facility and glassworks and food-processing plants. Pop. (1988 est.) 22,600.

Sandomierz Basin, Polish KOTLINA SANDOMIERSKA, lowland region, southeastern Poland, located south of the Lublin Uplands and north of the Western Carpathian foothills. It is drained by the Vistula River and its tributary the San River. The Sandomierz Basin is a structural depression with natural transportation routes connecting the basin in an easterly direction with the upper Dnestr valley (in the Ukraine) and in a westerly direction with the Oświęcim Basin on the upper Vistula near Kraków. Sandy tracts are widespread in the northern part of the depression, while marshy conditions exist in the area of the Vistula-San confluence. The region contains rich deposits of coal, natural gas, and petroleum. The basin's energy resources made possible the rise of the Upper Silesian industrial agglomeration, Poland's most important industrial region. Kraków, Rzeszów, and Tarnów are principal industrial and commercial centres in the basin.

Sandoway, town and major seaport, southern Myanmar (Burma). It lies along the Bay of Bengal at the mouth of the Sandoway River. An old established settlement, it was reputedly once the capital of the ancient empire of Arakan. Engaged in coastal trade with Akyab and Ramree islands, it is the site of a diesel electric plant. Nearby Ngapali beach is a resort that developed when air service began from Yangôn (Rangoon). Kinmaw is a coastal settlement directly north. The nearby Taungup Pass leads eastward to Pyè on the Irrawaddy River. Pop. (1983) 97,746.

Sandoz, Mari Susette (b. 1901, Sandoz post office, Sheridan county, Neb., U.S.—d. March 10, 1966, New York, N.Y.), American biographer and novelist known for her scrupulously researched books portraying the early American West.

Sandoz's life as a student and teacher in rural Nebraska—a rigorous life that left her blind in one eye from a blizzard at age 13—prepared her to depict realistically pioneer and Indian life. She wrote almost 80 stories while in college, but her first success came when she was in her mid-30s, with *Old Jules* (1935), a story of her father's hard farm life.

Sandoz's books include *Crazy Horse* (1942), a biography of the Sioux Indian chief; *Cheyenne Autumn* (1953), which concerns Indians leaving a reservation, to which they had been sent by the U.S. Army, in order to return home; *The Buffalo Hunters* (1954), which tells of the white settlers' slaughter of bison and its social impact on the West; and *The Battle of the Little Bighorn* (1966). These works are praised for their accurate re-creation of character and historical events.

sandpiper, any of numerous shorebirds belonging to the family Scolopacidae (order Charadriiformes), which also includes the woodcocks and the snipes. The name sandpiper refers particularly to several species of small to middle-sized birds, about 15 to 30 cm (6 to 12 inches) long, that throng sea beaches and inland mud flats during migration.

Sandpipers have moderately long bills and legs, long, narrow wings, and fairly short tails. Their colouring often consists of a complicated "dead-grass" pattern of browns, buffs, and blacks on the upperparts, with white or cream colouring below. They are frequently paler in autumn than in spring. Some species have distinguishing features, such as speckled breasts, white rump bands, or contrasting throat patches, but their general appearance is similar and they are notoriously difficult



White-rumped sandpiper (*Calidris fuscicollis*)
Helen Cruickshank from The National Audubon Society Collection/Photo Researchers—EB Inc.

to identify. Most puzzling are the smallest sandpipers, known as peep, stint, or oxeyes. Most of these, formerly divided among the genera *Erolia, Ereunetes,* and *Crocethia,* are now placed in the broad genus *Calidris.*

Sandpipers feed on the beaches and mud flats of ocean coastlines and inland waters, running along near the water and picking up their food of insects, crustaceans, and worms. They utter thin, piping cries while in flight or while running along the sand. Sandpipers usually nest on the ground in the open, in a scantily lined little hollow. They lay four spotted eggs, from which hatch active, downy young. Many sandpipers nest in the Arctic and sub-Arctic regions and pass through the North Temperate Zone in great flocks on the way to their breeding sites.

The common sandpiper (*Actitis,* or sometimes *Tringa, hypoleucos*) is an abundant breeder on grassy shores of lakes and rivers throughout Eurasia, and it winters from Africa to Australia and Polynesia. This species is notable for a nervous mannerism of wagging its tail. The closely related spotted sandpiper (*A. macularia*) is the best-known New World sandpiper; this species breeds beside streams and ponds of sub-Arctic and temperate North America and winters as far south as Argentina.

The solitary sandpiper (*Tringa solitaria*), which breeds in North America and winters in South America, is unusual in nesting not on the ground but in the old tree nests of other birds. The closely related green sandpiper (*T. ochropus*) is its slightly larger counterpart in boreal and mountainous regions of Eurasia.

The genus *Calidris* contains many birds known as sandpipers, along with others such as the knot and the sanderling (*qq.v.*) and the dunlin (*q.v.*)—which is sometimes called the red-backed sandpiper. The least sandpiper (*C. minutilla*), less than 15 cm in length, is the smallest sandpiper. Sometimes called the American stint, it is abundant in Alaska and across sub-Arctic Canada to Nova Scotia. It winters on coasts from Oregon and North Carolina to South America. The purple sandpiper (*C. maritima*) breeds in foggy Arctic highlands, chiefly in eastern North America and northern Europe, and winters as far north as Greenland and Great Britain. It is grayish with yellow legs and bill and is easily approached in the field. Another Old World species is the rufous-necked sandpiper (*C. ruficollis*), which breeds in Siberia and winters as far south as New Zealand and Tasmania. The white-rumped sandpiper (*C. fuscicollis*), which breeds in Arctic North America and winters in southern South America, is rust-coloured in breeding season but gray otherwise. The upland sandpiper (*Bartramia longicauda*), also called Bartram's sandpiper and, mistakenly, the upland plover, is an American bird of open fields. It is a slender, gray-streaked bird almost 30 cm long that feeds on grasshoppers and other insects.

Sandringham, parish and royal mansion, West Norfolk district, county of Norfolk, England. With the surrounding estate of 19,500 acres (7,900 hectares) of sandy heath and farmland, the mansion was acquired for the Prince of Wales, later Edward VII, in 1861 and has since been part of the British sovereign's personal possessions. Successive monarchs have used it for winter residence during the partridge-shooting season, and George VI died there in 1952. The village and church of West Newton lie nearby. Pop. (1981) 440.

sandstone, lithified accumulation of sand-sized grains (0.063 to 2 mm [0.0025 to 0.08 inch] in diameter). It is the second most common sedimentary rock after shale, constituting about 10 to 20 percent of the sedimentary rocks in the Earth's crust. Because of their abundance, diverse textures, and mineralogy, sandstones are important indicators of erosional and depositional processes.

A brief treatment of sandstones follows. For full treatment, *see* MACROPAEDIA: Minerals and Rocks.

Texturally, sandstones consist of two components: (1) a framework composed of sand-sized grains and (2) interstitial volume between grains, which may be empty, especially in modern sandstones, or, in the case of most ancient sandstones, filled with either a chemical cement of silica or calcium carbonate or a fine-grained matrix.

The principal mineral constituents of the framework are quartz, feldspar, and rock fragments. The relative proportions of these have genetic implications first for the source area and second for the rate of deposition.

Texture and mineralogical properties are used for sandstone classification, though considerable debate exists as to which properties to emphasize. Several important classes include orthoquartzite (nearly pure quartz); arkose (feldspar-rich, quartz-poor with only minor fine-grained component); and graywacke (feldspar- and quartz-rich, but with significant fine-grained component). Sedimentary-rock sequences associated with different sandstone types usually show patterns that reflect the depositional environment and source region. Orthoquartzites, for example, are commonly associated with shallow marine carbonates and shale, whereas graywacke is associated with deep-water shales.

Sandusky, city, seat (1838) of Erie county, northern Ohio, U.S. It lies along Sandusky Bay (Lake Erie's largest natural harbour [there bridged to Port Clinton]), 63 miles (101 km) west of Cleveland. In the 18th century the French and British established trading posts in the area, and Fort Sandusky was burned in 1763 during Pontiac's War (an Indian uprising). Sandusky was a supply depot during the War of 1812; Commodore Oliver Perry's naval victory (Sept. 10, 1813) over the British occurred about 25 miles (40 km) northwest, near Put-in-Bay. Previously known as Ogontz Place, after an Ottawa Indian chief, the site was settled (1816) by Connecticut residents who had been awarded the land for losses suffered from British raids during the American Revolution. It was also

briefly known as Portland. The present name (from a Wyandot Indian word meaning "cold" or "pure water") was adopted in 1845. The first railroad arrived in 1838. In the 1850s Sandusky was a terminus of the Underground Railroad, an escape route for slaves. Johnson's Island in Sandusky Bay was a prison for Confederate officers during the Civil War.

Its harbour location south of Marblehead Peninsula and a cluster of offshore islands (notably Kelleys Island) has made Sandusky a focal point for a popular summer recreation area, and tourism is a major economic asset. Fish markets, the lake trade (especially coal shipping), wineries, and industry (notably food processing and the manufacture of steel, iron castings, auto parts, and plastic and paper products) are basic to the economy. The Firelands Campus (1968) of Bowling Green State University is in Huron, 10 mi east. Inc. city, 1824. Pop. (1980) 31,360.

Sandviken, town in the *län* (county) of Gävleborg, eastern Sweden, on the north shore of Storsjön (lake). It developed around the ironworks and steelworks established in 1862; in 1927 it became a *köping*, or market town, and in 1943 a town. There are engineering works and stone quarries. The early history of the area is represented by an old church, south of the city, which contains a medieval Flemish altarpiece and 15th-century wall paintings. Pop. (1984 est.) mun., 41,319.

Sandwell, district (borough), metropolitan county of West Midlands, England, comprising the urban industrial communities of Warley and West Bromwich. Its area is 33 sq mi (86 sq km). Metalworking, especially nail making, dates from the Middle Ages, and coal was mined in the 13th century. The main industrial growth, based on local coal and ironstone reserves, followed the coming of the canals in the 18th century. Ironworks were established, including the famous Soho Manufactory (1761) at Smethwick, which was associated with the engineers James Watt and Matthew Boulton. Today Sandwell is an important centre of engineering and iron foundries, producing a wide range of metal products. Chemicals and glassmaking are also important. Three motorways converge in the borough. Pop. (1983 est.) 307,300.

Consult the INDEX *first*

Sandwich, parish (town) at the northern edge of Dover district, county of Kent, England, on the River Stour, 2 mi (3 km) from the sea. Originally the tidewater came far enough up the Stour Estuary to make Sandwich a port. By the 9th century the town had replaced the decayed Roman port of Richborough, and in the 11th century it became one of the Cinque Ports. It flourished during the Middle Ages and was chartered as a borough in 1226. English kings continually used it for their expeditions to France, and its herring fishing and general trade prospered. Progressive silting of the channel entrance led to its decay by the 17th century; and an influx of French and Flemish Protestant refugees only temporarily revived its prosperity. In modern times it has remained small, retaining many old buildings along the narrow, winding streets within the line of the old walls, now marked by a public walk. Two of its medieval churches, St. Clement's and St. Peter's, are conspicuous buildings, as is St. Mary's, rebuilt 1667. Its golf course is well known. Pop. (1981 prelim.) 4,227.

Sandwich, town (township), Barnstable County, southeastern Massachusetts, U.S., on Cape Cod Bay, 11 mi (18 km) west-northwest of Barnstable town. The earliest European settlement (1637) on Cape Cod, it was incorporated in 1639 and named for Sandwich, Eng. From 1825 to 1888 it was famous for its pressed glass, now rare and valuable since the original secret formula for making it was lost. Examples of the art are displayed in the Sandwich Glass Museum. A number of colonial buildings survive, including Hoxie House and Dexter's Grist Mill. The town's Heritage Plantation has several exhibits, notably antique auto, military, and arts and crafts museums. Scusset State Beach Reservation and Shawme-Crowell State Forest are nearby. Cranberry growing and tourism are the economic mainstays. Pop. (1980) 8,727.

Sandwich (island, Vanuatu): *see* Éfaté.

sandwich, in its basic form, slices of meat, cheese, or other food placed between two slices of bread. Although this mode of consumption must be as old as meat and bread, the name was adopted only in the 18th century for John Montagu, 4th earl of Sandwich, who had sliced meat and bread brought to him at the gaming table so that he could continue to play as he ate. His title lent the preparation cachet, and soon it was fashionable to serve sandwiches on the Continent, and the word was incorporated into the French language. Since that time the sandwich has been incorporated into virtually every cuisine of the West, by virtue of its simplicity of preparation, portability, and endless variety.

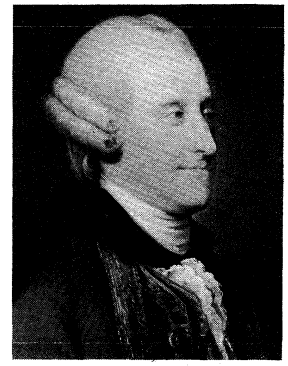
Any type of roll or bread and any type of food that can be conveniently so eaten can go into a sandwich, hot or cold. British tea sandwiches are made with thin-cut bread filled with fish paste, cucumber, watercress, or tomato. Scandinavian *smørrebrød* are served open-faced, with artfully composed toppings of fish, sliced meats, and salads. In France, hollowed-out rolls are a popular base. The United States contributed elaborate sandwich formulas, two of the most successful being the club sandwich of sliced chicken or turkey, bacon, lettuce, and tomato, and the Reuben of corned beef, swiss cheese, sauerkraut, and Russian dressing served grilled on black bread. Hot sandwiches, notably the ubiquitous hamburger on a bun, are a staple of the U.S. diet, with the peanut butter and jelly sandwich the mainstay of the American schoolchild.

Sandwich, Edward Montagu, 1st earl of, VISCOUNT HINCHINBROKE, BARON MONTAGU OF ST. NEOTS, Montagu also spelled MOUNTAGU (b. July 27, 1625, Barnwell, Northamptonshire, Eng.—d. June 7 [May 28, old style], 1672, Southwold Bay, off Suffolk), English admiral who brought Charles II to England at the Restoration in 1660 and who subsequently fought in the Second and Third Dutch Wars.

The son of Sir Sydney Montagu, he raised a regiment for Parliament after the outbreak of the Civil War and fought at the battles of Marston Moor (July 2, 1644) and Naseby (June 14, 1645) and at the siege of Bristol (September 1645). Although one of Oliver Cromwell's intimate friends and MP for Huntingdonshire from 1645 to 1648, he took little part in public affairs until 1653, when he was appointed a member of the Council of State. In January 1656 he was made a general at sea, an office he held jointly with Robert Blake. He was sent by Richard Cromwell to Denmark with a fleet in April 1659 to arrange a peace between Denmark and Sweden, but after Richard's fall (May) he returned to England and in September resigned his command. Reappointed general at sea in February 1660, he secured the fleet for Charles II, then in Holland, and was entrusted with the duty of bringing the King to England. He was created earl of Sandwich in July 1660 and was the patron of Samuel Pepys at the Admiralty for some years.

In the Second Dutch War (1665–67) Sandwich commanded a squadron under the Duke of York (later James II) and distinguished himself in the battle off Lowestoft on June 13, 1665 (June 3, old style). When the Duke retired in July, Sandwich became commander in chief, but after he had allowed the distribution of valuable cargoes from some captured Dutch ships without obtaining the King's permission he was dismissed from his command (November). He nevertheless served on diplomatic missions and in 1670 was appointed president of the Council for Trade and Plantations. On the outbreak of the Third Dutch War in 1672, Sandwich was again called into military service. He commanded a squadron under the Duke of York and during the fight in Solebay (Southwold Bay), his ship the "Royal James" was destroyed by fire. Sandwich's body was found at sea some days later and was buried in Westminster Abbey.

Sandwich, John Montagu, 4th earl of (b. Nov. 3, 1718—d. April 30, 1792, London), British first lord of the Admiralty during the American Revolution (1776–81) and the man for whom the sandwich (*q.v.*) was named.



John Montagu, 4th earl of Sandwich, oil painting after a portrait by John Zoffany in the National Portrait Gallery, London

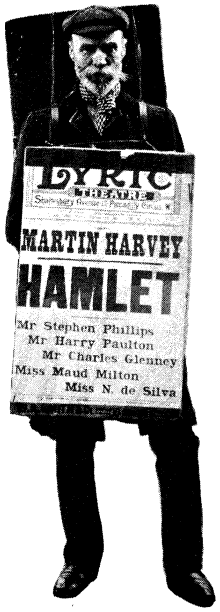
By courtesy of the National Portrait Gallery, London

Having succeeded his grandfather, Edward Montagu, the 3rd earl, in 1729, he studied at Eton and Trinity College, Cambridge, and travelled abroad and then took his seat in the House of Lords in 1739. He served as postmaster general (1768–70) and secretary of state for the northern department (1763–65, 1770–71). In the latter capacity he took a leading part in the prosecution (1763) of John Wilkes, the British politician and agitator, whose friend he once had been, thereby earning the sobriquet of "Jemmy Twitcher," after a treacherous character in John Gay's *Beggar's Opera.* He also was first lord of the Admiralty (1748–51, 1771–82). During the latter period his critics accused him of using the office to obtain bribes and to distribute political jobs. Although he was frequently attacked for corruption, his administrative ability has been recognized. However, during the American Revolutionary War he insisted upon keeping much of the British fleet in European waters because of the possibility of French attack, and he was subjected to considerable criticism for insufficient naval preparedness.

His interest in naval affairs and his promotion of exploration led the English explorer Capt. James Cook to name the Sandwich Islands (Hawaii) after him (1778). His *Voyage Round the Mediterranean* was published in 1799. The sandwich was named after him in 1762 when he spent 24 hours at a gaming table without other food.

sandwich board, advertising sign consisting of two placards fastened together at the top with straps supported on the shoulders of the

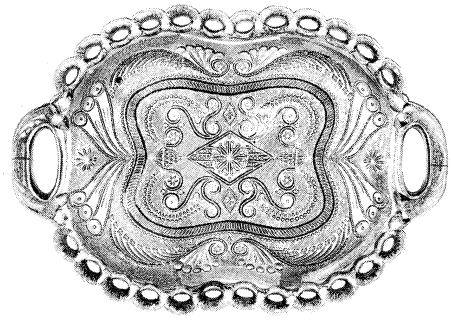
carrier, or sandwich man. The sandwich board was a popular form of advertising in the 19th century, when merchants and tradesmen hired men to carry the placards up and down the



Sandwich board carried by a sandwich man, London, late 19th century
Culver Pictures

streets (sometimes on horseback), promoting their goods and services to passersby. Charles Dickens was the first to refer to such sign carriers as "sandwich men." Sandwich boards disappeared in the early 20th century until the Great Depression, when lack of funds for large advertising campaigns made this inexpensive advertising technique temporarily popular once more. Sandwich boards were rarely used in the late 20th century.

Sandwich glass, glass made by the Boston and Sandwich Glass Company at the village of Sandwich, Mass., 1825–88. The factory was established by Deming Jarves and produced glass of different types, including blown, molded, cut, and engraved. Sandwich became famous, however, chiefly for its early pressed glass (glass pressed in a mold), for which the first American machinery was developed by Jarves around 1827. His pressed glass has some kinship with French Baccarat pressed glass, which had a parallel development from around 1830, though Sandwich glass has a different repertoire of ornament, less classical than its French counterpart. This repertoire was very large, as has been established not only from the many pieces surviving in collections but also from excavations carried out on the factory site during the 1930s, which revealed many fragments of hitherto unlisted patterns. Almost every conceivable item of tableware—as well as vases, lamps, scent bottles, and other objects—was made in pressed glass, in which patterns were given a stippled background. This production tended to overshadow other types of Sandwich glass that also achieved distinction, including a "striped" blown glassware and opaline glass, notably in a ruby-red colour.



Lacy pressed glass tray, probably Boston and Sandwich Glass Company, Sandwich, Mass., c. 1830–35; in the Corning Museum of Glass, Corning, N.Y.
By courtesy of the Corning Museum of Glass, Corning, N.Y.

Sandwich Islands: *see* Hawaii.

Sandwīp Island, island situated in the Meghna Estuary, southeastern Bangladesh. The easternmost island of the Ganges Delta, it is 25 miles (40 km) long and 3–9 miles (5–15 km) wide. It is separated from Chittagong region to the east by the Sandwīp Channel, one of the four mouths of the Meghna Estuary, and from Hātia Island to the west by the Hātia River. Formed of silt deposits from the Meghna, it is an exceptionally fertile area. It is, however, continually subject to tidal waves.

Sandwīp Island was a 17th-century Portuguese and Arakanese (Burmese) pirate stronghold until the Muslim governor of Bengal put an end to their depredations in 1665. It remained an administrative problem under early British rule. The island is connected to the mainland by steamer.

Sandys, Sir Edwin (b. Dec. 9, 1561, Worcestershire, Eng.—d. October 1629, Kent), a leading Parliamentary opponent of King James I of England and a founder of the colony of Virginia. His activities in Parliament prepared the way for the Parliamentarian movement that eventually deposed and executed James's successor, Charles I.

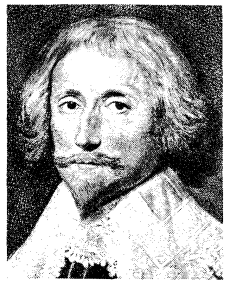
Sandys was the son of Edwin Sandys, bishop of Worcester and later archbishop of York, and the brother of the poet George Sandys. Trained in law, he entered Parliament in 1586. While traveling on the Continent from 1593 to 1599, he wrote *A Relation of the State of Religion* (1605), a remarkably tolerant analysis of contemporary creeds. He was knighted shortly after the accession of James I, and in 1604 he was reelected to Parliament, where he unexpectedly emerged as a critic of the king, especially in opposition to royal plans for the union of England and Scotland. He earned James's enmity by boldly expressing his belief in constitutional monarchy and rejecting the doctrine of the divine right of kings.

Sandys' interest in overseas expansion caused him to join the Virginia Company (1607) and several other joint-stock enterprises, including the East India Company. Upon gaining control of the Virginia Company in 1619, he had a representative assembly established in Virginia—the first representative body in the North American colonies. Nevertheless, in 1624 James's government dissolved the company.

In the 1621 Parliament, Sandys actively opposed monopolies, Roman Catholics, and the royal minister Sir Lionel Cranfield, whom he helped to impeach in the 1624 Parliament.

Sandys, George (b. March 2, 1578, near York, Yorkshire, Eng.—d. March 1664, Boxley Abbey, Kent), English traveler, poet, colonist, and foreign service career officer who played an important part in the development of English verse, especially of the heroic couplet. A journal of his travels in the Middle East, *Relation of a Journey* (1615), went through nine editions in the 17th century.

The youngest son of Edwin Sandys, archbishop of York, he studied at Oxford. In 1621–25 he was treasurer and director of industry and agriculture in the colony of Virginia. He published a translation of Ovid's *Metamorphoses* (1621–26), and his reputation largely rests on a revised edition published in 1632 together with philosophical commen-



George Sandys, engraving after a portrait by Cornelius Janssen; frontispiece to *Relation of a Journey* (1615)
By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

taries translated from various ancient authors, and including a translation of Book I of Virgil's *Aeneid.* John Dryden called him "the ingenious and learned Sandys, the best versifier of the former age," and commended his ability to give his verse the same turn as the original. Many later poet-critics also attested to the value of his translations. He prepared the way for the heroic couplet of Dryden and Alexander Pope.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

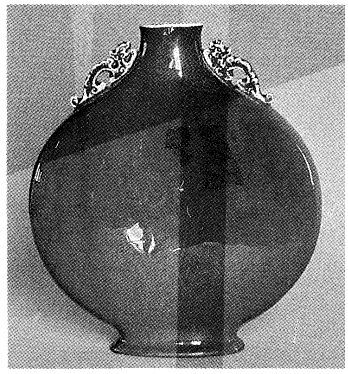
Sanfilippo's syndrome, also called MUCOPOLYSACCHARIDOSIS III, rare hereditary (autosomal recessive) metabolic disease characterized by severe mental retardation. There are three varieties, each caused by a defect in a different enzyme involved in the breakdown of mucopolysaccharides, a group of substances important in the structure and maintenance of connective tissues. All three varieties appear in early childhood, and affected persons usually die by age 20. Features of the disease include excessive hair growth and progressive partial paralysis of all four limbs. Mild growth retardation may occur, causing moderate dwarfism, but this is neither as common nor as severe as in related mucopolysaccharidoses.

Sanford, Edward T(erry) (b. July 23, 1865, Knoxville, Tenn., U.S.—d. March 8, 1930, Washington, D.C.), associate justice of the United States Supreme Court (1923–30).

Sanford was admitted to the Tennessee bar in 1888 and began his law practice in Knoxville. His public career began in 1907 when President Theodore Roosevelt named him assistant attorney general. The following year he was appointed judge of the U.S. District Court for the middle and eastern districts of Tennessee. In 1923 President Warren G. Harding named Sanford to the U.S. Supreme Court.

A number of his important opinions dealt with the federal Bankruptcy Act and with the question of freedom of expression. He wrote the celebrated opinion in *Liberty Warehousing* v. *Grannis,* which declared that a federal court could not issue a declaratory judgment even if such a proceeding is authorized under state law. His most noted opinion was in the "Pocket Veto" case, in which he ended a 140-year-old dispute by ruling that the president has 10 calendar, rather than legislative, days to act on a bill before the adjournment of Congress.

sang-de-boeuf (French: "oxblood"), a glossy, blood-red glaze, often with turquoise streaks, imitated in Europe from the 18th century from Chinese *lang* porcelain of the Ch'ing dynasty, especially the reigns of K'ang-hsi (1661–1722) and Ch'ien-lung (1735–96). Called *ch'ui hung* ("blown red") by the Chinese, the glaze owes its colour to the presence of copper, which turns red in a kiln with a reducing atmo-



Sang-de-boeuf glazed porcelain pilgrim bottle, Ch'ing dynasty, Ch'ien-lung reign (1735–96); in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London; photograph, EB Inc.

sphere; *i.e.,* one in which oxygen is replaced by carbon monoxide.

Sang-kan River, Wade–Giles romanization SANG KAN HO, Pin-yin SANG GAN HE, river in Shansi and Hopeh provinces, China. The Sang-kan River rises just south of Ning-wu, near the Great Wall of China, on the eastern slope of the Kuan-ts'en Shan (mountains), in northern Shansi. After flowing northeast in a trough running parallel to the strike of the Heng Shan, it turns southeast near Hsüan-hua (Hopeh) to emerge into the North China Plain in the Peking area. The Sang-kan flows south of Peking to Tientsin, where it flows into the Hai Ho, which empties into the Gulf of Chihli (Po Hai), a large gulf of the Yellow Sea. Its total length is about 190 mi (300 km), and its drainage area is approximately 18,500 sq mi (48,000 sq km).

The name Sang-kan is given to the river in its upper course, where it flows across the dry plateau of northern Shansi. Its lower course was originally known colloquially as the Wu-ting Ho (River with No Fixed Course) because it was constantly subject to flooding and to changes of channel. It was given the name Yung-ting Ho (River with a Permanently Fixed Course) toward the end of the 17th century, when extensive flood control works were undertaken. Further flood control measures were undertaken in 1698, 1726, 1751, and during the 19th century. The river has always carried an enormous silt load, which has silted up the channel as fast as it could be cleared. In the early 1950s the river was dammed in the mountains northwest of Peking by the Kuan-t'ing Dam, a hydroelectric, irrigation, and flood control project. Flooding has also been relieved by the construction of various waterways as part of the Hai Ho conservancy project.

Sanga River (Central Africa): *see* Sangha River.

Sangallo FAMILY, outstanding family of Florentine Renaissance architects. Its most prominent members were: Antonio da Sangallo the Elder; his older brother Giuliano da Sangallo; Antonio (Giamberti) da Sangallo the Younger, the nephew of Giuliano and Antonio Sangallo the Elder; and Francesco da Sangallo, the son of Giuliano.

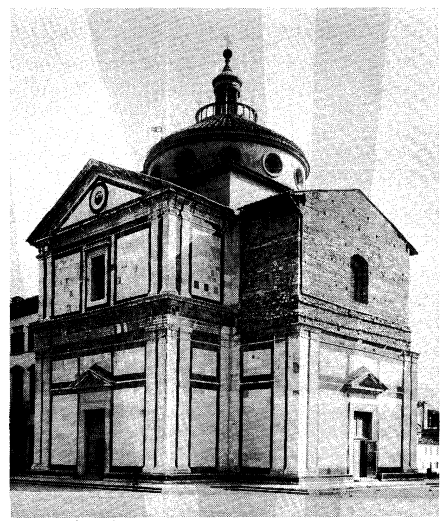
Giuliano da Sangallo (1445?–1516) was an architect, sculptor, and military engineer whose masterpiece, a church of Greek-cross plan, Sta. Maria delle Carceri in Prato (1485–91), was strongly influenced by Filippo Brunelleschi. It is the purest, most classic expression of that style of 15th-century architecture. Giuliano worked for the powerful Medici family in Florence and built their villa at Poggio a Caiano in 1485. As a military engineer he was effective in the defense of Florence against Naples in 1478. In Rome Giuliano worked on the design of St. Peter's, but he was overshadowed by Bramante. He designed influential facade projects for S. Lorenzo, Florence, in 1515–16.

Antonio da Sangallo the Elder (1455–1535), a military architect in his younger years, is best known for the major work of his life, the pilgrimage church of the Madonna di San Biago at Montepulciano, a tiny but important cultural centre of Tuscany. An ideal central-plan church (*i.e.,* one symmetrical about a central point) of the High Renaissance, it also is a Greek-cross plan built of travertine and designed with three facades; the west tower was never completed, but the east tower stands, and, with the church placed on a peak overlooking the valley, it is a majestic sight.

Antonio da Sangallo the Younger (1483–1546) was the most influential architect of his time. He arrived in Rome when he was about 20 and built a town house for Cardinal Alessandro Farnese in 1513, and when the Cardinal became Pope Paul III, he had Antonio the Younger enlarge it into the most imporant palace in Rome, the Palazzo Farnese (1534–46). A fortress-like, 16th-century Florentine palace, this structure was representative of a type of building on which a code of academic rules was based, exercising an immense influence well into the 19th century. The inner court of the palace is entered through an arch entrance, and the carriageway, lined with Roman Doric order antique granite columns, is a superior design. Antonio borrowed from the ancient Roman architectural motifs from the Colosseum and the Theatre Marcellus, but Michelangelo made changes in them.

Throughout his career, Antonio worked on St. Peter's, first as Bramante's assistant and in 1520 as chief architect. His wooden model of St. Peter's (1539–46), commissioned by Pope Paul III, still stands in the Vatican Museum.

Francesco da Sangallo, known as Il Margotta (1494–1576), the son of Giuliano, was primarily a sculptor whose style was characterized



Church of Sta. Maria delle Carceri, Prato, Italy, designed by Giuliano da Sangallo, 1485–91

Anderson—Alinari from Art Resource/EB Inc.

by minute detailing. He sculpted the tomb of Bishop Marzi-Medici (1546) in the church of SS. Annunziata, Florence, as well as the tomb of Bishop Bonofede (1550) in the Certosa di Val d'Ema, near Florence.

śaṅgam literature (India): *see* caṅkam literature.

Sangamon Interglacial Stage, major division of Pleistocene time and deposits in North America (the Pleistocene Epoch began about 2,000,000 years ago and ended about 10,000 years ago). The Sangamon Interglacial follows the Illinoian Glacial Stage and precedes the Wisconsin Glacial Stage, both periods of widespread continental glaciation and severe climatic conditions, as opposed to the moderate conditions of the Sangamon. The Sangamon was named for deposits studied in Sangamon County, Illinois, U.S.

Sangamon deposits frequently consist of ancient soils, which are widespread through much of the central United States. An excellent sequence of Sangamon sediments from Richmond, in southern Indiana, has provided much information on Sangamon climates in the region as well as information about the dominant forests. The Illinoian Glacial Stage ended with a cool, moist period that gradually became drier and then warmer, until a warm, dry climate marked the height of Sangamon time, during which an oak–hickory forest was dominant. Toward the latter part of the Sangamon, the climate again became cooler, then wetter, and finally passed into the next glacial episode, the Wisconsin. Sangamon vertebrates in the southern Great Plains region included the dire wolf, an extinct wolf that reached large size; short-faced bear; giant bison, with very well-developed horns; columbian mammoth; sabre-toothed cats; giant ground sloths; camels; jaguars; horses; and others. Most of these forms are no longer found in the United States or are extinct; the same is true of numerous large-size small animals, including rodents, insectivores, and lizards, that have been found in Sangamon deposits.

Sangamon River, river formed by headstreams in northwestern Champaign County, Illinois, U.S. It flows southwesterly, bending around Decatur, where a dam impounds Lake Decatur, and turns west past Springfield, the state capital, and then north and west to join the Illinois River just north of Beardstown, after a course of 250 mi (400 km). The first Illinois home (1830) of Abraham Lincoln was on a bluff above the river, 7 mi southwest of Decatur; the site is now in the Lincoln Trail Homestead State Park. In 1831 Lincoln moved to New Salem on the Sangamon River, northwest of Springfield. That site is now within Lincoln's New Salem Historic Site.

Sangāreddi, also spelled SANGAREDDY, also called SANGĀREDDIPET, town, administrative headquarters of Medak district, Andhra Pradesh state, southern India, on the Deccan Plateau near the Mānjra River. The town has mainly an agricultural economy (rice, sugarcane, and oilseeds) and is noted for the manufacture of brass, silverware, and silk cloth. Pop. (1981) 31,360.

Sangbui (Liberia): *see* Sanniquellie.

Sänger, Eugen (b. Sept. 22, 1905, Pressnitz, near Komotau, Austria-Hungary—d. Feb. 10, 1964, Berlin), German rocket propulsion engineer whose projected "antipodal bomber," with a range far greater than that made possible by its fuel capacity alone, greatly interested the major Western governments and the Soviet Union at the end of World War II. The development of long-range missiles and the difficulties of high-altitude precision bombing with the antipodal craft discouraged the building of Sänger's bomber.

After experimenting successfully with a small rocket motor burning light fuel oil, Sänger in 1933 designed a stratosphere rocket aircraft. He directed the Trauen rocket program of the German Aviation Research Institute (1936–45), worked for the French armament ministry (1946–54), directed the Institute of Jet Propulsion Physics, Stuttgart (1954–63), and taught at the West Berlin Technological University (1963–64).

Sanger, Frederick (b. Aug. 13, 1918, Rendcombe, Gloucestershire, Eng.), English biochemist who was awarded the Nobel Prize for

Chemistry in 1958 for his determination of the structure of the insulin molecule. In 1980 he became only the fourth person ever to be awarded a second Nobel Prize.

Sanger was educated at St. John's College, Cambridge, where he earned a doctorate in biochemistry in 1943. He worked continuously on biochemical research at Cambridge until 1951, when he began working under the auspices of the Medical Research Council. Sanger spent 10 years elucidating the structure of the bovine insulin molecule, and by 1955 he had determined the exact order of all that molecule's amino acids. His achievement, in which the structure of a relatively complex protein was completely established, was an essential preliminary to the laboratory synthesis of insulin. The laboratory techniques that he developed for determining the order in which amino acids are linked in proteins opened the way toward the determination of the structure of many other complex proteins.

Sanger subsequently turned his attention to determining the sequence of nucleotides in molecules of DNA and RNA. By 1977 he had elucidated the sequences of nucleotides in the DNA molecule of a small virus, and this achievement brought him a share (with Paul Berg and Walter Gilbert) of the 1980 Nobel Prize for Chemistry. He was named a Companion of Honour in 1981 and was made a member of the Order of Merit in 1986.

Sanger, John and George, bynames LORD JOHN and LORD GEORGE (respectively, b. 1816, Chew Magna, Somerset, Eng.—d. Aug. 22, 1889, Ipswich, Suffolk; b. Dec. 23, 1825, Newbury, Berkshire, Eng.—d. Nov. 28, 1911, Park Farm, near Finchley, Middlesex), circus impresarios who were the proprietors of one of the largest and most important English circuses in the 19th century.

The brothers were assistants in their father's touring peep show and formed their own show in 1853. By 1871 they had leased Astley's Amphitheatre and produced circus entertainment at Agricultural Hall in London as well as in a huge traveling tent circus. In the late 1870s the brothers ended their partnership and formed separate shows. George's *70 Years a Showman* appeared in 1908.

Sanger, Margaret, *née* HIGGINS (b. Sept. 14, 1879, Corning, N.Y., U.S.—d. Sept. 6, 1966, Tucson, Ariz.), founder of the birth-control movement in the United States and an international leader in the field. She is credited with originating the term "birth control."

The sixth of 11 children, she attended Claverack College and then took nurse's training at the White Plains (N.Y.) Hospital. She was married twice: to William Sanger in 1900 and, after a divorce, to J. Noah H. Slee in 1922. After a brief teaching career she practiced obstetrical nursing on the Lower East Side of New York City, where she witnessed the relationships among poverty, uncontrolled fertility, high rates of infant and maternal mortality, and deaths from botched illegal abortions. Sanger became a feminist who believed in every woman's right to avoid unwanted pregnancies, and she devoted herself to removing the legal barriers to publicizing the facts about contraception.



Margaret Sanger

By courtesy of Planned Parenthood-Federation of America, Inc.

In 1914 Sanger began issuing a magazine, *The Woman Rebel* (later entitled *Birth Control Review*), and distributing a pamphlet, *Family Limitation,* advocating her views. She was indicted for mailing materials advocating birth control, but the case was dismissed in 1916. Later that year she opened in Brooklyn the first birth-control clinic in the United States. She was arrested and charged with maintaining a "public nuisance," and in 1917 she served 30 days in the workhouse. These and subsequent episodes of legal harrassment helped to crystallize public opinion in favour of the birth-control movement. Sanger's legal appeals prompted the federal courts first to grant physicians the right to give advice about birth-control methods and then, in 1936, to reinterpret the Comstock Act of 1873 (which had classified contraceptive literature and devices as obscene materials) in such a way as to permit physicians to import and prescribe contraceptives.

In 1921 Sanger founded the American Birth Control League, and she served as its president until 1928. The league was one of the parent organizations of the Birth Control Federation of America, which in 1942 became the Planned Parenthood Federation of America, with Sanger as honorary chairwoman. Sanger also organized the first World Population Conference, Geneva, Switz., in 1927 and she was the first president of the International Planned Parenthood Federation (founded 1953). Subsequently she took her campaign for birth control to Far Eastern countries, especially India and Japan.

Among her numerous books are *What Every Mother Should Know* (1917), *My Fight for Birth Control* (1931), and *Margaret Sanger: An Autobiography* (1938).

sangha, Buddhist monastic order, traditionally composed of four groups: monks, nuns, laymen, and laywomen. The sangha is a part—together with the Buddha and the dharma (teaching)—of the Threefold Refuge, a basic creed of Buddhism.

The sangha originated in the group of disciples who renounced the worldly life to wander with the Buddha and listen to his teachings. After the Buddha's death his disciples continued to live together as a community, wandering from place to place, living off the receipt of alms. Fortnightly, at the time of the full and new moon (the *uposatha* days), followers of the Buddha would gather to reaffirm their sense of community and purpose by reciting their basic beliefs, such as the Threefold Refuge and the codes of conduct. The custom of spending the rainy season in one place in a study retreat (*see* vassa) led gradually to the settling of the community.

The modern sangha is governed by disciplinary rules (vinaya) that form part of the sacred canon. Generally, the monastic order is dependent on the lay community for economic support in the form of alms or large gifts of money and property, since Buddhist monks—notably those of the Theravāda tradition in Southeast Asia—do not engage in commerce or agriculture.

Sangha River, also spelled SANGA, tributary of the Congo River, formed by the Mambéré and Kadeï headstreams at Nola, southwestern Central African Republic. The Sangha River flows 140 miles (225 km) south to Ouesso in the Congo, forming part of Cameroon's border with the Central African Republic and the Congo Republic. The river then turns south-southeast and southwest, flowing 225 miles (362 km) to its mouth on the Congo River, south of Bobaka. The Sangha River is navigable by steamer all year below Ouesso and intermittently up to Nola. Its lower, swampy course splits into several mouths and is connected by divergent streams with the Likouala aux Herbes, Likouala, and Ubangi (Oubangui) rivers.

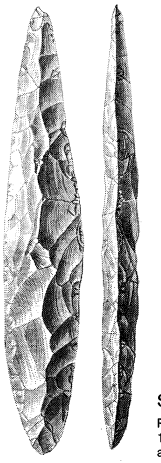
Sānghar, town, Sind province, southern Pakistan. The town is connected by road with the cities of Hyderābād, Karāchi, and Sukkur. Sānghar is a market town and has several cotton-textile factories. The surrounding area consists chiefly of semiarid land, a part of the great Thar Desert, and some cropped areas irrigated by the Mithrao Canal system, which feeds from the Indus River. Rice, wheat, and cotton are the chief crops grown in the locality. Pop. (1981 prelim.) town, 29,000.

Sangihe Islands, Indonesian KEPULAUAN SANGIHE, also spelled SANGI, islands, constituting Sangihe Talaud *kabupaten* (regency), off the northeastern tip of Celebes, Indonesia. The islands are administered from Manado, the capital of Sulawesi Utara *provinsi* ("province"). The island group comprises Sangihe, Siau, Tahulandang, Biaro, and a number of islets, with a total area of 408 square miles (1,056 square km). The capital of the regency is Tahuna (Taruna), on Sangihe's western coast. The volcano Mount Awu (6,070 feet [1,850 m]) on Sangihe is active. The prevailing religion of the islands' inhabitants is Christianity. Manila hemp is grown, and its weaving is the most important industry, but fishing and shipping are also important. Pop. (1980) 238,433.

Sāngli, town, southern Mahārāshtra state, western India. It lies along the Krishna River, east of Kolhāpur on the Pune–Bangalore railway. The town is the former capital (1761–1947) of Sāngli state. Its market in oilseeds and turmeric is one of the most important in India. Sāngli contains a Ganapati temple that attracts many pilgrims. The town's industries include cotton-textile and oil mills, copper and brass manufactures, and a large-scale cigarette factory. Sāngli has a number of colleges affiliated with Shivaji University at Kolhapur.

The chief agricultural products of the surrounding Krishna River valley are millet, sugarcane, and dairy products. Southeast of Sāngli lies the rapidly growing Sāngli-Miraj industrial complex. The town of Miraj is renowned for the manufacture of musical instruments, and Sāngli is a traditional centre of goldsmiths. Most of the region's arts and science, commercial, engineering, and medical colleges are located in the Sāngli-Miraj area. The Miraj Medical Centre has given the locality a reputation for excellent medical care. Pop. (1981) town, 152,389; metropolitan area, 268,988.

Sangoan industry, sub-Saharan African stone tool industry of Acheulian derivation (*see* Acheulian industry) dating from the up-



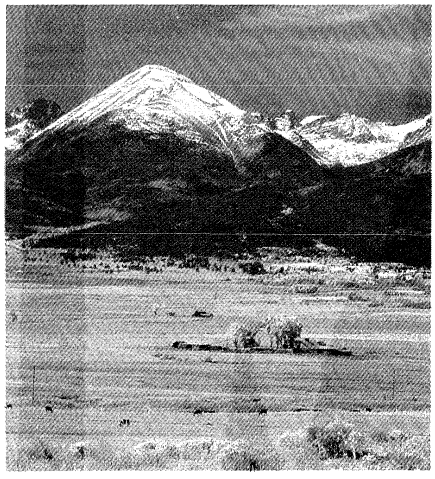
Sangoan stone pick

From F. Bordes, *The Old Stone Age,* copyright 1968 by McGraw-Hill Book Co. and Weidenfeld and Nicolson Ltd.; used with permission

per Pleistocene. It is more or less contemporaneous with the Fauresmith industry of southern Africa.

The Sangoan industry was discovered in 1920 at Sango Bay, Uganda, and is also found in Angola, Zaire, Kenya, and Zambia. Variant forms of Sangoan occur in Zimbabwe and South Africa. The Sangoan industry is characterized by a sort of pick, large planes for woodworking, hand axes, scrapers, and flake knives.

Sangre de Cristo Mountains, segment of the southern Rocky Mountains, extending south-southeastward for about 250 miles (400 km) from Poncha Pass, in south-central Colorado, U.S., to the low divide southwest of Las Vegas, N.M., in north-central New Mexico.



Sangre de Cristo Mountains in Colorado
David Muench—EB Inc.

Usually considered an extension of the Front Range (*q.v.*), they are divided into the Culebra and Sangre de Cristo ranges in Colorado. Many of their glaciated summits surpass 14,000 feet (4,300 m), including Kit Carson, Crestone, and Humboldt, with Blanca Peak (14,345 feet [4,372 m]) being the highest. The southern portion culminates at Wheeler Peak (13,161 feet [4,011 m]), New Mexico's highest point.

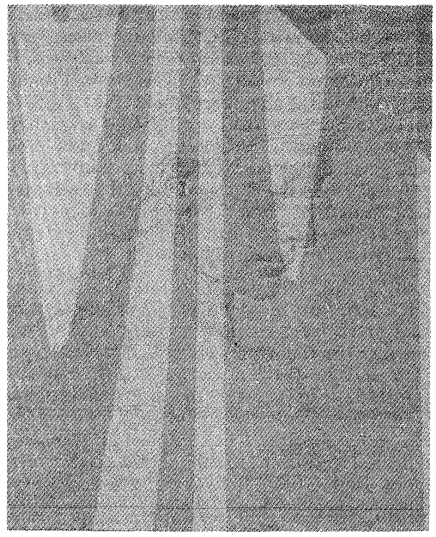
The mountains were named in 1719 by the Spanish explorer Antonio Valverde y Cosio, who, impressed at sunrise by the red-tinted, snowy peaks, supposedly uttered a fervent "Sangre de Cristo" ("Blood of Christ"). Headstreams of the Pecos and Canadian rivers originate within the range, which is embraced by San Isabel, Rio Grande, Carson, and Santa Fe national forests and includes the Great Sand Dunes (Colorado) and Pecos (New Mexico) national monuments. Tourism and mining are the main economic activities.

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Sangrūr, city, in southeastern Punjab state, northwestern India. The city was founded in the 17th century and became the capital of the former independent state of Jind. In 1948 it became part of India. Sangrūr is an agricultural market with some light industry, including handloom weaving and handicrafts. There are good road and rail connections with the rest of Punjab and with neighbouring states.

Sangrūr lies in a region that is largely flat and dry, with a large area under irrigation. The principal crops in the area are wheat, cotton, gram (a legume), and millet. Pop. (1981) 45,220.

sanguine, chalk or crayon drawing done in a blood-red, reddish, or flesh colouring. The pigment employed is usually a chalk or clay containing some form of iron oxide. Sanguine was used extensively by 15th- and 16th-century artists such as Leonardo da Vinci (who employed it in his sketches for the "Last Supper"), Michelangelo, Raphael, and Andrea del Sarto.



"Profile with Oriental Headdress," sanguine drawing by Michelangelo, *c.* 1522; in the Ashmolean Museum, Oxford
By courtesy of the Ashmolean Museum, Oxford, Eng.

Especially appropriate for rendering effects of mass and atmosphere, sanguine was greatly favoured by the Venetian painters and by those artists, such as Peter Paul Rubens and Antoine Watteau, who were influenced by them. In conjunction with black and white, sanguine formed the technique known as *à trois crayons* ("with three pencils").

sanhedrin, also spelled SANHEDRIM, any of several official Jewish councils in Palestine under Roman rule, to which various political, religious, and judicial functions have been attributed. Taken from the Greek word for council (*synedrion*), the term was apparently applied to various bodies but became especially the designation for the supreme Jewish legislative and judicial court—the Great Sanhedrin, or simply the Sanhedrin, in Jerusalem. There were also local or provincial sanhedrins of lesser jurisdiction and authority. A council of elders, or senate, called the *gerousia,* which existed under Persian and Syrian rule (333–165 BC), is considered by some scholars the forerunner of the Great Sanhedrin.

Although eminent sources—the Hellenistic-Jewish historian Josephus, the New Testament, and the Talmud—have mentioned the Sanhedrin, their accounts are fragmentary, apparently contradictory, and often obscure. Hence, its exact nature, composition, and function remain a subject of scholarly investigation and controversy. In the writings of Josephus and the Gospels, for example, the Sanhedrin is presented as a political and judicial council headed by the high priest (in his role as civil ruler); in the Talmud it is described as primarily a religious legislative body headed by sages, though with certain political and judicial functions. Some scholars have accepted the first view as authentic, others the second, while a third school holds that there were two Sanhedrins, one a purely political council, the other a religious court and legislature. Moreover, some scholars attest that the Sanhedrin was a single body, combining political, religious, and judicial functions in a community where these aspects were inseparable.

According to the Talmudic sources, including the tractate *Sanhedrin,* the Great Sanhedrin was a court of 71 sages that met on fixed occasions in the Lishkat La-Gazit ("Chamber of the Hewn Stones") in the Jerusalem Temple and that was presided over by two officials (*zugot,* or "pair"), the *nasi* and the *av bet din.* It was a religious legislative body "whence the law [Halakha] goes out to all Israel." Politically, it could appoint the king and the high priest, declare war, and expand the territory of Jerusalem and the Temple. Judicially, it could try a high priest, a false prophet, a rebellious elder, or an errant tribe. Religiously, it supervised certain rituals, including the Yom Kippur (Day of Atonement) liturgy. The Great Sanhedrin also supervised the smaller, local sanhedrins and was the court of last resort. Again, however, there is a scholarly dispute as to whether the aforementioned specifications are merely an ideal or an actual description. Also, according to one interpretation, the Talmudic sources seem to ascribe to the past a state of affairs that existed only after the fall of the Temple (AD 70).

The composition of the Sanhedrin is also in much dispute, the controversy involving the participation of the two major parties of the day, the Sadducees and the Pharisees. Some say the Sanhedrin was made up of Sadducees; some, of Pharisees; others, of an alternation or mixture of the two groups. In the trials of Jesus, the Gospels of Mark and Luke speak of the assembly of the chief priests, elders, and scribes under the high priest, referring to "the whole council [*synedrion*]" or "their council," and the Gospel According to John speaks of the chief priests and Pharisees convening the council. The Gospel accounts have been subjected to critical scrutiny and questioning because of the extreme theological and historical significance of the issue, but none of the theories evolved has won scholarly consensus. It is still uncertain, for example, whether the Sanhedrin had the power to hand down a death sentence in a case such as that of Jesus. The Book of Acts gives an account of the trials of Peter and John before "the council and all the senate" (apparently one and the same), pointing to a split between the Pharisaic and Sadducean members of the Sanhedrin.

The Great Sanhedrin ceased to exist at Jerusalem after the disastrous rebellion against Rome in AD 66–70. However, a sanhedrin was assembled at Jabneh, and later in other localities in Palestine, that is considered by some scholars to be the continuation of the Jerusalem council-court (*see* yeshiva). Composed of leading scholars, it functioned as the supreme religious, legislative, and educational body of Palestinian Jews; it also had a political aspect, since its head, the *nasi,* was recognized by the Romans as the political leader of the Jews (patriarch, or ethnarch). This sanhedrin ceased with the end of the patriarchate in AD 425, although there have been abortive or short-lived attempts to reinstitute the sanhedrin in modern times.

sanidine, alkali feldspar mineral, a high-temperature form of potassium aluminosilicate ($KAlSi_3O_8$) that sometimes occurs in surface rocks. Sanidine forms colourless or white, glassy, transparent crystals in acidic volcanic rocks.

Because sanidine that occurs in the Earth's crust has cooled quickly (its structure is stable only above 700° C [1,300° F]), it has trapped a disordered distribution of the aluminum and silicon atoms in its aluminosilicate crystal framework. Among the various forms of potassium aluminosilicate, there is a complete variation in ordering from the fully random arrangement in high-sanidine (a very-high-temperature form), through sanidine and then orthoclase, to the fully ordered arrangement in microcline.

The name anorthoclase is applied to the intermediate members of the high-albite–sanidine series that contain less than 40 percent $KAlSi_3O_8$. Anorthoclase occurs, often as crystals, only in sodium-rich volcanic rocks, such as the andesitic lavas of Pantelleria, southwest of Sicily. Other occurrences include Kilimanjaro, Tanzania; Mt. Kenya, Kenya; Yellowstone National Park, Wyoming; and the German Rhineland.

sanidinite facies, one of the major divisions of the mineral facies classification of metamorphic rocks, the rocks of which form under the most intense conditions of contact metamorphism—either at the contacts of igneous intrusions with the surrounding rocks or in inclusions of other rocks in intrusions. Temperatures approaching the melting point of the rock may be reached; the pressure is relatively low and depends upon the depth of the intrusion. More intense conditions cause fusion, and less intense conditions form rocks of the hornfels facies. Minerals characteristic of such rocks include sanidine, corundum, cordierite, and sillimanite; glass from partial fusion or relict minerals from less intense temperatures may also be present. The particular mineralogy formed depends largely upon the composition of the parent rock surrounding the igneous intrusion. Volatiles such as carbon dioxide and water are expelled from the rock during the mineral-forming reactions.

Sanin, Ivan (Russian Orthodox abbot): *see* Joseph of Volokolamsk.

sanitary landfill, method of controlled disposal of refuse on land. The method was introduced in England in 1912 (where it is called controlled tipping) and involves natural fermentation brought about by microorganisms. Usually the refuse is deposited in shallow layers, compacted, and covered within 24 hours with earth or other chemically inert material to form an effective seal. Mechanical equipment such as a bulldozer is used to grade, compact, and cover the refuse. The method often is employed to reclaim otherwise useless land, *i.e.,* to fill declivities to levels convenient for building or park and other public purposes.

Sanjar, in full MUʿIZZ AD-DĪN SANJAR (b. 1084/86—d. May 8, 1157), Seljuq prince of Khorāsān from *c.* 1096 to 1157, whose fame almost eclipses that of the "Great Seljuqs" because of the length of his reign, his power and victories in its first half, his disasters in the second, and the fact that he was the last real Seljuq sultan in Iran.

Appointed governor of Khorāsān by his half brother Berk-yaruq, who succeeded Malik-Shāh as sultan, Sanjar in fact acted as an independent prince throughout his reign and after the death of his full brother Muḥammad in 1018 was regarded as the head of the Seljuq house. His longevity saved Khorāsān from the internecine struggles that destroyed the other Seljuq lines and enabled him to maintain an organized government in spite of the growing dangers that gathered around him.

Sanjar established his suzerainty over the Turkish Qarakhanid princes of Transoxania and over the Ghaznavids of the Indian borderland. He entered Ghazna (Ghaznī) itself in 1117 and there installed his own nominee on the throne. Later, however, the insubordination of his viceroy Atsiz in Khwārezm (modern Khiva) and the appearance of a new and dangerous enemy in Transoxania eroded Sanjar's position. His new enemy was the recently founded confederacy of Central Asian tribes under the Karakitai, with whom the Turkish Qarluqs of Transoxania made common cause. Sanjar suffered a terrible defeat near Samarkand in 1141; Transoxania was lost, and the Karakitai established a distant suzerainty over Khwārezm. Sanjar maintained his hold over Khorāsān in spite of Atsiz, but he had suffered a great loss of prestige and power; the fame of his defeat even reached Europe, where it took the form of the legend of Prester John (*q.v.*), the Christian priest-king who was to destroy Islām (there were Nestorian Christians among the Karakitai). Finally there was an uprising of the Oğuz (Ghuzz) tribes in Sanjar's realm. Although originally the instrument of the Seljuqid conquests, they had never accepted a centralized administration. In 1153 they captured the old sultan and kept him prisoner for two years, albeit with respect. He escaped but died without having restored order in Khorāsān.

Sanjō, city, Niigata Prefecture (*ken*), Honshu, Japan, on the delta of the Shinano-gawa (Shinano River). Sanjō was founded as a castle town in the 16th century. It was a river port and post town during the Tokugawa era (1603–1867), when the city first became known as a centre of metal tool production. Carpenter tools and household hardware are still produced in more than 2,000 small workshops. Pop. (1980) 85,275.

Sanjō, Go-, in full GO-SANJŌ TENNŌ, personal name TAKAHITO (b. Sept. 3, 1034, Kyōto—d. June 15, 1073, Kyōto), 71st emperor of Japan, whose abdication in favour of his son, Kidahito (the emperor Shirakawa), established a precedent for government by retired emperor, thereby contributing to the decline of the powerful Fujiwara clan.

One of the few Japanese rulers of the period not born of a Fujiwara mother, Takahito became emperor in 1068, taking the reign name Go-Sanjo (Later Sanjo); he ascended the throne over the objections of the great clan, which, since 857, had dominated the government, usually by making Fujiwara daughters principal concubines or consorts to reigning emperors. A lack of daughters left the family vulnerable to Go-Sanjō, an emperor who chose to rule as well as to reign. Fujiwara dominance was further threatened when Go-Sanjō, seeking to reform court procedures and expenditures, established a records office (*kirokujo*) to scrutinize the legal titles of the great estates and confiscate those lacking authentic Imperial verification. Through claims to judicial and fiscal autonomy, these estates, some of the largest of which were owned by the Fujiwara, were wrecking the Imperial government. Even though the Fujiwara clan was torn by internal rivalries, they ignored most of Go-Sanjō's directives, and his reform measures were largely unsuccessful.

In desperation, Go-Sanjō abdicated in favour of his son. Just as the Fujiwara had dominated the reigning emperors and grown rich and powerful through their daughters, Go-Sanjō and those who ruled after him for almost 100 years held power through their obedient sons.

Sanjō Sanetomi, KOSHAKU (Duke, or Prince) (b. Jan. 3, 1838, Kyōto—d. Feb. 18, 1891, Tokyo), radical court noble who helped restore power (1868) to the Meiji emperor and end the 264-year domination of Japan by the Tokugawa family. After the restoration Sanjō became an important leader of the new government.

In his youth he was a political leader of the court nobles gathered around the Emperor. In 1862, when the Emperor tried to reassert his authority over the shogunate (the military dictatorship through which the Tokugawa family ruled Japan), Sanjō acted as the Emperor's messenger, ordering the Shogun to expel all foreigners from the country. The next year, when Satsuma, one of the feudal fiefs into which Japan was then divided, effected a coup d'etat at the Imperial court and forced the Emperor to reverse his radical policy, Sanjō took shelter in the more sympathetic fief of Chōshū.

After the restoration Sanjō was chief minister of the Council of State throughout most of the period between 1871 to 1885. Theoretically this position revived the ancient and privileged role of Imperial adviser. In fact, Sanjō served chiefly as spokesman for the bureaucracy that ruled in the name of the emperor Meiji.

In 1873, when the government faction seeking war with Korea pressed him for Imperial approval, Sanjō was unable to bear the pressure of decision and relinquished his post to his colleague Iwakura Tomomi, who was able to defeat the plans of the war party. Finally, in 1885, when the modern cabinet system was instituted in preparation for constitutional government, Sanjō was elevated to the post of lord keeper of the privy seal (*naidaijin*), a position above the cabinet entitling its holder to speak in the emperor's name.

Sanka (Japanese: Mountain Cave), outcaste group of people in Japan. The Sanka are sometimes called the Japanese Gypsies, wandering in small bands through the mountainous regions of Honshu. They are not distinguishable in either physical type or language from the rest of the Japanese.

Little is known of their history. Although they are mentioned in Japanese chronicles from the 11th century, much of the information about them is vague. Like other depressed castes in Japan, they had chiefs through whom they dealt with feudal authority and who were responsible for the conduct of the group. There is no evidence to support the claim that they were a wild people who lived in caves. In their mountain habitat they seem to have been wood gatherers, charcoal burners, and hunters. Despite Japanese legislation against social discrimination, their descendants are still regarded with contempt much like that shown the Burakumin (*q.v.*).

Śaṅkara, also spelled SHAṄKARA, also called SAṄKARĀCĀRYA (b. 700?, Kāladi village?, India—d. 750?, Kedārnāth), philosopher and theologian, most renowned exponent of the Advaita Vedānta school of philosophy, from whose doctrines the main currents of modern Indian thought are derived. He wrote commentaries on the *Brahma-sūtra* and the principal *Upaniṣads*, affirming his belief in one eternal unchanging reality (Brahman) and the illusion of plurality and differentiation.

There are at least 11 works that profess to be biographies of Śaṅkara. All of them were composed several centuries later than the time of Śaṅkara and are filled with legendary stories and incredible anecdotes, some of which are mutually conflicting. Today there are no materials with which to reconstruct his life with certainty. His date of birth is naturally a controversial problem. It has been customary to assign him the birth and death dates 788–820. But the dates 700–750, grounded in 20th-century scholarship, are more acceptable.

According to one tradition, Śaṅkara was born into a pious Nambūdiri Brahman family in a quiet village called Kālaḍi on the Cūrṇā (or Pūrṇā, Periyār) River, Kerala, southern India. He is said to have lost his father, Śivaguru, early in his life. He renounced the world and became a *sannyāsin* (ascetic) against his mother's will. He studied under Govinda, who was a pupil of Gauḍapāda. Nothing certain is known about Govinda, but Gauḍapāda is notable as the author of an important Vedānta work, *Māṇḍūkya-kārikā,* in which the influence of Mahāyāna Buddhism—a form of Buddhism aiming at the salvation of all beings and tending toward nondualistic or monistic thought—is evident and even extreme, especially in its last chapter.

A tradition says that Śiva, one of the principal gods in Hinduism, was Śaṅkara's family deity and that he was, by birth, a Śākta, or worshipper of Śakti, the consort of Śiva and

female personification of divine energy. Later he came to be regarded as a worshipper of Śiva or even an incarnation of Śiva himself. His doctrine, however, is far removed from Śaivism and Śāktism. It is ascertained from his works that he had some faith in, or was favourable to, Vaiṣṇavism, the worship of the god Vishnu. It is highly possible that he was familiar with Yoga (one of the classical systems of Indian philosophy, as well as a technique to achieve salvation). One study has suggested that in the beginning he was an adherent of Yoga and later became an Advaitin (Nondualist).

Biographers narrate that Śaṅkara first went to Kāśī (Vārānasi), a city celebrated for learning and spirituality, and then travelled all over India, holding discussions with philosophers of different creeds. His heated debate with Maṇḍana Miśra, a philosopher of the Mīmāṃsā (Investigation) school, whose wife served as an umpire, is perhaps the most interesting episode in his biography and may reflect a historical fact; that is, keen conflict between Śaṅkara, who regarded the knowledge of Brahman as the only means to final release, and followers of the Mīmāṃsā school, which emphasized the performance of ordained duty and the Vedic rituals.

Śaṅkara was active in a politically chaotic age. He would not teach his doctrine to city dwellers. The power of Buddhism was still strong in the cities, though already declining, and Jainism, a nontheistic ascetic faith, prevailed among the merchants and manufacturers. Popular Hinduism occupied the minds of ordinary people, while city dwellers pursued ease and pleasure. There were also epicureans in cities. It was difficult for Śaṅkara to communicate Vedānta philosophy to these people. Consequently, Śaṅkara propagated his teachings chiefly to *sannyāsin*s and intellectuals in the villages, and he gradually won the respect of Brahmans and feudal lords. He enthusiastically endeavoured to restore the orthodox Brahmanical tradition without paying attention to the bhakti (devotional) movement, which had made a deep impression on ordinary Hindus in his age.

It is very likely that Śaṅkara had many pupils, but only four are known (from their writings): Padmapāda, Sureśvara, Toṭaka (or Troṭaka), and Hastāmalaka. Śaṅkara is said to have founded four monasteries, at Śṛṅgeri (south), Purī (east), Dvāraka (west), and Badarīnātha (north), probably following the Buddhist monastery (*vihāra*) system. Their foundation was one of the most significant factors in the development of his teachings into the leading philosophy of India.

More than 300 works—commentative, expository, and poetical—written in the Sanskrit language, are attributed to him. Most of them, however, cannot be regarded as authentic. His masterpiece is the *Brahma-sūtra-bhāṣya,* the commentary on the *Brahma-sūtra,* which is a fundamental text of the Vedānta school. The commentaries on the principal *Upaniṣad*s that are attributed to Śaṅkara are certainly all genuine, with the possible exception of the commentary on the *Śvetāśvatara Upaniṣad.* The commentary on the *Māṇḍūkya-kārikā* was also composed by Śaṅkara himself. It is very probable that he is the author of the *Yoga-sūtra-bhāṣya-vivaraṇa,* the exposition of Vyāsa's commentary on the *Yoga-sūtra,* a fundamental text of the Yoga school. The *Upadeśasāhasrī,* which is a good introduction to Śaṅkara's philosophy, is the only non-commentative work that is certainly authentic.

Śaṅkara's style of writing is lucid and profound. Penetrating insight and analytical skill characterize his works. His approach to truth is psychological and religious rather than logical; for that reason, he is perhaps best considered to be a prominent religious teacher rather than a philosopher in the 20th-century sense. His works reveal that he was not only versed in the orthodox Brahmanical traditions but also was well acquainted with Mahāyāna Buddhism. He is often criticized as a "Buddhist in disguise" by his opponents because of the similarity between his doctrine and Buddhism. Despite this criticism, it should be noted that he made full use of his knowledge of Buddhism to attack Buddhist doctrines severely or to transmute them into his own Vedāntic nondualism, and he tried with great effort to "vedanticize" the Vedānta philosophy, which had been made extremely Buddhistic by his predecessors. The basic structure of his philosophy is more akin to Sāṅkya, a philosophic system of nontheistic dualism, and the Yoga school than to Buddhism. It is said that Śaṅkara died at Kedārnātha in the Himalayas. The Advaita Vedānta school founded by him has always been preeminent in the learned circles of India. (Se.M.)

BIBLIOGRAPHY. Among the biographies of Śaṅkara written in Sanskrit, Vidyāraṇya, *Śaṅkara-digvijaya* (14th century) in verse, is best known, though legendary. T.M.P. Mahadevan, *Homage to S'ankara* (1959), gives a short account of Śaṅkara's life based upon the traditions. S. Radhakrishnan, *Indian Philosophy,* vol. 2 (1958), contains a brief but fairly critical biography and a detailed account of his works and philosophy.

Sankarah, Tall (Iraq): *see* Larsa.

Sankaran Nair, Sir Chettur (b. July 11, 1857, Malabar Coast, India—d. April 24, 1934, Madras), Indian jurist and statesman who, despite his independent views and outspokenness, attained high government positions rarely open to Indians in his time. He simultaneously opposed the extreme Indian nationalist movement led by Mohandas K. Gandhi and its forcible suppression by the British Indian government.

Sankaran Nair was appointed public prosecutor (1899) and advocate general (1907) for Madras State and a judge of the Madras High Court (1908). In his best known judgment, he upheld conversion to Hinduism and ruled that such converts were not outcastes. For some years he was a delegate to the Indian National Congress, and he presided at its Amraotī session (1897). He founded and edited the *Madras Review* and the *Madras Law Journal.*

In 1915 Sir Chettur (he was knighted in 1912) joined the Viceroy's Council as member for education. In that office he frequently urged Indian constitutional reforms, and he supported the Montagu–Chelmsford plan (promulgated April 22, 1918), according to which India would gradually achieve self-government within the British Empire. He resigned from the council in 1919 in protest against the protracted use of martial law to quell unrest in the Punjab. Afterward, he was a councillor to the secretary of state for India (in London, 1920–21) and a member of the Indian Council of State (from 1925). He also served as chairman of the All-India Committee, which, in 1928–29, rather ineffectually met with the Simon Commission (Indian Statutory Commission, comprising British politicians) concerning Indian constitutional problems.

In his book *Gandhi and Anarchy* (1922), Sir Chettur attacked Gandhi's nationalist Non-cooperation Movement and British actions under martial law. A British court held that this work libelled Sir Michael Francis O'Dwyer, lieutenant governor of India during the Punjab rebellion of 1919.

sankin kōtai, system inaugurated in 1635 in Japan by the Tokugawa shogun (hereditary military dictator) Iemitsu by which the great feudal lords (daimyo) had to reside several months each year in the Tokugawa capital at Edo (modern Tokyo). When the lords returned to their fiefs, they were required to leave their wives and families in Edo. The system, which was imitated by the various daimyo in their own fiefs with their own retainers, ensured the continued subservience of the great lords to the Tokugawa shogunate. It also led to the improvement of communications and the development of a commercial economy, as merchants gathered in the provincial and metropolitan capitals to supply the needs of these lords. On the other hand, the lords became divorced from the government of their fiefs, and their debts piled up.

In the face of rising dissatisfaction with shogunal policies, the *sankin kotai* system was virtually abolished in 1862. An attempt to reestablish it in 1865 failed, and the shogunate was overthrown a short time later.

Sankt Bernhardinpass (Switzerland): *see* San Bernardino Pass.

Sankt Gallen (German), French SAINT-GALL, canton, northeastern Switzerland, bounded north by Lake Constance (Bodensee); east by the Rhine Valley, which separates it from the Austrian Vorarlberg Bundesland (federal state) and from Liechtenstein; south by the cantons of Graubünden, Glarus, and Schwyz; west by the canton of Zürich; and northwest by the canton of Thurgau. Appenzell Ausser-Rhoden and Appenzell Inner-Rhoden half cantons form an enclave in northern Sankt Gallen. Sankt Gallen canton has an area of 778 sq mi (2,014 sq km) and is traversed by the level valleys of the Rhine, Linth, and Seez rivers, the last flowing through the Walensee (Lake Walenstadt). Its topography varies from the extensive Rhine plain to the rolling country of the Fürstenland in the northwest, to Alpine peaks in the south and in the upper Toggenburg (Thur Valley). More than one-fourth of the area is forested, and three-fifths of the rest is meadowland and Alpine pastures.

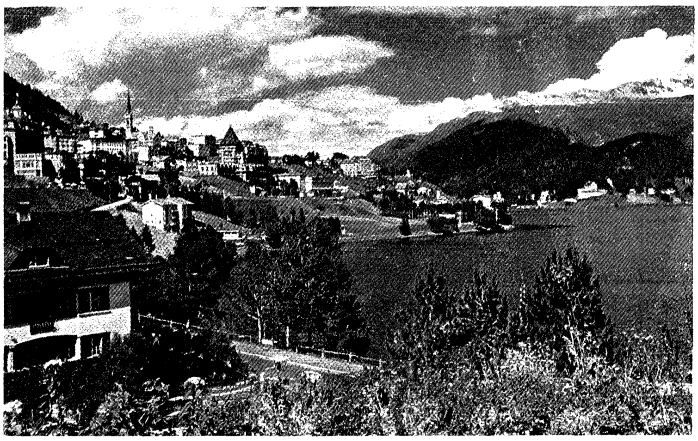
Historically, the canton represents the territorial acquisitions of the abbey-principality of Sankt Gallen. The area was included in Säntis canton of the Helvetic Republic after the abbey was secularized in 1798, and it entered the Swiss Confederation as Sankt Gallen canton in 1803. Its constitution dates from 1890.

The predominant farming activity is dairying, with livestock raising in the uplands, but there is also a substantial production of fruit and wine in the Rhine and Seez valleys, with some mixed farming. The principal industry, textiles and embroidery, is widely distributed and includes the manufacture of textile machinery. Many rural families engage in home weaving or embroidery. Other industries in the canton include the production of chemicals, pharmaceuticals, chocolate, pyrotechnics, matches, optical goods, felt, and paper. Iron and manganese are mined near Sargans. There are numerous tourist, health, and winter-sports resorts in the canton, including those in the Toggenburg and along the Rhine and the thermal spa of Bad Ragaz. The capital is Sankt Gallen. The population is German speaking and about three-fourths Roman Catholic and one-fourth Protestant. Pop. (1983 est.) 394,590.

Sankt Gallen (German), French SAINT-GALL, town, capital of Sankt Gallen canton, northeastern Switzerland, in the Steinach Valley, just south of Lake Constance (Bodensee). In 612 the Celtic missionary St. Gall founded a hermitage on the site. Disciples joined him, and *c.* 720 the foundation became a Benedictine abbey under Abbot Otmar. Until the 11th century, the abbey school was the most important educational institution north of the Alps, and in its scriptorium were laid the foundations of the world-famed library. The town that developed around the abbey was ruled by the abbots, princes of the Holy Roman Empire after 1206. The abbey and the town allied with the Swiss Confederation in 1453

and 1454, respectively. Clerical rule ended with the introduction of the Reformation in 1524, and the town became the capital of the new canton formed in 1803, when the abbey was disendowed. The town's outlying parishes were incorporated in 1918, when a communal constitution was adopted. Sankt Gallen has been a Roman Catholic episcopal see since 1846.

The most notable landmarks are the abbey church and the former monastic buildings.



Sankt Moritz village in the Oberengadin (Upper Inn Valley), Switzerland
Photo Research International

The church (1755–72), one of the finest Baroque structures in Switzerland, is now the Roman Catholic cathedral. The library (1758–67), with its unique rococo hall, contains about 2,000 manuscripts, as well as numerous incunabula and books dating from the Carolingian and Ottonian empires. There is a commercial university, schools of textiles, embroidery, and fashion, several museums, a theatre, and a concert hall.

Sankt Gallen had a long association with linen and cotton textiles and early in the 20th century was a leading embroidery centre. The latter industry still flourishes but has been balanced by metalworking and the manufacture of clothing and glass. Well-known local events include the biennial Children's Summer Festival, the biennial International Horse Show, and the Swiss National Fair for agriculture and dairying. The population is German-speaking and about evenly divided between Protestants and Roman Catholics. Pop. (1987 est.) 72,910.

Sankt Gotthardpass (Switzerland): *see* Saint Gotthard Pass.

Sankt Joachimsthal (Czechoslovakia): *see* Jáchymov.

Sankt Michael, also called MICHAELISKIRCHE, Hildesheim, Ger., basilican church built between 1010 and 1033 under Bishop Bernward, famous teacher and confidant of the emperor Otto III. The church is one of the most important examples of Ottonian architecture. The church was damaged in World War II but has since been restored to its original appearance.

Sankt Michel (city and province, Finland): *see* Mikkeli.

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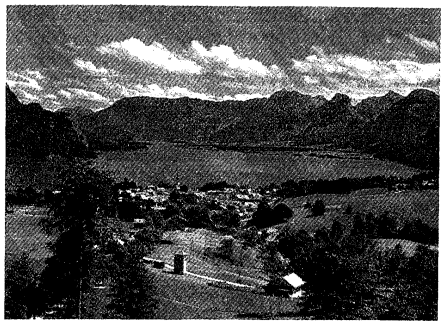
Sankt Moritz (German), French SAINT-MORITZ, Romansh SAN MUREZZAN, town, or *gemeinde* (commune), Graubünden *canton,* southeastern Switzerland, in the Oberengadin (Upper Inn Valley), surrounded by magnificent Alpine peaks and comprising the Dorf (village), the Bad (spa), and the hamlets of Suvretta and Champfèr. Originally known for its curative mineral springs, it became a fashionable spa and summer resort in the 17th century. Since the late 19th century, it has developed as one of the world's most famous winter-sport centres and was the scene of the Winter Olympic Games in 1928 and 1948. The resort is on an international highway, is linked by rail with international lines, and has an airport at Samedan, just northeast. Sankt Moritz depends on tourism and the hotel industry. The population speaks German and Romansh and is largely Protestant. Pop. (1980) 5,900.

Sankt-Peterburg (Russian S.F.S.R.): *see* Leningrad.

Sankt Pölten, city, Niederösterreich *Bundesland* ("federal state"), northeastern Austria, on the Traisen River between the foothills of the Alps and the Danube River, west of Vienna. Once the site of the Roman settlement of Aelium Cetium, the town developed in the 8th century around an abbey dedicated to St. Hippolytus, whose name in Germanicized form became Sankt Pölten. The bishops of Passau controlled the city until 1490. It was chartered in 1159 and became an episcopal see in 1785. Notable landmarks include the cathedral (originally the abbey church) and the Renaissance town hall, both remodeled in the 18th century; the convent of the Institut der Englischen Fräulein and the Prandtauer church, both designed by the local architect, Jakob Prandtauer (1660–1726); the episcopal palace (1636–53); and the Franciscan church (1757–68). The Augustinian abbey is in nearby Herzogenburg. An important rail junction, Sankt Pölten manufactures office furniture, hosiery, chemicals, paper, machinery, and textiles. Pop. (1981) 50,419.

Sankt Veit, also called SANKT VEIT AN DER GLAN, town, Kärnten *Bundesland* ("federal state"), southern Austria, on the Glan River north of Klagenfurt. The capital of Kärnten until 1518, its town hall dates from 1468 and its old ducal castle from the 15th to 16th century. The Romanesque parish church was altered in the Gothic style in the 14th century. There are several castles in the vicinity, including the Frauenstein and Hunnenbrunn. A summer resort, Sankt Veit has textile mills and sawmills. Pop. (1981) 12,007.

Sankt Wolfgang, also called SANKT WOLFGANG IM SALZKAMMERGUT, town, Oberösterreich *Bundesland* ("federal state"), central Austria; it lies on the east shore of the Wolfgang (Aber) Lake in the Salzkammergut lake region, west of Bad Ischl. A cog, or rack, railway ascends the Schafberg (5,850 feet [1,783 m]) from the town. The Late Gothic Pilgrimage Church (1430–77) has a magnificent carved wooden altar (1481) by the sculptor Michael Pacher. The town's Zum Weissen Rossl (The White Horse) inn was made famous in the operetta by Ralph Benatzky. Best known as an Alpine resort, Sankt Wolfgang also makes paper and cellulose. Pop. (1981) 2,479.



Sankt Wolfgang on the Wolfgang (Aber) See in the Salzkammergut lake region, Austria
Jan Elter—Shostal/EB Inc.

Sankuru River, main tributary of the Kasai River (itself a tributary of the Congo, or Zaire, River) in Zaire, central Africa. About 750 miles (1,200 km) long, it begins in the western highlands of Shaba (Katanga), where it is known as the Lubilash River, and flows 285 miles (460 km) north and northwest, where it becomes the Sankuru proper and where it flows northward and then almost directly westward to the Kasai. The Sankuru is navigable for 365 miles (590 km) below the town of Pamia-Mutombo, north of the city of Mbuji-Mayi.

Sanlúcar de Barrameda, port city, Cádiz *provincia,* in the *comunidad autónoma* ("autonomous community") of Andalusia, southwestern Spain, on the south bank of the Guadalquivir estuary, north of Cádiz city. Built on the site of Luciferi-Fani, a Roman settlement, the town was taken from the Moors in 1256 and given to the soldier Alonso Pérez de Guzmán the Good, who was its first lord and builder of the first castle. The court of the dukes of Medina-Sidonia was later established there. From its port Columbus sailed across the Atlantic in 1498 (his third voyage), and Ferdinand Magellan departed in 1519 to circumnavigate the world. The 14th-century church and the palace of the dukes of Medina-Sidonia contain many art treasures. The Hospital of Saint George was founded in the town by Henry VIII of England in 1517 and now houses the Colegio de San Francisco. Sanlúcar produces the famous aromatic white wine of Andalusia known as Manzanilla. It is also a popular sea-bathing resort on the Costa de la Luz ("Coast of Light").

On the other side of the river lies the Coto Doñana, held by German archaeologist Adolf Schulten to be the site of Tartessus, a settlement of ancient Iberian people, and Sanlúcar, or *sant lugar,* which was the "holy place" of the Tartessian temple dedicated to the morning star, Venus. *Barrameda* is an Arabic word signifying "sandy gateway" and alludes to the sandbank that once obstructed the navigation of the Guadalquivir 60 miles (100 km) upstream to Seville, of which Sanlúcar was the anteport in the days of Seville's monopoly of colonial trade. Pop. (1981) 48,496.

Sanlúcar de Barrameda, Gaspar de Guzmán y Pimental, duque de (duke of): *see* Olivares, Gaspar de Guzmán y Pimental, conde-duque de.

Sanmicheli, Michele (b. 1484, San Michele, Verona, republic of Venice [Italy]—d. 1559, Venice), Mannerist architect, especially noted for his original treatment of military fortifications.

He was a pupil of his father, Giovanni, and

his uncle Bartolommeo, both architects in Verona. At an early age he went to Rome, where he studied with architects trained under Bramante and Giuliano da Sangallo. There he also met Antonio da Sangallo the Younger, with whom he later collaborated.

From 1509 to 1528 he was *capomastro* ("master builder") of the cathedral of Orvieto. He was also employed by the city of Venice (from 1535) as a military architect and designed elaborate fortresses for Venice, Cyprus, and Crete. In 1527 Sanmicheli began to transform the fortifications of Verona according to the newer system of corner bastions, which he did much to advance. The Porta Nuova (1533–40) and the Porta San Zeno (1541), fortified gates in Verona, are among his best works. He also designed churches and palaces, many of them reworkings of designs of Bramante, Raphael, the Sangallo family, and Michelangelo.

Sanmiguelia, genus of fossil plants based upon impressions of palmlike leaves in Middle to Upper Triassic rocks of Colorado (190,000,000 to 215,000,000 years ago). It may be among the earliest of angiosperms, or flowering plants. The elliptic leaves were pleated, up to 40 cm (16 inches) long and 25 cm (10 inches) wide, and borne at the tip of a tapering stem.

sann hemp (plant): *see* sunn.

Sannār Dam, also spelled SENNAR DAM, dam impounding the Blue Nile River for irrigation at the town of Sennar in The Sudan. Completed in 1925, it is 9,925 feet (3,025 m) long with a maximum height of 130 feet (40 m) and irrigates cotton and other crops of the Gezira.

Sannazzaro, Jacopo (b. July 28, 1456, Naples—d. April 24, 1530, Naples), Italian poet whose *Arcadia* was the first pastoral romance and, until the rise of the Romantic movement, one of the most influential and popular works of Italian literature.

Sannazzaro became court poet of the House of Aragon at the age of 20. In 1501, when Frederic, last king of the dynasty, lost his throne, Sannazzaro accompanied him into exile in France. During this period he brought to light several lost Latin works, including Ovid's *Halieutica* and Nemesianus' *Cynegetica.* After Frederic's death in 1504 Sannazzaro returned to Naples, where he spent the rest of his life.

Sannazzaro wrote both in Italian and in Latin. In addition to *Arcadia,* his Italian works include lyric poems in Petrarchan style. *Arcadia* (1504) is partly autobiographical, partly allegorical, and consists of short poems, in dialogue or soliloquy form, linked by prose narrative. The success of *Arcadia* has been attributed not so much to Sannazzaro's many formal artifices as to his delicate analyses of human impulses and to his fanciful creation of a dream world, which introduced a new type of poetic sensibility.

R. Nash's *Arcadia & Piscatorial Eclogues* appeared in 1966.

Sanniquellie, also called SANGBUI, SANOKOLE, or SANOKWELE, town, north-central Liberia, West Africa, at the intersection of roads from Monrovia and Côte d'Ivoire (Ivory Coast). A rural administrative centre among the Mano and Malinke (Mandingo), it has government and church secondary schools and the George W. Harley Memorial Hospital. There is local trade in agricultural products (rice, cassava, palm oil and kernels) and ivory carvings. Diamond mining in the area was important. Pop. (1980 est.) 10,500.

Sannō Ichijitsu Shintō (Japanese: "One Truth of Sannō Shintō"), also called ICHIJITSU SHINTŌ, or TENDAI SHINTŌ, in Japanese religion, the syncretic school that combined Shintō with the teachings of the Tendai sect of Buddhism. Shintō–Buddhist syncretism developed from the Japanese concept that Shintō deities (*kami*) were manifestations of Buddhist divinities. The earliest of these schools, Ryōbu Shintō (*q.v.*), was founded on the belief that Amaterasu Ōmikami, the chief Shintō deity, corresponded to the Buddha Mahāvairocana (Japanese Dainichi).

In the Heian period (794–1185), the Tendai sect established its headquarters outside Kyōto on Mount Hiei. Sannō (Japanese: "Mountain King"), the mountain's *kami,* became identified with the Buddha Śākyamuni (Japanese Shaka), the principal figure of Tendai Buddhism. The Sannō Shintō school emerged, based on the Tendai belief in Buddhist unity. Thus, Shaka was identical to Dainichi, and Sannō to Amaterasu. Further interpretation of the Tendai teaching of the "one truth" (*ichijitsu*) of the world—as manifested in the *Lotus Sūtra*—resulted in Sannō Ichijitsu Shintō, in which Amaterasu became the ultimate source of Buddhist and Shintō unity. This school flourished during the Tokugawa period (1603–1867).

Sannoisian Stage, lowermost and oldest major division of lower Oligocene rocks and time in France (the Oligocene Epoch began about 38,000,000 years ago and lasted about 12,000,000 years). The Sannoisian, which precedes the Stampian Stage, was named for outcrops studied at Sannois Butte, near Paris, where it consists of variegated marls deposited in a brackish-water, salt-marsh environment. Elsewhere, freshwater limestones predominate. The Brie Limestone contains a large amount of siliceous matter, which remains after the carbonate component of the limestone is dissolved away. The resulting rock type was formerly quarried extensively as a source for millstones, and the Brie was even known as the Brie Millstone. The Sannoisian is equivalent to the Lattorfian Stage, a term widely recognized as the standard stage name for the lower Oligocene Epoch.

sannyasi, also spelled SANNYASIN, Sanskrit SANNYĀSIN ("abandoning," or "throwing down"), in Hinduism, a religious ascetic, one who has renounced the world, having achieved the fourth ashrama, or stage, of life. The name sannyasi also specifically designates an ascetic who pays particular allegiance to the god Śiva, who is sometimes known as "the great ascetic." The Śaiva ascetics were organized in the 8th century AD by the renowned Hindu teacher Śaṅkara into 10 orders, the *daśnāmī* (*see* daśnāmī sannyāsin).

Among the sannyasis, the highest stage of achievement is that reached by the paramahamsa ("great swan"). This honorific is usually given only after a probation of at least 12 years as an ascetic and only to those sannyasis who have achieved full self-knowledge. They are considered free of all worldly rules and duties, such as those pertaining to caste, and are no longer required to carry out image worship or sacrifices but may, if they wish, worship internally only. The most renowned paramahamsa of modern times was the 19th-century saint Ramakrishna, who founded a religious order in Bengal.

Sannyasis, like other sadhus, are not cremated (the customary method of disposing of the dead among Hindus) but are generally buried in a seated posture of meditation.

Sanron, school of Japanese Buddhism derived, by way of China, from the Indian Mādhyamika school. *See* Mādhyamika.

sans serif, in printing, a style of roman letter stripped of its serif—*i.e.,* such embellishments as the vertical line at the end of the top right and lower left curved segments of the letter "s," the base line on which the lowercase "n," "m," and "l" rest, etc. Though the concept of such a type has challenged recent designers, the face itself is used largely for display purposes, in which continuous reading is not a requirement. Inconclusive tests appear to indicate that the roman face with serifs is easier to read than that without them. It has been suggested, again inconclusively, that the sans serif type suffers in that its individual letters,

ABCDEF
abcdef

Helvetica sans serif type
By courtesy of Monsen Typographers, Inc.

when printed, tend somehow to stand out as individual letters rather than as parts of words.

sansa (musical instrument): *see* mbira.

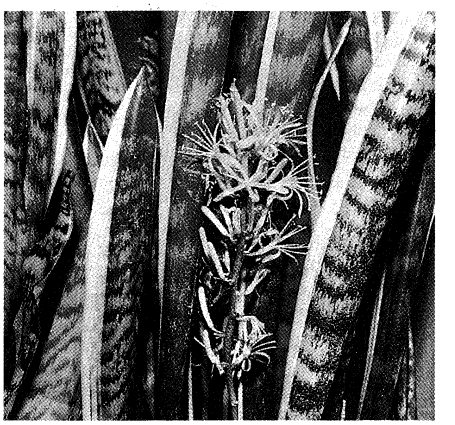
Sansanné-Mango (Togo): *see* Mango.

Sanscrit language: *see* Sanskrit language.

sansculotte, French SANS-CULOTTE ("without knee breeches"), in the French Revolution, any of the ill-clad and ill-equipped volunteers of the Revolutionary army or, later, any of the ultrademocrats of the Revolution. Sansculottes were for the most part men of the poorer classes or leaders of the populace, but during the Reign of Terror public functionaries and persons of good education styled themselves *citoyens sans-culotte* ("citizens sansculotte"). The distinctive costume of the typical sansculotte was the *pantalon* (long trousers)—in place of the *culotte* worn by the upper classes—as well as the *carmagnole* (short-skirted coat), the red cap of liberty, and *sabots* (wooden shoes). The influence of the sansculottes ceased with the reaction that followed the fall of Robespierre (July 1794), and the name itself was proscribed.

In the Republican Calendar the complementary days at the end of the year were at first called *Sans-culottides;* this name was, however, suppressed by the National Convention when the constitution of the year III (1795) was adopted, that of *jours complémentaires* ("complementary days") being substituted.

Sansevieria, genus of ornamental foliage plants in the family Agavaceae, with more than 50 species variously known as bowstring hemp, snake plant, and leopard lily, native



Mother-in-law's-tongue (*Sansevieria trifasciata* variety *laurentii*)
Sven Samelius

primarily to tropical Africa. They have short, thick roots and long, narrow basal leaves that stand erect. Many species have water-resistant leaf fibres that are used in the manufacture of ropes and for bowstrings.

Mother-in-law's-tongue (*S. trifasciata* variety

laurentii) is a popular houseplant because of its yellow-striped leaves. It has tiny pale-green, scented flowers. The species commonly called snake plant (*S. thyrsiflora*) has leaves with light-green bands and yellow edges, and the greenish-white, fragrant flowers are borne in a tall cluster.

Sansi, nomadic criminal tribe originally located in the Rājputāna area of northwestern India but expelled in the 13th century by Muslim invaders and now living in Rājasthān state as well as scattered throughout all of India. The Sansi claim Rājput descent, but, according to legend, their ancestors are the Beriya, another criminal caste. Relying on cattle thievery and petty crime for survival, the Sansi were named in the Criminal Tribes Acts of 1871, 1911, and 1924, which outlawed their nomadic life-style. Reform, initiated by the Indian government, has been difficult because they are an untouchable caste and sell or barter any land or cattle given to them.

Numbering 59,073 in 1961, the Sansi speak Hindi and divide themselves into two classes, the *khare* (pure) and the *malla* (halfbreeds resulting from kidnappings). Some are cultivators and labourers, although many are still nomadic. They trace their descent patrilineally and also serve as the traditional family genealogists of the Jat, a peasant caste. Their religion is simple Hinduism, but a few have converted to Islām.

Sansin (Korean: Mountain God), in Korean religion, a guardian spirit residing in mountains, whose cult has been closely associated with mountain tigers and is still fostered in Korean Buddhist temples. In early indigenous religion of Korea, worship of sacred mountains gradually gave way to worship of wild bears, wolves, and especially tigers, who roamed the mountains. There are, consequently, numerous names for Lord of the Mountain still current in Korea, each of which signifies a tiger. The animal reputedly can be dispatched by angry mountain spirits to harm villagers and cattle when worship is neglected. Examples of *sansindo,* a traditional painting type, characteristically depict a tiger and an old man (or monk in Buddhist robes), though most mountain spirits other than the tiger itself are considered female.

Worship of Sansin is most pronounced during festivals that have been celebrated throughout Korea for many centuries. During the Silla dynasty (57 BC–AD 935) such events were held at 42 locations under state auspices. From the 10th to the 14th century state-sponsored festivals were held at 13 sites in spring and autumn with shamans and female musicians leading the festivities. The Yi dynasty (1392–1910), despite its Confucian ideology, encouraged continuation of the semi-annual festivals, because the rituals included prayers for national well-being and security. Peasants also selected sacred mountains as sites for altars and added a celebration at the beginning of the year.

In modern Korea, Sansin festivals are observed in the hope that the mountain god will provide a good harvest, drive away evil spirits, and prevent disease and drought. Offerings are made at one or more of three altars: one designated for nut fruit only, one for vegetables, and one for meat, wine, cake, soup, and fruit—the last altar being the most popular. Traditionally, the celebration takes place at midnight. The site, preferably a natural stone altar surrounded by trees, must be determined by a "pure male"—*i.e.,* a respected villager in his 40s, who has no worries and no sick relative at home.

Sanskrit language, also spelled SANSCRIT (Sanskrit *saṃskṛta:* "prepared, cultivated, purified, refined"), Old Indo-Aryan language, the classical literary language of the Hindus of India. Vedic Sanskrit, based on a dialect of northwestern India, dates from as early as 1800 BC and appears in the text of the Rigveda; it was described and standardized in the important grammar book by Pāṇini, dating from about the 5th century BC. Literary activity in so-called Classical Sanskrit, which is close to but not identical with the language described by Pāṇini, flourished from *c.* 500 BC to AD 1000 and continued even into modern times. Currently, a form of Sanskrit is used not only as a learned medium of communication among Hindu scholars but also as a language for some original writing. The language, written in the Devanāgarī script is, in fact, undergoing something of a revival, though it is neither a widespread nor a usual mother tongue.

Sanskrit grammar is similar to that of other older Indo-European languages, such as Latin and Greek; it is highly inflected and complex. Sanskrit has three genders (masculine, feminine, and neuter), three numbers (singular, dual, and plural), and eight cases (nominative, accusative, instrumental, dative, ablative, genitive, locative, and vocative), although only in the singular of the most common declension does a noun show different forms for each case. Adjectives are inflected to agree with nouns. Verbs are inflected for tense, mode, voice, number, and person.

Sanskrit literature, body of writings produced by the Aryan peoples who entered the Indian subcontinent from the northwest, probably during the 2nd millennium BC. It developed as the vehicle of expression for the Brahmanical society that gradually established itself as the main cultural force throughout the region in the period before the Muslim conquest. Beginning *c.* 1500 BC, with the era of the Vedic hymns, the classical period of Sanskrit drew to a close *c.* AD 1000. Throughout this period of 2,500 years the dating of most literary works is problematical; the difficulty is aggravated by the tendency to ascribe authorship to well-known or legendary names. Two main periods in the development of the literature are discernible: the Vedic period, approximately 1500–200 BC; and, somewhat overlapping it, the classical period, approximately 500 BC–AD 1000.

Sansom, William (b. Jan. 18, 1912, London—d. April 20, 1976, London), writer of short stories, novels, and travel books who is considered particularly acute in his dissections of London life and scenes.

Educated at Uppingham School, Rutland, Sansom worked in banking and advertising until World War II. After writing some film scripts following the war, he became a full-time writer. His most important novels are *The Body* (1949), *A Bed of Roses* (1954), *The Loving Eye* (1956), and *Goodbye* (1966). His short stories have been collected in *Fireman Flower* (1944), *Something Terrible, Something Lovely* (1948), *A Touch of the Sun* (1952), *Blue Skies, Brown Studies* (1960), and *The Marmalade Bird* (1973), containing "Down at the Hydro," one of his best stories. He also wrote travel books about his European trips and a biography of Marcel Proust, *Proust and His World* (1973).

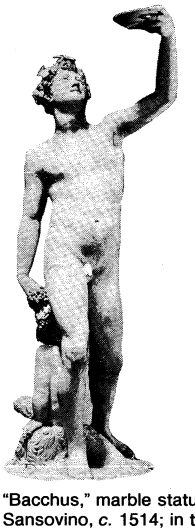
Sansovino, Andrea, original name ANDREA CONTUCCI (b. *c.* 1467, Monte San Savino, Republic of Florence—d. 1529, Monte San Savino), Italian architect and sculptor whose works reflect the transition from early to High Renaissance.

His earliest great work was the marble Altar of the Sacrament in S. Spirito, Florence, executed for the Corbinelli family between 1485 and 1490; the fineness of detail, high emotional pitch, and lively narrative quality seen in the altar are typical of his early style. After several years in Portugal, according to Vasari, the 16th-century biographer of Italian artists, Sansovino was again in Florence in 1502, when he began the marble group of the "Baptism of Christ," now above the central door of the baptistery. The calm and dignified poses, the strong but controlled emotion, and the generalized beauty of the bodies mark this as one of the first works in the style of the High Renaissance.

In 1505 Sansovino went to Rome and was commissioned by Pope Julius II to execute the almost identical tombs of cardinals Ascanio Sforza and Girolamo Basso della Rovere in Sta. Maria del Popolo. These tombs, completed by 1509, were the most influential of all Sansovino's innovations, with their adaptation of the triumphal-arch form and the novel sleeping attitude of the deceased cardinals. Sansovino's last great charge was to supervise both the decoration of the Santa Casa (Holy House of the Virgin) and the construction of several buildings at Loreto. His marble relief of the "Annunciation" on the shrine there is a composition of great richness that still has some of the narrative charm of his very early work.

The influence of Sansovino's suave and graceful style acted as a counterbalance to Michelangelo's titanic and muscular sculpture throughout the 16th century. His most important follower was Jacopo Tatti, called Sansovino after his master.

Sansovino, Jacopo, original name JACOPO TATTI (b. July 2, 1486, Florence—d. Nov. 27, 1570, Venice), sculptor and architect who introduced the style of the High Renaissance into Venice. In 1502 he entered the Florence workshop of the sculptor Andrea Sansovino and as a sign of admiration adopted his master's name. In 1505 he accompanied the Florentine architect Giuliano da Sangallo to Rome, studying ancient architecture and sculpture while employed by Pope Julius II in the restoration of ancient statues. Back in Florence he carved the statue of "St. James the Elder" (1511–18; Sta. Maria del Fiore) and the "Bacchus" (*c.* 1514; Bargello, Florence).



"Bacchus," marble statue by Jacopo Sansovino, *c.* 1514; in the Bargello, Florence

Alinari—Art Resource/EB Inc.

From 1518 Jacopo worked in Rome, first on the "Madonna del Parto" (*c.* 1519; S. Agostino, Rome), which shows the continuing influence of Andrea Sansovino, and on the "St. James" (1520; Sta. Maria di Monserrato, Rome).

After the sack of Rome in 1527, Sansovino fled to Venice, where he was made *protomagister* of the cathedral. He became a friend of the painter Titian and the author Pietro Aretino and was appointed chief architect of

the city, a position he held until his death. His first Venetian building was the Palazzo Corner della Ca' Grande (1533), in which he retained the rusticated base and trabeated second story (*piano nobile*) of the Roman palaces of Bramante and Raphael. But Sansovino added a third story and altered the proportions of each story to conform more closely to Venetian tradition of palace design. His Zecca (Mint) dates from 1536 and is notable for the imaginative rustication of its columns and wall surfaces, which give the building an appropriately fortified appearance. The Library of St. Mark's, one of the major architectural works of the 16th century, was begun the same year.

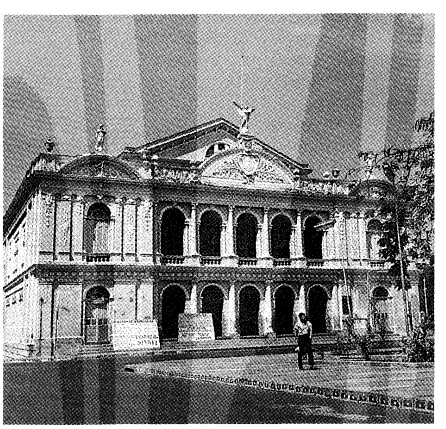
Sansovino's early Venetian bronzes, such as the statuettes of the evangelists and the doors of the sacristy in St. Mark's (1540s), recall the easy grace of his Roman and Florentine works but show a new independence and maturity of conception. His marble statue of the youthful "St. John the Baptist" (1554) in Sta. Maria dei Frari shows the transition from his mature style to that of his old age.

Among the works showing his severe late style are the bronze portrait of Tommaso Rangone over the entrance to the church of S. Giuliano (1554), which Sansovino also designed; the colossal statues of "Mars and Neptune" (1554–56, Doges' Palace, Venice); and the monument to the doge Francesco Venier in S. Salvatore (1556–61).

Many of Sansovino's most important works are decorative elements of his architecture, and he was perhaps more successful than any other Renaissance architect in fusing architecture and sculpture. He remained an advocate of the balance and restraint of the High Renaissance style even while Mannerism was becoming the dominant artistic trend in Italy.

Santa Ana, department (formed in 1855), western El Salvador, bounded by Guatemala to the north and west, Honduras to the north, and the Río Lempa to the east, with an area of 781 sq mi (2,023 sq km). The terrain is mostly rugged, and in the south are several volcanoes, including Santa Ana Volcano, the country's highest peak. The northern part has many deep valleys, cut by the Río Lempa and its tributaries. Santa Ana grows much of the nation's coffee, mostly on volcanic slopes at altitudes of between 1,800 and 4,000 ft (550 and 1,200 m). Other products include beans, vegetables, corn (maize), fruits, livestock, and cheese. To the north, near Metapán, iron and copper are mined and limestone is quarried. A dam at the outlet of Lake Güija (in the northwest) regulates the flow of the Río Lempa and provides electricity for industrial development, concentrated in the city of Santa Ana (*q.v.*), the departmental capital. Pop. (1981 est.) 445,462.

Santa Ana, capital of Santa Ana department, western El Salvador. Situated in a basin between mountains at an altitude of 2,153 ft (656 m), it is located on the Inter-American Highway, a section of the Pan-American Highway, northwest of San Salvador and 10 mi (16 km) north-northeast of Santa Ana Volcano (7,724 ft). Known as Santa Ana since 1708, it is the nation's second largest city and the commercial centre of western El Salvador. Santa Ana is a major coffee-processing centre, having one of the world's largest coffee mills (El Molino). Industrial activities include alcoholic-beverage distilling and the manufacture of cotton textiles, furniture, and leather goods. Historic landmarks include the Spanish Gothic cathedral and El Calvario colonial church. The city has a branch of the University of El Salvador. There are summer resort facilities at nearby Lake Coatepeque. The ruined Indian city of Chalchuapa is 9 mi west. In late 1981 raids by leftist guerrillas damaged the city's infrastructure. Pop. (1982 est.) mun., 212,663.



Teatro Nacional (National Theatre), Santa Ana, El Salvador

Salmer—SCALA from Art Resource/EB Inc.

Santa Ana, city, seat (1889) of Orange County, southern California, U.S., at the base of the Santa Ana Mountains, on the Santa Ana River. The site, part of Rancho Santiago de Santa Ana, was laid out in 1869 by William H. Spurgeon. The community developed as a centre for the farm produce of the Santa Ana Valley after the Southern Pacific Railroad connected it (1878) to Los Angeles. Nearby military installations and freeway construction spurred residential and industrial growth after World War II. Santa Ana (junior) College was founded in 1915. The Charles W. Bowers Memorial Museum features Pacific coast history and artifacts. Inc. city, 1886. Pop. (1980) city, 203,713; (1982 est.) Anaheim–Santa Ana metropolitan area (SMSA), 2,013,800.

Santa Ana de Cuenca (Ecuador): *see* Cuenca.

Santa Ana Volcano, Spanish VÓLCAN SANTA ANA, mountain peak in southwestern El Salvador. The highest peak in the country, it rises to 7,724 ft (2,381 m). The volcano last erupted in 1920 and has a small sulfurous lake in its crater. Laguna (lake) de Coatepeque, a popular recreation area, is at its eastern foot. The city of Santa Ana lies at the foot of the northeastern slope of the volcano.

Santa Anna, Antonio López de (b. Feb. 21, 1794, Jalapa, Mex.—d. June 21, 1876, Mexico City), army officer and statesman who was the storm centre of Mexico's politics during such events as the Texan revolt (1836) and the Mexican War (1846–48).



Santa Anna, daguerreotype by F.W. Seiders

By courtesy of the San Jacinto Museum of History Association, San Jacinto Monument, Texas

Santa Anna, son of a minor colonial official, served in the Spanish Army and rose to the rank of captain. He fought on both sides of nearly every issue of the day. In 1821 he supported Agustín de Iturbide and the war for Mexican independence; in 1823 he helped overthrow Iturbide. In 1828 he backed Vicente Guerrero for president, only to help depose him later.

Santa Anna gained much prestige in 1829 when he fought against Spain's attempt to reconquer Mexico, and he became known as the Hero of Tampico. This surge of glory helped him gain the presidency in 1833 as a Federalist and opponent of the Catholic Church; in actuality, however, he established a centralized state. He remained in power until 1836, when he marched into Texas to quell a rebellion by U.S. settlers there. During the course of this punitive expedition Texas declared its independence from Mexico (March 2). Santa Anna, after defeating Texan forces at the Alamo (*q.v.*) and Goliad, then moved eastward to the San Jacinto River, where he was defeated and captured by Sam Houston on April 21. He was sent to Washington, D.C., for an interview with Pres. Andrew Jackson, who returned him to Mexico, where he was forced into retirement.

In 1838, when the French Navy seized Veracruz and demanded an indemnity for injuries to French citizens in Mexico, Santa Anna led forces to Veracruz, only to shoot at the ships as they departed. He lost a leg in the skirmish. He gained enough prestige from this event to act as dictator from March to July 1839, while the President was away. Two years later he led a revolt and seized power, which he held until driven into exile in 1845.

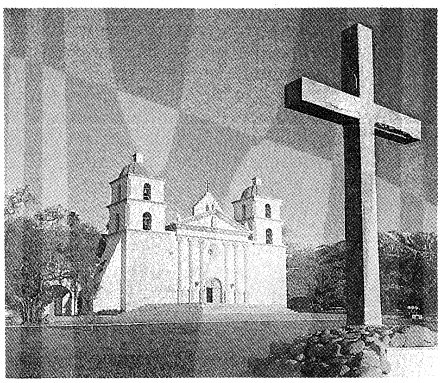
When war with the United States broke out, Santa Anna contacted U.S. president James Polk, who arranged for a ship to take him to Mexico for the purpose of working for peace. Santa Anna took charge of the Mexican forces upon his return; but instead of acting for peace, he led his men against the United States until he was routed by U.S. forces under Gen. Winfield Scott. Santa Anna again retired, moving to Jamaica in 1847 and to New Granada in 1853. Ten years later he sought U.S. support in an attempt to oust the emperor Maximilian, whom the French had placed on the Mexican throne; at the same time he offered his services to Maximilian. Both proposals were refused. Two years before he died, poor and blind, Santa Anna was allowed to return to his country.

Santa Bárbara, department, northwestern Honduras, bounded on the west by Guatemala and on the southeast by Lake Yojoa. The population of the 1,975-sq-mi (5,115-sq-km) department is concentrated in the Ulúa and tributary mountain valleys in the southern third and in the Chamelecón lowland across the north central part; the mountainous areas in the southern and central portions are sparsely settled, but lumbering is important. About one-half of the area is in farms, the principal products of which are coffee, corn (maize), tobacco, sugarcane, beans, cattle, poultry, and rice. Agriculture has occasionally been disrupted by conflict between peasants and landowners. Gold and silver are mined at El Mochito. In 1979 construction began on a hydroelectric plant at El Níspero on the Palaja River. Secondary roads link the settlement centres with Santa Bárbara (*q.v.*), the departmental capital. Pop. (1983 est.) 286,854.

Santa Bárbara, capital, Santa Bárbara department, northwestern Honduras, in the hot lowlands near the Ulúa River and west of Lake Yojoa. It was founded in 1761 by settlers from Gracias. Santa Bárbara is a commercial as well as administrative centre. The raising of livestock and the cultivation of sugarcane are the principal economic activities in the hinterland; palm hats, clothing, and furniture are made in the town. Ruins of the colonial

city of Tencoa have been discovered near the town. Santa Bárbara is reached by a branch from the Inter-Oceanic Highway, and it has an airfield. Pop. (1983 est.) 26,344.

Santa Barbara, city, seat of Santa Barbara County, southwestern California, U.S., on the Pacific coast at the base of the Santa Ynez Mountains, facing the Santa Barbara Channel. It was named for the patron saint of mariners



Mission Santa Barbara, California
David Muench—EB Inc.

by Sebastián Vizcaíno in 1602. The presidio was established in 1782 and the mission of Santa Barbara in 1786, and a port and agricultural market subsequently developed. The mission, western headquarters of the Franciscan Order, has been in continuous use since its founding. John Charles Frémont raised the U.S. flag at the presidio in 1846, and the city was incorporated in 1850. After the arrival (1887) of the Southern Pacific Railroad, it was promoted as a seaside resort and developed a tourist, citrus, cattle, and oil economy. After the 1925 earthquake, many buildings were restored in Spanish Colonial style; the city's adobe character is preserved by law.

Westmont College was founded in 1940, Santa Barbara City (junior) College in 1946, and the University of California at Santa Barbara (founded as a private school in 1891) was organized in 1944. The Center for the Study of Democratic Institutions is in Santa Barbara. The city is the headquarters for Los Padres National Forest. Pop. (1980) city, 74,542; (1982 est.) Santa Barbara–Santa Maria–Lompoc metropolitan area (SMSA), 308,500.

Santa Bárbara de Samaná (Dominican Republic): *see* Samaná.

Santa Barbara Islands, also called CHANNEL ISLANDS, chain extending 150 mi (241 km) along, and 25–90 mi off southern California's Pacific coast. Separated from the mainland by the Gulf of Santa Catalina and the Santa Barbara and San Pedro channels, the islands include (north to south) San Miguel, Santa Rosa, Santa Cruz, Anacapa, Santa Barbara, San Nicolas, Santa Catalina, and San Clemente. They were once the home of the extinct Canaliño Indians and were visited in 1542 by the Portuguese navigator Juan Rodríguez Cabrillo, who is reputedly buried on one of them. Rugged and mountainous, they range in size from Santa Cruz (98 sq mi [254 sq km]), the largest, to the small Anacapa islets and are divided into the Santa Barbara (north) and Santa Catalina (south) groups. The larger islands support sheep ranches. Santa Catalina Island is a noted resort.

Channel Islands National Monument (established in 1938 with headquarters in Oxnard, Calif.) embraces Anacapa and Santa Barbara islands. Sea caves are common, and the islands are frequented by colonies of sea lions, seals, and birds. Noted also for distinctive plant life (about 830 varieties), including the giant coreopsis, they contain fossils of marine invertebrates and Pleistocene elephants. Only Santa Cruz and Santa Catalina are forest covered. Geologic structure is related to the coast ranges, and composition is of upthrust fault blocks (the Santa Barbara group is believed by some to be anticlinal mountains). Ocean basins and troughs between the islands reach depths of more than 6,000 ft (1,829 m).

Seeping oil, from a ruptured underwater well in the Santa Barbara Channel, caused widespread ecological damage to several of the northern islands in 1969.

Santa Catalina Island, one of the Channel Islands, 22 mi (35 km) off the Pacific coast of California, U.S. It is 22 mi long and 8 mi across at its greatest width and has an area of 74 sq mi (192 sq km). It rises to Mt. Orizaba (2,130 ft [648 m] above sea level) and is forested and chaparral covered. Part of Los Angeles County, it was discovered by Juan Rodríguez Cabrillo in 1542 and sheltered a Spanish sea expedition (1602) led by Sebastián Vizcaíno, who named it on the feast day (November 25) of St. Catherine (Catalina) of Alexandria. Deeded to the United States in the Treaty of Guadalupe Hidalgo (1848), it developed as a resort after it was purchased (1919) by William Wrigley. Avalon (incorporated 1913), the only city, is connected by boat and air services to San Pedro and Long Beach on the mainland. A seal colony, evening flying-fish trips, and submarine gardens are attractions.

Santa Catarina, southern coastal *estado* (state) of Brazil, bounded on the north by the state of Paraná, on the south by the state of Rio Grande do Sul, on the east by the Atlantic Ocean, and on the west by Misiones province of Argentina. One of the smaller Brazilian states, it has an area of 37,060 sq mi (95,985 sq km). The capital is Florianópolis, located on coastal Santa Catarina Island. The region was given various names by early Spanish and Portuguese cartographers; the name Santa Catarina is said to have been given in honour of St. Catherine of Alexandria by the Italian navigator Sebastian Cabot, when he was in the service of Spain.

Santa Catarina was part of a larger hereditary captaincy (district administered by a captain) established by the Portuguese crown in 1532, although the first Portuguese settlement, at what is today the port of São Francisco do Sul near the Paraná border, was not made until 1648. Interior highland prairies were used for cattle raising, and early in the 18th century trading posts were opened along the cattle trails leading across the plateaus toward the coastal towns and the northern markets.

The captaincy of Santa Catarina was created in 1738 to serve as an outpost in the Portuguese–Spanish territorial wars. It was governed from Rio de Janeiro by the military until 1822, when Brazil became an empire independent of Portugal. A revolution that spread northward from Rio Grande do Sul in 1839 created the short-lived Republic of Santa Catarina.

During the 19th century a considerable immigration of non-Portuguese peoples occurred. Germans arrived as early as 1829 and came in great numbers during the 1850s, settling along the coastal valleys and founding the cities of Blumenau, Joinvile, and Brusque. Many Italians immigrated after 1875, and Poles, Ukrainians, and Russians arrived in the 1880s. African slaves comprised about 10 percent of the population in the 1870s; they were emancipated in 1888. Santa Catarina became a state of Brazil when, in 1889, a republic was proclaimed to replace the empire; Florianópolis was designated as the capital.

Behind the seacoast a great escarpment rises like a mountain wall; the state has little level ground. Its highest point is Campo do Padres, at 6,000 ft (1,800 m) in elevation, located in the southeast part of the state. There are two principal river systems, one formed by the coastal rivers flowing eastward to the coast, the other flowing south to the Uruguay River, which forms part of the state's southern border.

Rainfall is heavy, ranging from 47 to 97 in. (1,200 to 2,500 mm) annually; average temperatures range from a summer high of about 69° F (21° C) to a winter low of about 48° F (9° C). Although much of the original forest cover, which consists of mixed tropical and subtropical vegetation, has been cleared, there are extensive reforestation programs that are now being pursued.

The overwhelming majority of the population is white, the remainder predominantly black and Indian. The Portuguese spoken by the majority has also influenced the languages spoken by the descendants of the various immigrant groups. The dominant religion is Roman Catholicism; there are also several Protestant sects, and spiritualism has much influence, principally in urban areas.

There have been elementary schools in Santa Catarina for centuries, but secondary education became prevalent in the interior only in the 20th century. Higher education was introduced in 1919, and a number of universities are located in the major cities, the most prominent being the Federal University of Santa Catarina (founded 1960), in Florianópolis.

A prominent feature of state welfare is the public housing program. There were several hundred hospitals throughout the state in the late 20th century and a few thousand doctors.

The manufacture of wood products forms a major part of Santa Catarina's industry; these products include processed wood, furniture, and charcoal. Brazil's best coal is mined about 70 mi (112 km) northwest and southwest of Tubarão on the southern coast. Fishing and fish processing are important, as also are cattle raising and other forms of food production and processing. About one-third of Brazil's wheat comes from the state, and the food-processing and textile industries are flourishing.

Two national highways cross the state from north to south and one from east to west. A railway line crosses the centre of the state from south to north but is no longer of major significance. River and sea transport is poorly developed. The principal ports are Itajaí, São Francisco do Sul, Florianópolis, Imbituba, and Laguna. There is an international airport at Navegantes.

The theatre is popular in Florianópolis and Blumenau. The state Institute of History and Geography has been in existence since 1896 and the Academy of Letters since 1920. Pop. (1984 est.) 4,011,000.

Santa Clara, city, capital of Villa Clara province, central Cuba. It lies at 367 ft (112 m) above sea level amid hills of coral rock. Founded in 1689 by families fleeing constant pirate threats in coastal Remedios, Santa Clara occupies the site of the ancient Indian town of Cubanacán, which, according to some authorities, Columbus mistook for the headquarters of the Mongol emperor Kublai Khan. Initially dependent upon livestock raising and associated industries, the city has flourished on sugar and tobacco in the 20th century. The Santa Clara Steel Combine makes finished steel products and parts. The University of Las Villas was founded in Santa Clara in 1948. The city is situated near the geographic centre of the island, on the central highway, and is the junction point of Cuba's main railroads. Pop. (1983 est.) 191,272.

Santa-Clara, cape on the Atlantic coast of northwestern Gabon, Africa, in the Estuaire province. Extending south from the larger peninsula that separates the Gabon Estuary from Corisco Bay, it juts into the mouth of the estuary. Santa-Clara lies 12 mi (20 km) north

of Libreville and just north of Owendo, one of Gabon's major ports. Like Cape Esterias, still farther north, Santa-Clara has fine sand beaches that attract some tourism. Okoumé trees have been planted on the cape as part of a forestry development scheme. In the 1970s Santa-Clara was designated the site for a new mineral-exporting port (for iron, manganese, and uranium), part of the Owendo port complex at the western terminus of the Trans-Gabon Railway.

Santa Clara, city, Santa Clara county, west-central California, U.S. It lies along the Guadalupe River in the Santa Clara valley, about 48 miles (77 km) southeast of San Francisco and immediately adjacent to San Jose on the southeast. The original settlement grew around the Mission Santa Clara de Asís, which was founded in 1777 and was the eighth in the California chain of 21 missions. Santa Clara was incorporated in 1852. The Spanish historical influence is evident in the city's place-names, architecture, and restored mission. The city developed as a processing centre for the prunes, apricots, and other fruits and vegetables grown in the rich Santa Clara valley. By the 1940s, however, manufacturing had surpassed agriculture in importance, and since then Santa Clara's growth has reflected a balanced agricultural-industrial economy. The city's population has grown considerably from the 1950s.

Great America, a 200-acre (81-hectare) amusement park, is an economic asset. Santa Clara University, which is the oldest institution of higher learning in California, was founded as a college by Jesuits in 1851 and became a university in 1855. The mission was damaged by earthquakes in 1812 and 1818; the mission building on the university campus is a restoration of the third mission, built in 1822. The city suffered moderate damage in an earthquake that struck central California on Oct. 17, 1989. Pop. (1988 est.) 89,830.

Santa Claus, legendary figure who is the traditional patron of Christmas in the United States and other countries. His popular image is based on traditions associated with a 4th-century Christian saint. *See* Nicholas, Saint.

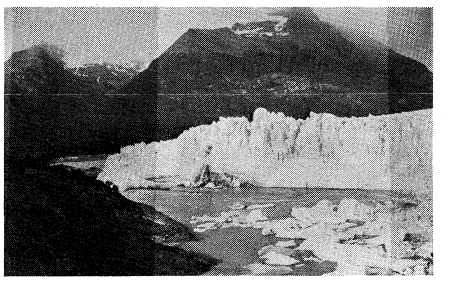
Santa Claus, town, Spencer county, southwestern Indiana, U.S. It lies 38 miles (61 km) east-northeast of Evansville. Laid out in 1846, it was jocularly called Santa Claus after the preferred name of Santa Fe was found to be that of another Indiana community (and because it was the Christmas season). Its post office annually remails more than 1 million pieces of Christmas mail with the Santa Claus postmark. The village contains Santa Claus Land, a children's park with amusement rides and displays of toys from many countries. The Lincoln Boyhood National Memorial, 4 miles (6 km) west, commemorates the childhood farm home of Abraham Lincoln and is the burial site of his mother, Nancy Hanks Lincoln. Lincoln State Park and Lincoln City are nearby. Pop. (1988 est.) 760.

Santa Coloma de Gramanet, city, Barcelona *provincia,* in the *comunidad autónoma* ("autonomous community") of Catalonia, northeastern Spain. The city, a northern industrial suburb of Barcelona, produces metallurgical goods, textiles, chemicals, bicycles, and cigarette paper. Nearby is the Torre Pallaresa, a 16th-century (late Gothic) country house. Archaeological finds have shown Santa Coloma to be the site of a pre-Roman settlement. In 1471 the Catalans were defeated there by John II of Aragon. Pop. (1981) 140,588.

Santa Croce, church of the Franciscans in Florence, one of the finest examples of Italian Gothic architecture. It was begun in 1294, possibly designed by Arnolfodi Cambio, and was finished in 1442, with the exception of the 19th-century Gothic Revival facade and campanile. On many of the interior walls are masterpieces of Tuscan Gothic or proto-Renaissance painting: the Bardi and Peruzzi chapels' frescoes are by Giotto; the Baroncelli Chapel has frescoes by Taddeo Gaddi and a polyptych by Agnolo Gaddi, who also did the frescoes in the Castellani Chapel. There are examples of sculpture by such masters of early Renaissance art as Rossellino, Donatello, Mino da Fiesole, Andrea della Robbia, and Benedetto da Maiano.

Many famous Italians are buried in the church: *e.g.,* Leon Battista Alberti, Michelangelo, Vittorio Alfieri, Leonardo Bruni, Gioacchino Rossini, and Galileo. One of the finest examples of early Renaissance architecture, the Pazzi Chapel by Brunelleschi, is in the 14th-century cloister.

Santa Cruz, *provincia,* southern Argentina. It lies within the region known as Patagonia and extends westward from the Atlantic Ocean to the Andean cordillera on the Chilean frontier. Its area of 94,187 square miles (243,943 square km) is very sparsely inhabited.



Moreno Glacier on Lake Julio A. Roca, Santa Cruz province, Argentina
Ernesto Alstadt

Santa Cruz is a region of constant winds and dust storms which sweep over its dry tablelands and its arid, precipitous coast. In spite of the region's latitude, however, the climate is relatively mild, the temperature being moderated by the proximity of the ocean. The province's western rim includes forested Andean foothills and a number of beautiful glacial lakes, notably Lake Argentino, where tourism is the main economic activity. Glaciers descend from the Andean slopes into this lake.

Santa Cruz province has three national parks. Perito Francisco P. Moreno National Park, with an area of 444 square miles (1,150 square km), lies in the Andes and includes the divide between Pacific and Atlantic drainage. Los Glaciares National Park, which lies farther south and has an area of 1,722 square miles (4,459 square km), is noted for its glacial landforms. The Petrified Forest National Park has an area of 39 square miles (100 square km).

Santa Cruz was part of the Patagonia National Territory from 1878 until it was made a separate national territory in 1884. In 1955 it achieved provincial status.

There are sheep ranches in the sheltered canyons that cross the central desert, but little agriculture. The province's principal line of communication is the shipping service that links its Atlantic ports, where wool and sheepskins from the interior are collected for shipment to Buenos Aires. Río Gallegos (*q.v.*), the southernmost port of continental Argentina and the provincial capital, is also a centre of the sheep trade. Other ports are San Julián, Santa Cruz, and Puerto Deseado. Pop. (1986 est.) 138,000.

Santa Cruz, city, east-central Bolivia, situated in the hot, tropical lowlands at 1,365 feet (416 m) above sea level. Founded by Spaniards from Paraguay in 1561 at what is now San José de Chiquitos, it was attacked repeatedly by Indians until 1595, when it was moved to its present location along the Piray River and renamed Santa Cruz de la Sierra. Its inhabitants declared their independence from Spain in 1811, and the city was recaptured only briefly by royalist forces. In 1950 a highway to Cochabamba was completed, and the 422-mile (650-kilometre) Santa Cruz-Corumbá (Brazil) railway provides access to Atlantic ports. Santa Cruz is Bolivia's second largest city and has experienced an economic boom. It is a trade centre for the subtropical and tropical crops (including sugarcane, rice, coffee, and tobacco) grown in the surrounding area, which also has large reserves of natural gas to the north and south. The city manufactures leather products and alcohol, has a sugar refinery and an oil refinery, and is the seat of the Universidad Boliviana Mayor "Gabriel René Moreno" (1880). Santa Cruz also has an airport. Pop. (1988 est.) 627,920.

Santa Cruz, city, seat (1850) of Santa Cruz county, west-central California, U.S. It lies on the north shore of Monterey Bay, at the foot of the Santa Cruz Mountains, and is about 80 miles (130 km) south of San Francisco. It was the site of Mission Santa Cruz (founded 1791, reconstructed 1931) and of the model Spanish colony (village) of Branciforte (1797). After coming under U.S. control in 1846, the settlement progressed as a lumber, fishing, and agriculture centre. After 1950 the city experienced steady growth with the increasing industrialization of the area.

The area's scenic beauty and its mild climate are principal attractions. The locality is enhanced by clumps of redwood trees, which increase to forest proportions in the Santa Cruz Mountains just north of the city. Another feature of Santa Cruz is its magnificent sweep of beach, which attracts thousands of tourists. To accommodate these visitors, the city has built several seaside facilities, including a long wharf that extends a half mile into the bay. The University of California at Santa Cruz was established in 1965. The central shopping district of Santa Cruz was severely damaged by an earthquake that struck central California on Oct. 17, 1989. Inc. 1866. Pop. (1988 est.) city, 47,770; Santa Cruz PMSA, 226,700.

Santa Cruz, Alvaro de Bazán, Marqués de (Marquess of) (b. Dec. 12, 1526, Granada, Spain—d. Feb. 9, 1588, Lisbon, Port.), the foremost Spanish naval commander of his day. He was prominent in many successful naval engagements in a century that saw Spain rise to the zenith of its power and was the first proponent and planner of the Spanish Armada, the fleet that was to attempt the invasion of England shortly after his death.

The son of a Spanish naval commander, he entered the navy at an early age and fought against the French, the Turks, and the Moors in the Mediterranean. He steadily advanced in rank and was created the Marqués de Santa Cruz in 1569. In the Battle of Lepanto against the Turks (1571), Santa Cruz, as commander of the reserve fleet, displayed excellent seamanship and played an important role in the crushing of the Turkish fleet.

In 1580 Santa Cruz commanded the fleet that aided the Duke de Alba's conquest of Portugal. Three years later, at the Second Battle of Terceira, Santa Cruz defeated a superior French naval squadron sent unofficially to support a rebellion in the Azores against Philip II, the Spanish king. His victory was marred, however, by his execution of all French prisoners despite the protests of his own men. This act did not prevent Philip II from appointing him "captain general of the ocean."

It was after that battle that Santa Cruz urged Philip II to undertake the invasion of England; his letter of Aug. 9, 1583, to the king is generally considered as the first step in the creation of the Spanish Armada. Philip, who scaled down Santa Cruz's original requisition of ships

and men, appointed him naval commander of the invasion force. Santa Cruz then began the task of preparing the fleet at Lisbon. In spite of difficulties in obtaining men and supplies, English raids, and Philip's interference, Santa Cruz succeeded in assembling and fitting out nearly the entire Armada before his untimely death. The Armada then was given to the Duque de Medina-Sidonia, a man thoroughly unfamiliar with naval affairs. Whether Santa Cruz would have succeeded in the invasion of England has been a topic of conjecture for historians.

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Santa Cruz de Barahona (Dominican Republic): *see* Barahona.

Santa Cruz de el Seibo (Dominican Republic): *see* El Seibo.

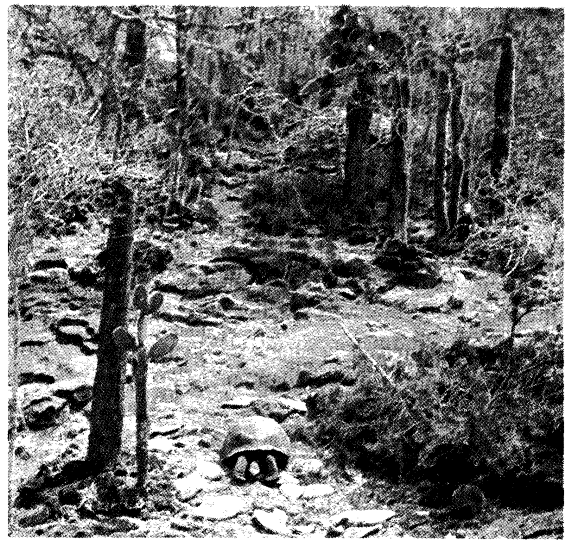
Santa Cruz de Tenerife, port city, capital of the island of Tenerife in the Canary Islands and of Santa Cruz de Tenerife province, in the autonomous community (region) of the Canary Islands, Spain, occupying a small plain between two usually waterless ravines. It was founded in 1494. A treasure fleet in the harbour was largely destroyed by a British naval squadron under Robert Blake in 1657. The British naval hero Capt. (later Adm.) Horatio Nelson lost his right arm in an unsuccessful assault on Santa Cruz in 1797. After 1877 the banana and tomato trade and, later, harbour improvements and the tourist trade caused rapid growth. Notable public buildings include the parish church of the Concepción, military and archaeological museums, a theatre, and a bullring. The water supply comes by aqueduct from the interior mountains. A well-planned seafront adjoins a harbour sheltered by two moles, and Santa Cruz is an important oil bunkering port with an oil refinery. A catastrophic collision (582 fatalities) at Los Rodeos international airport in 1977 gave impetus to the construction of a new facility, Queen Sofia Tenerife South, opened in 1978.

Gen. Francisco Franco, then captain general of the Canary Islands, organized in Santa Cruz the national uprising that led to the Spanish Civil War in 1936. Pop. (1982 est.) city, 221,660; province, 762,503.

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Santa Cruz del Quiché, capital, Quiché department, northwestern Guatemala, in the southwestern Sierra de Chuacús at an elevation of 6,631 ft (2,021 m) above sea level. In addition to its administrative role, the town functions as a market centre for the Indian villages in the vicinity. Corn (maize), beans, and livestock are the principal products. The ruins of Utatlán, former capital of the Quiché Indians, and mineral baths are nearby. The city is connected by road with Chichicastenango and Sacapulas and is 100 mi (160 km) from Guatemala City. Pop. (1981 prelim.) mun., 35,036.

Santa Cruz Island, also called INDEFATIGABLE ISLAND, one of the Galápagos Islands, in the eastern Pacific Ocean, about 600 mi (965 km) west of Ecuador. Circular in shape, it has an area of 389 sq mi (1,007 sq km), and a central volcanic crater rises to 2,300 ft (701 m). Puerto Ayora, on the southern coast, originally a colony of Scandinavians and Germans, has a harbour that can accommodate boats. Subsistence farming, fruit and sugarcane cultivation, and cattle raising are the basic activities. Known also as Chaves, its official Ecuadorian name is Isla Santa Cruz. Pop. (1980 est.) 2,176.



Giant tortoise (*Testudo elephantopus*) on Santa Cruz Island, Galápagos Islands
Jen and Des Bartlett—Bruce Coleman Inc.

Santa Cruz Islands, volcanic group in the Solomon Islands, southwestern Pacific Ocean, 345 mi (555 km) east of Guadalcanal. The main islands are Nendo (also called Ndeni, or Santa Cruz Island), Utupua, Vanikolo, and Tinakula. The largest island, Nendo, is 25 mi long and 14 mi wide, with heavily wooded slopes rising to 1,800 ft (550 m). The Spanish navigator Álvaro de Mendaña de Neira tried to form a colony there in 1595. In 1942 a U.S.–Japanese sea battle was fought near the islands.

From 1923 to 1964 kauri pine timber was cut and shipped to Australia. Copra is now the chief export. The inhabitants are primarily Melanesian, with a small Polynesian minority. Pop. (1976) 5,421.

Santa Elena Peninsula, peninsula in southwestern Guayas province, Ecuador, the northernmost extension of the west coast desert of South America. It is bounded by the Gulf of Guayaquil on the south and Bahía (bay) de Santa Elena on the north. It is an arid region, with Ecuador's important oil field at Ancón, refineries, salt mines, and a fertilizer plant. The oil deposits, however, are not far from depletion. Ores of sulfur, platinum, and gold are believed to exist but remain unsurveyed and unexploited. The peninsula offers fine seaside resort facilities at Salinas, and domestic tourism is of growing importance.

Santa Eugenia de Riveira, city, La Coruña province, in the autonomous community (region) of Galicia, northwestern Spain. The city is the chief centre of Riveira (Ribeira) municipality. It lies on the Ría (inlet) de Arosa across the ria from Villagarcía de Arosa, in the Galician Atlantic coastal zone. Remains of Roman fortifications and of the Phoenician port, La Covasa, attest to early occupation of the site, although the city was not established in its modern sense until the 19th century. The church of Laguna del Carregal y de la Graña is adorned with fishing and hunting motifs. Santa Eugenia is a seaside resort and fishing port, with factories for canning seafood, processing fish and flour, and building marine motors. Pop. (1981) 23,081.

Santa Fe, province of lowland plains, northeastern Argentina, bounded on the east by the Río Paraná. It lies within the northern reaches of the Pampa except in the subtropical northeast, where there are marshes, tall savannas, and clusters of woodland, and in the subtropical dry forests of the northwest, where there are thorny shrubs and low trees. The area is 51,354 sq mi (133,007 sq km).

The province (first settled in the late 16th century by Spaniards from Asunción, Paraguay) long remained a sparsely populated area exporting yerba maté. Into the early 19th century it repeatedly experienced *malónes* (violent Indian attacks) and epidemics. Not until the mid-1850s, when Rosario was made the official port of the Argentine Confederation, did stable economic growth begin. Thereafter, Santa Fe developed as the centre of immigrant agricultural *colonias* and commercial grain production.

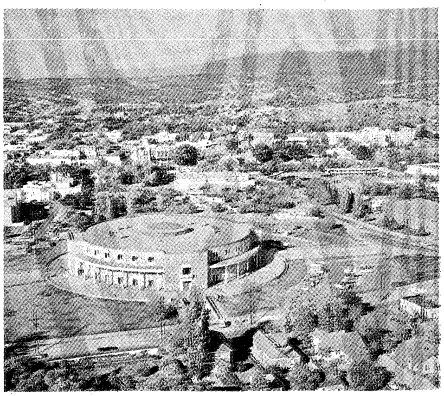
Important crops are wheat, soybeans, corn (maize), and sorghum followed by cotton and sugarcane grown in the extreme northeast. The province is the centre of Argentine dairy production, which is often processed on the agricultural cooperatives that are commonplace to this area. Oceangoing vessels load and discharge at the province's four river ports of Villa Constitución, Rosario, San Lorenzo, and Santa Fe (the provincial capital). The 7,850-ft tunnel between the cities of Santa Fe and Paraná greatly facilitates road communications. Pop. (1983 est.) 2,589,000.

Santa Fe, city, capital of Santa Fe province, northeastern Argentina, on a channel of the Río Paraná, at the mouth of the Río Salado, opposite the city of Paraná. It was founded in 1573 as Santa Fe de Vera Cruz at nearby Cayastá by Juan de Garay, lieutenant governor of Asunción, Paraguay. Moved to its present site in 1651, it was developed as a supporting river port for the Spanish settlement at Asunción, 615 mi (990 km) north on the Río Paraguay. During the colonial era it was a missionary centre of the Jesuits, whose church dates from 1660. Until the mid-19th century it marked the northern limit of provincial expansion and served as a strategic outpost against the Indians of the Gran Chaco region. A congress meeting there in 1853 produced the constitution establishing the Argentine Republic.

Its economy is diversified and includes flour mills, dairy plants, plants processing forest products, mineral smelters, and automobile manufacturers. Its port, modernized for oceangoing vessels, is the most inland seaport in the world (250 mi from the Río de la Plata estuary) and handles Bolivian and Paraguayan, as well as Argentine, commerce. Santa Fe has three national historic monuments—the San Francisco Church and Convent (1680), La Merced Church (1660–1754), and the Santa Fe Cathedral (1685). The National University

of the Litoral (1919) is located there. Pop. (1980) 287,240.

Santa Fe, capital of New Mexico, U.S., and seat (1852) of Santa Fe County, in the north central part of the state, on the Santa Fe River. It lies in the northern Rio Grande Valley at 6,996 ft (2,132 m) above sea level at the foot



State Capitol, Santa Fe, N.M.
Dick Kent

of the Sangre de Cristo Mountains. A dry, invigorating climate makes it a popular summer resort, while mountain skiing attracts winter visitors.

Founded in 1610 by Gov. Don Pedro de Peralta, it was named Villa Real de la Santa Fé de San Francisco de Asis (Royal City of the Holy Faith of St. Francis of Assisi) and developed around a central plaza. Evacuated in 1680 after the Pueblo Indian Revolt, it was retaken peacefully in 1692 by Don Diego de Vargas, an event commemorated by an annual fiesta.

During the 18th century Santa Fe served as the administrative, military, and missionary headquarters of a vast, sparsely populated Spanish colonial frontier province. U.S. interest in the area was aroused by the report of Lieut. Zebulon M. Pike, who was imprisoned there during his exploration of the Southwest in 1806. After Mexican independence (1821), a brisk wagon-train commerce developed over the Santa Fe Trail from Independence, Mo. During the Mexican War the city was occupied (1846) by U.S. forces under Gen. Stephen Watts Kearny, and an English-language newspaper was published there in 1847. After New Mexico was ceded to the United States in 1848, Santa Fe became the capital in 1851 of the Territory of New Mexico and, in 1912, of the state. In 1862 the city was occupied for two weeks by Confederate forces under Gen. H.H. Sibley. The railroad arrived in 1880, and there were brief mining booms in the nearby mountains; but the city essentially remained a trading centre for ranchers, farmers, and Indians.

Construction in the early 1940s of the Los Alamos Scientific Laboratory (later renamed Los Alamos National Laboratory) for atomic research, 35 mi (56 km) northwest, brought new economic vitality to the area.

The Palace of the Governors (built by Peralta in 1610) was restored as a museum in 1914. A new group of spaciously landscaped state government buildings, including the capitol (completed in 1966), faces the river. Traditional Spanish-Pueblo Indian architecture has been protected since 1958 by zoning ordinance. The 17th-century Chapel of San Miguel, also known as Oldest Church (rebuilt 1710, restored 1955), and the Cathedral of St. Francis, built in 1869 by John B. Lamy, first bishop of Santa Fe, are architectural landmarks.

With a large Spanish-American population, the city is the cultural capital of the Southwest. It is built on the site of a prehistoric Tiwa Indian pueblo, and archaeological research is conducted in the surrounding Indian territory. The Museum of New Mexico has units on Indian and Spanish colonial art. The Museum of Navaho Ceremonial Art is privately endowed. The College of Santa Fe (formerly St. Michael's) was founded in 1859, and St. John's College in 1964. The Santa Fe Indian School and the New Mexico School for the Deaf are also in the city.

Santa Fe is a regional headquarters for the National Park Service and headquarters for the Santa Fe National Forest (immediately east). Pop. (1980) 48,899.

Santa Fe de Bogotá (Colombia): *see* Bogotá.

Santa Fe Island, also called BARRINGTON ISLAND, one of the Galápagos Islands, in the eastern Pacific Ocean, about 600 mi (965 km) west of Ecuador. Situated halfway between San Cristóbal and Santa Cruz islands, it is south of the vortex of the archipelago, is dotted with small volcanic cones, and has an area of 7½ sq mi (19 sq km). The island was originally named for Sir Samuel Barrington, a 19th-century British admiral; its present official Ecuadorian name is Isla Santa Fe. A dried-up watercourse cut through lava leads to Barrington Harbour, a landlocked bay in the islands that has seal rookeries at either end.

Santa Fe Railway: *see* Atchison, Topeka and Santa Fe Railway Company.

Santa Fe Trail, in U.S. history, famed wagon trail from Independence, Mo., to Santa Fe, N.M., an important commercial route (1821–80). Opened by William Becknell, a trader, the trail was used by merchant wagon caravans travelling in parallel columns, which, when Indians attacked, as they did frequently between 1864 and 1869, could quickly form a circular line of defense. From the Missouri River, the trail followed the divide between the tributaries of the Arkansas and Kansas rivers to the site of present Great Bend, Kan., then proceeded along the Arkansas. At the western end, three routes turned south to Santa Fe, the shortest being the "Cimarron Cutoff" through the valley of the Cimarron River.

The importance of the eastward silver and fur trade and westward transport of manufactured goods over the trail was a contributing cause of U.S. seizure of New Mexico in the Mexican War. Use of the trail increased under U.S. rule, especially after the introduction of mail delivery service via stagecoach (1849), but ceased with the completion of the Santa Fe railroad in 1880.

Santa Gertrudis, breed of beef cattle developed in the 20th century by the King Ranch in Texas. It originally resulted from crossing Brahman bulls of about seven-eighths pure breeding and purebred Shorthorn cows. Over a period of years beginning with first crosses in 1910, selective breeding was practiced in which preference was given to red colour without sacrificing type and conformation. Santa Gertrudis cattle are usually solid red in colour with occasional small white markings on the forehead or in the region of the flanks. They were developed from foundation stocks of about five-eighths Shorthorn and three-eighths Brahman ancestry.

Santa Gertrudis cattle are generally the heaviest of the beef breeds. They have great depth and length of body, with more loose skin about the neck, brisket, and navel than the breeds of strictly British origin. They proved to be highly adaptable to the semitropical U.S. Gulf Coast.

Santa Hermandad, English HOLY BROTHERHOOD, constabulary created in the late 15th century by the Catholic Monarchs (Ferdinand and Isabella) to maintain law and order throughout Spain. *See* hermandad.

Santa Isabel (capital of Equatorial Guinea): *see* Malabo.

Santa Isabel, formerly YSABEL, island in the central Solomon Islands, southwestern Pacific Ocean, 50 mi (80 km) northwest of Guadalcanal. About 130 mi (209 km) long and 20 mi (32 km) across at its widest point, it has a mountainous backbone with Mt. Marescot (4,000 ft [1,219 m]) as its highest peak. Kia Passage divides Santa Isabel from a group of islets (Barola [Barora Fa], Barora Ite, and Ghaghe) at its northern end; San Jorge Island lies off its southwestern corner, separated by Ortega Channel and Thousand Ships Bay. The group is largely under coconut plantations for copra production, and there is a timber development near Allardyce Harbour. Nickel-bearing laterites were discovered in the 1960s. Chief villages on Santa Isabel are Kia (north) and Dadale Plantation (centre). Rekata Bay in the northwest was a Japanese base during World War II until captured by U.S. forces in 1943. Pop. (1976) Santa Isabel and adjacent islands, 10,420.

Santa Lucia Range, segment of the Pacific Coast Ranges, west central California, U.S., extending southeastward for about 140 mi (225 km) from Carmel Bay to the Cuyama River in Monterey and San Luis Obispo counties. Lowest in the south, the range rises to Junipero Serra Peak (5,863 ft [1,787 m]) in the north. It parallels the Pacific Ocean (west) and the Salinas Valley (east). The mountains, named in 1602 by the Spanish explorer Sebastián Vizcaíno, are heavily wooded and embrace a division of the Los Padres National Forest. A scenic highway runs along the ocean just west of the range.

Santa Luzia Island, Portuguese ILHA DE SANTA LUZIA, island of Cape Verde, in the Atlantic Ocean, about 400 mi (640 km) off the West African coast between the islands of São Nicolau and São Vicente. It has an area of 14 sq mi (35 sq km) and rises to an altitude of 1,296 ft (395 m). The island is largely uninhabited.

Santa Maria, city, central Rio Grande do Sul state, southern Brazil, lying in the Rio Jacuí Valley at an elevation of 502 ft (153 m). Founded in 1797, it was given city status in 1876. The community was once called Santa Maria da Bôca do Monte (St. Mary of the Mountain's Mouth) because of its position at the foot of the Serra Geral. The city is now a thriving commercial centre and a rail junction for the main lines from São Paulo to the Uruguay border and from the state capital, Pôrto Alegre, to the Argentine border. It is also served by an airfield and several major highways. Its industries include railroad shops and meat-processing plants. The Universidade Federal de Santa Maria was founded in 1960. Pop. (1980 prelim.) 151,202.

Santa Maria, also called GAUA, largest island of the Banks Islands in Vanuatu, southwest Pacific Ocean. The island, with an area of 132 sq mi (342 sq km), is rugged and rises to Mt. Gharat, an active volcano (2,615 ft [797 m]) that contains a lake in its crater. The Polynesian inhabitants produce copra and cacao for export. Pop. (1979 prelim.) 766.

Santa María, original name MARIGALANTE, Christopher Columbus' flagship on his first voyage to America. About 117 feet (36 metres) long, the "Santa María" had a deck, three masts, and forecastle and sterncastle and was armed with bombards that fired granite balls. She performed well in the voyage but ran aground off Haiti on Dec. 25, 1492, and was lost. Her sister ships, the "Niña" and "Pinta," less than half her size, returned safely to Spain despite near catastrophe in storms.

Santa Maria de Belém (Portugal): *see* Belém.

Santa Maria dei Frari, English ST. MARY OF THE FRIARS, Franciscan church in Venice, originally built in the mid-13th century but rebuilt in Gothic style in the 15th century. This important example of Venetian Gothic ecclesiastical architecture (often referred to simply as the Frari) contains many masterpieces of Venetian Renaissance art, notably Giovanni Bellini's triptych "Madonna and Child with Saints" (1488) and the "Assumption" (1516–18) and "Pesaro Madonna" (1519–26) by Titian, who is buried in the church.

Santa María Island, also called CHARLES ISLAND, one of the southernmost Galápagos Islands, in the eastern Pacific Ocean, about 600 mi (965 km) west of Ecuador. Originally named for the British king Charles II, it is also known as Isla Floreana, but the official Ecuadorian name is Isla Santa María. The island, with an area of 64 sq mi (166 sq km), has central volcanic craters reaching an altitude of 1,800 ft (550 m) and sloping verdant hills leading to the sandy shore. It was the site of the first Galápagos settlements and of an 18th-century whaler's post office. In 1832 Gen. José Villamil claimed the Galápagos for Ecuador and established a colony for political prisoners. Norwegian immigrants settled on Santa María in 1927 but did not remain. Fruit, subsistence crops, cattle, and fishing are the economic activities of small settlements. Pop. (1980 est.) 57.

Santa Maria Island, Portuguese ILHA DE SANTA MARIA, southeasternmost island of the Azores archipelago (a part of Portugal), in the North Atlantic Ocean. It has an area of 37 sq mi (97 sq km) and is administratively part of Ponta Delgada district. Its economy is based chiefly on fishing and cattle raising, and cereals and vines are cultivated. On the island's western plateau is an important international airport (originally constructed as a U.S. air base in 1944) for transatlantic flights.

The island's capital, Vila do Porto, founded in the 1430s, is the oldest town in the Azores; it has a 15th-century parish church and a commemorative stela, dedicated in 1432 to "the discoverers." Columbus, returning from his first voyage to America in 1493, called at what is now the hamlet of Anjos on the northern coast. Pop. (1981) 6,500.

Santa Maria Novella, English NEW ST. MARY, Italian Gothic-style church of the Dominicans in Florence. It was planned by two Dominican brothers, Sisto and Ristoro, and construction began *c.* 1278 and was completed in 1350, except for the facade, which was completed by Leon Battista Alberti in proto-Renaissance style (1456–70).

Frescoes painted on the interior walls of the church, cloister, and chapterhouse are by such Italian masters of Gothic and early Renaissance painting as Nardo di Cione, Andrea da Firenze, Masaccio ("The Trinity" fresco), Ghirlandajo, Filippino Lippi, and Paolo Uccello. Sta. Maria Novella also houses important early Renaissance works of sculpture by Brunelleschi and Benedetto da Maiano.

Santa Marta, capital of Magdalena department, northern Colombia, on a small bay of the Caribbean Sea, 40 mi (64 km) east-northeast of the mouth of the Río Magdalena. It was founded in 1525 and is the oldest city in Colombia. Connected with the Magdalena by swampy channels and lakes, it became a port for colonial New Granada. Simón Bolívar, hero of the struggle for independence, died at an estate on the edge of the town in 1830.

Santa Marta's commerce overtook that of the port of Cartagena in the mid-19th century but then declined because the channels to the Magdalena were inadequate for steamboats.



"The Liberator," statue of Simón Bolívar, Santa Marta, Colom.
Harrison Forman

In the 1880s Santa Marta began shipping bananas grown in the hinterland to the south. The Atlantic Railway, completed in 1961, provided the city's first rail connection with Bogotá. Santa Marta is also accessible by highway and air. The Technological University of Magdalena opened in 1966. Pop. (1982 est.) 234,000.

Santa Marta Mountains, Spanish SIERRA NEVADA DE SANTA MARTA, Andean mountain range, northern Colombia, bounded on the north by the Caribbean Sea and encircled on three sides by the coastal lowlands. The volcanic massif rises abruptly from the coast, culminating in snowcapped Pico (peak) Cristóbal Colón (18,947 ft [5,775 m] above sea level), the highest peak in Colombia. The lower slopes are used for agriculture and livestock raising, but the region is not well developed. The local population includes Arawak Indians. Santa Marta, to the northwest, and Valledupar, to the southeast, are the nearest cities.

Santa Monica, city, Los Angeles County, southern California, U.S., on Santa Monica Bay. Laid out in 1875 by Sen. John P. Jones, it was named for a local spring, Las Lágrimas de ("the tears of") Santa Monica, and promoted as an oceanside resort and port–terminus of the Los Angeles-to-Independence Railroad. Although eclipsed as a port by San Pedro, it prospered as a residential and vacation centre. The Douglas Aircraft Company (McDonnell–Douglas), established there after World War I, was the forerunner of the city's modern aerospace and communications industries. Santa Monica City (junior) College was established in 1929. Will Rogers State Beach and State Park are both in Pacific Palisades. Inc. 1886. Pop. (1980) 88,314

Santa Rita Durão, José de (Brazilian poet): *see* Durão, José de Santa Rita.

Santa River, Spanish RÍO SANTA, river in Ancash department, west central Peru, rising in the snowcapped Nevado de Tuco in the Andean Cordillera Blanca and flowing into Aguash and Conococha lakes. From the latter it emerges as the Santa River; it then flows northwest, descending from 14,000 to 7,000 ft (4,300 to 2,100 m) above sea level, between the Cordillera Blanca and the Cordillera Negra, to form the Callejón de Huaylas, a densely populated agricultural region. Below Huallanca the river veers westward and plunges through a spectacular gorge, the Cañon del Pato, to enter the Pacific Ocean after a course of 200 mi (300 km), descending 1,400 ft in one 6-mi stretch.

Fed by the glaciers and snowfields of the Cordillera Blanca, the Santa River has the most regular flow of all Peruvian coastal rivers, and the volume of its discharge is second only to that of the Río Chira. Although a scarcity of flat land prevents large-scale irrigation at the Santa's mouth, the river is nevertheless a major economic asset to Peru. In the Cañon del Pato are four hydroelectric stations, which provide power for the city of Chimbote, particularly its steel mills. In addition, some water is diverted northward to irrigate the vast sugarcane area around Trujillo.

Santa Rosa, city, capital of La Pampa province, central Argentina. Founded in 1892, the city developed as an agricultural centre processing grain (wheat) and cattle from the eastern part of the province. It has a regional museum of art and natural history; the University of La Pampa was founded there in 1958. The city is a communications centre that serves central Argentina. Pop. (1980 prelim.) 51,689.

Santa Rosa, department, southern Guatemala, bounded on the south by the Pacific Ocean. In the highlands of the department, which has an area of 1,141 sq mi (2,955 sq km), farmers raise corn (maize) and beans, and there are coffee plantations. In the Pacific lowlands, agricultural products include sugarcane, rice, and sesame. Large herds of beef cattle are fed on hay. Scenic Lake Ayarza is in the northeast. Cuilapa (*q.v.*), the capital, lies on the Pan-American Highway, which traverses the department, as does the Pacific Coast Highway. Pop. (1982 est.) 249,930.

Santa Rosa, city, seat (1854) of Sonoma County, western California, U.S., on Santa Rosa Creek, at the foot of the Sonoma Mountains, 50 mi (80 km) north-northwest of San Francisco. Founded in 1833 by Mariano Guadalupe Vallejo and probably named for St. Rose of Lima, it developed as a processing–shipping centre for agricultural produce of the Sonoma Valley. The home and gardens of Luther Burbank, the plant breeder, were given by his widow to Santa Rosa Junior College (founded 1918). In the nearby Valley of the Moon is the Jack London "Wolf House" and Memorial where the writer's original manuscripts are displayed. The city's Church of One Tree Museum (built from a single redwood tree) honours Believe-it-or-not creator Robert L. Ripley, a native son. Agriculture and lumbering no longer dominate the economy, which now mainly depends on retail service industries catering to an increasing residential population. Inc. 1868. Pop. (1980) city, 83,205; (1982 est.) Santa Rosa–Petaluma metropolitan area (SMSA), 313,200.

Santa Rosa de Cabal, city, Risaralda department, west central Colombia, on the western slopes of the Andean Cordillera (mountains) Central. It is a commercial and manufacturing centre for the fertile agricultural and pastoral hinterland. Silkworms are raised in the vicinity, and there are silver, gold, and mercury mines nearby. The city is on a highway and railroad linking Pereira, the departmental capital, and Manizales, capital of Caldas department. Pop. (1973) 31,301.

Santa Rosa de Copán, capital, Copán department, northwestern Honduras, in the highlands at 3,806 ft (1,160 m) above sea level, near the Alash Higuito River, a tributary of the Mejocote. It was founded in the 18th century and was called Los Llanos until 1812 and Los Llanos de Santa Rosa thereafter. In 1843 it received city status; when it became department capital in 1869, it received its modern name. Santa Rosa is now the chief commercial centre of western Honduras. Major industries include tobacco blending and cigar making, sugar refining, and mat weaving; lumber, furniture, leather products, clothing,

and beverages are also produced; antimony is mined in the vicinity. Santa Rosa is also a transportation centre, and highways lead in several directions toward centres in Honduras and El Salvador; it also has an airfield. Pop. (1983 est.) 31,821.

Santa Sindone: *see* Turin, Shroud of.

Santa Tecla (El Salvador): *see* Nueva San Salvador.

Santāl, also called MANJHI, tribal people of eastern India, numbering about 5,080,000 in the late 20th century. Their greatest concentration is in the states of Bihār, West Bengal, and Orissa. Some 65,000 also live in Bangladesh and 10,000 in Nepal. Their language is Santali, a dialect of Kherwari, a Munda language.

Many Santāl are employed in the coal mines near Asansol or the steel factories in Jamshedpur, while others work during part of the year as paid agricultural labourers. In the villages, where tribal life continues, the most important economic activity is the cultivation of rice. Each village is led by a hereditary headman assisted by a council of elders; he also has some religious and ceremonial functions. Groups of villages are linked together in a larger territorial unit termed a pargana, which also has a hereditary headman.

The Santāl have 12 clans, each divided into a number of subdivisions also based on descent, which is patrilineal. Members of the same clan do not marry each other. Membership in the clan and subclan carries certain injunctions and prohibitions with regard to style of ornament, food, housing, and religious ritual. Marriage is generally monogamous; polygyny, though permitted, is rare. The traditional religion centres on the worship of spirits, and the ancestral spirits of the headmen are objects of an important cult.

To make the best use of the Britannica, consult the INDEX *first*

Santalaceae, the sandalwood family (order Santalales), which includes about 30 genera and more than 400 species of semiparasitic shrubs, herbs, and trees, distributed in tropical and temperate regions. In some genera the unlobed, usually alternate leaves are reduced to scalelike structures. The green leaves contain some chlorophyll, which allows the plants to manufacture food, but all Santalaceae are parasites to a certain extent and form connections (haustoria) to their hosts to obtain water and nutrients. The majority of the Santalaceae are root parasites; the others are stem parasites. Most have small, inconspicuous, bisexual or unisexual flowers, which occur singly, although a few species have groups of flowers in the leaf axils or on short spikes. The one-seeded fruit may be surrounded by a brightly coloured nutlike structure.

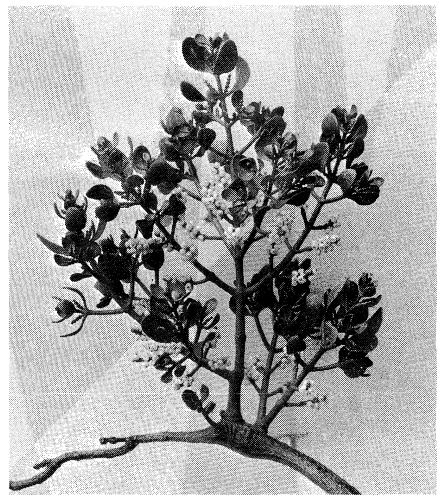
The aromatic sandalwood (*Santalum album*) is the only economically important member of the family; it is used in the manufacture of furniture and in perfumery. Bastard toadflax (genus *Comandra* in North America, genus *Thesium* in Europe) and oil, or buffalo, nut (*Pyrularia pubera*), the oil-filled, pear-shaped fruit of a North American parasite, are other commonly known members of the Santalaceae.

Santalales, the sandalwood order of flowering plants. It is a miscellaneous collection of plants that has been variously classified to include as few as 5 or as many as 21 families. More than half of the Santalales are partially or entirely parasitic on other plants, most are tropical or subtropical in distribution, and almost all are evergreen.

A brief treatment of Santalales follows. For full treatment, *see* MACROPAEDIA: Angiosperms.

The perennials, shrubs, and trees that constitute the order range in size from 60 feet (18 m) to the dwarf mistletoe (*Arceuthobium minutissimum*), one of the smallest of the vascular plants, whose flowering stems extend no more than 1/8 inch (about 3 mm) from the host plant.

Many members of Santalales have long been important for their use in religious rituals and folk customs. The Christmas mistletoe (*Viscum album*), known for centuries before the birth of Christ, is used by Christians throughout Europe and North America during the Christmas season. Sandalwood was used in religious ritual in Egypt as early as 1700 BC and probably earlier in Asia, where it is prized today by Hindus, Buddhists, Parsis, and the Muslims of Southeast Asia. Sandalwood is also used for wood carving and as a source of oil.



Mistletoe (*Phoradendron flavescens*), one of the parasitic plants in the order Santalales
Field Museum of Natural History (Neg. #68727), Chicago

The mistletoes—such as the genera *Dendropthoe* of India and *Struthanthus* of tropical America—are also important because they cause serious damage to such economically important plants as cacao, rubber, and citrus and other fruit trees. Members of *Arceuthobium* attack the conifers of western North America, while members of *Phoradendron* attack walnuts, oaks, and some conifers of the United States. All known members of seven of the families of Santalales are parasites. The most obvious evidence of parasitism in these plants is the occurrence of the haustorium, a specialized organ that penetrates the living tissue of its host and absorbs water and nutrients, transferring them to the parasite through partial fusion of the xylems (water-conducting tissues) of the host and parasite. In most members of the Viscaceae, the haustorium fragments and branches out through the host's softer tissues. In some species of *Arceuthobium,* a threadlike system develops that may reach into the growing point of the host.

Nearly all members of the Santalales have simple leaves that lack stipules. A few species have surface hairs on their leaves or stems. In the Balanophoraceae and some other parasites, the leaves are reduced to scalelike organs.

Flowers of many members of the order have either petals or sepals or neither, although some have both. The stamens (male) usually equal the number of petals and occur opposite the lobes of the petals. In most members of the order, the ovary (female) is inferior in position. Ovules (developing seeds) are few.

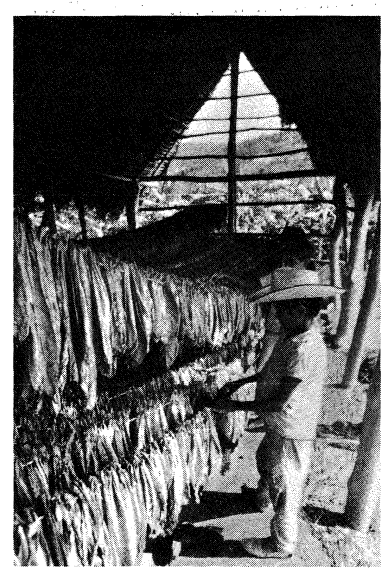
Members of the Olacaceae produce rather large nuts, while the Balanophoraceae have minute fruits. The solitary seeds, containing endosperm (special nutrient tissue), are usually dependent upon birds for their dispersal.

Sant'Ambrogio Basilica, basilica in Milan that is an outstanding example of Lombard Romanesque architecture. Although the church was originally built between 379 and 386, the earliest portions of the present structure date from the 9th and 10th centuries. The rebuilt vaulted nave and aisles date from 1128, the atrium from *c.* 1050, and the narthex from 1095–96.

Donato Bramante designed parts of the basilica and its chapel between 1492 and 1497. Some of his unfinished plans were executed in 1955.

Santana do Livramento, city, southwestern Rio Grande do Sul state, southern Brazil, lying at 689 feet (210 m) above sea level in the Santana Hills across from Rivera, Uruguay. It was founded in 1833 and given city status in 1876. The economy of the region is based largely on cattle and sheep raising. In the city are meat-packing plants and factories processing leather and animal by-products. Wool, lumber, and maté (tea) are exported. Santana do Livramento is a customs station on a main railroad line and is also accessible by highway and air. Pop. (1980) 58,072.

Santander, *departamento,* north-central Colombia, occupying the Magdalena river valley and the Andean Cordillera Oriental. Established in 1886, it occupies an area of 11,790 square miles (30,537 square km). It is the principal petroleum-producing *departamento* of Colombia, with production centring on Barrancabermeja. Its agricultural products are dominated by tobacco; the manufacture of cigars and cigarettes is an important industry. Coffee is grown on the temperate midslopes of the Andes. Sharecropping on coffee farms and tobacco farms is common. The Industrial University of Santander was founded in 1947. A railroad connects the departmental capital, Bucaramanga, with the Magdalena River at Puerto Wilches. Pop. (1985) 1,438,226.

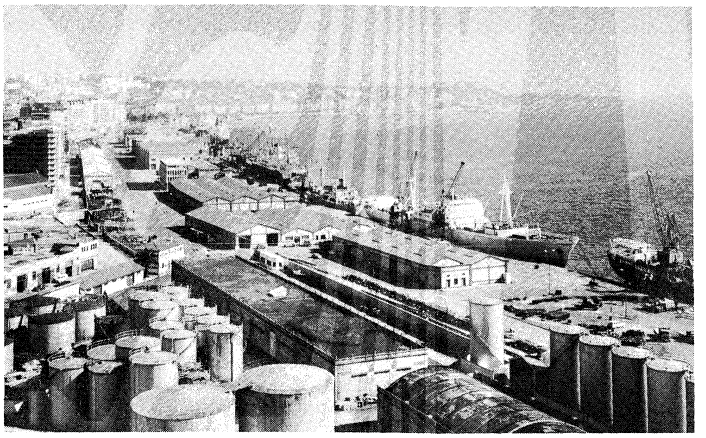


Drying tobacco leaves, Santander *departamento,* Colombia
Carl Frank

Santander (province, Spain): *see* Cantabria.

Santander, port city and capital of Cantabria *provincia* and the *comunidad autónoma* ("autonomous community") of Cantabria, northern Spain, on the southern shore of Cape Mayor, a rocky peninsula extending eastward and sheltering the Santander Bay (an inlet of the Bay of Biscay). The city's excellent harbour was possibly the site of the Roman colony of Portus Victoriae. The centre of the lower town

was rebuilt after it was destroyed by fire spread by a windstorm in 1941. Notable surviving buildings include the Magdalena Palace, presented by the town to Alfonso XIII; a Gothic cathedral; the library of the contemporary writer and historian Marcelino Menéndez y Pelayo; and the provincial museum, with a large collection of prehistoric artifacts from the locality. Santander has a summer university and is an episcopal see. The University of Santander was founded in 1972.



The port of Santander, Spain
Griera—Zardoya Archivo

The economy is based on fishing, iron refining, and activities connected with the port (shipbuilding). Manufactures are varied. Pop. (1982 est.) 184,094.

Santander, Francisco de Paula (b. April 2, 1792, Rosario de Cúcuta, New Granada—d. May 6, 1840, Bogotá), Colombian soldier and statesman who fought beside Simón Bolívar in the war for independence and was president of the newly formed New Granada from 1833 until 1837.

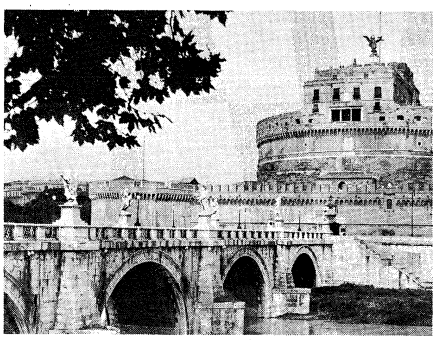
Santander left law school in 1810 to join the patriot army and was promoted rapidly. He escaped the Spanish reconquest of 1816 by fleeing to the eastern lowlands and returned in 1819 as brigadier general in Bolívar's invading force. Santander remained as vice president of New Granada in the Republic of Colombia. During much of the time before 1827, he served as acting president in Bolívar's absences. Santander proved to be an able statesman, known for his democratic republican principles and efficient procedures. Santander and Bolívar began to clash over political differences soon after New Granada's independence; a climax was reached in 1826, when Bolívar decided to retain Venezuela in Colombia, a decision of which Santander disapproved.

In 1828 conspirators attacked Bolívar's palace at San Carlos; he escaped through a window as the intruders entered. Santander was believed to be connected with the plot and was sentenced to death, though it is now thought that he tried to discourage the conspirators. Nothing was proved, and his sentence was therefore commuted to banishment.

After Gran Colombia was dissolved in 1830 and a new constitution was promulgated in 1832, Santander was called back to become president of New Granada on April 1, 1833; his administration was noted for its economy, firmness, and orderliness. His intolerance of Bolívaristas, however, caused some disturbance, and an unsuccessful plot to overthrow him was led by Gen. José Sarda. His presidency ended in 1837, after which he served as senator for New Granada. His death was followed by a two-year civil conflict of major proportions.

Sant'Angelo, Ponte, ancient Roman bridge, probably the finest surviving in Rome itself, built over the Tiber by the emperor Hadrian (Publius Aelius Hadrianus; reigned 117—138 AD) to connect the Campus Martius with his mausoleum (later renamed Castel Sant'Angelo). Originally named the Pons Aelius, the bridge was completed about AD 135. It consists of seven stone arches and five main spans of about 60 feet (18 metres) each, supported on 24-ft piers.

In the 13th century Pope Clement IV installed an iron balustrade and in the 16th century Pope Clement VII placed statues of SS. Peter and Paul at the end of the bridge.



Ponte Sant'Angelo and Castel Sant'Angelo, Rome
J. Allan Cash

In 1688, 10 statues of angels, designed by Bernini, were mounted on the parapets.

Sant'Antioco, Isola di, volcanic island in the Mediterranean Sea just off the southwest coast of Sardinia, Italy. It has an area of 42 sq mi (108 sq km), composed primarily of rocky and uneven terrain, and rises to 889 ft (271 m). The island, administratively part of Cagliari province, is connected by rail with the Sardinian mainland, 1 mi (2 km) east.

The chief town and port, on the northeast coast, is Sant'Antioco, site of the Phoenician and Roman city of Sulcis (Sulci), destroyed by the Saracens in the Middle Ages. There are remains of a Punic and Roman necropolis, a Phoenician sanctuary, and early Christian catacombs (under the parish church) believed to contain the remains of St. Antioch. A museum is near the necropolis. There are vineyards and saltworks on the island and important fisheries. The small town of Calasetta, on the north coast, has bathing beaches and ferry service to Carloforte, on the neighbouring Isola di San Pietro. Pop. (1981 prelim.) mun., 12,408.

Santarém, city, west central Pará state, northern Brazil, on the right bank of the Rio Tapajós, near its influx into the Amazon River. Santarém was founded in 1661 as a Jesuit mission to a Tapajó Indian settlement (*aldeia*) and grew around a fort built by Pedro Teixeira. It was given town status in 1758, with the name of Tapajós, and was elevated to city rank in 1848. A group of Confederate exiles settled in Santarém after the U.S. Civil War; some of their descendants still live in the area, but most of the original settlers returned, disillusioned, to the United States.

Santarém is now the most important town on the Amazon between Belém (593 mi [955 km] downriver to the east) and Manaus and is a port of call for river steamers. The Rio Tapajós is navigable for steamers to the rapids 170 mi above Santarém and for small boats to a point near Diamantino in Mato Grosso state. A modest trade comes from the settlements along the riverbanks. Rosewood oil, rubber, lumber, and jute are the region's most important exports. Manufactures include automobiles, machinery, and electrical equipment. Bauxite is converted to aluminum in Santarém, and petroleum and alcohol fuels, are processed there. A few miles south of the city the escarpment of the Santarém plateau rises to an elevation of 400 ft (120 m). The plateau, which is crossed by a road to Belterra, is one of the most productive areas of agricultural colonization in the Amazon Valley. Rice, *feijão* (beans), cassava, and malva are the principal crops. Highways link Santarém to Cuiabá, Pôrto Velho, and Belém. Pop. (1980) 102,181.

Santarém, city, capital, and *concelho* (municipality), Santarém district, central Portugal, on the Tagus (Portuguese Tejo) River, 47 mi (76 km) northeast of Lisbon. Originating as the Roman Scalabis (renamed Praesidium Julium by Julius Caesar), it became an important fortress city in the wars between the Moors and Christians, until it was finally taken by the Christians in 1147. The Portas do Sol are the ruins of the Alcáçova castle, a royal residence in the Middle Ages; other landmarks are a former Jesuit seminary (1676), the late Gothic church of the Convento da Graça (with the tomb of Pedro Álvares Cabral, discoverer of Brazil), and the early Gothic basilica of São João de Alporão (now housing the municipal museum of sculpture). Each May, the Ribatejo agricultural fair is held in the city, attracting thousands of visitors. Industries include food processing, and tourism is of growing economic importance. Kaolin deposits, found near Santarém, are used to make china and pottery.

Santarém district (area 2,605 sq mi [6,747 sq km]) is a rich agricultural region supplying the city with crops for its processing industries. Pop. (1981) city, 20,034; *concelho*, 62,738; district, 458,229.

Santareno, Bernardo, pseudonym of ANTÓNIO MARTINHO DO ROSÁRIO (b. Nov. 19, 1924, Santarém, Port.—d. Aug. 30, 1980, Lisbon), poet and dramatist, considered one of Portugal's leading 20th-century playwrights. His university studies at Coimbra were completed in medicine, and subsequently he pursued a dual career in Lisbon as a psychiatrist and writer.

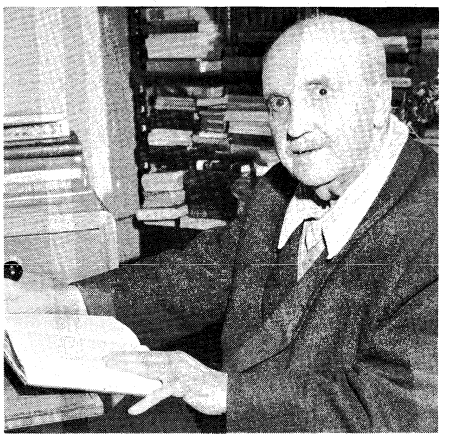
Santareno created a stage world reminiscent of that of the celebrated Spanish writer Federico García Lorca. His plays typically deal with the lives of Portuguese fishermen and offer a fusion of popular themes and superstitions and existential concerns. He seeks to identify the national "soul" or prototype of the Portuguese, and his characters oscillate between the sacred and the profane, the physical and the metaphysical. His dramas exhibit a tragic, morose quality that is frequently combined with the erotic.

Among his more than a dozen well-known plays are *O lugre* (1959; "The Lugger"), *O crime de Aldeia Velha* (1959; "The Crime of Old Town"), *António Marinheiro* (1960), *O*

pecado de João Agonia (1961; "The Sin of John Agony"), *Irmã Natividade* (1961; "Sister Nativity"), and *O inferno* (1967; "Hell").

Articles are alphabetized word by word, not letter by letter

Santayana, George, original name JORGE AUGUSTÍN NICOLÁS RUIZ DE SANTAYANA (b. Dec. 16, 1863, Madrid—d. Sept. 26, 1952, Rome), Spanish-born U.S. philosopher, poet, and humanist who made important contributions to aesthetics, speculative philosophy, and literary criticism. From 1912 he resided in Europe, chiefly in France and Italy.



Santayana

Early life and career. George Santayana was born in Madrid of Spanish parents. He never relinquished his Spanish citizenship, and, although he was to write in English with subtlety and poise, he did not begin to learn that language until taken to join his mother in Boston in 1872. Santayana was to reside in New England for most of the ensuing 40 years. He went through the Boston Latin School and Harvard College, graduating summa cum laude in 1886. He then spent two years studying philosophy at the University of Berlin before returning to Harvard to complete his doctoral thesis under the Pragmatist William James. He joined the faculty of philosophy in 1889, forming with James and the Idealist Josiah Royce a brilliant triumvirate of philosophers. Yet his attachment to Europe was strong. He spent his summers in Spain with his father, visited England, and spent his sabbatical leaves abroad: at Cambridge, in Italy and the East, and at the Sorbonne.

At Harvard he began to write. *The Sense of Beauty* (1896) was an important contribution to aesthetics. The essay, which is concerned with the nature and elements of man's aesthetic feelings, holds that to judge that anything is beautiful is "virtually to establish an ideal" and that to understand why something is thought to be beautiful enables one to distinguish transitory ideals from those that, springing from more fundamental feelings, are "comparatively permanent and universal." The vital affinity between such aesthetic faculties and man's moral faculties is illustrated in Santayana's next book, *Interpretations of Poetry and Religion* (1900), particularly in the discussion of the poetry of Robert Browning, which is a model of its kind.

The Life of Reason (1905–06) was a major theoretical work consisting of five volumes. Conceived in his student days after a reading of Hegel's *Phenomenology of Mind,* it was described by Santayana as "a presumptive biography of the human intellect." The life of reason, for Santayana as for Hegel, is not restricted to purely intellectual activities, for reason in all of its manifestations is a union of impulse and ideation. It is instinct become reflective and enlightened. The theory is given practical illustration in a series of essays, gathered into two volumes: *Three Philosophical Poets: Lucretius, Dante, and Goethe* (1910); and *Winds of Doctrine* (1913), in which the poetry of Percy Bysshe Shelley and the philosophies of Henri Bergson, a French evolutionary philosopher, and of Bertrand Russell are trenchantly discussed.

Return to Europe. Santayana was appointed a full Harvard professor in 1907. In 1912, however, while he was in Europe, his mother died, and he sent in his resignation from there. He never returned to America, although several attractive offers were made by Harvard in an attempt to draw him back.

Santayana's resignation astonished his colleagues, for it came at the height of his career. All of his books were admired and influential, and there seemed to be an intimate connection between them and his teaching. Clearly, he was a gifted teacher: interested in his students, devoid of pedantry, and with a superb capacity for analyzing philosophies and related poetry with lucid sympathy while judging them by standards that remained rational and humane. His resignation, nevertheless, can be seen as inevitable: he disliked the academic straitjacket; he wished to devote himself exclusively to his writing; and he was ill at ease in America. His Latin heritage and allegiance gave to his thinking a striking range and perspective, but the net result was to make him want "to say plausibly in English as many un-English things as possible." From the strain of doing this, he was thankful to escape.

When World War I began, Santayana was in Oxford, and he settled there for the duration. Though he enjoyed the friendship of several eminent people, the war saddened him, and he led a secluded life. *Egotism in German Philosophy* appeared in 1916, making clear his strong allegiance to the Allied cause; he also wrote a number of popular essays centring on the English character and countryside. At the end of the war he was offered a life membership in Corpus Christi College, Oxford, but he declined.

Santayana's system of philosophy. In 1924 he settled permanently in Rome. The atmosphere was congenial to a native-born Catholic who, though evolving into a philosophical materialist for whom the world of spirit was wholly ideal and nonexistent, had always admired the Catholic and classical traditions. Three new books consolidated his reputation as a humanist critic and man of letters, and this side was brought to perfect expression in a novel, *The Last Puritan* (1935).

The bulk of his energies in the interwar years, however, went into speculative philosophy. *Scepticism and Animal Faith* (1923) marks an important departure from his earlier philosophy and serves as "a critical introduction" to and résumé of his new system developed in the four-volume *Realms of Being* (1928, 1930, 1937, 1940), an ontological (nature of being) treatise of great concentration and finish. In these later works Santayana enhanced his stature as a philosopher by achieving greater theoretical precision, depth, and coherence. *Scepticism and Animal Faith* conveys better than any other volume the essential import of his philosophy. It formulates his theory of immediately apprehended essences and describes the role played by "animal faith" in various forms of knowledge.

In *Realms of Being* extraordinarily complex problems are elucidated with luminous succinctness: Santayana makes his way with athletic ease through forests in which ontological philosophers like Husserl or Existentialist ones like Sartre flounder self-indulgently. "The realm of essence," in Santayana's system, is that of the mind's certain and indubitable knowledge. Essences are universals that have being or reality but do not exist. They include colours, tastes, and odours as well as the ideal objects of thought and imagination. "The realm of matter" is the world of natural objects; belief in it rests—as does all belief concerning existence—on animal faith. Naturalism, the dominant theme of his entire philosophy, appears in his insistence that matter is prior to the other realms.

Such a philosophy enabled Santayana to accept imperturbably another onset of war. He took rooms in a Catholic nursing home and began a three-volume autobiography, *Persons and Places* (1944, 1945, 1953). When Rome was liberated in 1944, the 80-year-old author found himself visited by an "avalanche" of American admirers. By now he was immersed in *Dominations and Powers* (1951), an analysis of man in society; and then with heroic tenacity—for he was nearly deaf and half blind—he gave himself to translating Lorenzo de' Medici's love poem, "Ambra," during which he was overtaken by his last illness. He died in September 1952, a few months before his 89th birthday, and was buried, as he had wished, in the Catholic cemetery of Rome in a plot reserved for Spanish nationals.

(N.V.He.)

MAJOR WORKS. *Philosophy. The Sense of Beauty* (1896); *The Life of Reason; or The Phases of Human Progress* (1905–06), five volumes consisting of *Reason in Common Sense, Reason in Society, Reason in Religion, Reason in Art,* and *Reason in Science; Scepticism and Animal Faith* (1923); *Realms of Being* (1927–40), four volumes consisting of *The Realm of Essence, The Realm of Matter, The Realm of Truth,* and *The Realm of Spirit; Dominations and Powers* (1951).

Critical writings. Interpretations of Poetry and Religion (1900); *Three Philosophical Poets: Lucretius, Dante, and Goethe* (1910); *Winds of Doctrine* (1913); *Egotism in German Philosophy* (1916); *Philosophical Opinion in America* (1918); *Character and Opinion in the United States* (1920); *Soliloquies in England and Later Soliloquies* (1922); *Platonism and the Spiritual Life* (1927); *Some Turns of Thought in Modern Philosophy* (1933); *The Idea of Christ in the Gospels* (1946).

Other works. The Last Puritan (1935), a novel; *Persons and Places,* 3 vol. (1944–53), autobiography.

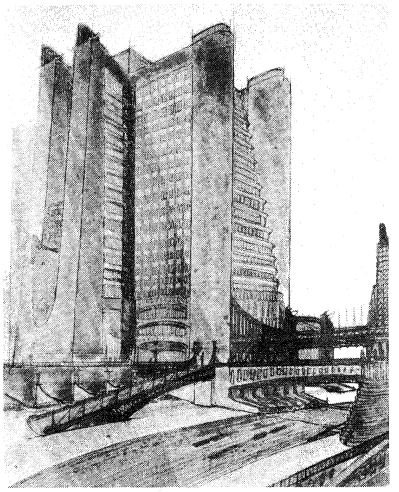
BIBLIOGRAPHY. George W. Howgate, *George Santayana* (1938, reprinted 1971), and Daniel Cory, *Santayana: The Later Years* (1963), together provide a detailed biographical portrait that may be supplemented by Daniel Cory (ed.), *The Letters of George Santayana* (1955), and by Santayana's three-volume autobiography, *Persons and Places* (1944–53). Of special interest among book-length studies of his moral philosophy are: Willard E. Arnett, *Santayana and the Sense of Beauty* (1955); Milton K. Munitz, *The Moral Philosophy of Santayana* (1939); and Jacques Duron, *La Pensée de George Santayana: Santayana en Amérique* (1950), which contains a detailed list of book reviews and articles on Santayana up to 1950. Two volumes bring together most of the shorter critiques of Santayana's philosophy: P.A. Schilpp (ed.), *The Philosophy of George Santayana* (1940); and John Lachs (ed.), *Animal Faith and Spiritual Life* (1967). Editorial introductions to the following collections of Santayana's work provide interesting appraisals of his achievement as humanist and social and literary critic: Norman Henfrey (ed.), *Selected Critical Writings of George Santayana* (1968); Richard Colton Lyon (ed.), *Santayana on America* (1968); Douglas L. Wilson (ed.), *The Genteel Tradition* (1967); and W.G. Holzberger (ed.), *Complete Poems of George Santayana, a Critical Edition* (1979).

Santee, a major division of the Dakota (*q.v.*), or Sioux, confederation of American Indians.

Santee-Wateree-Catawba river system, inland waterway 538 mi (866 km) long, in the southeastern United States, rising as the Catawba River in the Blue Ridge Mountains of western North Carolina. The Catawba flows

east and then south into South Carolina to Great Falls, a distance of 220 miles (350 km), where it becomes the Wateree River. The Wateree continues southward through a series of lakes and reservoirs, the largest being Wateree Lake (15 miles [24 km] long), to its junction with the Congaree. From this confluence the Santee, as it is called, winds southeastward for 143 miles (230 km) to its delta on the Atlantic Ocean south of Georgetown, S.C. The Santee has been dammed to form Lake Marion, a 40-mile-long reservoir that is connected by a navigable waterway, Lake Moultrie, and the Cooper River to Charleston, S.C. The entire river system, navigable upstream as far as Camden, S.C., is the most important waterway and source of hydroelectric power in South Carolina.

Sant'Elia, Antonio (b. April 30, 1888, Como, Italy—d. Oct. 10, 1916, near Monfalcone), Italian architect notable for his visionary drawings of the city of the future.



Detail from "Project for the 'New City'," watercolour by Sant'Elia, 1914; in a private collection, Rome
Oscar Savio

In 1912 he began practicing architecture in Milan, where he became involved with the Futurist movement. Between 1912 and 1914 he made many highly imaginative drawings and plans for cities of the future. A group of these drawings called *Città Nuova* ("New City") was displayed in May 1914 at an exhibition of the Nuove Tendenze group, of which he was a member. Although Sant'Elia's ideas were Futuristic, it has been questioned whether he was actually a member of the group. Essentially he was a socialist who felt that a complete break with architectural styles of the past and historic solutions to urban design was needed.

The hundreds of Sant'Elia's drawings that have survived depict various aspects and vistas of a highly mechanized and industrialized city, with skyscrapers and multilevel traffic circulation. A collection of these drawings is on permanent exhibition at Villa Olmo, near Como.

Sant'Elia volunteered for army duty shortly after the outbreak of World War I, and he died in the battle of Monfalcone.

Santería, religious cult that originated in Cuba and spread to neighbouring islands and the United States, principally among blacks and Hispanics. It developed out of the traditions of the Yoruba people (of modern Nigeria and Benin), who, from the 16th to the 19th century, were transported to Cuba as slaves on the sugar plantations.

In common with other cults brought to the New World by Africans—such as the voodoo of Haiti or the Macumba of Brazil—Santería blended elements of Christianity and West African beliefs. There is belief in one Supreme Being but also in saints or spirits known as *orishas,* in each of which are found a force of nature and a set of humanlike behavioral characteristics. Priests or advocates known as *santeros* are said to possess *ache,* the magical power of the *orishas.* Ritual devotions involving musical rhythms (usually drumming and dancing), offerings of food and animal sacrifice, devination with fetishes made of bones or shells, trancelike seizures, and other rites are thought to reveal the sources of day-to-day problems and point the way to their resolution. Adherents also believe that an *orisha* can intervene on one's behalf or may even enter into one's being, becoming part of one's personality.

In Santería, elements of Roman Catholicism are mixed with African traditions. To a Santería believer, St. Peter is Oggun, the Yoruba patron of miners and workers. St. Barbara, the Christian patron of artillery, is the warrior *orisha* Chango. Such blending of beliefs enabled Africans to retain their native faith while appearing to convert to Roman Catholicism.

Santiago, *región metropolitana,* central Chile, bordering Argentina on the east, Valparaíso region on the north and west, and O'Higgins region on the south. Santiago, created a province in 1826 and a metropolitan region in 1974, has an area of 5,926 square miles (15,349 square km), spanning the fertile Central Valley and the Andean cordillera. Winter rains and snowmelt in the watershed of the Maipo River supply the water used for power development and for farm and urban needs. River canyons provide summer recreation areas and access to winter resorts (Farellones, Lagunillas, and Refugio lo Valdés).

Santiago is Chile's major industrial and agricultural region. The bulk of Chile's industrial and commercial activity is concentrated in the national and regional capital of Santiago (a pattern of production not uncommon elsewhere in South America), but there are important farm supply, marketing, and processing activities at San Bernardo (location of major railroad shops), Puente Alto (a paper- and gypsum-processing centre), Melipilla, Talagante, and Buin. Dairying and beef production are significant; the main crops are grains, grapes, potatoes, and beans. Copper, gypsum, and limestone are mined. Marketing is facilitated by the proximity of urban centres, by main-line railroad communications, and by the best-developed regional road system in Chile. Pop. (1987 est.) 4,913,100.

Santiago, capital of Chile and of the *región metropolitana* of Santiago; it lies on the canalized Mapocho River, in view of high Andean peaks to the east. The city was founded as Santiago del Nuevo Extremo (Santiago of the New Frontier) in 1541 by the Spanish conquistador Pedro de Valdivia. The area was inhabited by the Picunche Indians, who were placed under the rule of the Spanish settlers. The original city site was limited by the two surrounding arms of the Mapocho River and by Huelén (renamed Santa Lucía) Hill to the east, which served as a lookout.

During the period of Spanish domination, growth was slow. Santiago's checkerboard outline was maintained until the early 1800s, when it grew to the north, to the south, and especially to the west. The south bank of the Mapocho River was drained and converted into a public promenade, now the Alameda Bernardo O'Higgins. The city was only slightly damaged during the War of Independence (1810–18), since the decisive Battle of Maipú took place outside the city limits. Santiago was named the republic's capital in 1818, and thereafter the wealth of the nation flowed into the city.

Architectural remnants of the colonial era include the Palace of the Governors, the Metropolitan Cathedral, the Mint, the Consulate Tribunal, and the churches of San Francisco, Santo Domingo, the Recoleta Franciscana, and the Church of Mercy. The Cousiño Palace is an example of 19th-century architecture, while early 20th-century styles are expressed in the Fine Arts Palace, the National Library, and the Union Club. Modern architectural achievements are represented by residences at Vitacura, San Luis Hill, and Lo Curro.

Greater Santiago contains Chile's greatest concentration of industry. The main products are foodstuffs, textiles, shoes, and clothes; metallurgy and copper mining are also important. The city also has an active financial sector, including a stock exchange, the major banks with hundreds of branches, and many insurance companies.

Santiago is the centre of the nation's railroads. Highways and roads connect the city with the ports of San Antonio to the west and Valparaíso to the northwest, thus providing an outlet to the Pacific Ocean. The city has a subway system, and air services are provided by the international airport at Pudahuel and the airport at Los Cerrillos, which handles domestic flights. There are also two smaller civil airports—Lo Castillo and Tobalaba—as well as El Bosque, a military airport.

The city's cultural life is cosmopolitan, its native institutions exhibiting European and North American influences. There has been a strong resurgence of mestizo artisanship, especially in the fields of music, theatre, painting, and literature.

The city contains the National Archives and and numerous libraries and museums. Advanced educational institutions include the University of Chile (founded 1738), the Catholic University of Chile (1888), and the State Technical University (1947).

The most prominent recreation areas are the public parks of Santa Lucía Hill and San Cristóbal Hill, with its zoo and camping grounds. Many private and public sports clubs, as well as stadiums, offer varied facilities. There are ski slopes in Farellones, and several resorts are located along the coast between Algarrobo and Santo Domingo. Pop. (1987 est.) Greater (Gran) Santiago, 4,858,-300.

Santiago, city, western Panama, in the Pacific lowlands north of Puerto Mutis, its port on the Gulf of Montijo. One of the oldest settlements in Panama, the city flourished in the colonial era, and many fine old buildings remain.

It is also a marketing centre for the rice, coffee, corn (maize), livestock, and other products from the hinterland. Gold deposits occur in the vicinity. Santiago lies on the Pan-American Highway, and it has an airfield. Pop. (1980) 21,809.

Santiago, in full SANTIAGO DE COMPOSTELA, city, La Coruña *provincia,* in the *comunidad autonóma* ("autonomous community") of Galicia, northwestern Spain, near the confluence of the Sar and Sarela rivers, 32 mi (51 km) southwest of La Coruña city. Santiago is the Spanish for St. James, whose shrine the city possesses. In AD 813 a tomb discovered at nearby Padrón was said to have been supernaturally revealed to be that of the apostle St. James the Great, martyred at Jerusalem in about AD 44. His bones had been taken to Spain, where, according to legend, he had formerly evangelized. The discovery of the relics provided a rallying point for Christian Spain, then confined to a narrow strip at the north of the Iberian Peninsula, most of which was occupied by Moors. Over the tomb Alfonso II of Asturias built an earthen church that Alfonso III replaced by a stone one, and the town that grew up around it became the most important Christian place



Santiago de Compostela, Spain
J. Allan Cash—Rapho/Photo Researchers

of pilgrimage after Jerusalem and Rome during the Middle Ages. The whole town, except the tomb itself, was destroyed in 997 by al-Manṣūr Abū Ja'far (Almanzor), military commander of the Moorish caliphate of Córdoba. In 1078 the present cathedral was begun by order of Alfonso VI of Leon and Castile. This Romanesque building (consecrated 1128, completed 1211), located at the east end of the Plaza Mayor, has a Baroque west facade (El Obradoiro) above a flight of steps built by Fernando Casas y Novoa (1738–47). An outstanding feature of the interior is the Pórtico de la Gloria (located behind the facade), a tripartite porch showing a Last Judgment, Romanesque but tinged with Gothic features, by Maestro Mateo. At the north of the Plaza Mayor is the Hospicio de los Reyes Católicos (Hospice of the Catholic Kings), built in 1501–11 by Enrique de Egas to receive the pilgrims and later used as a hotel. Other noteworthy secular buildings are the colleges of San Jerónimo (founded 1501), Fonseca (founded 1530), and San Clemente (founded 1601), and the University (founded 1532, though the building dates from 1750). The monastery of San Martín Pinario, now a seminary, was founded in the 10th century and rebuilt in the 17th. The monastery of San Francisco was supposedly founded by St. Francis of Assisi when he made a pilgrimage to Santiago in 1214. The church of Santa María Salomé and the collegiate church of Santa María la Real del Sar in the suburbs both date from the 12th century, with later facades.

Santiago's chief economic activities, apart from agriculture and the artistic industries of silverwork, jetwork, and wood engraving, include brewing and the distillation of spirits, foundries, and the manufacture of linen, paper, furniture, soap, and matches. Pop. (1981) 93,695.

Santiago, Battle of (June–July 1898), concluding engagement fought near Santiago de Cuba in the Spanish-American War, in which U.S. successes on land and sea resulted in final victory over the Spaniards. On May 19, 1898, a month after the outbreak of hostilities between the two powers, a Spanish fleet under Adm. Pascual Cervera arrived in Santiago harbour on the southern coast of Cuba. U.S. naval squadrons in the Atlantic, under Rear Adm. William T. Sampson and Commo. Winfield S. Schley, thereupon blockaded the harbour entrance.

To support the operation by land, U.S. troops (including the Rough Riders, a volunteer cavalry regiment led by Theodore Roosevelt) disembarked east of the city and penetrated its outer defenses. Between July 1 and July 3 they took the fortified village of El Caney and completed their assault on San Juan Ridge by capturing its highest point, San Juan Hill. In an effort to escape capture, Admiral Cervera led his squadron out of the harbour on July 3. In the ensuing battle all the Spanish ships came under heavy fire from the U.S. fleet and were beached in a burning or sinking condition.

Two weeks later, Spain surrendered Santiago de Cuba. The U.S. victory ended the war, suppressed all Spanish naval resistance in the New World, and enhanced the reputation of the U.S. Navy.

Santiago, Order of, Spanish ORDEN DE SANTIAGO, Christian military–religious order of knights founded *c.* 1160 in Spain for the purpose of fighting Spanish Muslims and of protecting pilgrims on their way to the shrine of Santiago de Compostela. Originally called the Order of Cáceres, after the city in which it was founded, the order assumed the Santiago name in 1171.

In 1174 King Alfonso VII of Castile gave the knights the town of Uclés, where their central monastery was established. By 1493 the Order of Santiago had nearly 700,000 members and an annual income of 60,000 ducats, and in that year the Catholic Monarchs (Ferdinand II and Isabella I) took possession of the order in an effort to consolidate their own power.

Santiago, Río (Mexico): *see* Grande de Santiago River.

Santiago de Cuba, province, southern Cuba, bounded on the west by the province of Granma, on the north by Holguín, on the east by Guantánamo, and on the south by the Caribbean Sea. Part of former Oriente province until 1976, it has an area of 2,450 sq mi (6,346 sq km). The northern part of the province is generally mountainous except for the east–west-trending Central Valley, drained by the Río Cauto. The country's highest mountain, Pico Turquino, 6,470 ft (1,972 m) above sea level, is in the Sierra Maestra, which stretches east–west along the southern coast. Pines and Juniper grow on the northern slopes, whereas the southern slopes on the leeward side are semiarid. The Sierra Maestra sheltered Fidel Castro's forces during their campaigns that led to the overthrow of Fulgencio Batista in 1959.

Coffee and cacao are grown in the Sierra Maestra and along the Central Valley. Other products are sugarcane, corn (maize), bananas, timber, citrus fruits, mangoes, poultry, and honey; cattle are raised and dairy products are important. The mountains surrounding Santiago de Cuba (*q.v.*) city, the provincial capital and one of the nation's major ports, yield iron, manganese, and copper. Industries include coffee roasting, furniture making, distilling, sugar refining, and textile manufacture. Santiago de Cuba city is the southern terminus of the central highway and the major railway. Pop. (1983 est.) 919,135.

Santiago de Cuba, city, capital of Santiago de Cuba province, eastern Cuba. It nestles in a valley of the Sierra Maestra that is pierced by a pouch-shaped bay. The bay's entrance, cutting into high bluffs that rise from the sea, is nearly invisible offshore. The chief bluff, about 200 ft (60 m) high, is El Morro, crowned by a colonial fortress, Castillo del Morro.

Santiago de Cuba was founded in 1514 by Diego Velázquez, first governor of Cuba; it was moved a few miles to the present site in 1522. The settlement commanded a strategic location upon the northern Caribbean in the early colonial period, and it served as the capital of Cuba until 1589. With the shift of population toward the western end of the island, Santiago de Cuba lost its leading position to Havana. The explorer Hernán Cortés was the first mayor of Santiago de Cuba, and it was from there that he set out in 1518 on the expedition that culminated in the conquest of Mexico.

Santiago de Cuba was a focal point of the Spanish-American War, and many reminders of that conflict are found in the area. Decisive engagements were fought near the city on the hills of El Viso (in the village of El Caney) and San Juan. The harbour was partially blocked by the scuttled collier "Merrimac"; and the principal naval action of the war was fought along the coast near the port on July 3, 1898.

On July 26, 1953, the revolutionary leader Fidel Castro led an attack against the Moncada Barracks in the city. The attack was repulsed by government troops, but the name The 26th of July Movement became attached to Castro's cause. In 1956, after his release from prison, he led a small group of supporters back into the Sierra Maestra; although they isolated the city from the rest of the island, it remained in government hands until Castro's final victory in 1959.

During the next two decades the city experienced a rapid growth of population and services. The University of Oriente (founded 1947), a medical school, a sports stadium, and several museums are located there, and the city is known as a cultural and tourism centre.

Santiago de Cuba province was part of former Oriente province until 1976, and it has an area of 2,450 sq mi (6,346 sq km). The northern part of the province is generally mountainous except for the east–west-trending Central Valley drained by the Río Cauto. The country's highest mountain, Pico Turquino, 6,470 ft (1,972 m) above sea level, is in the Sierra Maestra, which stretches east–west along the southern coast. Pines and juniper grow on the northern slopes, whereas the southern slopes on the leeward side are semiarid. Coffee and cacao are grown in the Sierra Maestra and along the Central Valley. Other products are sugarcane, corn (maize), bananas, timber, citrus fruits, mangoes, poultry, and honey; cattle and dairy products are also important. The mountains surrounding Santiago de Cuba city yield iron, manganese, and copper. The city is the southern terminus of the central highway and Cuba's major railway. Pop. (1981 est.) 404,829.

Santiago de Guayaquil (Ecuador): *see* Guayaquil.

Santiago de los Caballeros, city, capital of Santiago province, northern Dominican Republic, on the Yaque del Norte River, in the heart of the fertile Valle del Cibao. Whether founded in 1494 by Christopher Columbus (as some historians claim) or in 1495 by his brother Bartolomeo, Santiago was among the first European settlements in America. In 1504, 30 caballeros (gentlemen) of the Order of St. James (Santiago) moved from nearby La Isabela to Santiago, henceforth known as Santiago de los Caballeros. After being destroyed by an earthquake in 1562, the city was rebuilt a few miles away, where the Arroyo (stream) Nibaje meets the Yaque; ruins of the old city are still visible in the district of San Francisco de Jacagua. Santiago survived numerous earthquakes and fires to serve repeatedly as the republic's capital.

Notable landmarks include the San Luis Fort, the Universidad Católica Madre y Maestra (University of the Catholic Mother and Teacher; 1962), various palaces, and the cathedral of Santiago el Mayor situated opposite the city park (Parque Duarte). A technological university was founded in 1974.

The city's economy depends mainly on the

production of cigarettes, rum, furniture, pharmaceuticals, soaps, leather articles, and processed foods, including cacao, milled rice, and dairy produce. Santiago is on the main highway linking Santo Domingo (85 mi [137 km] southeast) with Montecristi in the extreme northwest. Pop. (1981) 278,638.

Santiago de Surco, also called SURCO, community and district, southeastern Lima–Callao metropolitan area, Peru. Created in about 1824 (reorganized 1893 and 1929), it stretches eastward from the Río Surco to the foothills of the Andes and is bisected from north to south by the Pan-American Highway. The surrounding area has changed, as farmlands have given way to the spreading community. Upper-income housing developments predominate, the rambling villas shielded from view by lush gardens.

Private high schools, a state normal school, and the Universidad de Lima (1963) are in the district. In the south is an aviation school. Recreational facilities include the Lima Polo and Hunt Club, a golf club, and a race track. Pop. (1981 prelim.) district, 148,118.

Santiago del Estero, province, north central Argentina, located mostly at the southwestern margins of the vast Gran Chaco lowland plains, but extending onto the Andean piedmont in the far west. The province has a dry, subtropical climate with seasonal (summer) rains and covers an expanse of 52,222 sq mi (135,254 sq km). Thorn scrubs and clusters of low quebracho trees typify the Gran Chaco area, while saline marshes and lakes dominate the south and southwest. The (year-round) Dulce and (seasonal) Salado rivers discharge from outliers of the Andes onto the plains of Santiago del Estero, diagonally draining the province from the northwest to the southeast.

The first Spanish settlement in Argentina was made in Santiago del Estero in 1553 by Francisco de Aguirre, a conquistador from Chile who founded *encomiendas* (royal land grants worked by Indians). The province was created in 1820 after separation from Tucumán province. Its name derives from the former large seasonal bodies of water (*esteros*) bordering the Río Dulce in the vicinity of the provincial capital, Santiago del Estero.

The seasonal rainfall and poor drainage makes consistently profitable agriculture possible only through irrigation from the Dulce and Salado rivers. The main irrigated crops are cotton, alfalfa, grapes, squash, sweet potatoes, and assorted melons. Cattle, mules, and goats are raised in both irrigated and nonirrigated areas; and the species of quebracho tree of this part of the Gran Chaco is felled mostly for firewood, not tannin. The province is crossed by several railways, which connect it with many parts of Argentina and with Bolivia and Chile. The completion of a major irrigation project on the upper Dulce (in about 1950) has led to a steady population decline in most of southeastern Santiago del Estero, which now receives less seasonal runoff. Pop. (1983 est.) 630,000.

Santiago del Estero, city, capital of Santiago del Estero province, northwestern Argentina, and the oldest continuous settlement in the country. It was founded in 1553 by Spaniards coming from Peru, led by Francisco de Aguirre, and moved slightly south in 1556 to its present location on the Río Dulce.

Although the climate is extremely hot and dry, the surrounding irrigated plains produce considerable crops of wheat, cotton, flax, corn (maize), and alfalfa. Food processing is the main industrial activity. The city is linked by road and rail with the Argentine northwest and with the ports of Santa Fe and Rosario. Notable buildings include the Gothic-style San Francisco Solano Church (1590) and the Wagner Museum, which displays archaeological findings. Pop. (1980 prelim.) 148,357.

Santiago del Nuevo Extremo (city, Chile): *see* Santiago.

Santiago Island (Cape Verde): *see* São Tiago Island.

Santiago Rodríguez, province, northwestern Dominican Republic, occupying the northern slopes and foothills of the Cordillera Central. It was created in 1951 from Montecristi province, with an area of 394 sq mi (1,020 sq km). It is drained by several tributaries of the Yaque del Norte River, the country's largest river.

Because of semiarid conditions in much of the province, livestock raising is more important than agriculture, though cassava, plantains, peanuts (groundnuts), coffee, and tobacco are grown. Some lumbering is done in the mountains. Titanium deposits exist near Monción. A secondary highway traverses the province through Santiago Rodríguez city, the provincial capital. Pop. (1981) 55,411.

Santiago Rodríguez, city, capital of Santiago Rodríguez province, northwestern Dominican Republic, on the northern slopes of the Cordillera Central. It was called Sabaneta until 1936, and it was named capital of the newly created province in 1951.

The city serves as a commercial centre for the region, dealing principally in tobacco, beeswax, timber, and hides. The city can be reached by secondary highway from Mao and Dajabón. Pop. (1981) 9,170.

Santillana, Iñigo López de Mendoza, marqués de (marquess of) (b. Aug. 19, 1398, Carrión de los Condes, Castile and Leon—d. March 25, 1458, Guadalajara, Castile), Spanish poet and Humanist who was one of the



Marqués de Santillana, detail of an oil painting by Jorge Inglès, 1458; in the Palacio del Duque del Infantado, Viñuelas, Spain

Archivo Mas, Barcelona

great literary and political figures of his time. As lord of the vast Mendoza estates, he led the nobles in a war against King John II of Castile and in expeditions against the Muslims; he also collected a magnificent library (now in the Biblioteca Nacional, Madrid), patronized the arts, and wrote poetry of high quality.

An exceptionally well-educated man, Santillana was instrumental in having Homer, Virgil, and Seneca translated into Spanish. Fluent in French, Italian, Galician, and Catalan and less so in Latin, he wrote the first sonnets in Spanish. They are admired but are highly imitative of Petrarch. He also collected proverbs and wrote traditional didactic and allegorical poetry, but he is primarily remembered for his 10 *serranillas* (pastoral songs) and for the preface to his collected works.

The *serranillas*, which describe the encounters between a knight and a shepherdess, transformed popular lyrics into elegant, refined poetry. The famous preface to his collected works, the *Proemio,* the first example in Spanish of formal literary criticism, distinguishes three literary styles: high, for classical writing in Greek and Latin; middle, for formal works in the vernacular; and low, for ballads and songs without formal order.

Śantiniketan, also spelled SHANTINIKETAN, former town, now part of Bolpur town, Bīrbhūm district, West Bengal state, northeastern India. Śantiniketan (Sanskrit: The Abode of Peace) began as Śantiniketan Āś-



Viśva-Bhārati University, Śantiniketan, West Bengal, India

Kaypix—Shostal Assoc./EB Inc.

ram, a meditation centre founded and endowed in 1863 by Maharishi Debendranath, the father of the world-famous Bengali poet Rabindranath Tagore. Tagore, in turn, established the Brahmo Vidyalaya (school) and in 1901 another open-air laboratory school. By 1921 the latter had expanded into Viśva-Bhārati University, which sought a basis for a common fellowship between the cultures of East and West.

Viśva-Bhārati is a residential university (incorporated 1951), with an international student body, hostels, and extensive grounds. It includes separate colleges for fine arts and crafts, Sino-Indian studies, music and dance, research in Asian languages, teacher training, technology, and postgraduate studies and research. Rabindra-Sadana is the university's museum and academy for the study of Tagore. The town also contains Udayana, Tagore's residence. At nearby Srīniketan is an institution founded in 1922 by Tagore and an associate that is concerned with rural reconstruction, health, social welfare, and the revival of ancient arts and handicrafts. Many outstanding Indian painters have made studies there. Pop. (1981) Bolpur, 38,436.

Sāntipur, town, Nadia district, West Bengal state, northeastern India, just north of the Hooghly River. It was the centre of large factories under the British East India Company, and Sāntipur hand-woven muslins had a European reputation in the 18th and 19th centuries. The district's major cotton-weaving centre, it also has agricultural trade and pottery manufacture.

The town, constituted a municipality in 1865, is a pilgrimage centre, with sacred bathing steps, or *ghāṭs,* on the river. A festival in honour of Krishna is held annually. It has a college affiliated with the University of Calcutta. Pop. (1981) 82,890.

Śāntirakṣita (fl. 8th century), Indian Buddhist teacher and saint who was instrumental in the development of Tibetan Buddhism.

Invited to Tibet by King Thī-srong-detsan (ruled 740–786), Śāntirakṣita was forced to flee to Nepal after adherents of the nativistic Bon religion blamed him for the outbreak of an epidemic. After his return to Tibet, according to late 14th-century accounts, he urged the King to invite the Indian Buddhist teacher Padmasambhava to help him.

Śāntirakṣita became the first abbot of the monastery at Samye (Bsam-yas), which he

headed for 13 years and where he and Padmasambhava taught the doctrines of the Buddhist Yogācāra sect and Tantric philosophy. He ordained the first seven Tibetan Buddhist monks and is credited with incorporating several elements of Bon, including its pantheon, into the lowest level of Tantric Buddhism and with instituting symbolic worship to take the place of Bon animal sacrifices.

Santo (island, Vanuatu): *see* Espiritu Santo.

Santo André, city, southeastern São Paulo *estado* ("state"), Brazil. It lies along the Tamanduatei River at 2,438 feet (743 m) above sea level. Santo André is part of the São Paulo (southeastern) metropolitan area. The original colonial settlement became a town in 1553 and a municipal seat in 1889.

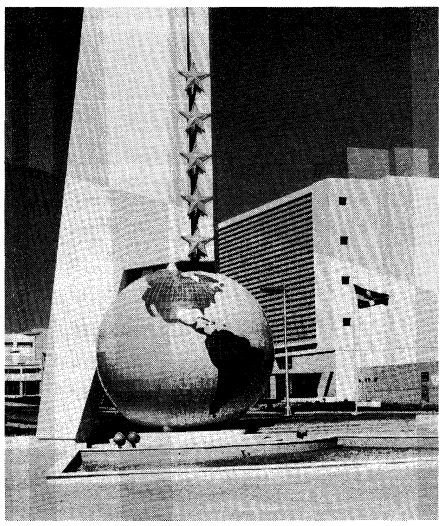
The city's economic expansion began in the 1930s, and much of the city's labour force is now employed in industry. Santo André has textile, metal, chinaware, and furniture industries. Grains, as well as sweet potatoes, tomatoes, and other vegetables, are cultivated in the surrounding area. Pop. (1980) 549,556.

Santo Ângelo, city, northwestern Rio Grande do Sul *estado* ("state"), southern Brazil. It is situated near the Ijuí River, at 1,004 feet (306 m) above sea level. It was founded in 1707. Santo Ângelo is the trade and transportation centre for a largely agricultural municipality, which produces corn (maize), *feijão* (beans), cattle, and hogs. The city is linked by rail and road to Cruz Alta to the southeast and Santa Rosa to the north, and it has an airport. Pop. (1980) 50,173.

Santo Antão Island, Portuguese ILHA DE SANTO ANTÃO, northwesternmost island of Cape Verde in the Atlantic Ocean, about 400 miles (640 km) off the western African coast. It has an area of 301 square miles (779 square km) and rises to Tope de Coroa (6,491 feet [1,979 m]).

Coffee, bananas, oranges, sugarcane, tobacco, castor beans, and cinchona are cultivated on the island, and horses, sheep, and cattle are raised. Ribeira Grande, on the northeast shore, is the chief town. Pop. (1980) 43,321.

Santo Domingo, capital of the Dominican Republic and the oldest permanent city established by Europeans in the Western Hemisphere. It is situated on the southeast coast of the island of Hispaniola, at the mouth of the Ozama River. Santo Domingo was founded in 1496 by Bartolomeo Columbus, brother of Christopher Columbus, as the capital of the first Spanish colony in the New World. The city is also the seat of the oldest Roman Catholic archbishopric in the Western Hemisphere.



The Armed Forces building, Santo Domingo, Dominican Republic

Photri

The original city was located on the left (east) bank of the Ozama River and was called Nueva Isabela in honour of Queen Isabella. It was destroyed by a hurricane, however, and was rebuilt in 1502 at its present location on the right bank of the river. It became the starting point of most of the Spanish expeditions of exploration and conquest of the other West Indian islands and the adjacent mainland. The colony prospered as the seat of government of the Spanish possessions in the Americas until the conquest of Mexico and Peru, after which its importance declined.

In 1586 Sir Francis Drake, the English buccaneer, sacked the city. In 1655 its inhabitants defeated a British force that had been sent to seize the city. From 1795 to 1809 Santo Domingo was under French domination, and then, after a brief Spanish period, it was conquered by invaders from Haiti. Independence was proclaimed in 1844, and Santo Domingo became the capital of the new Dominican Republic until the republic's annexation to Spain in 1861–65. The city has been the Dominican capital since the restoration of independence in 1865. The city's name, officially changed in 1936 to Ciudad Trujillo in honour of the dictator Rafael Trujillo, was restored after his assassination in 1961.

Santo Domingo is the industrial, commercial, and financial centre of the country. Its industrial development has been greatly influenced by the construction of hydroelectric dams, which furnish its industries with inexpensive electrical power. The country's most important industries, such as metallurgy, refrigerators, petrochemicals and plastics, cement, textiles, and food processing, are located in Santo Domingo.

Santo Domingo is also the chief seaport of the Dominican Republic. Its harbour at the mouth of the Ozama River was greatly improved in the 1930s in order to handle the largest vessels, and the port handles both heavy passenger and freight traffic. Roads connect the capital with the rest of the republic. There are no railway lines from the city, except those of the nearby sugar refineries. An international airport serves the city.

Santo Domingo claims the oldest university in the Western Hemisphere: the Autonomous University of Santo Domingo (founded 1538). The city's other educational institutions include the Pedro Henríquez Ureña National University (1966) and a technological university. Cultural institutions include the National Theatre-School of Art, the music conservatory and the National Symphony Orchestra, the Museum of Dominican Man—important for its pre-Columbian collection—and various public and private libraries, especially the National Library. The two most prominent colonial monuments in Santo Domingo are the cathedral and the palace of Diego Columbus. The cathedral, built in Spanish Renaissance style, dates from 1514 and contains the reputed remains of Christopher Columbus. Pop. (1983 est.) 1,410,000.

Santo Tomás de Castilla, also called MATÍAS DE GÁLVEZ, port, northeastern Guatemala. It lies on Amatique Bay off the Gulf of Honduras. It was settled originally by Belgians in the 19th century; although the name was changed officially to Matías de Gálvez in 1958, the earlier name is more commonly used. When the Guatemalan government became dissatisfied with foreign control of the older, neighbouring port at Puerto Barrios, it built a deepwater port and a planned town with modern housing and shipping offices at Santo Tomás. In 1975 a free trade and industrial zone opened.

Santo Tomás has become the busiest port of Guatemala, handling chiefly general cargo, while Puerto Barrios is limited to agricultural produce. Santo Tomás is also the headquarters of the Guatemalan navy. Guatemala City is linked to Santo Tomás by railroad, highway, and air. Santo Tomás is administratively a part of Puerto Barrios, and its population is included with that city.

Santo Tomé de Guayana (Venezuela): *see* Ciudad Guayana.

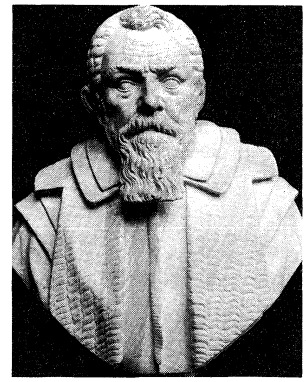
Santonian stage, standard, worldwide division of Late Cretaceous rocks and time (97 million to 66 million years ago). The Santonian stage precedes the Campanian and follows the Coniacian stage. In northern Europe the Santonian is represented by the Granulaten Chalk, the equivalent of portions of the Upper Chalk in Great Britain. Several zones, representing smaller divisions of rocks and time, are recognized in the Santonian and are characterized by various species of ammonite cephalopods (mollusks).

santonin, toxic drug obtained from the dried flower heads of various Asiatic species of *Artemisia.* A derivative of santoninic acid, santonin has been used orally as an anthelmintic (worming agent). Santonin was one of the first anthelmintics used to combat *Ascaris* (intestinal roundworm) infestation in humans and animals. It has been replaced by more effective and less toxic drugs.

Santorin, also spelled SANTORÍNI (Greece): *see* Thera.

Santorio Santorio, Latin SANCTORIUS, or SANTORIUS (b. March 29, 1561, Capodistria [now Koper, Yugos.]—d. Feb. 22, 1636, Venice [Italy]), Italian physician who was the first to employ instruments of precision in the practice of medicine, and whose studies of basal metabolism introduced quantitative experimental procedure into medical research.

Santorio was a graduate of the University of Padua (M.D., 1582), where he later became professor of medical theory (1611–24). In about 1587 he was apparently summoned to attend as physician on a Croatian nobleman. From 1587 to 1599 Santorio seems to have spent much time among the southern Slavs, though he maintained a frequent correspondence with his Paduan colleagues, the astronomer Galileo Galilei and the anatomist Hieronymus Fabricius ab Aquapendente. Santorio was an early exponent of the iatrophysical school of medicine, which attempted to explain the workings of the animal body on purely mechanical grounds, and he adapted several of Galileo's inventions to medical practice, resulting in his development of a clinical thermometer (1612) and a pulse clock (1602).



Santorio, marble portrait bust

Alinari—Art Resource/EB Inc.

Endeavouring to test the Greek physician Galen's assertion that respiration also occurs through the skin as "insensible perspiration," Santorio constructed a large scale on which

he frequently ate, worked, and slept, so that he might study the fluctuations of his body weight in relation to his solid and liquid excretions. After 30 years of continuous experimentation, he found that the sum total of visible excreta was less than the amount of substance ingested. His *De Statica Medicina* (1614; "On Medical Measurement") was the first systematic study of basal metabolism.

Santos, port city, southeastern São Paulo state, Brazil, occupying an alluvial plain on the inner side of the Ilha (island) de São Vicente, cut off from the mainland by a tidal channel. The city lies only a few feet above sea level, and its swampy island is drained by deep concrete conduits. The channel is free from obstructions, and in front of the city it widens into a bay deep enough for the largest vessels. The docks are 4 mi (6 km) long and can accommodate about 50 ships at a time.



Bay and docks of Santos, Braz.
Reflejo—EB Inc.

Founded in 1543 and named for the Hospital dos Santos in Lisbon, it was sacked by the English privateer Thomas Cavendish in 1591. It has become the world's leading coffee port, and the aroma of coffee permeates the city. In addition to coffee, exports include cotton, sugar, bananas, castor oil, *xarque* (jerked beef), corn (maize), seafood (sardines, croakers, hake, lobster), oranges, and hides. Transport equipment, electrical machinery, steel and ferroalloy products, methol, wood veneers, and textiles are manufactured there for export. Other industries include sawmills, canneries, and factories producing cement, candy, soap, soft drinks, and canvas items. A petroluem refinery at Cubatão and a hydroelectric plant serve the city, which will also receive energy from the Itaipu plant. Santos is the nation's largest port.

A humid, subtropical climate and marshy surroundings once created unfavourable living conditions, but drainage canals, the paving of streets, better housing, sanitation, and port improvements have made Santos a healthful city. A suburban seaside resort, Guarujá, attracts many visitors from inland Brazil. Railroads and highways descend the steep coastal range, the Serra do Mar, from the city of São Paulo, the state capital, 49 mi northwest. Santos also has two airports. Pop. (1980) 410,933.

Santos, Lucia dos (b. 1907, Aljustrel, Port.), Portugese shepherd girl, later a Carmelite nun, who claimed she saw visions of the Virgin Mary in 1917 at Fátima, Port., which subsequently became one of the most famous Marian shrines.

The first of six visions came to her on May 13, 1917, while she was tending sheep with her two cousins, Francisco and Jacinta. In accordance with the Virgin's promise, the vision was repeated on the 13th of each month until October, except for August, when the children were at Valinhos pasture, near Aljustrel, where they saw the lady on August 19. At that time, the children had been abducted by incredulous civil authorities, who interrogated and threatened them. In the August vision the lady promised a great miracle for October.

Reports of the visions excited interest, and by October 13 the observers at Fátima reached an estimated 70,000. The Virgin Mary reportedly revealed herself to the children as the Lady of the Rosary and asked for a chapel to be built there for her. Immediately afterward, there occurred a "solar phenomenon" that was reported by many who saw it; the Sun reputedly fell toward the Earth. Lucia then announced the identity of the lady and her wish.

Lucia and her cousins, the latter of whom died soon after the visions, were interviewed frequently by church officials, and a formal inquiry commenced in 1922. After years of investigation the cult of Our Lady of Fátima was authorized by the bishop of Leiria, Port., on Oct. 13, 1930. In 1936, 1937, 1941, and 1942 Lucia prepared documents giving additional details of the experience. In 1948 she entered the Carmelites at Coimbra, Port., and on the 50th anniversary (May 13, 1967) of the first vision, she accompanied Pope Paul VI to the shrine with about 1,000,000 pilgrims. *The Meaning of Fátima* by C.C. Martindale, S.J., was published in 1950.

Santos-Dumont, Alberto (b. July 20, 1873, Cabangu, near Palmyra [now Santos-Dumont], Minas Gerais, Braz.—d. July 23, 1932, Guarujá, São Paulo), Brazilian aviation pioneer who in 1909 produced his famous "Demoiselle" or "Grasshopper" monoplanes, the forerunners of the modern light plane.



Santos-Dumont, 1931
H. Roger-Viollet

Santos-Dumont was educated in France, where he spent most of his life. Becoming interested in aerial flight, he made a balloon ascent in 1898 and then began to construct dirigible airships. After many failures he built one that in 1901 won the Deutsch Prize and a prize from the Brazilian government for the first flight in a given time from Saint-Cloud to the Eiffel Tower and return.

Shortly after the Wright brothers' flights in 1903, Santos-Dumont turned his attention to heavier-than-air machines. After experimenting with a vertical-propeller model, in 1906 he built a machine, the 14-*bis*, on the principle of the box kite, and in October he won the Deutsch-Archdeacon Prize for the first officially observed powered flight in Europe; in November he flew 220 metres in 21 seconds.

He returned in 1928 to Brazil, where, within a few years, having become depressed over the use of aircraft in war, he committed suicide.

Santos Montejo, Eduardo (b. Aug. 28, 1888, Bogotá—d. March 27, 1974, Bogotá), prominent Latin American journalist, president of Colombia, 1938–42.

He earned a doctorate of law at the National University in 1908 and pursued further studies in Paris. Active in Liberal Party politics from 1917 on, he served as minister of foreign relations (1930), governor of Santander (1931), head of the Colombian delegation to the League of Nations (1931–33), senator (1935–37), and was elected president in 1938. Although wartime conditions hampered the effectiveness of his administration, he introduced programs that set important precedents for subsequent governments. These included the development of public housing, credit reforms, and highway construction, and also the negotiation of a border treaty with Venezuela. He broke relations with the Axis powers after Pearl Harbor and spoke out for Latin American solidarity and against economic imperialism. After his term expired, Santos remained active in the Liberal Party and was elected vice president in 1946, but his most important later role was that of journalist. Santos criticized Gustavo Rojas Pinilla's dictatorship in the pages of *El Tiempo*, a newspaper he owned from 1913 until his death. He was awarded the Maria Moors Cabot Prize for outstanding journalism by Columbia University (New York) in 1960.

Sanudo, Marino (b. June 22, 1466, Venice—d. April 4, 1536, Venice), Venetian historian whose *Diarii* is an invaluable source for the history of his period. In his enthusiasm for historical and classical learning, Sanudo collected a notable library of manuscripts, rare books, maps, and ethnographical drawings.

Sanudo began his *Vite dei dogi* ("Lives of the Doges") *c.* 1490; it covers the period from the origins of Venice to September 1494 and includes material from his earlier writings. In his unpublished *La spedizione di Carlo VIII,* ("The Expedition of Charles VIII"), he brought the story up to 1495. On Jan. 1, 1496, he began his diaries. These are his most important work and constitute a kind of universal history, written from the Venetian point of view. They contain many letters, original documents, and firsthand accounts as well as detailed digressions on culture, trade, public works, and social customs. After he became a senator in 1498, Sanudo was able to continue his diaries with even greater efficiency because he not only observed but took part in the events he was describing. In 1531 he was given a pension to continue the work, which thenceforward was semiofficial in character, and he carried it on until 1533; the result was 40,000 closely written pages published as *I diarii,* 58 vol. (1879–1902; "The Diaries"). Sanudo possessed a certain vigour of style but lacked the true historian's sureness of touch and sense of the relationship between particular events and general causes.

Sanūsī, as-, in full SĪDĪ MUḤAMMAD IBN ʿALĪ AS-SANŪSĪ AL-MUJĀHIRĪ AL-ḤASANĪ AL-IDRĪSĪ (b. *c.* 1787, Tursh, near Mostaganem, in northern Africa—d. Sept. 7, 1859, Jaghbūb, Cyrenaica), North African Islāmic theologian who founded a militant mystical movement, the Sanūsīyah, which helped Libya win its independence in the 20th century.

During his formative years in his native country, which was incorporated in the Ottoman Empire, as-Sanūsī observed the corruption of the Ottoman administrators. To continue his religious studies, in 1821 he went to Fès, in Morocco. Morocco was then nominally independent but actually a colony of France. As-Sanūsī's experiences under foreign rule and his observation of the inherent weakness of the Islāmic states convinced him of the need for a revitalized Islāmic community.

After a pilgrimage to Mecca in 1828, as-Sanūsī visited Egypt. Attracted to mysticism in Morocco, in Egypt he joined many different orders, apparently in the hope of discovering as much as possible about their organization and doctrines. In 1837, while in the Hejaz (now in Saudi Arabia), he founded his own order, which later became known as the Sanūsīyah. He limited his activities to the Bedouin tribes of the area, and he made no effort to challenge tribal patterns of authority or religious beliefs. In 1841 he was expelled from the Hejaz by the Ottoman authorities, and in 1843 he moved the order to Cyrenaica, where he used the same tribal tactics as before to create a reliable instrument for challenging the existing power structure. In *c.* 1856 the order was moved to Jaghbūb, also in Cyrenaica but away from the sphere of Egyptian and Ottoman political control and near the caravan route from North Africa to the Hejaz and equatorial Africa. This location offered an excellent seat from which propaganda work could be carried out among the tribes.

The Sanūsīyah became popular among the tribes of Cyrenaica. In the 20th century it spearheaded the liberation movement against Italian colonization. As-Sanūsī's grandson Idrīs I ruled as king of Libya from 1951 to 1969.

Sanūsīyah, also spelled SENNUSIYA, a Muslim Ṣūfī (mystic) brotherhood established in 1837 by Sīdī Muḥammad ibn ʿAlī as-Sanūsī. In modern history, the head of the Sanūsī brotherhood was king of the federal kingdom of Libya from its creation in 1951 until it was superseded by a Socialist republic in 1969.

The Sanūsīyah brotherhood was a reformist movement aimed at a return to the simple faith and life of early Islām. As a missionary order it sought to reform the lives of the Bedouins and convert the non-Muslim peoples of the Sahara and Central Africa. The vast majority of people called Sanūsī did not practice Sanūsī rites but were personal followers of as-Sanūsī al-Kabīr, the Grand Sanūsī, and his family.

By the turn of the 20th century the order was well-established among most of the Bedouins and the oasis dwellers of Cyrenaica and the Sirtica, the Libyan Desert of Egypt, southern Tripolitania, Fezzan, central Sahara, and the Hejaz. The order was strongest in Cyrenaica, where it integrated its religious lodges (*zāwīyahs*) with the existing tribal system to such an extent that it was able to marshal its members against the Italians in World War I. After the war the Sanūsīs emerged as political spokesmen for the people of Cyrenaica in the negotiations with the British and the Italians and maintained this role throughout World War II. On Dec. 24, 1951, Idris, the head of the Sanūsīyah, was proclaimed king of an independent United Kingdom of Libya. He was overthrown by a military junta led by Col. Muammar al-Qaddafi on Sept. 1, 1969.

Sanwa Bank, Ltd., Japanese SANWA GINKŌ, major Japanese commercial bank conducting general domestic banking and foreign exchange operations. Headquarters are in Ōsaka.

The bank was established in 1933 by the merger of Konoike Bank Ltd. (established 1877), Yamaguchi Bank Ltd. (1879), and the Sanjūshi (34th) Bank Ltd. (1878). The bank provides a full range of domestic banking services and is noted as the first Japanese bank to offer network banking (in which deposits and withdrawals could be made at any branch) and general-purpose consumer loans. International banking, particularly foreign exchange operations, is conducted through its main offices and numerous foreign offices.

sanxian (musical instrument): *see* san-hsien.

São Bernardo do Campo, city, southeastern São Paulo state, Brazil, on a tributary of the Rio Tietê, at 2,506 ft (764 m) above sea level; it is part of the southern São Paulo metropolitan area. Formerly known as Borda do Campo and São Bernardo, the original colonial settlement was given town status in 1553 and was made the seat of a municipality in 1889. It houses many large national and international companies. Furniture making, automobile assembling, spinning and weaving, and tanning are among the most important manufacturing activities. Pop. (1980) 381,097.

São Caetano do Sul, city, southeastern São Paulo state, Brazil, situated near the Rio Tamanduatei at 2,418 ft (737 m) above sea level. It was founded in 1631 by Benedictine monks.

São Caetano do Sul was made the seat of a municipality in 1948 and is now part of the southeastern São Paulo metropolitan area. In the city, national and international companies are engaged in extracting and refining nonferrous minerals and in manufacturing automobiles, trucks, textiles, and appliances. Chemicals and pharmaceuticals are produced there. Pop. (1980) 163,082.

São Carlos, city, in the highlands of central São Paulo state, Brazil, at 2,903 ft (885 m) above sea level, situated on the Corrego (stream) Monjolinho, a tributary of the Rio Jacaré Guaçu. Formerly known as São Carlos do Pinhal, the settlement was given town status in 1865 and was made the seat of a municipality in 1880.

Agriculture, cattle raising, and industry contribute to the city's economy. Coffee, sugarcane, cereals, tobacco, cotton, and potatoes are the principal local crops. The city has breweries, distilleries, textile mills, and other factories. The Universidade Federal de São Carlos (1970) is located there. The city is linked to São Paulo, the state capital, 166 mi (267 km) southeast, by rail, road, and air. Pop. (1980) 109,167.

São Cristóvão, city, eastern Sergipe state, northeastern Brazil, near the mouth of the Rio Vasa Barris. A port for coastal shipping, its industries include sugar milling and distilling. The city was the capital of Sergipe until 1855. Colonial buildings include the 17th-century monastery of São Francisco. Pop. (1980 prelim.) 11,720.

São Domingos, town, Cacheu region, northwestern Guinea-Bissau, West Africa. It is situated on an estuary of the Rio Cacheu, an inlet of the Atlantic Ocean (south). Its economy is based on agriculture; rice culture predominates in the nearby western coastal areas, palm culture farther inland, and mixed forest to east. São Domingos is connected by road and river to the rest of Guinea-Bissau. Pop. (1979) 19,071.

São Filipe de Benguela (Angola): *see* Benguela.

São Francisco River, Portuguese RIO SÃO FRANCISCO, river of South America, the largest wholly within Brazil, rising in the Serra da Canastra in southwestern Minas Gerais state, and flowing north and east across the great central plateau for about 1,811 mi (2,914 km) to its mouth on the Atlantic Ocean about 60 mi (100 km) north of Aracaju.

A brief treatment of the São Francisco River follows. For full treatment, *see* MACROPAEDIA: South America.

The river flows more than 1,000 mi northward across Bahia state, receiving several tributaries along both banks. About 100 mi above Petrolina, the river begins a great curve to the northeast and enters a 300-mi-long stretch of rapids and falls. Below the falls, the river flows about 150 mi to its one-mile-wide mouth on the Atlantic Ocean.

The upper river valley is an area of thorny forest vegetation and includes plants such as the caroá (used for its fibres), the mamona (which yields castor oil), the date palm, the cajú (cashew), and the rubber tree. The upper middle valley, extending to the falls zone, is less dry and is covered with grassland and forests of semideciduous trees. The falls zone passes through the dry Brazilian interior leading to the lower São Francisco, which flows through a floodplain of fine silt soils. The fish of the river are an important food source and include sardines.

The climate of the river basin is dry and hot. Rainfall is deficient over most of the area and drought is frequent. Precipitation occurs during the summer months and the rest of the year is dry. The average annual discharge of the river is about 102,000 cu ft per sec (2,900 cu m per sec) but varies seasonally four to five times. The upper river valley is an agricultural region, while the lower river valley is dry and suitable for pastoral activities. Along the coast near the mouth of the São Francisco, wetland rice is grown. The river is subject to seasonal changes of water level of up to 30 ft (10 m), and all of its tributaries run dry during the winter. Its drainage basin has an area of 243,681 sq mi (631,133 sq km). The river is navigable for more than 1,000 mi upstream of Petrolina. Its hydroelectric potential, estimated at 520,000,000 kilowatts, is its most important resource; major hydroelectric dams on the river include the Três Marias (Paulo Alfonso), Itaparica, Sobradinho, and Moxoto, which provide electric power to northeastern Brazil.

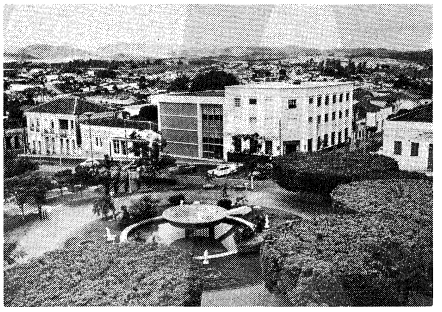
São Gonçalo, city, southwestern Rio de Janeiro state, eastern Brazil, on the Riacho (stream) Imbuaçu, just northeast of Neves. It is a northeastern suburb of Niterói, the former state capital. Its varied industries are dominated by chemical works. A large cement plant lies just to the east in Guaxindiba, and citrus fruits are grown in the area. Railroads and highways lead to downtown Niterói and to inland communities. Pop. (1980) 221,591.

Sao João Baptista de Ajudá, former Portuguese exclave (detached portion) of São Tomé and Príncipe, in the city of Ouidah, Benin (formerly Dahomey). Founded in 1788, it consisted of a fort and old factory (trading station). It was forcibly taken by Dahomey in 1961. The fort was occupied by two Portuguese officials and their families prior to their expulsion at that time.

São João da Boa Vista, city, east central São Paulo state, Brazil, lying at 2,392 ft (729 m) above sea level on the Rio Jaguari-Mirim, near Poços de Caldas and the Minas Gerais state border. The settlement, originally called Santo Antônio do Jaguari and then São João do Jaguari, was given town status in 1859 and was made the seat of a municipality in 1880.

The city serves as a trade centre for an agricultural region that produces coffee, rice, cotton, *feijão* (beans), sugarcane, and various fruits. The city also manufactures textiles, ce-

ramics, shoes, furniture, and agricultural machinery. Goods are transported by rail, road,



The centre of São João da Boa Vista, Braz.
Plessner International

and air to São Paulo, the state capital, 162 mi (261 km) south. Pop. (1980 prelim.) 45,712.

São João de Meriti, formerly called MERITI, city and northwestern suburb of Rio de Janeiro city, Rio de Janeiro state, eastern Brazil. Rio São João de Meriti, founded in 1647, was given city status in 1931. It is located near the headwaters of the São João de Meriti, at 233 ft (71 m) above sea level, 14 mi (23 km) northwest of Rio de Janeiro city, where most of its labour force is employed.

Sugarcane and livestock are produced in the surrounding area, and industries include tanneries, dairies, metallurgical plants, and factories manufacturing plastics and rubber. Modern highways link São João de Meriti to Rio de Janeiro and to inland communities; electric commuter rail service provides direct communication with central Rio de Janeiro. Pop. (1980) 210,574.

São João del Rei, city, south central Minas Gerais state, Brazil, on the Rio das Mortes, a tributary of the Rio Grande, at 2,822 ft (860 m) above sea level. It was given city status in 1838. The city retains a colonial atmosphere and has two notable 18th-century churches, the Carmo and São Francisco de Assis, with sculptures by the Brazilian master Antônio Francisco Lisboa (called Aleijadinho, the Little Cripple).

The city's economy is based on extraction of minerals (tantalite, tin, manganese, titanium dioxide, diamonds, and monazite), manufacturing, and livestock and poultry raising. Agricultural products include coffee, rice, corn (maize), *feijão* (beans), sugarcane, garlic, and sorghum. Goods are shipped by rail to Belo Horizonte, the state capital, 189 mi (304 km) north, and to neighbouring communities. The city has three museums. Pop. (1980) 53,341.

São Jorge Island, Portuguese ILHA DE SÃO JORGE, volcanic island of the central Azores, east central North Atlantic. Lying 35 mi (56 km) south of the island of Graciosa, the 92-sq-mi (238-sq-km) island measures 36 mi by 4 mi. Its central peak, Pico da Esperança, rises to 3,497 ft (1,066 m).

Part of the Angra do Heroísmo district of Portugal, São Jorge produces wine, cereals, and cheese. Its principal settlement, Velas, is on the west. A major earthquake caused severe damage in 1980. Pop. (1981) 10,255.

São José do Rio Prêto, city, in the highlands of northwestern São Paulo state, Brazil, at 1,558 ft (475 m) above sea level near the headwaters of the Rio Prêto. Originally called Rio Prêto, it became a seat of a municipality in 1894 and developed as a service centre for an agricultural region that grows coffee, cotton, rice, and *feijão* (beans). These products, as well as meat, dairy products, vegetable oils, textiles, and chemicals, are processed there. The city can be reached by rail, road, or air from São Paulo city, 250 mi (400 km) southeast. Pop. (1980) 172,027.

São José dos Campos, city, southeastern São Paulo state, Brazil, on the Rio Paraíba do Sul at 2,110 ft (643 m) above sea level. Known successively as Vila Nova de São José, Vila de São José do Sul, and Vila de São José do Paraíba, the colonial settlement developed around a Jesuit mission. It attained town status in 1767 and was made the seat of a municipality in 1854.

The city is now the service centre for an agricultural region that produces rice, sugarcane, *feijão* (beans), corn (maize), milk, and fruits. Manufactures include ceramics, diesel engines, tires, cardboard, soaps, wine, and rayon. Situated on the São Paulo–Rio de Janeiro axis, 50 mi (80 km) northeast of São Paulo city, São José dos Campos is easily accessible by rail, highway, or air. Pop. (1980) 268,034.

São Leopoldo, city, eastern Rio Grande do Sul state, Brazil, on the Rio dos Sinos at 85 ft (26 m) above sea level, just north of Pôrto Alegre, the state capital. The first German colony (1824) established in southern Brazil, it was named after Maria Leopoldina, wife of the Brazilian emperor Pedro I, and was elevated to city rank in 1864.

São Leopoldo serves an agricultural region producing potatoes, *feijão* (beans), corn (maize), rice, hogs, and cattle. It is also industrialized, manufacturing leather products, arms and munitions, aluminum ware, and other items. The Universidade do Vale do Rio dos Sinos (1969) is located there. Transportation facilities are excellent, for the city is on the São Paulo–Pôrto Alegre highway and is served by river boats and a railroad. Pop. (1980) 94,868.

São Lourenço River, Portuguese RIO SÃO LOURENÇO, northeastern tributary of the Paraguay River, rising near Poxoreu, northwestern Mato Grosso do Sul state, Brazil. It flows approximately 300 mi (480 km) southwest through the Paraguay floodplain, to join the Paraguay River 80 mi north of Corumbá. It receives the Cuiabá River, which rises near Rosário Oeste, 300 mi northeast of the confluence. The name Cuiabá is sometimes given to the combined (lower) course of the two rivers. The São Lourenço is navigable for small craft and is a trade and travel route.

São Luís, city, capital of Maranhão state, Brazil, on the west side of the Ilha (island) de São Luís. The island is really a long, narrow peninsula between the drowned mouths of the Mearim and Itapicuru rivers (the Baía [bay] de São Marcos on the west and the Baía de São José on the east), and it is cut off from the mainland by a shallow side channel, the Estreito (strait) do Mosquito. The city was formerly called São Luiz do Maranhão, or simply Maranhão. Founded in 1612 by Daniel de la Touche de la Ravardière, a French naval officer, and named in honour of Louis XIII, it was captured in 1615 by the Portuguese, and from 1641 to 1644 it was held by the Dutch.

São Luís is the state's chief seaport, and it is the chief port for the products of Teresina in Piauí state, with which it is connected by rail. Industries include sugar refining, a rum distillery, cotton mills, plants for processing cacao, and factories for metallurgical products, chemicals, and hammocks. Exports include babassu palm oil, castor beans, balsam, hides and skins, lumber, cotton, sugar, rice, cassava, and corn (maize).

The city is the seat of the Institute of History and Geography, one of the oldest in Brazil, and of the Universidade Federal do Maranhão (1966). São Luís has been the birthplace of many distinguished writers and poets. Since 1679 it has been the seat of a bishopric, and its buildings, including the Palace of Justice, preserve much of the Portuguese colonial atmosphere. In the early 1980s John Gisiger, an American architect, started a plan for restoration of 60 blocks of the city, financed by the Maranhão state government. Highways connect São Luís with Belém, Teresina, and Brasília. A railroad extends to Fortaleza, and São Luís has air service to Belém and Fortaleza. Hydroelectric and thermal electric plants supply energy to the area. Pop. (1980) 182,258.

São Manoel River, Manoel also spelled MANUEL (Brazil): *see* Teles Pires River.

São Marcos Bay, Portuguese BAÍA DE SÃO MARCOS, bay of the Atlantic ocean in Maranhão state, northeastern Brazil. It is about 60 mi (100 km) long and up to 10 mi wide.

The bay is actually a drowned river mouth, part of the Rio Mearim estuary, and it receives the Grajaú and the Itapicuru rivers. Of the bay's several islands, the largest is Ilha de São Luís, site of the state capital, São Luís.

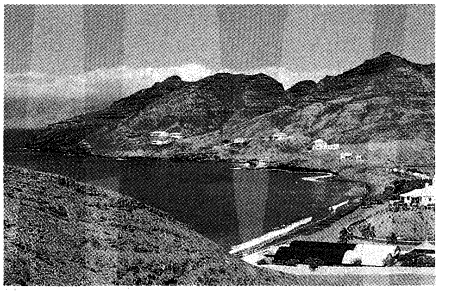
São Miguel Island, Portuguese ILHA DE SÃO MIGUEL, island, largest of the Azores, in the North Atlantic Ocean, 740 mi (1,190 km) west of Cabo (cape) da Roca, Portugal. Up to 40 mi long and 9 mi wide, it has an area of 288 sq mi (746 sq km). The island is volcanic in origin, with peaks culminating in the Pico da Vara, 3,570 ft (1,088 m) above sea level; it has been devastated by nearly a dozen earthquakes and eruptions since the 15th century.



Volcanic crater near Pico da Cruz, São Miguel Island, Azores
Graham Young—Photo Trends

Now a major winter resort, São Miguel is also a producer of fruits (especially pineapples), tea, wine, tobacco, cereals, meat, and dairy products. Along with the nearby Ilha de Santa Maria, it forms the administrative district of Ponta Delgada; its largest city, Ponta Delgada (*q.v.*), is the district's capital. Other important settlements are the resort centres of Furnas and Sete Cidades. Natália de Oliveira, the Surrealist writer, was born on São Miguel in 1923. Pop. (1981) 132,326.

São Nicolau Island, Portuguese ILHA DE SÃO NICOLAU, English SAINT NICHOLAS ISLAND, island of Cape Verde, in the Atlantic Ocean, between the islands of Santa Luzia and Boa Vista, about 400 mi (640 km) off the West African coast. Of volcanic origin



Harbour at Vila da Ribeira Brava, São Nicolau Island
Photri

and mountainous, it has an area of 150 sq mi (388 sq km) and rises to 4,277 ft (1,304 m) at Monte Gordo.

Settled since the 15th century, the island's

main economic activities are agriculture (coffee, oranges, beans, corn [maize]) and horse raising. The chief town, Vila da Ribeira Brava, is near the north shore. Pop. (1980 prelim.) 13,575.

São Paulo, *estado* ("state") of southeastern Brazil, bordering on the Atlantic Ocean to the southeast and bounded by the states of Minas Gerais (northeast), Rio de Janeiro (east), Paraná (southwest), and Mato Grosso do Sul (west). São Paulo constitutes the richest and most populous region of the country. With a total area of 95,714 square miles (247,898 square km), it produces more than half of the country's manufactures and more than one-third of its leading crop—coffee. The overwhelming majority of its population is urban and suburban. The state capital, São Paulo, is the largest city in Brazil (having overtaken Rio de Janeiro in the 1950s).

The area that was to become São Paulo was settled in 1532 by the Portuguese under the explorer Martim Afonso de Souza, who established a flourishing settlement at São Vicente, now a resort town near Santos. When Brazil was divided into captaincies, or hereditary fiefs, the captaincy of São Vicente, comprising the whole of Brazil south of Rio de Janeiro, was granted to Souza (1534). The Vicentinos (inhabitants of São Vicente) had begun to explore the hinterlands, and new villages began to appear on the coastline and on the plateau, which became the main region of inland settlement. In 1681 the captaincy was renamed São Paulo, and the town of São Paulo (founded 1554) was designated the capital.

In the 18th century the Portuguese inhabitants of the captaincy (called Paulistas, or Paulistanos) continued to penetrate the west, north, and south. São Paulo existed on its commerce, sugar growing, and diversified agriculture until the introduction of coffee planting in the 19th century opened a new economic era.

The national independence of Brazil was proclaimed in São Paulo in 1822, at which time the captaincy became a province of the new Brazilian empire. The region of São Paulo became a state when the republic was formed in 1889. Political importance grew with the economy. The nation's first three civilian presidents after the downfall of the empire in 1889 were Paulistas. In the 20th century, Paulistas, who first served as mayors of the capital city, as governors, or as local political or industrial leaders, have occupied the presidency, cabinet, and other federal positions with significant regularity.

São Paulo has a coastline 370 miles (600 km) long. The narrow coastal zone is broken by lagoons, tidal channels, and mountain spurs. It is bordered by the well-wooded slopes of the Serra do Mar, a part of the Great Escarpment, which rims an extensive plateau with wide, grassy plains, about 1,500 to 3,000 feet (460 to 920 m) above sea level. Isolated ranges of low elevation break the surface in places, but, in general, the undulating tableland slopes toward the Paraná River, the state's western boundary.

The Paraná—and its tributaries, the Paranapanema, Tieté (which traverses the whole state), Pardo, Canoas, Inferno, Anhanguera, Turvo, and Dourados—flows westward into the estuary of the Río de la Plata. The extreme eastern part of the tableland, however, slopes to the east, and, from a little east of the city of São Paulo, the Paraíba do Sul River turns northeastward and flows parallel to the coast, meandering across a wide floodplain used for the production of rice.

On the coast the average temperature is about 68° F (20° C), and the annual rainfall is about 79 inches (2,007 mm); on the plateau the average temperature varies between about 64° and 68° F (18° and 20° C), and in the mountainous areas annual rainfall reaches 59 inches (1,500 mm). The lower third of the state is crossed by the Tropic of Capricorn, and the weather in general is mild and healthful. The coastal zone has a hot climate and heavy rainfall. On the plateau rainfall is ample with high daytime temperatures and cool nights.

The evergreen forests are reminiscent of the wealth of vegetation in Brazil in days gone by. The vegetation is greatly diversified and includes several kinds of hardwoods (such as rosewood), wild fruits, and plants that are used for medicinal and ornamental purposes or for making textiles.

The Paulist animal life is rich and diverse, including the jaguar, cougar, tapir, capybara (an edible rodent related to the guinea pig), howling monkey, parrot, macaw, and alligator.

Before the arrival of the Portuguese, the two principal Indian groups were the Tupí-Guaraní, who lived on the coast and on the plateau, and the Tapuia, who lived farther inland. Black African slaves were introduced to the region by the Portuguese during the 17th century. With the absorption of the Indian element and with further European immigration (mostly Italian, Portuguese, and Spanish), from the end of the 19th century onward, the population of the state was reduced to three elements—white, black, and mulatto. Subsequently a small number of Japanese immigrants also arrived.

Brazilian-style Portuguese is the language in general use, and English is relatively widely spoken. São Paulo is predominantly Roman Catholic, though other Christian denominations are found.

Under federal law all citizens are entitled to primary education, which is free and compulsory; the cities have the best educational facilities. Institutions of higher learning include the University of São Paulo (with its constituent colleges and affiliated institutes), Mackenzie University, Pontifical Catholic University, and the Polytechnic School of Engineering—all of which are in the city of São Paulo—and Luis de Queiroz Higher School of Agriculture in Piracicaba.

Agriculture is largely mechanized; it owes its modernization largely to the Luis de Queiroz school and to the Institute of Agronomy of Campinas.

Coffee was formerly the main source of wealth of the state and still accounts for a considerable portion of the total value of its products, although industry, mostly centred in the city of São Paulo and its environs, is surpassing coffee in importance. Besides coffee, crops include sugarcane, cotton, corn (maize), rice, beans, Indian or Paraguay tea (maté), potatoes, and such fruits as bananas and oranges.

Ranching has begun to transform the old coffee lands into stock-raising areas and pastures for vast herds of cattle. Hogs, sheep, horses, and goats are also raised.

The state has an extensive network of highways. Santos is the nation's busiest port and the largest coffee-shipping port in the world. The ports of São Sebastião, Iguape, Ubatuba, and Cananéia, which are considerably smaller, serve the coastal trade. São Paulo city has an international airport and is the centre of the state's most important cultural institutions. Pop. (1988 est.) 32,091,000.

São Paulo, city, capital of São Paulo *estado* ("state"), southeastern Brazil. The foremost industrial centre in Latin America, São Paulo is Brazil's largest city and one of the most populous cities in the Western Hemisphere. It originated as a small Indian settlement founded by Portuguese Jesuit priests in 1554.

A brief treatment of São Paulo follows. For full treatment (including a map), *see* MACROPAEDIA: São Paulo.

São Paulo is situated in the hills of the Serra do Mar on the edge of Brazil's Great Escarpment, 30 miles (48 km) from its Atlantic port of Santos and 220 miles (350 km) southwest of Rio de Janeiro. The city's topography includes open country, valleys, and foothills, with the higher parts being the preferred residential areas. The valleys consist of alluvial land on the banks of the Tietê, Pinheiros, and Tamanduateí rivers.

Because of its moderate elevation (2,690 feet [820 m]), São Paulo enjoys a more temperate climate than most areas that lie within the tropics. The temperature ranges from the freezing point during the winter to 86° F (30° C) on an exceptionally hot summer day. A gentle wind from the Serra da Cantareira contributes to this moderate climate.

The economy of São Paulo is diversified. Principal industries include the production of textiles, mechanical and electrical appliances, furniture, and chemicals and pharmaceuticals and the processing of foodstuffs. Metallurgy and oil refining are important in the surrounding area, with refineries located at Cubatão and Capuava and heavy metallurgical plants at Taubaté. Wholesale and retail trade are well developed, with each commercial specialty assigned to its own zone within the city. São Paulo is also a national and international banking centre, with branches of banks from many foreign countries.

Throughout most of the 19th century, São Paulo consisted of dilapidated buildings on narrow, unpaved streets, with churches and convents reflecting the influence of the Jesuit and Franciscan religious orders. It adopted a city plan in 1889, after rapid and unchecked growth had engulfed the entire metropolis. Since then, successive administrations have widened and relocated streets, straightened rivers, and generally encouraged more rational growth.

The growth of São Paulo as a cultural and intellectual centre can be traced to the founding of the Faculty of Law (1827), which was incorporated into the University of São Paulo (1934), now the most esteemed institution of higher learning in the city. Affiliated institutions include the Butantã Institute, a world-famous research centre for the study of snakes and antitoxins. São Paulo is also noted for its libraries and theatres, particularly the Municipal Theatre.

Located at a key junction of three of Brazil's most important railroads, São Paulo is linked to the coastal port of Santos by a cable railway and by a highway. (Santos is the nation's busiest port and the largest coffee-shipping port in the world.) Highways connect São Paulo with other major inland cities and most other Brazilian states. Its Congonhas, Cumbica, and Viracopos airports are among the world's busiest. Area city, 576 square miles (1,493 square km); metropolitan area, 3,101 square miles (7,951 square km). Pop. (1985 est.) mun., 10,099,086; metropolitan area, 15,280,375.

Consult the INDEX *first*

São Paulo de Luanda (Angola): *see* Luanda.

São Pedro e São Paulo Rocks (Brazil): *see* Saint Peter and Saint Paul Rocks.

São Roque, Cape, Portuguese CABO DE SÃO ROQUE, headland on the northeastern Atlantic coast of Brazil, Rio Grande do Norte state, 20 miles (32 km) north of Natal, the state capital. It is frequently called the easternmost point of the South American continent (at 5°29′ S 35°13′ W), but the true eastern extremity is at Cape Branco (Cabo Branco), to the southsoutheast (at 7°9′ S 34°47′ W).

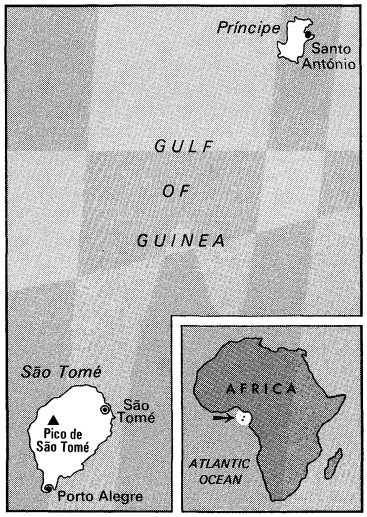
São Salvador (Brazil): *see* Salvador.

São Tiago Island, Portuguese ILHA DE SÃO TIAGO, English SANTIAGO ISLAND, largest and most populous island of Cape Verde, in the Atlantic Ocean, about 400 mi (640 km) off the West African coast. It has an area of 383 sq mi (991 sq km) and rises to Pico da Antónia (4,566 ft [1,392 m]).

São Tiago is Cape Verde's most agriculturally productive island. Corn (maize) is the main crop; bananas, oranges, sugarcane, coffee, and castor beans are also grown. Fishing is important, and a new trading port, to be built with Soviet assistance, has been planned for the city of Tarrafal, on the northwest coast. Praia (*q.v.*), on the south shore of the island, is the capital of Cape Verde. Pop. (1980 prelim.) 145,923.

São Tomé, Cape, Portuguese CABO DE SÃO TOMÉ, headland on the Atlantic coast of eastern Brazil, Rio de Janeiro state, 25 mi (40 km) southeast of Campos. It was formed by sediments deposited by the Rio Paraíba do Sul, which discharges into the ocean at a point 25 mi to the north. The cape was first seen by Europeans in 1501.

São Tomé and Príncipe, Portuguese SÃO TOMÉ E PRÍNCIPE, democratic republic of West Africa, located on the Equator in the part of the Gulf of Guinea known as the Bight of Biafra. It consists of two main islands (São Tomé and Príncipe) and a number of islets. Their total area is 372 sq mi (964 sq km), of which São Tomé comprises 334 sq mi. The capital and largest town is São Tomé. The



São Tomé and Príncipe

population of the republic in 1984 was estimated at 101,000.

The article that follows is a summary of significant detail about São Tomé and Príncipe. For information about regional aspects of São Tomé and Príncipe, *see* MACROPAEDIA: Central Africa; European Overseas Exploration and Empires, The History of.

For current history and for statistics on society and economy, *see* the article "World Affairs" and BRITANNICA WORLD DATA, respectively, in the *Britannica Book of the Year.*

The land. The two main islands are each made up of northeast and southwest lowlands and central volcanic highlands, and they both have swift-flowing streams. The island of São Tomé is oval-shaped, about 30 mi (48 km) long and 20 mi wide, mountainous in the western part (rising to an altitude of 6,640 ft [2,024 m] at the Pico de São Tomé), and more gently sloping in the eastern part. Príncipe is about 10 mi long and 5 mi wide; its northern half consists of plains and its southern half is mountainous, culminating in Pico do Príncipe (3,610 ft). The two islands are separated by about 90 mi of sea.

The climate is tropical, with average annual temperatures at lower elevations of 80° F (27° C); above 2,000 ft, temperatures average about 68° F (20° C) annually. The rainy season lasts from October to May and the dry season from July to August. The average annual rainfall in the lowlands near the town of São Tomé is about 39 in. (1,000 mm) and in the mountains can reach totals as high as 150 to 200 in. annually. Tropical rain forests cover most of the area of the islands, changing above 4,500 ft into a cloud-mountain forest. The northern and northeastern lowlands of São Tomé and Príncipe have some grassy areas and woodland.

The people. The population of São Tomé and Príncipe is racially mixed but predominantly African; it includes descendants of slaves who were formerly imported from the coast of West Africa, southern European settlers (primarily Portuguese), and contract workers from Angola, Cape Verde, and Mozambique. The 1970s witnessed the exodus of most of the 4,000 Portuguese residents and the repatriation of several hundred São Toméan refugees from Angola. The official language is Portuguese, although several Creole dialects are widely spoken. Most of the population is Roman Catholic. About 80 percent of the people live on São Tomé and the remainder on Príncipe. The town of São Tomé had a population in 1978 estimated at 25,000; the second largest town is Santo António, on Príncipe. The birth rate in 1982 was 38.7 and the death rate was 10.2 per 1,000 population, respectively. Infant mortality was at the rate of 69.5 per 1,000 live births. The annual growth rate of the population in the early 1980s was about 2 percent.

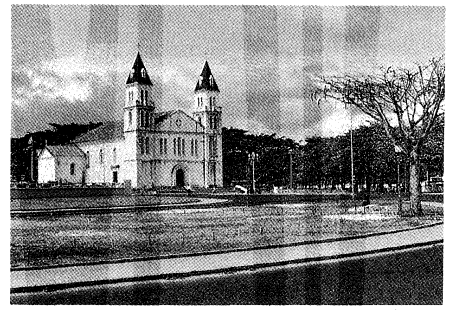
The economy. São Tomé and Príncipe's centrally planned economy is based mainly upon agriculture and fishing. Its gross national product (GNP), which amounted to U.S. $40,000,000 in 1981, or about $370 per capita, had fallen an average of 0.2 percent annually (1970–80). About 36 percent of the land, most in the coastal lowland areas, is cultivated, and of this, about 90 percent is in large, nationalized estates, the remainder having been allowed to remain in small private holdings. Cocoa is the principal cash crop, occupying about 55 percent of the cultivated land, followed by coconut and oil palms (yielding coconuts, palm kernels and oil, and copra), bananas, and coffee. Taro, cassava, breadfruit, and corn (maize) are grown for subsistence. Fishing, mainly for tuna and sharks, has some importance, with the annual catch in the early 1980s about double that of 10 years earlier. Although 64 percent of the land is forested, forestry is limited to satisfying local needs for sawn wood. Cinchona bark is harvested for quinine production. Manufacturing is limited to the processing of agricultural crops and the production of bread, biscuits, and beverages; attempted expansion, including a ceramics plant introduced by East Germany in the early 1980s, was hampered by a lack of developed markets for distributing manufactures.

Before independence in 1975, the flight of the Portuguese plantation owners, civil servants, and traders, along with the departure of most of the Cape Verdean workers and the influx of exiles from Angola, disrupted the economy and led to a drop in cocoa exports. The government, however, in the late 1970s began rehabilitation schemes that resulted in increased cocoa production in the early 1980s. Most food still has to be imported, and malnutrition is a continuing problem.

Imports generally exceed exports, except in years when cocoa, constituting 90 percent of exports, commands a high price on the international market. Copra, palm kernels, coffee, and cinchona bark are the other exports. Besides food, the principal imports include machinery, electrical equipment, and mineral fuels. The Netherlands, Portugal, the United States, and Germany are the main trading partners.

Communications on the islands are limited, but São Tomé town is linked by air with Príncipe, Angola, and Cameroon. Roads total 178 mi, including a coastal route around the island of São Tomé.

Administrative and social conditions. The Movimento de Libertação de São Tomé e Príncipe (MLSTP) is the country's only political party. The Popular Assembly is a 40-member


Nossa Senhora da Graça (Our Lady of Grace) cathedral on São Tomé
Paul Bovey, Federal Institute of Technology, Zurich

(mainly MLSTP officials) legislative body. It is elected for a period of four years and in turn elects a president of the republic for a four-year term from candidates proposed by the MLSTP. The Supreme Tribunal, appointed by the Popular Assembly, is the highest judicial body.

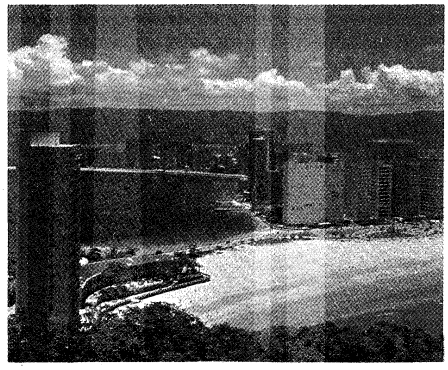
Free health care is available to all citizens of the country, and the islands have health facilities; malaria is a major health hazard. Education is similarly free and is compulsory for children of more than six years of age. There are several secondary schools on the islands and a technical school.

History. São Tomé island was probably uninhabited when first visited by European navigators in the 1470s. Thereafter, the Portuguese began to settle convicts and exiled Jews on the island and established sugar plantations, using slave labour from the African mainland; for some years São Tomé was important in the trade and transshipment of slaves. In the 17th century the island was held briefly by the Dutch. After a decline, the colony recovered its prosperity in the late 19th century with the exploitation of cocoa, but by 1909 British and German chocolate manufacturers were boycotting São Tomé cocoa because indentured labourers used on the plantations were virtually slaves. The islands played only a minor role in the initial conflicts between African nationalism and Portuguese colonialism. With other Portuguese colonies they were given the status of an overseas province in 1951. Dissatisfaction with working conditions on the plantations led to numerous strikes from 1952 until 1973. The islands became an independent republic on July 12, 1975.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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São Vicente, city, southeastern São Paulo state, Brazil, on the Ilha (island) de São Vicente, adjoining Santos city in the Baía (bay) de Santos. Although the exact date of its settlement is unknown, São Vicente was one of the earliest successful Portuguese captaincies in Brazil. It was given town status in 1532 and was made the seat of a municipality in 1700. Long since surpassed in importance by Santos and São Paulo, the city is now primarily a



Cidade Ocian apartment complex along the Praia Grande, São Vicente, Braz.
Dilson Martins—EB Inc.

resort with a large beach, the Praia Grande. Pop. (1980) 192,858.

São Vicente, Cabo de (Portugal): *see* Saint Vincent, Cape.

São Vicente Island, Portuguese ILHA DE SÃO VICENTE, English SAINT VINCENT ISLAND, island of Cape Verde, in the Atlantic Ocean, between the islands of Santo Antão and Santa Luzia, about 400 miles (640 km) off the western African coast. It has an area of 88 square miles (227 square km) and rises to Monte Verde (2,539 feet [774 m]). The main economic activities are subsistence agriculture (corn [maize], beans, potatoes) and fishing. An oil refinery was built in 1975. The chief city, Mindelo (*q.v.*), on the northwest shore, is Cape Verde's most important port. Pop. (1980) 41,594.

Saône-et-Loire, *département,* Bourgogne *région,* eastern France, created from part of the historic province of Burgundy. With an area of 3,311 square miles (8,576 square km), it is one of the largest *départements* in France. The Saône River links with the Doubs in the northeast, flows southward through Chalon-sur-Saône, and follows the eastern boundary. After passing through the ancient town of Tournus, celebrated for its Romanesque church, the river flows by Mâcon (*q.v.*), the capital. The Loire River flows along the southwestern border through the small industrial town of Digoin before passing through the southwestern corner. Crossing the northwest, the Aroux River flows past the cathedral city of Autun to join the Loire above Digoin. The Canal du Centre runs north-southeast across the Montceau-les-Mines and Blanzy industrial basin, which includes Le Creusot, the cradle of France's metallurgical industry. The canal passes through Paray-le-Monial, a pilgrimage centre with a Romanesque church modeled on the celebrated ruined Cluny abbey in the southeast. The Autoroute du Sud, a motorway from Paris to the Mediterranean, runs parallel to the Saône.

The climate is continental, with hot summers and harsh winters. Most of the land is covered with low mountains or high hills. In the northwest are the wooded granite mountains of Morvan. The Charollais region in the centre and south is the home of the well-known breed of cattle that bears its name. The Saône valley and the plain of Bresse in the east are rich agricultural lands (cereals, sugar beets, vegetables, dairy farming, and poultry). Vines on the Mâconnais heights above the Saône and around Châlons produce excellent wines, notably Brouilly, Moulin-à-Vent, Pouilly-Fuissé, and Mercurey. Coal is still mined at Blanzy; heavy metallurgy is carried on at Le Creusot; and elsewhere textiles, chemicals, and electronics are manufactured. Extensive remains of Paleolithic man have been found at Solutré-Pouilly near Mâcon. The *département* has five *arrondissements*—Mâcon, Autun, Chalon-sur-Saône, Charolles, and Louhans—and is in the educational division of Dijon. Pop. (1987 est.) 572,700.

Saône River, river, rising near Viomenil, Vosges *département,* southwest of Épinal, Lorraine *région,* eastern France, and flowing generally southward to the Rhône River at Lyon. From its source it flows southwestward into the Haute-Saône *département* near Corre, where it meets the Canal de l'Est. It flows through Gray to Pontailler-sur-Saône and crosses into the Côte d'Or *département* to enter the Saône-et-Loire *département,* where it is joined by the Doubs. It passes Chalon-sur-Saône, Tournus, Mâcon, and Villefranche before joining the Rhône after a course of 300 miles (480 km).

The Saône is navigable from Corre for 233 miles (375 km) and has 30 locks. Barge traffic is heavy along its lower course. Its basin is about 11,600 square miles (30,000 square km) in area and is connected by canal to both the Rhine and the Seine rivers.

Saora (people): *see* Savara.

Saoshyans, in Zoroastrian eschatology, final saviour of the world and quencher of its evil, the foremost of three saviours (the first two are Ōshētar and Ōshētarmāh), all posthumous sons of Zoroaster. One will appear at the end of each of the three last millennia of the world, miraculously conceived by a maiden who has swum in a lake where Zoroaster's seed was preserved. After 57 years Saoshyans, aided by 30 great persons of the departed who have remained linked with bodily existence, will break the demonic power and resurrect the bodies of the dead. Saoshyans and six helpers will then lead the work in the seven zones of the world, communicating with each other miraculously. When all souls have been cleansed, including those of the damned, Saoshyans will prepare for them white *haoma*—the ritual drink of the Zoroastrians—which will bestow eternal perfection on their bodies.

sap, watery fluid of plants. Cell sap is a fluid found in the vacuoles (small cavities) of the living cell; it contains variable amounts of food and waste materials, inorganic salts, and nitrogenous compounds. Xylem sap carries soil nutrients (*e.g.,* dissolved minerals) from the root system to the leaves; the water is then lost through transpiration. Maple sap is xylem sap, containing some sugar in late winter. Phloem, or sieve-tube, sap is the fluid carrying sugar from leaves to other parts of the plant in the summer. *See also* cohesion hypothesis.

Sap, Thale (Thailand): *see* Luang, Lake.

sap beetle, any member of the approximately 2,000 species of the insect family Nitidulidae (order Coleoptera), usually found around souring or fermenting plant fluids (*e.g.,* decaying fruit, moldy logs, fungi). Sap beetles are about 12 mm (0.5 inch) or less in length and oval or elongated in shape. In some species the elytra (wing covers) cover the abdomen; in others the tip of the abdomen is exposed. *Glischrochius fasciatus,* a common North American species, is shiny black with two red bands across the elytra. *Conotelus obscurus, C. lobiopa,* and *G. quadrisignatus* are also representative.

sapajou: *see* capuchin monkey.

Sapele, town and port, Rivers state, southern Nigeria, on the Benin River just below the confluence of the Ethiope and Jamieson rivers, 98 miles (158 km) from the Escravos Bar and entrance to the Bight of Benin. It lies on the road that branches to Warri, Ughelli, and Asaba and is connected by ferry to the road to Benin City.

Founded in the colonial period on land traditionally inhabited by the Urhobo (Isoko) people, Sapele has been a centre for sawmilling (obeche, abura, sapele, and mahogany) since 1925. Its plywood- and veneer-manufacturing plant is one of the largest in western Africa. Sapele is also known for the rubber plantations in the vicinity. Its industry became more diversified in the 1960s with factories for making shoes, tiles, plastics, and chemicals. Sapele is a local market centre in cassava, fish, palm oil and kernels, yams, and plantains, and it has a flour-milling plant. It has several secondary schools, a trade school, and a government hospital. Pop. (1988 est.) 114,200.

Saphar (ancient Arabia): *see* Ẓafār.

Sapieha FAMILY, original name SOPIHA, princely family important in Polish history that was descended from Ukrainian boyars subject to Lithuania.

Lew (1557–1633), a Calvinist in his youth, returned to Roman Catholicism and supported the king of Poland. He served as chancellor of Lithuania in 1589–1623 and encouraged Polish intervention in Russia during the Time of Troubles.

Paweł Jan (*c.* 1610–65) was active in wars against Muscovites, Cossacks, and Swedes. He was an opponent of the Polish king John II Casimir Vasa's centralizing policies.

Leon (1803–78) participated in the November Insurrection of 1830 against Russia and was chairman, in 1861–75, of the Austrian Galician Sejm (parliament).

Eustachy (1881–1963) was Polish envoy to London in 1919–20 and Polish foreign minister in 1920–21. Later he was a leader of the monarchist movement.

Sapindales, order of flowering plants that includes the soapberries and maples. Most of its members are trees (some of which are prized as sources of timber), shrubs, and woody vines. Of the order's nine families, the largest is Sapindaceae (soapberries), which includes most of Sapindales' 168 genera and 2,300 species.

A brief treatment of Sapindales follows. For full treatment, *see* MACROPAEDIA: Angiosperms.

The order is mostly tropical and subtropical, with many species occurring in rain forests below elevations of 2,000 m (6,600 feet). The tropical species include the order's largest members—*Schleichera oleosa* of Burma (growing to 60 m [18 feet]), *Pometia pinnata* (40–50 m [12–15 feet]), and *Tristiropsis canarioides* (up to 45 m [14 feet]) of New Guinea. Temperate species include the Mexican buckeye (*Ungnadia speciosa*) and the hopbush (*Dodonaea viscosa*) of the southwestern United States and the goldenrain tree (*Koelreuteria paniculata*) of China. Some genera occur in the same climatic region on different continents—*e.g., Acer, Aesculus,* and *Staphylea* of the temperate regions of North America and Eurasia, and *Paullina* of the tropical Americas, Africa, and Madagascar. Other genera are restricted in their distribution to a particular continent, part of a continent, archipelago, or even an island. Examples of these are *Melianthus* of South Africa and *Akania* of eastern Australia.

Sapindales are of major economic importance as timber. The most valuable timber tree of the order is the sugar maple (*Acer saccharum*) of North America. Its wood is used for cabinetry, construction, flooring, interior finish, and firewood. The tree's sap is treated to produce maple syrup and maple sugar, and the sugar maple is also used as an ornamental and shade tree. Buckeyes (*Aesculus*) are used for paper pulp and as ornamental and shade trees. They include the horse chestnut (*Aesculus hippocastanum*), the Ohio buckeye (*A. glabra*), and the yellow, or sweet, buckeye (*A. octandra*). Of the tropical trees, the *Pometia pinnata* and the akee (*Blighia sapida*) of West Africa are important sources of timber.

Of the tropical members of Sapindales, the

litchi (*Litchi chinensis*), rambutan (*Nephelium lappaceum*), longan (*Euphorbia longana*), akee, Spanish lime (*Melicoccus bijugus*), and Senegal cherry (*Aphania senegalensis*) are valued for their edible fruits.

The soapberries—including *Sapindus, Aphania,* and *Paullinia*—are important as soap substitutes because of the presence of saponins (chemical substances that produce soapy lathers).

Pollination for most of the Sapindales is probably accomplished by insects, birds, and, for some maples, by the wind. Most species have both bisexual and male or female flowers on the same plant. (Many of the bisexual flowers function unisexually, however.) Only a few species, such as the box elder (*Acer negundo*), have truly unisexual flowers with male or female flowers on separate plants. Self-sterile species include the silver maple (*Acer saccharinum*) and the mountain maple (*A. spicatum*).

The fruits of the Sapindales can be in the form of capsules, as in *Aesculus;* drupes (fleshy fruits with a single-seeded, stony pit), as in *Exothea;* berries, as in *Allophylus;* or samaroid schizocarps (fruits that break into winged segments), as in *Acer.* The seeds of the capsules, drupes, and berries are dispersed by birds and small mammals, those of the schizocarps by the wind.

Sapir, Edward (b. Jan. 26, 1884, Lauenburg, Pomerania, Ger.—d. Feb. 4, 1939, New Haven, Conn., U.S.), one of the foremost U.S. linguists and anthropologists of his time, most widely known for his contributions to the study of North American Indian languages. A founder of ethnolinguistics, which considers the relationship of culture to language, he was also a principal developer of the American (descriptive) school of structural linguistics.

Sapir, the son of an Orthodox Jewish rabbi, was taken to the United States at age five. As a graduate student at Columbia University he came under the influence of the noted anthropologist Franz Boas, who directed his attention to the rich possibilities of linguistic anthropology. For about six years he studied the Yana, Paiute, and other Indian languages of the western United States.

From 1910 to 1925 Sapir served as chief of anthropology for the Canadian National Museum, Ottawa, where he made a steady contribution to ethnology. One of his more important monographs concerned cultural change among American Indians (1916). He also devoted attention to Indian languages west of the continental divide. He joined the faculty of the University of Chicago (1925) and in 1929 suggested that the vast number of Indian languages of the United States and Canada and certain of those of Mexico and Central America could be classified in six major divisions. In 1931 he accepted a professorship at Yale University, where he established the department of anthropology and remained active until two years before his death.

Sapir suggested that man perceives the world principally through language. He wrote many articles on the relationship of language to culture. A thorough description of a linguistic structure and its function in speech might, he wrote in 1931, provide insight into man's perceptive and cognitive faculties and help explain the diverse behaviour among peoples of different cultural backgrounds. He also did considerable research in comparative and historical linguistics. A poet, an essayist, and a composer, as well as a brilliant scholar, Sapir wrote in a crisp and lucid fashion that earned him considerable literary repute.

His publications include *Language* (1921), which was most influential, and a collection of essays, *Selected Writings of Edward Sapir in Language, Culture, and Personality* (1949).

sapodilla (*Achras zapota*), tropical evergreen tree of the family Sapotaceae and its distinctive fruit. Though of no great commercial importance in any part of the world, the sapodilla is much appreciated in many tropical and



Sapodilla (*Achras zapota*)
Walter Dawn

subtropical areas, where it is eaten fresh. It is spheroid to ovoid in shape, rusty brown on the surface, and roughly 50–100 millimetres (2–4 inches) in diameter. The sweet flavour has been compared to a combination of pears and brown sugar. When the fruit is ripe the seeds, two to five in number, shiny black, and the size of flattened beans, are surrounded by translucent, yellowish brown, juicy flesh. When immature the flesh contains both tannin and milky latex and is unpalatable. The milky latex, the chief source of gum chicle that was once important in the chewing-gum industry, is extracted by tapping the trunk.

Sapodilla trees grow wild in the forests of southern Mexico and northern Central America. As a cultivated species the tree is medium sized and of slow growth. The reddish wood is hard and durable; elaborately carved lintels of sapodilla 1,000 years old are still to be seen in some Mayan ruins. The leaves, 50–125 mm long, are glossy and light green in colour, ovate to elliptic in outline; the flowers are small and inconspicuous. Propagation is usually by means of seed, but superior trees can be reproduced by grafting.

sapogenin, any of a class of organic compounds occurring in many species of plants as derivatives of the steroid or triterpenoid groups in the form of their glycosides, the saponins (*q.v.*). A similar group of steroid compounds, the genins, is present in the venom of toads, not as glycosides but free or combined with nitrogenous compounds.

Methods of converting the steroid sapogenin diosgenin into progesterone have been developed. An abundant source of diosgenin is a Mexican yam called *cabeza de negro,* and progesterone made from it is used in producing steroid hormones.

The toad venoms affect the heart, being lethal to small mammals and frogs. Chemically, they are similar to the sapogenins derived from digitalis. Preparations from toad skin have been used medicinally for centuries in the Orient and were used to treat dropsy in Europe before the introduction of digitalis.

saponin, any of numerous substances, occurring in plants, that form stable foams with water, including the constituents of digitalis and squill that affect the heart and another group that does not affect the heart.

Saponins affecting the heart have been used as arrow and spear poisons by African and South American natives. Digitalis, from purple foxglove, *Digitalis purpurea,* was introduced into heart therapy in 1785 by the Scottish physician William Withering. The non-cardiac-active saponins include digitonin, which was recognized in digitalis preparations in 1875; and dioscin, the precursor of diosgenin, which is obtained from a Mexican yam.

A small group of triterpenoid saponins has been isolated from soybeans.

saponite, clay mineral of the montmorillonite group. *See* montmorillonite.

Sapor (Latin), Greek SAPORES (name of Persian kings): *see under* Shāpūr.

sapote, also spelled ZAPOTE, also called MARMALADE TREE (*Calocarpum mammosum*), plant, of the sapodilla family (Sapotaceae), native to Central America but cultivated as far north as the southeastern United States. It grows to about 23 metres (75 feet) tall, bears small pinkish-white flowers, and has hard, durable, reddish wood.

The edible fruit is rusty brown, rather spherical, and about 5–10 centimetres (2–4 inches)



Sapote (*Calocarpum mammosum*)
W.H. Hodge

in diameter. The reddish flesh is spicy in flavour.

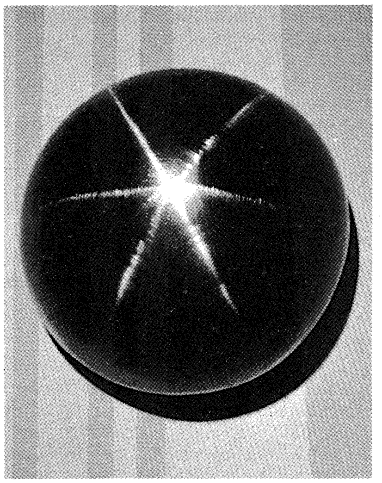
Sapper, pseudonym of HERMAN CYRIL MCNEILE (b. Sept. 28, 1888, Bodmin, Cornwall, Eng.—d. Aug. 14, 1937, West Chiltington, Sussex), British soldier and novelist who won immediate fame with his thriller *Bull-Dog Drummond* (1920), subtitled "The Adventures of a Demobilized Officer Who Found Peace Dull." Sapper published numerous popular sequels, but none had the impact and merit of the original.

sapper, military engineer. The name is derived from the French word *sappe* ("spadework" or "trench") and became connected with military engineering during the 17th century, when attackers dug covered trenches to approach the walls of a besieged fort. They also tunnelled under those walls and then collapsed the tunnels, thus undermining the walls. These trenches and tunnels were called "saps" and their diggers came to be called "sappers."

In modern armies, sappers serve three functions. They provide tactical support on the battlefield by installing portable bridges, tank traps, and other construction; they build major support facilities, such as airports, supply roads, fuel depots, and barracks; and they are assigned additional tasks, including the disarming and disposal of unexploded bombs and shells and the preparation and distribution of maps.

Sapphar (ancient Arabia): *see* Ẓafār.

sapphire, transparent to translucent, natural or synthetic variety of corundum (*q.v.;* aluminum oxide, Al_2O_3) that has been highly prized as a gemstone since about 800 BC. Its colour is due mainly to the presence of small amounts of iron and titanium and normally ranges from a very pale blue to deep indigo, with the most valued a medium-deep cornflower blue. Colourless, gray, yellow, pale-pink, orange, green, violet, and brown varieties of gem corundum also are known as sapphire; red varieties are called ruby. Much sapphire is unevenly coloured; it is also



The Star of Asia, 330-carat star sapphire; in the Smithsonian Institution, Washington, D.C.
Lee Boltin

dichroic; that is, the colour of most varieties changes with the direction of view. Alexandrite sapphire appears blue in daylight and reddish or violet in artificial illumination, somewhat like true alexandrite. Careful heating and cooling under various conditions can induce permanent colour changes in sapphire (*e.g.*, from yellow to colourless or greenish blue and from violet to pink). Other colour changes result from exposure to intense radiation. Most sapphire contains abundant microscopic inclusions; reflections from these yield a faint whitish sheen, known as silk. Tiny, regularly arranged mineral inclusions (commonly rutile) and elongate cavities are responsible for the asterism shown by star sapphire.

Sapphire is a primary constituent of many igneous rocks, especially syenites, pegmatites, and various basic (silica-poor) types; it also occurs in schists and metamorphosed carbonate rocks. Most commercial production has come from alluvial gravels and other placer deposits, where the sapphire commonly is associated with ruby and other gem minerals. The best known sources, including some lode deposits, are in Sri Lanka, Burma, Thailand, Australia (Victoria, Queensland, New South Wales), India, Madagascar, the Soviet Union, South Africa, and the United States (Montana, North Carolina).

Most transparent sapphire is faceted, generally in the brilliant style. Such gems have considerable sparkle, but they exhibit little fire because of their modest dispersion (separation of light into its component colours). Skillful cutting of unevenly coloured stones yields gems with a uniform appearance derived from only small portions of relatively deep colour. Star sapphire and other nontransparent varieties are cut *en cabochon* (in convex form, highly polished) rather than faceted. Despite its great hardness, some sapphire is carved or engraved, especially in the Orient.

Synthetic sapphire has been produced commercially since 1902. Clear, sound material is manufactured in the form of carrot-shaped boules and slender rods. Much is consumed by the jewelry trade, but most synthetic material is used for the manufacture of jewel bearings, gauges, dies, phonograph-needle points, thread guides, and other specialized components; some also is used as a high-grade abrasive. Synthetic star sapphire is made with luminous stars that are more regular and distinct than those in most natural stones; the asterism is obtained through controlled exsolution of impurities.

sapphire berry (shrub): *see* sweetleaf.

Sappho, also spelled PSAPPHO (fl. *c.* 610–*c.* 580 BC, Lesbos, Asia Minor), celebrated lyric poet greatly admired in all ages for the beauty of her writing. She is said to exceed all other poets, except Archilochus and Alcaeus, in the history of Greek literature in entering into a close personal relation with the reader. Her vocabulary, like her dialect, is for the most part vernacular, not literary. Her phrasing is concise, direct, and picturesque. She has the power of standing aloof and critically judging her own ecstasies and pains; but her emotions lose nothing of their force by being recollected in comparative tranquillity.

Sappho is said to have been married to Cercolas, a wealthy man from the island Andros. The tradition that she was banished with other aristocrats and went to Sicily for a time is likely to be true; most of her life, however, was spent at Mytilene on the island of Lesbos.

Her themes are invariably personal—primarily concerned with her friendships and enmities with other women—although her brother Charaxus was the subject of several poems. There are, in her work, only a few apparent allusions to the political disturbances of the time, which are so frequently reflected in the verse of her contemporary Alcaeus.

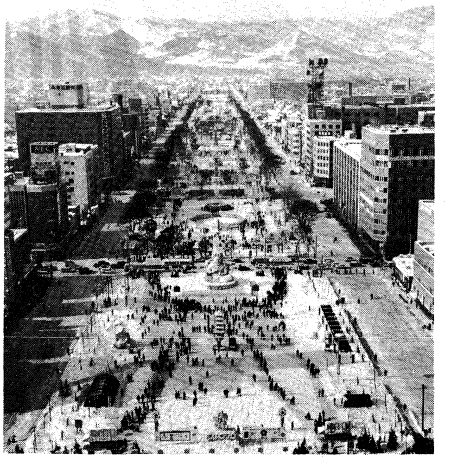
It was the fashion in Lesbos at this time for women of good family to assemble in informal societies and spend their days in idle, graceful pleasures, especially in the composition and recitation of poetry. Sappho, the leading spirit of one of these associations, attracted a number of admirers, some from distant places. The principal themes of her poetry are the loves and jealousies and hates that flourished in that sultry atmosphere. Rival associations are fiercely or contemptuously attacked. For other women, usually nameless, Sappho expresses her feelings in terms that range from gentle affection to passionate love. Ancient writers over a period of time, having a large volume of her work in front of them, alleged that Sappho was a lesbian. Her poetry shows that she entertained emotions stronger than mere friendship toward other women, but nothing in what is extant connects her or her companions with homosexual practices.

It is not known how her poems were published and circulated in her own lifetime and for the following three or four centuries. In the era of Alexandrian scholarship (especially the 3rd and 2nd centuries BC), what remained of her work was collected and republished in a standard edition of nine books of lyrical verse and one of elegiac. This edition did not survive the early Middle Ages. By the 8th or 9th century AD Sappho was represented only by quotations in other authors. Only one poem, 28 lines long, was complete. The next longest was 16 lines. Since 1898 these fragments have been greatly increased by papyrus finds, though no complete poem has been recovered and nothing equal in quality to the two longer pieces preserved in quotations.



Sappho (seated), detail from a hydria from Vári, Greece, *c.* 440–420 BC; in the National Archaeological Museum, Athens
By courtesy of the National Archaeological Museum, Athens

Sapporo, capital, Hokkaido Territory (*dō*), Japan, on the Ishikari-gawa (Ishikari River). Laid out in 1871, with wide, tree-lined boulevards intersecting each other at right angles, the city was made the prefectural capital in 1886. It owed its early development to the colonization bureau of the government. It is now a major commercial centre, with Otaru, on the Sea of Japan, as its outport. Chief industries are the manufacture of foodstuffs, sawmilling, printing, and publishing. A centre for national railways, Sapporo uses Chitose Airport for domestic flights. Beneath the Tsugaru-kaikyō (Tsugaru Strait) a submarine tunnel was under construction during the 1980s.



Ō-dōri Promenade in downtown Sapporo, Japan
Orion Press—FPG/EB Inc.

A popular centre for skiing and winter sports, Sapporo was the site of the Winter Olympics in 1972. The annual Snow Festival features giant sculptures carved from packed snow. The city is also the seat of Hokkaido University and has beautiful botanical gardens. Pop. (1983) 1,496,251.

Saprolegniales: *see* water mold.

sapropel, unconsolidated sedimentary deposit rich in bituminous substances. It is distinguished from peat in being rich in fatty and waxy substances and poor in cellulosic material. When consolidated into rock, sapropel becomes oil shale, bituminous shale, or boghead coal. The principal components are certain types of algae that are rich in fats and waxes. Minor constituents are mineral grains and decomposed fragments of spores, fungi, bacteria, and nonvascular plants. The organic materials accumulate in water under reducing conditions.

Sapru, Sir Tej Bahadur (b. Dec. 8, 1875—d. Jan. 20, 1949, Allahābād, India), jurist and statesman important in the progress of British India toward self-government. For his integrity and wisdom he was trusted both by the British government and by Indian intellectual and political leaders. He was knighted in 1922.

Educated at Āgra College, Allahābād, Sapru practiced law before the High Court at Allahābād from 1896. He was a member of the United Provinces (now Uttar Pradesh) Legislative Council (1913–16) and of the Imperial Legislative Council (1916–20), a law member of the Viceroy's Council (1920–23), and a delegate to the three Round Table Conferences in London (1930–32) concerning the government of India. His mediation helped to bring

about the Gandhi–Irwin Pact (1931), by which the Indian nationalist leader Mohandas K. Gandhi terminated a civil-disobedience campaign and was allowed to attend the second Round Table Conference. Sapru was also in part responsible for the Poona Pact modifying the British plan for a separate electorate of Hindu untouchables. This agreement caused Gandhi to abandon the fast (September 1932) that he had begun in protest against the British scheme.

In 1934 Sapru became a privy councillor. Unlike most of his political colleagues in India, he supported the World War II effort of the British Empire without insisting on an early grant of independence in return.

sapsucker, either of two species of North American woodpeckers of the family Picidae (order Piciformes), noted for drilling holes in neat close rows through the bark of trees to obtain sap and insects. They also catch insects in midair.

The yellow-bellied sapsucker (*Sphyrapicus varius*), about 20 cm (8 inches) long, breeds in northern regions (south in mountains) and migrates as far as the West Indies and Central America; red-breasted and red-naped



Yellow-bellied sapsucker (*Sphyrapicus varius*)
Kenneth W. Fink from Root Resources—EB Inc.

races occur west of the Rocky Mountains. Both sexes of *varius* have bold head-markings. The other species, Williamson's sapsucker (*S. thyroideus*), is found in high pine forests of the western United States but is uncommon throughout its range.

Saptamātṛkā (Sanskrit: "Seven Divine Mothers"), in Hinduism, a group of seven mother-goddesses, each of whom is the *śakti,* or female counterpart, of a god. They are Brahmāṇī, Māheśvarī, Kaumārī, Vaiṣṇavī, Vārāhī, Indrāṇī, and Cāmuṇḍā, or Yamī. (One text, the *Varāha-Purāṇa,* states that they number eight, including Yogeśvarī, created out of the flame from Śiva's mouth.)

Representations of the goddesses are found in shrines throughout India, frequently flanked by Vīrabhadra (a ferocious form of Lord Śiva) on the left and the elephant-headed Gaṇeśa on the right. The individual mothers can be identified by their weapons, ornaments, *vāhanas* ("mounts"), and banner emblems, which are in each case the same as that of their corresponding male deities. Any Saptamātṛkā cult that may have existed seems to have disappeared by the 11th century, perhaps, some scholars suggest, absorbed by the growing worship of Śakti (the supreme being personified as female).

sapwood, also called ALBURNUM, outer, living layers of the secondary wood of trees, which engage in transport of water and minerals to the crown of the tree. The cells therefore contain more water and lack the deposits of darkly staining chemical substances commonly found in heartwood. Sapwood is thus paler and softer than heartwood and can usually be distinguished in cross sections, as in tree stumps, although the proportions and distinctness of the two types are variable in different species.

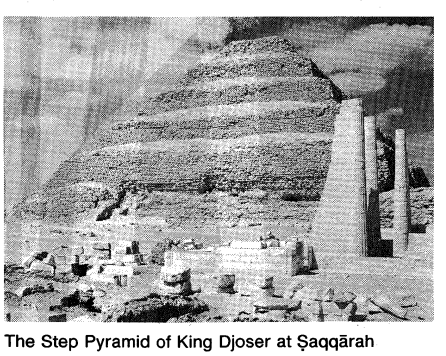
Ṣaqālibah, in medieval Muslim Spain, Slavs, or people from the Black Sea coast north of Constantinople. Later, by extension, the term came to designate all foreign slaves in the military.

The custom in 10th-century Spain was to buy Slavs captured by the Germans on their expeditions into eastern Europe. These and other slaves from Galicia, Lombardy, Calabria, and the land of the Franks—generally young boys—became Muslims, learned Arabic, and were then trained for military service or for administrative positions in the palaces and harems.

The number of Ṣaqālibah in Spain kept pace with the designs of the Umayyad rulers for expanding their territories in the Iberian peninsula and possibly into North Africa. In the reign of ʿAbd ar-Raḥmān III (912–961) alone, the number of slaves was reported to have grown from about 4,000 to 14,000. This increase was accompanied by a corresponding rise in their status in Muslim society. The Ṣaqālibah accumulated wealth and property and slaves of their own and became scholars and poets. Eventually they wielded significant political force in the capital, occupying high civil offices and military posts; they were used by the Umayyads to counterbalance the influential Arab aristocracy. Thus the Slav Najda led the Umayyad armies against Ramiro II of Leon in 939. With the deposition of the caliph Hishām II in 1009, the Ṣaqālibah emerged as one of the three major factions or parties (*taifas*) in Córdoba who for the next 23 years controlled the caliphate, making and unmaking rulers at will. In this same period of civil war and general confusion (1009–91), the Ṣaqālibah founded kingdoms in Denia, Tortosa, Valencia, and Almería, though they did not establish dynasties as did the other *taifas—e.g.,* the Arabs and the Berbers. The various petty kingdoms, however, were liquidated in 1090–91 and incorporated in the new Almoravid empire in Spain.

sāqīyah (water wheel): *see* sakia.

Ṣaqqārah, also spelled SAKKARA, part of the necropolis of the ancient city of Memphis, 15 miles (24 km) southwest of Cairo and west of the modern Arab village of Ṣaqqārah. The site extends along the edge of the desert plateau for about 5 miles (8 km), from Abū Ṣīr in the north to Dahshūr in the south. The earliest remains are those in the Archaic cemetery at the northernmost end of the site, where large mud-brick tombs, or mastabas, have been found that date to the very beginning of Egyptian history. Although storage jars found in the mastabas bore the names of the kings of the 1st dynasty, it seems that these tombs were those of high officials of the period, because the archaic kings were buried at Abydos in Upper Egypt.



The Step Pyramid of King Djoser at Ṣaqqārah
A.F. Kersting

South of the Archaic cemetery lies the Step Pyramid complex of Djoser, second king of the 3rd dynasty (*c.* 2650–*c.* 2575 BC). Djoser's architect Imhotep designed a new form of burial structure for the king in the shape of a pyramid in six stages. At the foot he constructed a huge complex of halls and courts in which the prototype structures of mud brick, wood, and reed were for the first time translated into fine limestone. Shepseskaf of the 4th dynasty built Mastabat al-Fara'ūn, a coffin-shaped tomb, and several kings of the 5th dynasty also constructed their pyramids at Ṣaqqārah. Unas, the last king of the 5th dynasty, was the first to inscribe on the walls of his pyramid chambers the Pyramid Texts designed to protect the dead king and to ensure him life and sustenance in the hereafter. Succeeding kings of the 6th dynasty continued the practice of inscribing Pyramid Texts in the underground chambers. With the exception of Teti, the 6th-dynasty kings built their pyramids to the south of Unas' pyramid, and the most southerly is that of a 13th-dynasty (*c.* 1756–*c.* 1630 BC) king.

Around the pyramids of their sovereigns, the Old Kingdom (*c.* 2575–*c.* 2130 BC) nobles were buried in mastabas. The wall carvings within their tombs depict scenes of daily life.

During the Middle Kingdom (1938–*c.* 1600? BC), relatively few tombs were built in the Ṣaqqārah necropolis, for provincial cemetaries were then popular. In the New Kingdom (1539–1075 BC), however, Memphis became a principal administrative and military centre, and a number of tombs from that period have been found, including the finely decorated tomb of the general, later pharaoh, Horemheb, rediscovered in 1975. Also, in that era and later the sacred Apis bulls were buried at Ṣaqqārah in large subterranean galleries, the most famous of which is the Serapeum. The last imposing tombs to be built in Ṣaqqārah were those of several rulers during the Saite and Persian periods. In the northwest part of the necropolis, beneath a field of mastabas of the 3rd and 4th dynasties, another complex of underground passages contains thousands of ibis mummies of the Ptolemaic period.

Šar Mountains, Serbo-Croatian ŠAR PLANINA, mountain range in Yugoslavia, one of the most rugged and impassable in the Balkans, extending northeast–southwest for about 47 miles (75 km) in western Macedonia. A southern continuation along the Albanian frontier, which includes the Korab, Bistra, Jablanica, and Galičica massifs, makes the total length of about 100 miles (160 km). The Pindus mountain system in Greece is the southward extension of these peaks in Yugoslavia and Albania. They are fold mountains of nonporous rocks; steep-walled, or cirque, lakes and fretted peaks, many at more than 6,000 feet (1,800 m), are evidence of local glaciation.

The Šar Mountains proper, which form the watershed between the Morava-Drim and Vardar river systems, include Titov Vrh, at 9,012 feet (2,747 m) the third highest peak in Yugoslavia, and Turčin (8,865 feet [2,702 m]). Between the mountains are several depressions, some containing large lakes suitable for arable farming and fruit growing. Pastureland above the tree line supports livestock raising, especially sheep. The area is especially noted for the production of cheese. The ranges are increasingly an area for climbing and winter

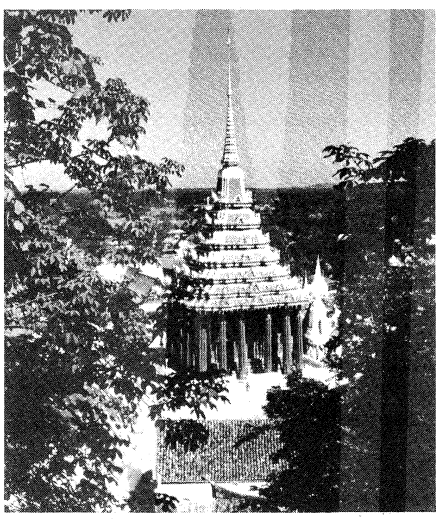
sports, with Popova Šapka a winter sports centre. Principal settlements are Tetovo and Gostivar. The Mavrovo Dam and lake provides a head of water for the Vrutok and Raven hydroelectric power stations. Valuable deposits of chrome ore are mined at the foot of the Šar Mountains.

Sara, cluster of peoples living on the fringe of the southern Sudan, especially in the northwestern regions of the Central African Republic and the south-central area surrounding Sarh, south of Lake Chad in Chad. They include the Gula, Kara, Kreish, Nduka, Ngama, and Sara proper. The Sara peoples all speak Central Sudanic languages of the Chari-Nile branch of the Nilo-Saharan family, and their material culture shows evidence of Sudanic influence.

Subsistence is primarily through hoe cultivation; taro, yams, and sweet potatoes are the main staples. Cattle, sheep, goats, and chickens are raised, as well as small horses.

Headmen aided by bodies of elders normally superintend autonomous village communities, each of which is composed of a separate exogamous clan. Polygyny is practiced. Initiation of the young occurs every seven years for a duration of two months. For boys this is a period of hardship and painful scarification; those who refuse to submit are believed to offend their ancestors and are killed with a spike thrust through the head.

Sara Buri, also spelled SARABURI, town, central Thailand, northeast of Bangkok. Sara Buri (locally called Pak Phrieo) is on the south bank of the Pa Sak River. Its economy is based on textile, metalworking, food-manufacturing, clothing, and woodworking industries. The Phra Buddha Bat shrine in the town contains a footprint of Buddha and is the scene of a yearly festival. Sara Buri is linked to Bangkok, 60 miles (100 km) south-southwest, by rail and highway. Sara Buri is situated in a densely settled rice-growing and cattle-ranching area. Pop. (1985 est.) 53,467.



Shrine of Buddha's footprint, Sara Buri, Thailand
Jules Bucher—Photo Researchers

Sara Lee Corporation, major American producer of frozen baked goods, fresh and processed meats, coffee, hosiery and knitwear, and household and shoe-care products. It is headquartered in Chicago.

The company was incorporated in 1941 as the South Street Company and went through several name changes before it adopted the name Consolidated Grocers Corporation in 1945 and Consolidated Foods Corporation in 1954. In 1956, Consolidated Foods purchased a bakery company, Kitchens of Sara Lee (founded 1935), and in 1985 the entire corporation took the name Sara Lee.

Sara Lee is the largest producer of frozen baked goods in the United States. The company's Douwe Egberts subsidiaries are major marketers of coffee in Europe, and its Hanes hosiery and underwear are major product lines in the United States. The company also manufactures shoe polish and other personal-care products under the Kiwi label. Sara Lee has plants operating in more than 20 countries worldwide.

Saraband rug: *see* Seraband rug.

sarabande, originally, a dance considered disreputable in 16th-century Spain, and, later, a slow, stately dance that was popular in France. Possibly of Mexican origin or perhaps evolved from a Spanish dance with Arab influence that was modified in the New World, it was apparently danced by a double line of couples to castanets and lively music. It was vigorously suppressed in Spain in 1583 but in the early 17th century spread to Italy and reached the French court, where it became a slow, serious processional dance in $\frac{3}{2}$ metre. The sarabande remained popular in France through the 17th century and survived somewhat longer as a stage dance. As a musical form it is a stylized version of the French dance; when used as part of a suite, as in Dietrich Buxtehude's four suites for lute or clavichord, it is normally the third movement.



Sarabande, engraving by J.G. Puschner, 1716, from G. Lambranzi's *Theatralische Tanzschule*
By courtesy of the Victoria and Albert Museum, London

Saracen, in the Middle Ages, any person—Arab, Turk, or other—who professed the religion of Islām. Earlier in the Roman world, there had been references to Saracens (Greek: Sarakenoi) by late classical authors in the first three centuries AD, the term being then applied to an Arab tribe living in the Sinai Peninsula. In the following centuries the use of the term by Christians was extended to cover Arab tribes in general; and, after the establishment of the caliphate, the Byzantines referred to all Muslim subjects of the caliph as Saracens. Through the Byzantines and the crusaders, the name spread into western Europe, where it was long in general use and has survived until modern times.



Saracens besieging crusaders in a tower, detail of a miniature in *Chroniques de France ou de Saint-Denis,* first half of the 14th century; in the British Library (Royal MS. 16 G vi)
Reproduced by permission of the British Library

Saraceni, Eugene: *see* Sarazen, Gene.

Saracoğlu, Şükrü (b. 1887, Ödemiş, near Smyrna, Ottoman Empire [now in Turkey]—d. Dec. 27, 1953, Istanbul), statesman who served as prime minister of the Turkish republic from 1942 to 1946.

Having studied economics and political science in Geneva, Saracoğlu returned to Turkey in 1918 following the defeat of the Ottoman Empire in World War I (1914–18). He joined the movement of Mustafa Kemal (later Atatürk) to resist the Allied occupation of Anatolia and in 1923 was elected to the Grand National Assembly as deputy for İzmir. He served as minister of finance (1927–30) and later prepared a report that served as the basis for reorganizing Turkey's cotton industry. He was minister of justice from 1933 to 1938, when he became the minister of foreign affairs. He later served as president of the Assembly.



Saracoğlu
By courtesy of the National Library, Bibliographical Institute, Ankara, Tur.

As foreign minister Saracoğlu concluded a treaty of alliance with Great Britain and France (1939), as a prerequisite of which France ceded to Turkey Hatay province with the Mediterranean port of Iskenderun (Alexandretta). His policy, nevertheless, was to maintain Turkish neutrality during World War II. As prime minister in 1942–46, he continued the neutrality policy until Turkey declared war on the Axis powers in February 1945, just before the war's end.

Saracoğlu's Cabinet was responsible for two major reform laws: the Tax on Capital (*Varlik Vergisi*), imposed on the commercial classes; and the Land Reform Law, which provided for the reappropriation of state and private estates to the landless peasants. In 1948 he was elected president of the Assembly, but he lost his seat as deputy for Izmir after the election of May 1950.

Sarada script, writing system used for the Kashmiri language by the educated Hindu minority in Kashmir and the surrounding valleys. It is taught in the Hindu schools there but is not used in printing books. Originating in the 8th century AD, Sarada descended from the Gupta script of North India, from which Devanāgarī (*q.v.*) also developed. The earliest inscriptions in Sarada script, found in Kashmir and northeastern Punjab, are dated AD 804. Sarada script corresponds letter for letter with Devanāgarī, although it differs greatly in shape, having stiff, thick strokes. Muslims

in Kashmir use a Persian-Arabic script, and much Kashmiri literature is written in Sanskrit with the Devanāgarī script.

Saragat, Giuseppe (b. Sept. 12, 1898, Turin, Italy—d. June 11, 1988, Rome), statesman and founder of the Socialist Party of Italian Workers (PSLI), who held many ministerial posts from 1944 to 1964, when he became president of the Italian Republic (1964–71).

A Turin University graduate in economics and commerce, Saragat joined the Socialist Party in 1922. An opponent of the Fascists, he was exiled by them from 1926 to 1943; upon returning to Rome in that year, he was arrested by Nazi occupation authorities but later escaped.

Saragat was minister without portfolio in the first post-liberation cabinet of Ivanoe Bonomi, in 1944, and then was ambassador to Paris (1945–46). In 1946 he was elected president of the Constitutional Assembly, which drafted postwar Italy's constitution.

At the Socialist Party Congress in 1947, Saragat opposed the idea of unity with the Communist Party and led those who walked out to form the PSLI. Shortly thereafter, he was invited to be vice-premier under Alcide De Gasperi (December 1947–May 1948). Elected to the Chamber of Deputies (April 1948), he again became vice-premier and minister of the merchant marine, but he resigned (October 1949) to devote himself to his party. It changed its name to the Italian Social Democratic Party (PSDI) in 1951 in an effort to reaffirm its independence from the Communists and the other leftist socialist group.

From 1954 to 1957 Saragat again served as vice-premier but resigned in opposition to the government's position on NATO. About this time, he suggested the idea of an "opening to the left," a coalition government including the leftist socialists.

Saragat was minister of foreign affairs in the cabinet of Antonio Segni in 1959–60 but resigned, causing the downfall of the government. In 1963 he campaigned against nuclear power stations in Italy as an unnecessary extravagance. Later that year he was once more minister of foreign affairs, under Aldo Moro, and saw the opening to the left materialize. He served until late 1964, when he succeeded Antonio Segni as president (a largely ceremonial and arbitral post). He resigned the presidency in 1971; in 1976 he became secretary of his old party, the PSDI.

Saragossa (Spain): *see* Zaragoza.

Sarah, also spelled SARAI, in the Old Testament, wife of Abraham and mother of Isaac. Sarah was childless until she was 90 years old. God promised Abraham that she would be "a mother of nations" (Genesis 17:16) and that she would conceive and bear a son, but Sarah did not believe. Isaac, born to Sarah and Abraham in their old age, was the fulfillment of God's promise to them. The barrenness of Sarah, cited in the preface (Genesis 11:30), stands in tension with the central theme of the Abraham saga, the promise that God will make him the founder of a mighty nation. With respect to the fulfillment of the promise, Sarah embodies the themes of fear and doubt, Abraham those of faith and hope. Her doubt drives Sarah to devise her own way of realizing the promise—she gives Abraham her maidservant, Hagar, so that Hagar might bear a child for them. When the promise is repeated, Sarah expresses her doubt in sarcastic laughter (Genesis 18:12). And when the promise is kept, Sarah, overcome by joy, still implies her doubt had been reasonable (Genesis 21:6–7). Her tomb at Hebron (Genesis 23) was a sign of Abraham's faith that God's promise of the land would also be kept.

Saraikela, also spelled SERAIKELA, town, southern Bihār state, northeastern India. The town was the capital of a former princely state that was founded by Bikram Singh of the Porahat Raj family in the 17th century. It was a sanad (grant) state of the Chota Nāgpur Commission and was one of the former Orissa states until incorporated into Bihār in 1948. The town is a road and agricultural-trade centre. The locality is chiefly an undulating plain with copper, iron-ore, asbestos, and limestone deposits. Pop. (1981) town, 7,865.

Consult the INDEX *first*

Sarajevo, capital and cultural centre of Bosnia and Hercegovina, Yugoslavia. It lies in the narrow valley of the Miljacka River at the foot of Mount Trebević. The city retains a strong Muslim character, having many mosques, wooden houses with ornate interiors, and the ancient Turkish marketplace (the Baščaršija); nearly one-half of the population is Muslim. The principal mosques are the Gazi Husreff-Bey's Mosque, or Begova Džamija (1530), and the Mosque of Ali Pasha (1560–61). Husreff-Bey also built the *medrese* (madrasah), a Muslim school of theology; the Imaret, a free kitchen for the poor; and the *hamam,* public baths. A late 16th-century clock tower is adjacent to the Begova Džamija. Museums include the Mlada Bosna (Young Bosnia), an annex of the town museum; the Museum of the Revolution, chronicling the history of Bosnia and Hercegovina since 1878; and a Jewish museum. Sarajevo has a university (1946) that includes faculties in mining and technology, an academy of sciences, an art college, and several hospitals. A number of streets named for trades survive from an original 37, and the Kazandžviluk (coppersmith's bazaar) is preserved in its original form.

Near Sarajevo are the remains of a Neolithic settlement of the Butmir culture. The Romans established a rest centre at nearby Ilidža, where the Bosna River has its source; there is still a sulfurous spa. The Goths, followed by the Slavs, began settling in the area in about the 7th century. In 1415 Sarajevo is mentioned as Vrhbosna, and, after the Turks invaded in the late 15th century, the town developed as a trading centre and stronghold of Muslim culture. Dubrovnik merchants built the Latin quarter (Latinluk), and migrating Sephardic Jews founded their quarter, Čifuthani. The 17th and 18th centuries were less fortunate—Prince Eugene of Savoy burned the town in 1697, while fires and plagues decimated the population.

The declining Ottoman Empire made Sarajevo an administrative centre in 1850, provoking a bloody revolt in 1851. After the Austro-Hungarian Empire ousted the Turks in 1878, formally annexing Bosnia and Hercegovina in 1908, a resistance movement, the Mlada Bosna, developed that culminated on June 28, 1914, when a Bosnian Serb, Gavrilo Princip, assassinated the heir apparent, Archduke Francis Ferdinand, and his wife. The Austro-Hungarian government used this incident as a pretext for mobilizing against Serbia, thus precipitating World War I. In November 1918 the Diet of Sarajevo proclaimed union within Yugoslavia. During the German occupation of World War II, Sarajevo resistance fighters in the republic fought several crucial battles against the Germans.

After World War II, Sarajevo rapidly repaired the considerable war damage. It is the centre of a road network, is linked by electrified rail line to the Yugoslav trunk line at Vrpolje, and has a rail connection to the Adriatic. Old craft trades, particularly metalware and carpet making, continue. Sarajevo was selected as the site for the 1984 Winter Olympic games. The city's industry includes a sugar-beet refinery, brewery, furniture factory, tobacco factory, hosiery works, communications plants, an agribusiness combine, and a growing automobile industry. At nearby Ilijaš, lignite from the Sarajevo Basin is made into coke, and there is a blast furnace for foundry pig iron. Pop. (1981) city, 319,017; metropolitan area, 448,519.

Sarakole (people): *see* Soninke.

Saramacca, creole language, based on English, spoken by Bush Negroes in the Guianas. *See* Sranantonga.

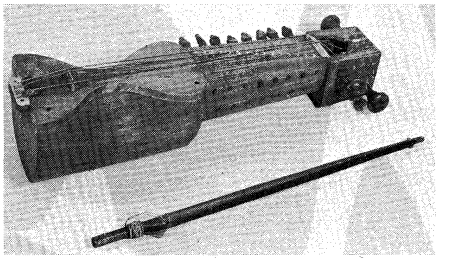
Saramo (people): *see* Zaramo.

Saran, also spelled SARAN', city, Karaganda *oblast* (province), Kazakh Soviet Socialist Republic. A major centre of coal mining in the Karaganda coal basin, it was established in 1946 near the Saran coal deposit and became a city in 1954. Manufacturing includes chemical and rubber product plants. Pop. (1987 est.) 64,000.

Saranac Lake, village and year-round resort on the small Flower Lake near the Saranac and St. Regis chain of lakes, in the Adirondack Mountains, astride the Essex–Franklin county line, northeastern New York, U.S. It lies 8 miles (13 km) northwest of Lake Placid. It originated in 1819 as a lumber community and became an early rendezvous for mountain guides. The place-name is of Iroquoian Indian origin, but its meaning is unknown. The village (elevation 1,600 feet [500 m]) became famous as a centre for the open-air treatment of tuberculosis after Edward L. Trudeau founded his sanitorium there in 1884. (In 1957, the properties and grounds were acquired by the American Management Association for use as a business-personnel training academy.) Robert Louis Stevenson was a patient of Trudeau during the winter of 1887–88, and the cottage where he wrote *Master of Ballantrae* is preserved. Modern facilities include the Ray Brook State Hospital and medical-research laboratories such as the Trudeau Institute. Tourism and wood-based industries are the chief sources of income. The U.S. Eastern Amateur Ski Association was founded in the village, and skiing, particularly on Mount Pisgah, is a major winter activity. The Mount Van Hoevenberg Olympic Bobsled Run is nearby. A Winter Carnival (February) is an annual event. Saranac Lake is the site of North Country (junior) Community College (1968). Inc. 1892. Pop. (1984 est.) 5,456.

sārangī, fiddle popular in northern Indian (Hindustani) music. Its roughly rectangular, slightly waisted body and broad, unfretted neck are generally carved from a single piece of wood. It has three gut melody strings, sometimes a fourth of metal, and often from 11 to 15 sympathetically vibrating metal strings. Though formerly an instrument of professional dancing girls, it is now played in classical dance ensembles.

The *sārangī* has a widely played folk-music variant, the *sārindā,* sometimes mistakenly called a *sārangī.* Its body is a deep, waisted wood shell with a skin belly. The upper half



Sārangi and bow

By courtesy of the Victoria and Albert Museum, London

is left open, its sides forming pointed, downcurved barbs.

Sārangpur, town, northwestern Madhya Pradesh state, central India, just east of the Kāli Sindh River. Sārangpur is located on an ancient site. It has a number of Jaina and Hindu ruins, including a 12th-century Jaina statue. It rose to importance in the 13th century under Sarang Singh Khichi, after whom it is named, and was a chief Mughal trade centre. It passed to Dewās princely state by treaty in 1818. An important commercial and agricultural trade centre, it is also engaged in sugar milling and handloom weaving. Pop. (1981) 18,861.

Saransk, city and capital of the Mordvinian Autonomous Soviet Socialist Republic, western Russian S.F.S.R., on the upper Insar River and on the western flank of the Volga River uplands. The city was founded in 1641 as a stronghold on the Saransk defensive line. It is an important route centre, with railways to Ryazan, Gorky, Kazan, Kuybyshev, and Penza. Industrial development was greatly stimulated in World War II, and a wide range of factories produce machinery, electrical equipment, penicillin, and consumer goods. Saransk has a university founded in 1957 and a research institute of Mordvinian culture. Pop. (1987 est.) 323,000.

Sarapeum, also spelled SERAPEUM, or SARAPION, either of two temples of ancient Egypt, dedicated to the worship of the Greco-Egyptian god Sarapis (Serapis). One of the most elaborate temples by that name was located on the west bank of the Nile near Ṣaqqārah and originated as a monument to the deceased Apis bulls, sacred animals of the god Ptah. Though the area may have been used as a cemetery for the bulls as early as 1400 BC, it was Ramses II (1279–13 BC) who designed a main gallery and subsidiary chambers (repeatedly enlarged by succeeding kings) to serve both as a catacomb for the deceased Apis bulls and as an above-ground shrine to the Apis who, in death, became associated with the god Osiris as Osiris-Apis. The Greeks living near Ṣaqqārah worshiped this god as Osorapis, which under the Ptolemaic dynasty became Sarapis, and the temple was thereafter called the Sarapeum.

The ruins of the Sarapeum at Ṣaqqārah were first discovered in 1850 by Auguste Mariette, a French Egyptologist. The subterranean chambers, which he entered in 1851, yielded the mummies of 64 Apis bulls, together with thousands of inscribed objects, many of them dated and thus of chronological value.

Another important Sarapeum was built at Alexandria, the new Ptolemaic capital. When Ptolemy I Soter (reigned 323–284 BC) wanted to select an official god for Egypt, he chose Sarapis, ordering his architect Parmeniscus to design what became one of the largest and best-known of the god's temples. There Sarapis was worshiped in a purely Greek ritual until AD 391, when the Sarapeum was destroyed by the patriarch Theophilus and his followers.

Sarapion, SAINT, also spelled SERAPION (fl. mid-4th century; feast day March 21; Coptic church, March 7), Egyptian monk, theologian, and bishop of Thmuis, Lower Egypt, Nile delta, a champion with St. Athanasius of Alexandria of orthodox doctrine in the 4th-century theological controversy over Arianism. Sarapion also compiled a significant service book for Christian eucharistic worship. A key figure in early monasticism, together with his Egyptian contemporary, St. Anthony, Sarapion also corresponded with the orthodox theologian Athanasius about the divine Trinity, particularly on the Holy Spirit.

Important as evidence of primitive Christian public prayer is Sarapion's *Euchologion* ("Collected Prayers," or "Sacramentary"), which contains liturgical texts for various rites and blessings, including some of the earliest formulas in the Eucharist. Sarapion also created certain unique eucharistic verses invoking the divine Logos ("Word") to consecrate the sacramental elements of bread and wine.

Sarapion had become bishop of Thmuis by 339, but, because of strong Arian opposition allied with political support, he had been forced out of office by 359.

Sarapis, also spelled SERAPIS, Egypto-Grecian deity of the sun first encountered at Memphis, where his cult was celebrated in association with that of the sacred Egyptian bull Apis (Osorapis). Introduced as a new deity with many Hellenic aspects by Ptolemy I (reigned 323–285/283 BC), he was originally a god of the underworld.



Sarapis, classical statue; in the Capitoline Museum, Rome

By courtesy of the Musei Capitolini, Rome

The Sarapeum at Alexandria was the largest and best-known of the god's temples. The cult statue there represented Sarapis as a robed and bearded figure regally enthroned, his right hand resting on Cerberus (the three-headed dog who guards the gate of the underworld), while his left held an upraised sceptre. Gradually Sarapis became revered not only as a sun god ("Zeus Sarapis") but also as a lord of healing and of fertility. His worship was established in Rome and throughout the Mediterranean, following the trade routes and being particularly prominent in the great commercial cities. Among the Gnostics (early Christian heretics who believed that matter is evil and the spirit is good) he was a symbol of the universal godhead. The destruction of the Sarapeum at Alexandria by the patriarch Theophilus and his followers in AD 391 signaled the final triumph of Christianity not only in Egypt but throughout the empire.

Sarapul, city and centre of Sarapul *rayon* (sector) of Udmurt Autonomous Soviet Socialist Republic, western Russian S.F.S.R. It is a port on the Kama River. Founded in the 16th century as a Russian stronghold on the trade route to Siberia, it was attacked by Pugachov rebels in 1774; it was chartered in 1780. Industries produce machine tools, radios, footwear, and foods. Several technical colleges and an agricultural college are located in the city. Pop. (1987 est.) 111,000.

Sarasate (y Navascuéz), Pablo (Martin Melitón) de (b. March 10, 1844, Pamplona, Spain—d. Sept. 20, 1908, Biarritz, Fr.), celebrated Spanish violin virtuoso and composer.

Beginning his violin studies at the age of five, Sarasate gave his first performance at age eight and later studied at the Paris Conservatory. In 1859 he began the concert tours that made him famous throughout the world. His playing was particularly admired for sweetness and purity of tone, perfect intonation, and a flawless technique that appeared effortless. Many prominent composers, including Camille Saint-Saëns, Max Bruch, Édouard Lalo, and Antonín Dvořák, wrote pieces for him. Sarasate is also known as a composer of virtuoso violin music, his most popular work being *Zigeunerweisen* (1878), a fantasy in gypsy style for violin and orchestra.

Sarasin, Jean-François, Sarasin also spelled SARRAZIN, or SARRASIN (b. 1614, Caen, Fr.—d. Dec. 5, 1654, Pézenas), French author of elegant verse, best known for the mock epic *Dulot vaincu* ("Dulot Defeated"), for the epic fragments *Rollon conquérant* ("Roland in Conquest") and *La Guerre espagnole* ("The Spanish War"), and for *La Pompe funèbre de Voiture* ("Voiture's Funeral Pomp").

Sarasin undertook classical studies, and in 1648 he entered the household of Armand I de Bourbon, Prince de Conti, in whose service he remained until his death. His position permitted him to enter Paris high society and to move in the circles of those men who were representatives of that epoch. His poems, witty and satiric, tended to cause astonishment and wonder. He became the poet of fashion around 1640, being a man born for his times. He also wrote historical works (*Histoire du siège de Dunkerque,* 1649; "History of the Siege of Dunkirk") and the unfinished work *La Conspiration de Wallenstein* ("The Wallenstein Conspiracy"), an excellent model of historical narrative. The introduction of the "burlesque" genre from Italy into France is owed him.

Sarasota, resort city, seat (1921) of Sarasota county, west-central Florida, U.S., on Sarasota Bay, 52 miles (84 km) south of Tampa. Sarasota, variously spelled Sara Zota and Sarasote, appeared on maps in the 1700s, but the origin of the place-name is unknown. Scottish settlers arrived in 1885, and after 1910 Mrs. Potter Palmer, a Chicago socialite, popularized the



The home of John Ringling, Ca' d'Zan, Sarasota, Fla.

Cliff Harden—Shostal/EB Inc.

place as a resort and established a model cattle ranch there. In 1927 John Ringling selected Sarasota as winter headquarters for the Ringling Bros. and Barnum & Bailey Circus, a position relinquished to nearby Venice in 1960. Tourism, cattle raising, and vegetable farming form the city's economic base. Sarasota is known for the Ringling museums, which include a large gallery of Baroque art with a fine collection of Peter Paul Rubens' works; the Asolo Theater (1790), brought from Venice and reassembled by the state of Florida; Ca' d'Zan, the palatial home of John Ringling, completed 1925; and the Museum of the Circus. The Circus Hall of Fame, Sarasota Jungle Gardens, and the Mayakka River State Park are nearby. The University of South Florida, Sarasota campus (1975), includes New College, founded in 1960; the Ringling School of Art was founded in 1931. Inc. city, 1902. Pop.

(1986 est.) city, 55,655; metropolitan area (MSA), 247,600.

Sarasvatī, Hindu goddess of learning and the arts. She is first referred to in literature as the personification of the sacred river, the Sarasvatī, and is also identified with Vāc, the goddess of speech. In later Hinduism she is usually considered the consort of the god Brahmā (the promulgator of the Veda), but she enjoys an autonomous position as the patroness of art, music, and letters. She is given legendary credit for having invented the Sanskrit language and the Devanāgarī script in which it is written. She is usually represented in painting and sculpture as graceful, fair (usually stark white), and dressed in white garments, riding on a swan (or goose) and holding a lute and a manuscript or book. She is annually worshiped with great enthusiasm by students and teachers alike at the advent of spring, which in the Hindu year occurs in January–February, when her image is taken out in jubilant



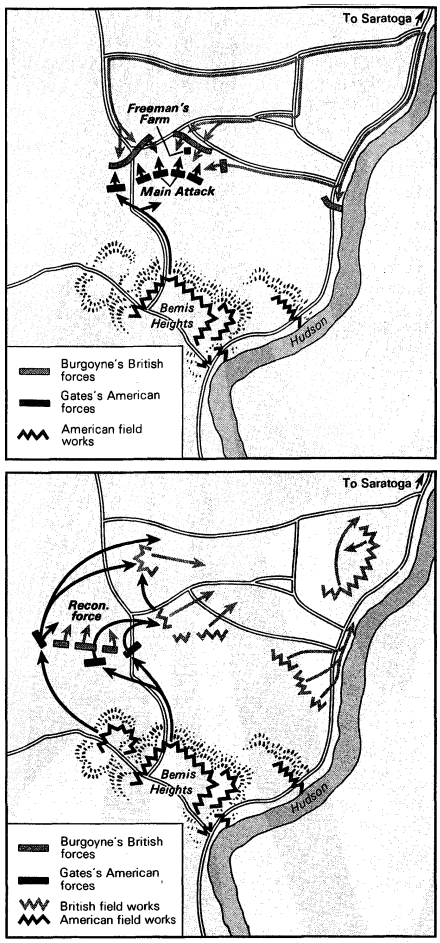
Sarasvatī, from a manuscript of "Meghadūta," Rajasthani style, early 18th century; in a private collection
Pramod Chandra

procession. Sarasvatī is also a popular goddess in Jaina and Buddhist mythology.

Saratoga, Battles of, in the U.S. War of Independence, closely related engagements in the fall of 1777 that are often called the turning point of the war in favour of the Americans. The failure of the American invasion of Canada in 1775–76 had left a large surplus of British troops along the St. Lawrence River. In 1777 these troops were to move south and join forces with General Sir William Howe's troops along the Hudson River.

Leading a force of about 8,000 British troops southward, General John Burgoyne forced the surrender of Fort Ticonderoga (July 6) and Fort Edward on the upper Hudson (July 31). He left nearly 1,000 men behind to garrison Fort Ticonderoga. Having collected 30 days' rations, Burgoyne crossed the Hudson and encamped near Saratoga, N.Y. General Horatio Gates, the American commander, was camped four miles away with 12,000 men and was receiving daily reinforcements.

On September 19 Burgoyne's army moved south and engaged the Continental forces at the Battle of Freeman's Farm, or the First



(Top) Battle of Freeman's Farm, Sept. 19, 1777, and (bottom) Battle of Bemis Heights, Oct. 7, 1777
From V. Esposito (ed.), *The West Point Atlas of American Wars*, © 1959 by Frederick A. Praeger, Inc.; reprinted by permission of Praeger Publishers, New York

Battle of Saratoga. Burgoyne failed to pierce Gates's lines, however, and thus open a way to Albany. On October 7 he led 1,500 of his men out on reconnaissance but met with a fierce American counterattack under General Benedict Arnold. This engagement was called the Battle of Bemis Heights, also known as the Second Battle of Freeman's Farm or the Second Battle of Saratoga. By now Burgoyne's army had been reduced to about 5,000 effective troops, and his supplies were running low. On October 8 Burgoyne began his retreat, but Gates, who had 20,000 men by now, surrounded him at Saratoga. On October 17 Burgoyne surrendered his troops under the Convention of Saratoga, which provided for the return of his men to Great Britain on condition that they would not serve again in North America during the war.

The American victory in the Battles of Saratoga helped to induce the French to recognize American independence and to give open military assistance, thus marking a turning point in the uprising and making possible its ultimate success.

Saratoga Springs, city, Saratoga County, east-central New York, U.S. It lies in the foothills of the Adirondack Mountains, west of the Hudson River, 30 miles (48 km) north of Albany. Possessing numerous natural mineral springs, its site was an ancient Indian camping ground with various spellings and meanings, the most acceptable being Sa-ragh-to-ga ("place of swift water"). Saratoga National Historic Park (established in 1926 and 12 miles [19 km] southeast) commemorates the Revolutionary War Battles of Saratoga (Sept. 19 and Oct. 7, 1777) which took place nearby.

The springs, long known to the Indians for their therapeutic value, attracted white visitors as early as 1771, and in 1791 the first hotel was built there by Gideon Putnam. During the 19th century Saratoga Springs became one of the most fashionable spas in the country, with ornate Victorian hotels. The Saratoga Association for the Improvement of the Breed of Horses was organized in 1863 and sponsored annual races in the city that continue to attract large crowds. The city's National Museum of Racing and Hall of Fame contain mementos of great horses and riders of the past. Eighty-three springs were acquired by the state (their use regulated by law) in 1909 after commercial exploitation (pumping and bottling) had greatly diminished their flow. Skidmore College was founded there as an arts school in 1911, and the Empire State College opened in 1971. "Yaddo" is a large private estate in the city used since 1926 as a retreat for authors and painters. The Saratoga Spa State Park (2,200 acres [890 hectares]) includes the Performing Arts Center (a summer home for the New York City Ballet and the Philadelphia Orchestra). Saratoga Lake is 3 miles (5 km) southeast, and the Grant Cottage State Historic Site (where President Ulysses S. Grant died) is 7 miles (11 km) north.

The city has acquired some light industry, including the manufacture of textiles, electronic equipment, mobile homes, and wallpaper. Inc. village, 1826; city, 1915. Pop. (1984 est.) 24,048.

Saratov, *oblast* (province), western Russian Soviet Federated Socialist Republic. With an area of 38,700 square miles (100,200 square km), it lies in the basin of the middle Volga River, which bisects it north–south. Saratov city is the administrative centre.

Most of the right(west)-bank area is occupied by the Volga Upland, which is greatly dissected by river valleys and erosion gullies; the left (east) bank is a low, rolling plain that formed the Volga German Autonomous Soviet Socialist Republic until 1941, when that administrative unit was abolished for security reasons. The *oblast* has a dry, continental climate, with frequent droughts. Rainfall amounts to only about 15 inches (380 mm) annually. Nevertheless, the presence of fertile chernozem soils has brought about the plowing up of almost all the grass-steppe vegetation on the west-bank area, thereby accelerating soil erosion. The east-bank area is dry steppe, with conditions increasingly resembling semidesert to the southeast, where sagebrush partly replaces the grass.

Agriculture, concentrating heavily on grains, cattle, and sheep, is well developed in the *oblast* despite recurrent droughts, and industry has greatly expanded since 1940, especially along the Volga. Wheat, corn (maize), and rye are the chief crops, and millet, sunflowers, mustard, melons, potatoes, and other vegetables are also grown. Livestock raising is important in the eastern part of the *oblast*. Natural gas and some petroleum are obtained near Yelshanka and Stepnoye and have stimulated the growth of oil-refining, chemical, and engineering industries in the cities of Saratov, Engels, Balakovo, and Balashov. Other, smaller cities are chiefly concerned with processing agricultural products (flour milling, distilling, and the extraction of vegetable oil). Pop. (1987 est.) 2,646,000.

Saratov, city and administrative centre of Saratov *oblast* (province), western Russian Soviet Federated Socialist Republic. It lies along the middle Volga River and was founded in 1590 as a fortress to protect the trade route along the Volga River from nomadic raiders. Its site was twice moved: in 1616 and again to the present location in 1674 after the fortress had been destroyed in a revolt. In the 19th century Saratov became a major commercial centre, especially after the railway to Moscow

was built in the 1870s. The modern city has become a large industrial complex that sprawls for many miles along the river. The road bridge across the Volga, opened in 1965, is claimed to be the largest in Europe.

Saratov's varied and large-scale industries are headed by engineering, electric and petrochemical equipment, machine tools, diesel motors, mobile generators, ball bearings, and refrigerators. The city's largest pre-Revolutionary industry, flour milling, is still important, and glass, brick and other building materials, footwear, clothing, and foodstuffs are also produced. Timber rafted down the Volga River is processed at Saratov's sawmills and made into furniture. Petroleum and natural gas occur in the locality and help contribute to Saratov's important chemical industries, which produce synthetic alcohol, synthetic fibres, acetone, and ammonium sulfate. In the 1960s a large dam and hydroelectric station were completed at Volsk on the Volga immediately above Saratov. Saratov has a university founded in 1919, a music conservatory, and other institutions of higher education. It is also a major rail junction, with lines leading to Moscow, Volgograd, Kazan, and other cities. Pop. (1987 est.) 918,000.

Sarawak, historic state that is now a part of Malaysia. It comprises the northwestern part of the island of Borneo and is bounded by the British protectorate of Brunei and Sabah state on the north and by Indonesian Borneo (Kalimantan) on the east and south. Sarawak has a low-lying and heavily indented coastline along the South China Sea. Much of its area is covered by primary rain forest. The alluvial, swampy coastal plain is backed by rolling country that is intersected by mountains and numerous navigable rivers.

Sarawak became the southern province of the sultanate of Brunei when the Majapahit empire of Java declined in the 15th century. James Brooke, an English adventurer and a former military officer of the East India Company, visited the territory in 1839 and aided the sultan in suppressing a revolt. As a reward for his services, Brooke was installed (1841) as raja of Sarawak over the sector from Tanjung Datu to the Batang (River) Samarahan; there he endeavoured to suppress piracy and headhunting.

Sarawak was recognized as a separate state by the United States (1850) and Great Britain (1864) and, until 1905, was gradually enlarged through purchase and annexation. In 1868 Brooke died and was succeeded as raja by a nephew, Charles Brooke. The latter ruled until 1917 and was succeeded by his son Charles Vyner Brooke. In 1941 the latter Brooke abrogated his absolute powers by enacting a constitution that was designed to establish democratic self-government, but the effort was delayed by the Japanese occupation (1942–45). The territory, devastated by war, was ceded to the British crown in 1946. Sarawak achieved self-government and joined Malaysia in 1963.

The economy of Sarawak is almost entirely agricultural, with cash-crop production (rubber, pepper, and sago small holdings) confined to the coastal zone; subsistence and shifting agriculture extends into the interior. Rice is also widely grown. The main exports are petroleum products, timber, and rubber. Industries include sawmilling and the processing of sago, copra, and pepper. Textiles, metal containers, soap, tiles, and small boats are manufactured.

Ibans (Sea Dayaks), who were the original headhunters of Borneo, and Chinese form a majority of the population, which also includes Malays, Land Dayaks, and Melanaus. The rivers are the principal arteries of internal transportation. The capital is Kuching (*q.v.*).

Sarazen, Gene, byname of EUGENE SARACENI (b. Feb. 27, 1902, Harrison, N.Y., U.S.), prominent American professional golfer of the 1920s and 1930s.

Of a poor, Italian-immigrant family, Sarazen began caddying when he was eight. After winning the U.S. Open in 1922 he repeated the feat in 1932, the year he also won the British Open. He won the Masters Tournament in 1935 and the Professional Golfers' Association of America (PGA) championship three times (1922, 1923, 1933) and played on six consecutive Ryder Cup teams. A gentleman farmer after retiring from active competition, he varied this occupation with world travel on behalf of televised golf promotions and writing books on golf.



Sarazen, 1935
AP/Wide World Photos

Sarcee, also spelled SARSI, North American Plains Indian people of Athabascan linguistic stock who lived in the 18th and 19th centuries near the upper Saskatchewan and Athabaska rivers. They probably moved southward to this region near the end of the 17th century when they became the northern neighbours of the Blackfoot Indians, from whom they received some protection from enemies. Their name comes from the Siksika (Blackfoot) and means "not good."

The Sarcee adopted the essentials of the Blackfoot culture and had versions of their military societies and the sun dance ceremony. Tobacco was their only crop and was planted ceremonially. They suffered from continual attacks by the Cree and other tribes; their population was reduced further by epidemics of smallpox and scarlet fever in the 19th century. In 1877 the Sarcee, along with the Blackfoot and Alberta Assiniboin, ceded their hunting grounds to the dominion government by treaty, and they were placed on a reservation in 1880.

Sarcocystis, genus of sporozoan parasites (phylum Protozoa) that are found in the heart and skeletal muscles of mammals (cattle, pigs, sheep, and man), birds, and reptiles. Infected muscle tissue contains white, cystlike masses (sarcocysts) that range from 25 micrometres (0.001 inch) to several millimetres in length. Each sarcocyst is divided into walled compartments, and each compartment contains a naked, crescent-shaped, sporelike body. The species *S. lindemanni* has been found in muscles of the larynx, the heart, and other organs in man. A related genus of increasing importance, *Toxoplasma,* is also found in many vertebrates, including humans.

sarcodine, any protozoan of the superclass (sometimes class or subphylum) Sarcodina. These organisms have streaming cytoplasm and use temporary cytoplasmic extensions called pseudopodia in locomotion (called amoeboid movement) and feeding. Sarcodines include the genus *Amoeba* (*see* amoeba) and pathogenic species, *e.g.,* dysentery-causing *Entamoeba histolytica.* These protozoans' cells may be spherical or irregular in shape; the pellicle (or envelope) is usually thin and flexible. Sometimes there is an external shell (*see* foraminiferan) or skeleton (*see* radiolarian). The cytoplasm, composed of ectoplasm and endoplasm, may contain more than one nucleus. Food, which adheres to the body surface or is trapped by pseudopodia, is digested in food vacuoles.

Sarcodines reproduce sexually by syngamy (fusion of two gametes) and asexually by division or budding. In multinucleate forms, cytoplasmic division with distribution of the nuclei occurs. Some sarcodines have flagella during certain stages of their development; in other groups flagellated and unflagellated generations alternate. Sarcodines may be either solitary or colonial. Although some are parasitic on plants or animals, most sarcodines are free-living, feeding on bacteria, algae, other protozoans, or organic debris. The genera are distinguished by the structure of their pseudopodia. *See also* pseudopodium.

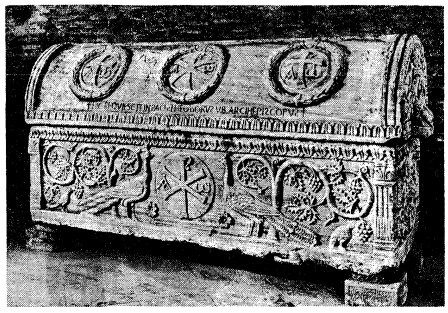
sarcoidosis, systemic disease of unknown cause that is characterized by the formation of granulation (scarlike) tissue. Sarcoidosis often disappears spontaneously within two or three years but may progress to involve more than one organ. It is observed in the lungs, lymph nodes, eyes, salivary glands, muscles, liver, spleen, and the connective tissues of the nervous system. Skin lesions and bone cysts are characteristically present in the chronic form of the disease. Sarcoidosis may cause no symptoms, or an attack may begin with the appearance of tender red nodules on the front of the legs and with pain in the joints. There may be fever that lasts from six weeks to three months. The chronic form of sarcoidosis usually results in severe disease of the lungs and kidneys; the lung disease may cause damage to the heart.

sarcoma, malignant tumour arising from embryonic connective tissue, or mesenchyme, relatively rare in adults but one of the more common malignancies of children. Sarcomas are generally divided into bone and soft-tissue tumours, the latter being much less common. Because mesenchymal cells form a variety of mature tissues, tumours may have the characteristics of bone (osteosarcoma), cartilage (chondrosarcoma), muscle (myosarcoma), or blood vessels (angiosarcoma). The varieties overlap, and the name given to the sarcoma is taken from the most developed tissue contained within the tumour. The most common is the osteosarcoma, a malignancy of immature bone (osteoid) that was highly lethal before the use of anticancer drugs, which have tripled survival rates. *See also* bone lesion.

sarcophagus, stone coffin. The original term is of doubtful meaning; Pliny explains that the word denotes a coffin of limestone from the Troad (the region around Troy) which had the property of dissolving the body quickly (Greek *sarx,* "flesh"; *phagein,* "to eat"). This explanation is questionable; religious and folkloristic ideas may have been involved in calling a coffin a body eater. The word came into general use as the name for a large coffin in imperial Rome and is now used as an archaeological term.

The earliest stone coffins in use among the Egyptians of the 3rd dynasty (*c.* 2650–2575 BC) were designed to represent palaces of mudbrick architecture, with an ornamental arrangement of false doors and windows. Beginning in the 11th dynasty (*c.* 2081 BC), boxlike sarcophagi of wood or limestone were in use

in Egypt and on the Lebanese coast at Byblos. In the 17th dynasty (*c.* 1630–1540 BC), anthropoid coffins (shaped to resemble the human form with a carved portrait head) of pasted papyrus sheets and, later, of wood, pottery, or stone were used. In the case of royalty, some were made of solid gold (Tutankhamen) or silver (Psussenes I). In the 18th–20th dynasties (*c.* 1539–1075 BC), the upper classes enclosed inner coffins of wood or metal in stone outer sarcophagi, a practice that continued into the Ptolemaic period.

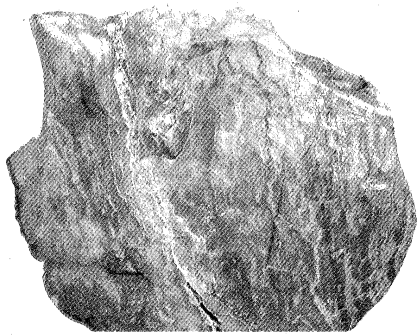


Sarcophagus of Archbishop Theodoric, marble, 6th century; in the church of Sant'Apollinare in Classe, Ravenna, Italy

Anderson—Alinari from Art Resource/EB Inc.

In the Aegean area, although not on the Greek mainland, rectangular terra-cotta coffins (larnakes) with elaborate painted designs came into general use in Middle Minoan times (*c.* 2000–*c.* 1570 BC). Sometimes these coffins resembled houses or bathtubs with large handles. The Phoenicians developed a white marble anthropoid sarcophagus of the Egyptian type in the 5th century BC, and in Hellenistic times they specialized in making leaden coffins and elaborately carved marble sarcophagi. In Italy, from *c.* 600 BC onward, the Etruscans used both stone and terra-cotta sarcophagi, and after 300 BC sculptured sarcophagi were used by the Romans. These often had carved figures of the deceased reclining on the couch-shaped lids.

sard and sardonyx, translucent, light- to dark-brown varieties of the silica mineral chalcedony, historically two of the most widely used semiprecious stones. Sard and its close relative carnelian have been used in engraved jewelry for centuries. Sard (from Sardis, the ancient capital of Lydia) was originally called sardion, which included both sard and carnelian until the Middle Ages. Except for crystal, it is the oldest known name for a silica mineral. One locality famous as a source of sard is Ratnapura, Sri Lanka. Bands of sard and white chalcedony are called sardonyx, which at one time was more precious than gold, silver, or sapphire. Sardonyx is widely used in cameos and intaglios. Its properties are those of quartz (*see* silicate mineral [table]).



Sardonyx from Texas

Joseph and Helen Guetterman collection; photograph, John H. Gerard—EB Inc.

Sārda River, river rising in the Himalayas and flowing south-southeast along the India–Nepal border to join the Ghāghara River after a course of about 300 miles (480 km). In its upper course, where the stream is known as the Kāli River, it enters the Gangetic Plain at Barmdeo Mandi, widening there above the Sārda Barrage; below this point it is known as the Sārda River. Its major tributaries are the Dhaulīganga, Gorīganga, and Sarju. The Sārda Barrage, near Banbāsa, is the source of the Sārda Canal (completed 1930), one of the longest irrigation canals in northern India.

sardana, communal dance intimately bound up with Catalan national consciousness. It is danced by men and women who join hands alternately in a closed circle. As they dance to the music of *tenores* and *tabales* (shawms and small drums), their faces remain solemn and dignified. The basic pattern of the sardana is a series of long (*llarg*) and short (*curt*) steps; the precise combination is determined by the leader, who signals the steps with a hand squeeze that is passed around the circle. The



Sardana

By courtesy of the Spanish National Tourist Office, Chicago

music is first slow, then rapid. The sardana developed in the 19th century from the *contrapás,* a similar dance with a broken circle.

Sardanapalus, also spelled SARDANAPALLUS, legendary king of Assyria. He apparently represents an amalgamation of the characters and tragic fates of three Assyrian rulers: Ashurbanipal (*q.v.*; ruled 668–627 BC); his brother, Shamash-shum-ukin; and the last Assyrian king, Sin-shar-ishkun.

According to the Greek historian Diodorus Siculus, Sardanapalus was the last of a line of 30 kings of Assyria, who exceeded all his predecessors in his sybaritic way of life. He emulated women in dress, voice, and mannerisms, passing his days spinning and making clothing. According to legend, he was responsible for the downfall of Assyria at the hands of an army of Medes, Persians, and Babylonians headed by Arbaces, a Median chief. Sardanapalus defeated the rebels thrice only to abandon the fight when his besieged royal capital of Ninus was flooded by the Euphrates River in apparent fulfillment of a prophecy. Sardanapalus built a huge pyre of his palace treasures, in which he ordered himself burned to death along with his servants and concubines.

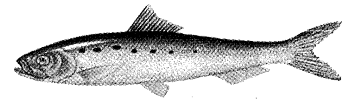
Sardes (ancient Lydian city): *see* Sardis.

Sardica, Council of (342/343), an ecclesiastical council of the Christian Church held at Sardica, or Serdica (modern Sofia, Bulg.). It was convened by the joint emperors Constantius II (Eastern, sympathetic to the Arian party) and Constans I (Western, sympathetic to the Nicene party) to attempt a settlement of the Arian controversies. In fact, the council merely embittered still further the relations between the two parties and those between the Western and Eastern halves of the Roman Empire. When Athanasius, whom the East had removed from his bishopric, appeared at the council and the Western bishops refused to exclude him, the Eastern bishops refused to take part and formulated a written protest addressed to several foreign prelates. The Western bishops, presided over by Hosius of Córdoba, confirmed the restoration of Athanasius and acquitted Marcellus of Ancyra of heresy. Canons 3, 4, and 5 of this council were of great historical importance. They invested the bishop of Rome with a prerogative that was the first legal recognition of the bishop of Rome's jurisdiction over the other sees and was, therefore, the basis for the further development of the Roman bishop's primacy as pope.

sardine, any of certain food fishes of the herring (*q.v.*) family, Clupeidae, especially members of the genera *Sardina, Sardinops,* and *Sardinella;* the name sardine can also refer to the common herring (*Clupea harengus*) and to other small herrings or herringlike fishes when canned in oil. The European sardine (*Sardina,* or *Clupea, pilchardus*)—known as pilchard in Britain—occurs in the Mediterranean Sea and off the Atlantic coasts of Spain, Portugal, France, and Britain. *Clupea harengus* is found throughout the North Atlantic, including coastal North America. The five recognized species of the genus *Sardinops* are so similar that they are sometimes classified as the single species *S. sagax.* The five species are found in different areas of the Pacific and Indian oceans and are fished off of western North and South America, Japan, Australia, and South Africa.

Sardines are small, silvery, elongated fishes with a single short dorsal fin, no lateral line, and no scales on the head. They range in length from about 15 to 30 cm (6 to 12 inches) and live in dense schools, migrating along the coast and feeding on plankton, of which they consume vast quantities. They spawn mainly in spring, with the eggs and, a few days later, the larvae drifting passively until they metamorphose into free-swimming fish.

Sardines of any species are commercially fished for a variety of uses: for bait; for fresh fish markets; for drying, salting, or smoking; and for reduction into fish meal or oil. The most important catching apparatus is an encircling net, particularly the variety known as the purse seine. Many other modifications of encircling nets are used, including traps or weirs, the latter being stationary enclosures composed of stakes into which schools of sardines are diverted as they swim along the coast. The fish are caught mainly at night,



Pacific sardine (*Sardinops sagax*)

Painted especially for *Encyclopaedia Britannica* by Tom Dolan, under the supervision of Loren P. Woods, Chicago Natural History Museum

when they rise to the surface to feed on plankton. After catching, the fish are submerged in brine while they are transported to shore. Sardines are canned in many different ways. At the cannery the fish are washed, their heads are removed, and the fish are cooked, either by deep-frying or by steam-cooking, after which they are dried. In Spain, Portugal, and many other countries the fish are then packed in either olive or soybean oil, while in Scandinavian countries they may alternatively be smoked. They may also be packed in a tomato or mustard sauce.

The chief use of sardines is for human consumption, but fish meal made from sardines is used as animal feed, while sardine oil has many uses, including the manufacture of paint, varnish, linoleum, and, in Europe, margarine. European sardines, young herring, and *Sardinops* are those most often canned.

Sardinia, Italian SARDEGNA, island and region of Italy, second to Sicily in size among the islands of the western Mediterranean. It lies 120 mi (200 km) west of the main Italian peninsula, 7.5 mi south of the neighbouring French island of Corsica, and 120 mi north of the African coast. It has an area of 9,194 sq mi (23,813 sq km). The capital is Cagliari.

The following article summarizes the administrative history, geography, demographic patterns, economy, and culture of modern Sardinia; for additional treatment of its geography and history, *see* MACROPAEDIA: Italy.

After having belonged to the Romans, the Vandals, the Byzantines, and the Arabs, the island was gained in the 11th century by Pisa and Genoa, which later struggled for domination over it. The House of Aragon gained control of Sardinia in 1326. Spanish domination lasted until 1708 when the island passed to Austria. In 1720 the Kingdom of Sardinia was ceded to the House of Savoy and was joined to the Piedmont. During the wars of the late 18th century against revolutionary France, the Piedmont was annexed by France. After the collapse of the Napoleonic empire, the Kingdom of Sardinia was given back its territories on the mainland, and during the 19th century it expanded to include almost all of Italy. In 1861 Victor Emmanuel II was proclaimed king of Italy, and the island became part of the unified Italian state.

The island's relief is dominated by mountains of granite and schist. The highest point is Mt. La Marmora (6,016 ft [1,834 m]) in the Gennargentu Massif. The climate is subtropical and Mediterranean. Precipitation ranges from 24 in. (600 mm) on the plains to 39 in. in the mountains. Sardinia's rivers, of which the Tirso and Flumendosa are the most important, are short and full of rapids. The evergreen and deciduous forests have been largely cut down and now occupy only 4 percent of Sardinia's territory. Scrub formations predominate, with maquis in the north and garigue in the south.

The population has a density of 175 persons per sq mi (67 per sq km), considerably less than the Italian average. The birth rate is 13.3 and death rate 7.8 per 1,000 population; natural increase is thus a very low 5.5. The annual rate of population growth between 1971 and 1981 was less than 1 percent, attributable in part to heavy emigration.

Agriculture and mining are the main branches of the economy. Natural pastures cover more than half the area of Sardinia. Sheep and goats are widely raised. Wheat, barley, grapes, olives, cork, and tobacco are produced. Fishing for tuna, lobster, and sardines is important. Sardinia is rich in minerals, including zinc and lead (four-fifths of Italy's production), lignite, fluorite, bauxite, copper, and iron. Processing industries include the smelting of lead and zinc and the production of aluminum and alumina. There are petroleum refineries and petrochemical complexes. Among other industries are food processing, textile and leather production, woodworking, and electrical engineering. Tourism is essentially concentrated on the coast, though the road network has been extended and much improved. The island is connected with continental Italy by both air and sea. The isolation of the island has preserved many traditions. These are expressed in a language that remains close to Latin, in songs and dances, and in beautiful costumes. Pop. (1983 est.) 1,605,410.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Sardinia, Kingdom of, also called KINGDOM OF PIEDMONT-SARDINIA, or KINGDOM OF SARDINIA-PIEDMONT, kingdom of the House of Savoy (*q.v.*) from 1720, which was centred on the lands of Piedmont (in northwestern Italy) and Sardinia. In 1718, by the Treaty of London among the great powers, Victor Amadeus II, duke of Savoy and sovereign of Piedmont, was forced to yield Sicily to the Austrian Habsburgs and in exchange received Sardinia (until then a Spanish possession). Two years later, on Aug. 24, 1720, he formally took possession; from that time until 1861 he and his successors were known as kings of Sardinia, though the seat of their power and wealth and their customary residence was in Piedmont. In March 1848 King Charles Albert promulgated a new constitution for Piedmont-Sardinia, the Statuto Albertino (*q.v.*), which became the basis of the constitution of the new Kingdom of Italy proclaimed by the first Italian parliament on March 17, 1861. Charles Albert's son, Victor Emmanuel II, became the first king of unified Italy.

Sardinian language, Sardinian SARDO, Romance language spoken on the Italian-ruled island of Sardinia; it is most similar to Vulgar Latin of all the modern Romance languages. Major dialects of Sardinian are Logudorian, spoken in central Sardinia; Campidanian, spoken in the south; Sassarian, spoken in the northwest; and Gallurian, spoken in the northeast. There is no standard form of Sardinian except the Sardo illustre, a literary language used mostly for folk verse, based on the Logudorian dialect. Italian is the official language of the island, and literature in Sardinian is virtually nonexistent. The earliest written materials are legal contracts dating from about 1080.

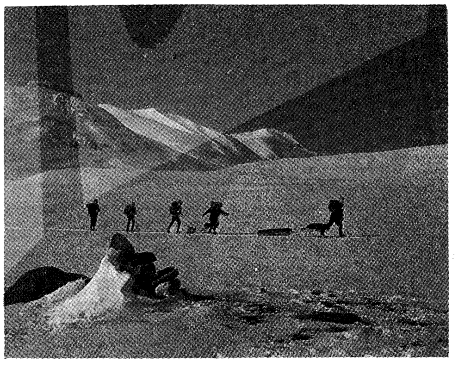
Sardis, also spelled SARDES, ruined capital of ancient Lydia, near present İzmir, in Manisa *il* (province), Turkey. Strategically located on a spur at the foot of Mt. Tmolus (Boz Dağ), it commanded the central plain of the Hermus Valley and was the western terminus of the Persian royal road. Sardis was the capital of the flourishing Lydian kingdom of the 7th century BC and was the first city where gold and silver coins were minted. Taken by the Persians (*c.* 546 BC), Sardis fell in turn to the Athenians, the Seleucids, and the Attalids until bequeathed to the Romans in 133 BC. Under the Roman Empire, it was the metropolitan capital and centre of judicial administration of the Roman province of Lydia. Destroyed by an earthquake in AD 17, the city was rebuilt and remained one of the great cities of Anatolia until the later Byzantine period. Its ruins include the ancient Lydian citadel and about 1,000 Lydian graves. Excavations of Sardis have uncovered more remains of the Hellenistic and Byzantine city than of the Lydian town described by the Greek historian Herodotus.

sardonyx: *see* sard and sardonyx.

Sardou, Victorien (b. Sept. 5, 1831, Paris—d. Nov. 8, 1908, Paris), playwright who, with Émile Augier and Alexandre Dumas *fils*, dominated the French stage in the late 19th century and is still remembered as a craftsman of bourgeois drama of a type belittled by George Bernard Shaw as "Sardoodledom." His work *Les Pattes de mouche* (1860; *A Scrap of Paper,* 1861) is a model of the well-made play. He relied heavily on theatrical devices to create an illusion of life, and this largely accounts for his rapid decline in popularity. *Madame Sans-Gêne,* his last success, is still performed, although his other successful plays are rarely played. His initial successes he owed to the actress Virginie Déjazet, and several of his 70 works were written for her; others were written for Sarah Bernhardt. In 1877 he was elected to the Académie Française.

śārdūla (Indian art): *see* vyāla.

Sarek National Park, park in Norrbotten *län* (county), northwestern Sweden, encompassing most of the Sarek mountain range. It was established in 1909, with the setting aside of an area of 749 sq mi (1,940 sq km), and it adjoins two other national parks—Stora Sjöfallet on the north and Padjelanta on the west.



Skiers in Sarek National Park, Sweden
Bert Persson—Ostman Agency

The almost inaccessible region, characterized by high peaks, deep valleys, wide plateaus, and glaciers, is drained by Rapaälven (Rapa River), which empties into Lake Laitaure. Several peaks rise more than 6,500 ft (2,000 m). The highest, Sarjektjåkko (6,854 ft), is the second highest in Sweden, after Kebnekaise Sydtopp; Sarjektjåkko was first climbed in 1879. Sarek is rich in vegetation and is the habitat of varied wildlife, including bears, wolves, wolverines, and lynxes.

Sarekat Islām, English ISLĀMIC ASSOCIATION, the first nationalist political party in Indonesia to gain wide popular support. Founded in 1912 the party originated as an association of those Muslim merchants who wanted to advance their economic interests in relation to Chinese merchants in Java, but the association became political. It quickly gained mass support and started working for the self-government of the Dutch East Indies. The party's most prominent leader was Omar Said Tjokroaminoto.

Its religious appeal helped the Sarekat Islām to grow rapidly. By 1916 the organization claimed 80 branches throughout Indonesia with a total membership of about 350,000. The Dutch authorities did not attempt to suppress the organization, presumably because they wanted to channel the increasingly radical movement into a constitutional stream.

The Sarekat Islām, however, became more and more involved in revolutionary activities. Communist elements entered the organization, and the struggle for power between the religious leaders and the Communists culminated in the division of the Sarekat Islām in 1921. Before the division the orthodox Marxist party, the Indies Social Democratic Association, changed its name to the Indies (after 1924, Indonesian) Communist Party (PKI). In 1920 the Communists tried to draw the movement into the orbit of the international Communist movement. The religious leaders of the Sarekat Islām, Agus Salim and Abdul Muis, aware of the Communist activities, urged a motion, passed in 1921 at a national party congress, that no member of the Sarekat Islām could hold dual party membership. This led to the departure of the left wing of the party. The latter group set up the Sarekat Islām Merah (Red Islāmic Association), which later changed its name to the Sarekat Rakjat (People's Association), to serve as the mass organization of the PKI. The split severely undermined the Sarekat Islām, which eventually declined into a secondary party.

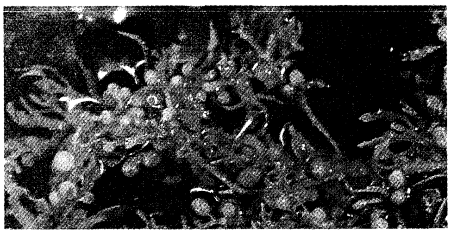
Sarema (Estonian S.S.R.): *see* Saaremaa.

Sargasso Sea, area of the North Atlantic Ocean, elliptical in shape and relatively still, that is strewn with free-floating seaweed of the genus *Sargassum.* It lies between the parallels 20° N and 35° N and the meridians 30° W and 70° W inside a clockwise-setting ocean-current system, of which the Gulf Stream (issuing from the Gulf of Mexico) forms part of the western rim. The sea reaches depths of 5,000–23,000 ft (1,500–7,000 m) and is characterized by weak currents, low precipitation, high evaporation, light winds, and warm, saline waters, all combining with the lack of thermal mixing to create a biological desert largely devoid of plankton, a basic food supply for fish.

The brown seaweed (gulfweed) is kept at the surface by its small but prominent berrylike bladders. It then travels with the wind and current, apparently receiving minor replenishment from coastal plants drifting in from the southwest. The seaweed supports a specialized marine life, most of which is characteristic of a coastal zone, but some is found only in this area.

The Sargasso Sea, which encompasses the Bermuda islands, was first mentioned by Columbus, who crossed it on his initial voyage in 1492. The presence of the seaweed suggested the proximity of land and encouraged Columbus to continue, but many early navigators had the fear (actually unfounded) of becoming entangled within the mass of floating vegetation.

Sargassum, also called GULFWEED, ROCKWEED, or SEA HOLLY, genus of brown algae (150 species) adapted for a free-floating tropical environment even though many species grow attached to rocks along the coast. The Sargasso Sea, a free-floating mass of seaweed, predominately *S. natans*, occurs in the Atlantic Ocean.



Sargassum

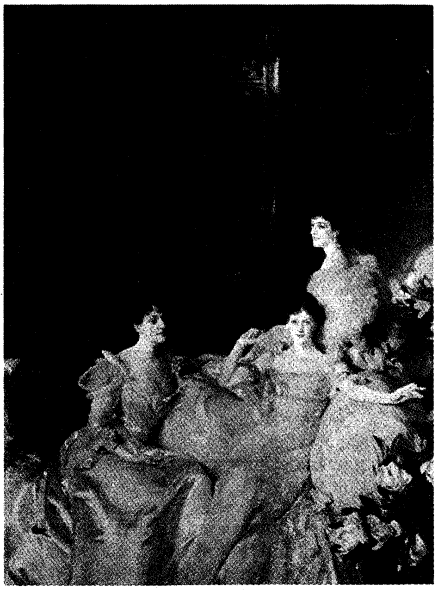
George Lower—The National Audubon Society Collection/Photo Researchers

Sargassum is also known as sea holly because of its highly branched thallus with hollow, berry-like floats (pneumatocysts) and many leaflike sawtooth-edged blades. It is used as fertilizer in New Zealand and as a component of soups and soy sauce in Japan. Most species reproduce sexually; an exception is *S. natans*, which reproduces only by fragmentation.

Sargent, Sir John Philip (b. Dec. 27, 1888—d. Feb. 13, 1972), British statesman and educator who served as the principal educational adviser to the government of India from 1938 to 1948.

Educated at St. Paul's School and Oriel College, Oxford, Sargent was director of education for Southend-on-Sea (1927–31) and the county of Essex (1931–38) before being named educational commissioner with the government of India (1938–42), educational adviser to the government of India (1943–48), and secretary of the education department of India (1945–48). Although his title changed, his role in India did not, as he continued to monitor and encourage educational progress at the provincial and the national levels. In 1948 he returned to London as director of the Commonwealth II department. He left government work in 1953 to accept the wardenship of Missenden Abbey Adult Education College. Sargent was knighted in 1946.

Sargent, John Singer (b. Jan. 12, 1856, Florence—d. April 15, 1925, London), U.S. painter whose elegant portraits created an enduring image of society of the Edwardian age.



"The Wyndham Sisters: Lady Elcho, Mrs. Tennant, and Mrs. Adeane," oil painting by John Singer Sargent, 1900; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York City, Wolfe Fund, 1927

The wealthy and privileged on both sides of the Atlantic came to his studio to be immortalized.

Sargent was brought up abroad and first saw the United States in 1876, when he established citizenship. Serious and reserved, he had a talent for drawing, and in 1874 he went to Paris to study painting with Carolus-Duran, a fashionable society portraitist. In 1879 Sargent travelled to Madrid to study the works of Velázquez and to Haarlem to see the works of Frans Hals. Some critics believe that his best work, in a rich, dark palette, was done in the years immediately after this trip.

At the Salon of 1884, Sargent showed what is probably his best known picture, "Madame X," the portrait of Madame Gautreau, a famous Parisian beauty. Sargent regarded it as his masterpiece and was disagreeably surprised when it caused a scandal—critics found it eccentric and erotic.

Discouraged by his Parisian failure, Sargent moved permanently to London. His work was probably too Continental and avant-garde to appeal immediately to English taste; "The Misses Vickers" (1884) was voted worst picture of the year by the *Pall Mall Gazette* in 1886. It was not until 1887, when "Carnation, Lily, Lily, Rose" (1885–86), a study of two little girls lighting Japanese lanterns, captured the hearts of the British public, that he began to experience the phenomenal acclaim in England and the United States that was to be his for the rest of his life.

Sargent's broad, slashing brushstrokes and brilliant palette evoke the accidental and a sense of the particular moment. He was surprisingly unrepetitive, responding to each sitter differently. His best portraits capture his subjects in a revealing, off-guard moment.

After 1910 Sargent gave up portraiture and devoted the rest of his life to painting murals and Alpine and Italian landscapes in watercolour. With stenographic brilliance Sargent pursued transparency and fluidity beyond J.M.W. Turner and Winslow Homer, sometimes becoming prophetically or accidentally Expressionistic, as in "Mountain Fire" (1895).

From 1890 to 1910 he worked on a commission for the Boston Public Library to execute murals on a history of the Jewish and Christian religions. He also executed murals in the Boston Museum of Fine Arts.

Sargent, Sir (Harold) Malcolm (Watts) (b. April 29, 1895, Ashford, Kent, Eng.—d. Oct. 3, 1967, London), English conductor who, as Britain's self-styled "ambassador of music," toured throughout the world.

He earned his diploma from the Royal College of Organists at 16 and in his early 20s became England's youngest doctor of music. In 1921 he conducted his own composition with Henry Wood's Queen's Hall Orchestra and in 1923 joined the staff of the Royal College of Music. He was chief conductor of the Robert Mayer children's concerts the following year and mounted the Courtauld-Sargent concerts in 1929. Sir Thomas Beecham enlisted his help in the formation of the London Philharmonic in 1932. Appointments followed with the Hallé Orchestra (to 1942), the Liverpool Philharmonic (to 1949), and the BBC Symphony Orchestra (to 1957). He took charge of London's Promenade Concerts from 1948 until his death. Sargent was unsurpassed as a choral conductor; the Royal Choral Society and the Huddersfield Choral Society were his for the better part of his performing life. He was also responsible for the premieres of several English operas. He was knighted in 1947.

Sargeson, Frank, pseudonym of NORRIS FRANK DAVEY (b. March 23, 1903, Hamilton, Waikato, N.Z.—d. March 1, 1982, Auckland), novelist and writer of short stories whose ironical, stylistically diverse works made him the most widely known New Zealand literary figure of his day.

Sargeson studied the law and won admission as a solicitor before taking up writing in the late 1920s. His early work consisted principally of short stories, a number of which were first published in the United States, although Sargeson remained a lifelong resident of New Zealand. Collections include *Conversations with My Uncle* (1936), *A Man and His Wife* (1940), and *That Summer* (1946).

In his novels, from the early *I Saw in My Dream* (1949) to the later *Joy of the Worm* (1969) and *Sunset Village* (1976), he treated themes of social corruption and personal freedom in a variety of styles. The *Collected Stories* (1964) and *The Stories of Frank Sargeson* (1973) broadened his international readership.

Sargodha, city, district, and division, Punjab Province, Pakistan. The city, the district and division headquarters, is a grain and cash crop market connected by road with Lahore and Miānwāli and by rail with Faisalābād (formerly Lyallpur) and Lahore. Industries include textile, hosiery, flour, and oilseed mills, cotton gins, and chemical and soap factories. Sargodha was founded in 1903 as headquarters of the Lower Jhelum Canal colony and was constituted a municipality in 1914 when the government of Shāhpur district was moved there from Shāhpur town. The city has a hospital, library, stadium, several schools, and two colleges affiliated with the University of the Punjab.

Sargodha district (area, 4,775 sq mi [12,367 sq km]), officially known as Shāhpur until 1960, is divided by the Jhelum River into the Bar on the east, a tract irrigated by the Lower Jhelum Canal, and the Thal, a desert region under development. The Salt Range traverses the north. Wheat, cotton, barley, and millet are the chief crops; cattle and sheep breeding is widespread. Gypsum, rock salt, mica, and glass sand deposits are also found.

Sargodha division (area 17,095 sq mi), constituted in 1960, consists of Sargodha, Miānwā-

li, Faisalābād, and Jhang Maghiāna districts. Pop. (1981 prelim.) city, 294,000; district, 2,557,000; division, 10,551,000.

Sargon, Akkadian and Assyrian SHARRU-KIN, name of rulers grouped below by country and indicated by the symbol •.

ASSYRIA

• **Sargon I** (fl. *c.* 1850 BC), ruler of Assyria during the old Akkadian period. Little is known in detail of Assyria in his time, but clearly the Assyrian trading colony in Cappadocia, known from the tablets discovered at Kultepe, was then in its heyday. This implies the ability of Sargon I to maintain the security of the trade routes, and the argument has been advanced that the colony in Cappadocia was actually within an area constituting an Assyrian province, a suggestion which derives some support from the existence of a tablet in Cappadocia bearing Sargon's seal.

• **Sargon II** (d. 705 BC), one of Assyria's great kings (ruled 721–705 BC) during the last century of its history. He extended and consolidated the conquests of his presumed father, Tiglath-pileser III.

Sargon is the Hebrew rendering (Isaiah 20:1) of Assyrian Sharru-kin, a throne name meaning "the king is legitimate." The name was undoubtedly chosen in reminiscence of two



Sargon II, detail of a relief from the palace at Khorsabad; in the Louvre, Paris

By courtesy of the Musee du Louvre, Paris; photograph, Maurice Chuzeville

former kings of Assyria, particularly in commemoration of Sargon of Akkad (flourished 2300 BC).

Although Sargon's ancestry is partly veiled in mystery, he was probably a younger son of Tiglath-pileser III and consequently a brother of his predecessor Shalmaneser V, who may have died ignominiously or may have been deposed. It was for Sargon to resume the conquests and to improve the administration of the empire his father had begun to assemble.

Upon his accession to the throne, he was faced immediately with three major problems: dealing with the Chaldean and Aramaean chieftainships in the southern parts of Babylonia, with the kingdom of Urartu and the peoples to the north in the Armenian highlands, and with Syria and Palestine. By and large, these were the conquests made by Tiglath-pileser III. Sargon's problem was not only to maintain the status quo but to make further conquests to prove the might of the god Ashur, the national god of the Assyrian empire.

When Sargon succeeded to the Assyrian throne, Marduk-apal-iddina II (Merodach-Baladan of the Old Testament), a dissident chieftain of the Chaldean tribes in the marshes of southern Babylonia, committed the description of his victory over the invading Assyrian armies (720 BC) to writing on a clay cylinder, which he deposited in the city of Uruk (biblical Erech; modern Tall al-Warkā). The presence of this record obviously did not suit Sargon. After having discharged other commitments, he uncovered Marduk-apal-iddina's record and removed it to his own residence, then at Kalakh (modern Nimrūd), substituting what has been described as an "improved" version that was more to his liking.

The extant texts reveal little about Sargon himself. With few exceptions, ancient Mesopotamian rulers have left no documents from which to write an actual biography. No personal documents have survived from Sargon's reign; but it seems fair to assume that phraseologies uncommon in the inscriptions of other Assyrian kings, found in his texts, must have met with his approval, even though it is uncertain whether such phrases—sometimes turning into what is obviously poetry—were in fact conceived by Sargon himself or ascribed to him by his historiographers. The discovery, at Nimrūd, of series of texts of omens written in cuneiform on beeswax encased in ivory and walnut boards and marked as being the property of the palace of Sargon perhaps also throws some light on Sargon the man. Although he may not have been the one to introduce cuneiform texts written on wax, this novel method of committing texts to writing apparently took his fancy. This assumption tallies well with the interest he took in the engineering projects undertaken in cities he conquered. Sargon's palace at Khorsabad was dedicated in 706 BC, less than a year before he died.

An unparalleled record of Sargon's eighth campaign (714 BC)—in the form of a letter to the god Ashur—has been recovered. According to this letter, Sargon, in 714, led the Assyrian armies from Kalakh, which at the time was still his residence, into the areas around modern as-Sulaimānīyah in Iraqi Kurdistan and into the highlands of the Zagros range beyond. His purpose was to come to the aid of allies of the Assyrian realm who were threatened by Rusa I, a king of Urartu and a bitter enemy of Assyria. During the progress of this campaign, the author of the account visualized, or anticipated, the reactions of his adversary as, from a mountain, he watched the approach of the Assyrian armies. The passage, like many others in this unique text, constitutes an ingenious stylistic device unparalleled in Assyrian historical literature. The phraseology employed by the author is original by Mesopotamian standards as they are known today: inventive, resourceful, testifying to a fertile mind, and clearly deviating from the commonplace platitudes that mostly characterize the standard accounts of Assyrian kings. Whether or not Sargon himself is responsible for the wording of this narrative, it is to his credit that an account of this nature emerged from his chancery, with his approval and endorsement. Sargon is assumed to have died in battle in 705. (Jo.La.)

BIBLIOGRAPHY. A.G. Lie, *The Inscriptions of Sargon II, King of Assyria* (1929), is still the only acceptable edition of Sargon's various inscriptions other than his account of the eighth campaign. François Thureau-Dangin, *Une Relation de la huitième campagne de Sargon (714 avant Jésus-Christ)* (1912), remains a standard edition of a unique document. A rendering, in translation, of the entirety of this text may be found in D.D. Luckenbill, *Ancient Records of Assyria and Babylonia,* 2 vol. (1927, reprinted 1969), as well as translations of various texts laid down by Assyrian monarchs. Luckenbill's two volumes remain a standard work of reference.

MESOPOTAMIA

• **Sargon,** byname SARGON OF AKKAD (fl. 24th to 23rd century BC), ancient Mesopotamian ruler (reigned *c.* 2334–2279 BC), one of the earliest of the world's great empire builders, conquering all of southern Mesopotamia as well as parts of Syria, Anatolia, and Elam (western Iran). He established the region's first Semitic dynasty and was considered the founder of the Mesopotamian military tradition.

Life. Sargon is known almost entirely from the legends and tales that followed his reputation through 2,000 years of cuneiform Mesopotamian history, and not from documents that were written during his lifetime. The lack of contemporary record is explained by the fact that the capital city of Agade, which he built, has never been located and excavated. It was destroyed at the end of the dynasty that Sargon founded and was never again inhabited, at least under the name of Agade.

According to a folktale, Sargon was a self-made man of humble origins; a gardener, having found him as a baby floating in a basket on the river, brought him up in his own calling. His father is unknown; his own name during his childhood is also unknown; his mother is said to have been a priestess in a town on the middle Euphrates. Rising, therefore, without the help of influential relations, he attained the post of cupbearer to the ruler of the city of Kish, in the north of the ancient land of Sumer. The event that brought him to supremacy was the defeat of Lugalzaggisi of Uruk (biblical Erech, in central Sumer). Lugalzaggisi had already united the city-states of Sumer by defeating each in turn and claimed to rule the lands not only of the Sumerian city-states but also those as far west as the Mediterranean. Thus, Sargon became king over all of southern Mesopotamia, the first great ruler for whom, rather than Sumerian, the Semitic tongue known as Akkadian was natural from birth, although some earlier kings with Semitic names are recorded in the Sumerian king list. Victory was ensured, however, only by numerous battles, since each city hoped to regain its independence from Lugalzaggisi without submitting to the new overlord. It may have been before these exploits, when he was gathering followers and an army, that Sargon named himself Sharru-kin (Rightful King) in support of an accession not achieved in an old-established city through hereditary succession. Historical records are still so meagre, however, that there is a complete gap in information relating to this period.

Not content with dominating this area, his wish to secure favourable trade with Agade throughout the known world, together with an energetic temperament, led Sargon to defeat cities along the middle Euphrates to northern Syria and the silver-rich mountains of southern Anatolia. He also dominated Susa, capital city of the Elamites, in the Zagros Mountains of western Iran, where the only truly contemporary record of his reign has been uncovered. Such was his fame that some merchants in an Anatolian city, probably in central Turkey, begged him to intervene in a local quarrel, and, according to the legend, Sargon, with a band of warriors, made a fabulous journey to the still-unlocated city of Burushanda (Purshahanda), at the end of which little more than his appearance was needed to settle the dispute.

As the result of Sargon's military prowess and ability to organize, as well as of the legacy of the Sumerian city-states that he had inherited by conquest and of previously existing trade of the old Sumerian city-states with other countries, commercial connections flourished with the Indus Valley, the coast of Oman, the islands and shores of the Persian Gulf, the lapis lazuli mines of Badakhshān, the cedars

of Lebanon, the silver-rich Taurus Mountains, Cappadocia, Crete, and perhaps even Greece.

During Sargon's rule Akkadian became adapted to the script that previously had been used in the Sumerian language, and the new spirit of calligraphy that is visible upon the clay tablets of this dynasty is also clearly seen on contemporary cylinder seals, with their beautifully arranged and executed scenes of mythology and festive life. Even if this new artistic feeling is not necessarily to be attributed directly to the personal influence of Sargon, it shows that, in his new capital, military and economic values were not alone important.

Because contemporary record is lacking, no sequence can be given for the events of his reign. Neither the number of years during which he lived nor the point in time at which he ruled can be fixed exactly; 2334 BC is now given as a date on which to hang the beginning of the dynasty of Agade, and, according to the Sumerian king list, he was king for 56 years.

The latter part of his reign was troubled with rebellions, which later literature ascribes, predictably enough, to sacrilegious acts that he is supposed to have committed; but this can be discounted as the standard cause assigned to all disasters by Sumerians and Akkadians alike. The troubles, in fact, were probably caused by the inability of one man, however energetic, to control so vast an empire without a developed and well-tried administration. There is no evidence to suggest that he was particularly harsh, nor that the Sumerians disliked him for being a Semite. The empire did not collapse totally, for Sargon's successors were able to control their legacy, and later generations thought of him as being perhaps the greatest name in their history.

Assessment. Attributing his success to the patronage of the goddess Ishtar, in whose honour Agade was erected, Sargon of Akkad became the first great empire builder. Two later Assyrian kings were named in his honour. Although the briefly recorded information of his predecessor Lugalzaggisi shows that expansion beyond the Sumerian homeland had already begun, later Mesopotamians looked to Sargon as the founder of the military tradition that runs through the history of their people.

(S.M.D.)

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Sarh, formerly FORT-ARCHAMBAULT, capital of Moyen-Chari *préfecture,* southern Chad, central Africa, on the Chari River. It is named for the dominant ethnic group, the Sara, and is the nation's second largest town. Its warm and seasonally wet climate permits the cultivation of cotton, Chad's major export, in the locality. An economically important textile production (cotton spinning, weaving, bleaching, and printing) complex was completed at Sarh in 1967. The town is also a centre for commercial fishing and a major marketplace, with a refrigerated slaughterhouse. Sarh lies on the main road from N'Djamena (capital of Chad) to Bangui (capital of the Central African Republic). The town has an airport, and the Chari River is navigable between Sarh and N'Djamena for much of the year. A hospital, a secondary school, and a National School of Communications (1963) are in the town. Pop. (1978 est.) 61,300.

Sārī, city and capital, Māzandarān *ostān* (province), northern Iran. Founded during the Sāsānid period (AD 224–651), it became the capital of Tabarestan (7th–9th century) after the Arab conquest of the region. The city was ravaged by the Mongols in the 12th century and visited by the historian Mostowfi in the 14th century. Āghā Moḥammad Khān (ruled 1779–97) of the Qājār dynasty chose Sārī as the capital of his empire.

Situated on the western bank of the Tālār River, Sārī is inhabited by Persians, Turks, Kurds, Bangashis, Afghans, and Turkomans. Industries produce bricks, mosaics, woven cloth and jute, ginned cotton, carpets, milled rice, alcoholic beverages, canned meat, and other food products. A railway connects Sārī with Gorgān, and roads link it with Bābol, Nowshahr, Shahsavār, and Amol. There is a ruined palace of Āghā Moḥammad Khān and the tombs of the *imāms* Yaḥyā and Zein al-Abedin. Pop. (1976) 70,936.

sari, also spelled SAREE, principal outer garment of women of the Indian subcontinent, consisting of a piece of often brightly coloured, frequently embroidered, silk, cotton, or, in recent years, synthetic cloth five to seven yards long. It is worn wrapped around the body with the end left hanging or used over the head as a hood.



Woman wearing a sari, detail of a gouache painting on mica from Tiruchchirāppalli, India, *c.* 1850; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London

Sculptured reliefs from the 2nd century BC show men and women with unclothed upper bodies wearing the sari wrapped around their hips and drawn between the legs in such a fashion as to form a series of folds down the front. There was no major change in the costume until the 12th century, when the Muslims conquered north and central India and insisted that the body be covered. Hindu women wear the sari over a short blouse and a petticoat into which it is folded and tucked at the waist to form a long skirt.

sārindā, folk fiddle of India played by the lower castes. It is of central Asian origin and comes in a variety of peculiar shapes, often resembling a pouch or bag. The body is constructed of wood and has a short neck without frets, lateral pegs inserted in a cubed pegbox, and three horsehair or gut strings. The *sāraṅgī,* a version popular in northern India, usually has a fourth string made of wire.

Sarino (Korean painter): *see* Cho Sok-chin.

Sāriska Wild Life Sanctuary, wildlife preserve in Alwar district, Rājasthān state, northwestern India, established in 1955 with an area of 190 sq mi (492 sq km) in Sāriska Forest. Acacia forests cover the arid lower slopes of the hills and the deep, narrow valleys; thickets of male bamboo (*Dendrocalamus strictus,* having a nearly solid culm) grow along the streams. Wildlife includes tiger, leopard, wild pig, nilgai, chital, porcupine, peafowl, partridge, and thrush. Kankwāsī Fort, a Śiva temple of the 12th century, and a 10th-century Neelkanth (Śiva) temple are of archaeological interest. There are good roads within the sanctuary and observation towers at Bāndi Pul and Kālīghātī.

Sarit Thanarat (b. June 16, 1908, Bangkok—d. Dec. 8, 1963, Bangkok), field marshal and premier in a military government of Thailand from 1958 to 1963.

Sarit studied at the Chula Chom Klao military academy in Bangkok, graduating in 1929 and subsequently serving as an army officer. He supported the military dictator Phibunsongkhram in his coup d'etat in 1947 and served until 1957 in that regime as minister of defense and commander of the army. In 1957, with some popular support, he removed Phibun, allowing the establishment of a civilian "caretaker" government. In October 1958, however, he seized power in another coup d'etat and proclaimed an "interim constitution," naming himself premier.

Sarit's first task was to uproot the corruption that had flourished during the former regime, particularly in the national police force. He launched campaigns against organized crime, made the smoking of opium illegal, and attempted to halt opium smuggling. He mounted the Thai government's first successful programs of rural economic development, particularly in the impoverished provinces of northeast Thailand; and he undertook a major expansion and improvement of the national education system.

Sarit's regime was highly authoritarian. Political parties were banned, opposition newspapers were made to cease publication, and constitutional rights were suspended in order that dissenters could be jailed without trial on charges of subversion. In foreign policy he was pro-American and anti-Communist, keeping Thailand in the Southeast Asia Treaty Organization and relying increasingly on U.S. military aid to stem the threat of Communist insurgency within Thailand. When Sarit died he was succeeded as premier by Gen. Thanom Kittikachorn.

Sariwŏn, city and provincial capital, Hwanghae-pukto (North Hwanghae Province), southwestern North Korea. Situated on the middle channel of the Chaeryŏng-gang (river), it is the market centre for agricultural products of the Chaeryŏng plain. A planned city, developed when the railway from Seoul to Sinŭiju was built in 1906, it is a junction for rail, road, and river transport. Its industry is mainly light, including agricultural machine workshops, food processing, and spinning mills. Sariwŏn College of Education, Sariwŏn College of Communism, Sariwŏn College of Agriculture, and the Agricultural Research Centre are located there. Pop. (latest est.) 42,-957.

Sark, French SERCQ, one of the Channel Islands (*q.v.*), in the English Channel, 7 mi (11 km) east of Guernsey, comprising Great Sark (north) and Little Sark (south) connected by La Coupée, a 100-yd (90-m) isthmus that is only 6 ft (2 m) wide at the top. Its area, including Brechou (privately owned, and separated from Great Sark by the narrow Le Gouliot Channel), is 2.1 sq mi (5.5 sq km).

Sark is essentially a plateau rising to 375 ft (114 m) with a scenic coast encircled by cliffs. Creux Harbour on the east is connected with

the interior by two tunnels, dating from 1588 and 1868; a second harbour was opened in 1949 at La Maseline. Apart from legends of St. Magloire (6th century), Sark first appears in history as a gift by William the Conqueror to Le Mont-Saint-Michel, *c.* 1040. A century later it was in the hands of the de Vernon family, lords of Néhou, who endowed the priory of St. Magloire as a dependency of the abbey of Montebourg. Sark reverted to the crown in 1204 by Richard de Vernon's forfeiture. For part of the 13th century an attempt was made to administer Sark and Alderney together; later Sark was governed by a royal *prévôt* (provost) who presided over a court of six jurats (magistrates chosen for life). The island was captured by the French in 1549, seized by a Flemish corsair and held briefly for the emperor Charles V, retaken by the French, and was in English hands again by 1558. To prevent it from becoming a nest of pirates, it was colonized by Hélier de Carteret, seigneur of St. Ouen in Jersey, under a patent of Elizabeth I (Aug. 6, 1565). At first the court was modelled on that of Jersey, with bailiff and jurats; but this was changed in 1675 to one composed of seneschal, *prévôt*, *greffier*, tenants, seigneur, constable, and *vingtenier*. By 1951 the members were reduced to seigneur, seneschal, tenants, and 12 deputies. The Carterets were seigneurs until 1732, after which the seigneury changed hands several times. From 1927 until 1974 it was held by the dame of Sark, Sibyl Hathaway; on her death she was succeeded by her son Michael Beaumont as 22nd seigneur.

The seigneur appoints the seneschal, who presides over the Chief Pleas, a body of 40 tenants and 12 deputies, which regulates local affairs. The seigneur can, by temporary veto, delay the enactment of ordinances, which can also be annulled by the Royal Court of Guernsey, subject to appeal to the sovereign in council. Sark is part of the Bailiwick of Guernsey. Justice is administered by the court of the seneschal, with rights of appeal to the Royal Court of Guernsey. Police, if required, are supplied from Guernsey on repayment. Automobiles are forbidden on the roads of Sark. The canine population is controlled, and no one but the seigneur may keep a female dog.

Settlement is scattered; dairying is practiced, but the farmland (about a third of the island) includes substantial tillage. There is some market gardening. External trade is directed through Guernsey. Accommodation is limited, and most visitors come on day trips from Guernsey or on cruises. Pop. (1981) 560.

Sarkar, Sir Jadunath (b. Dec. 10, 1870, Karachmāria, Bengal—d. May 15, 1958, Calcutta), foremost Indian historian of the Mughal dynasty (1526–1857).

Educated in English literature at Presidency College, Calcutta, Sarkar at first taught English and later shifted to history during his tenure (1902–17) at Patna College. Sarkar chose Aurangzeb, the last major Mughal emperor, as the object of his life's work. His first book, *India of Aurangzib,* was published in 1901. His five-volume *History of Aurangzib* took 25 years to complete and was published in 1924. Sarkar devoted another 25 years to his four-volume *Fall of the Mughal Empire,* completed in 1950. Two of Sarkar's single-volume works are *Chaitanya: His Pilgrimages and Teachings* (1913) and *Shivaji and His Times* (1919). All his works demonstrate his vast knowledge of Persian-language sources and are skillfully written in English.

Sarkar served as vice chancellor of the University of Calcutta (1926–28) and on the Bengal legislative council (1929–32). He was knighted in 1929.

Sarkārs, Northern (India): *see* Northern Sarkārs.

Sarmatian, member of a people originally of Iranian stock who migrated from Central Asia to the Ural Mountains between the 6th and 4th century BC and eventually settled in most of southern European Russia and the eastern Balkans.

Like the Scythians to whom they were closely related, the Sarmatians were highly developed in horsemanship and warfare. Their administrative capability and political astuteness contributed to their gaining widespread influence. By the 5th century BC the Sarmatians held control of the land between the Urals and the Don River. In the 4th century they crossed the Don and conquered the Scythians, replacing them as rulers of almost all of southern Russia by the 2nd century. The Roman province of Lower Moesia (Bulgaria) was penetrated during the time of Nero's rule, and an alliance which the Sarmatians formed with Germanic tribes posed a formidable threat to the Romans in the West as late as the lst century AD. In the final centuries of their existence the Sarmatians invaded Dacia (Romania) and the lower Danube region, only to be overwhelmed by the Goths during the 3rd century AD, though many of them joined their conquerors in the Gothic invasion of western Europe. Sarmatia perished when hordes of Huns migrated after AD 370 into southern Russia. Those surviving became assimilated or escaped to the West to fight the Huns and the last of the Goths. By the 6th century their descendants had disappeared from the historical record.

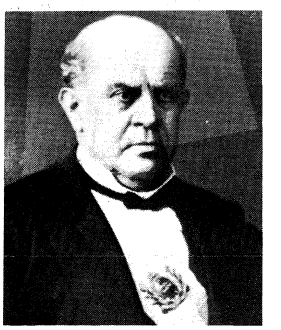
Because of their common nomadic and Central Asian heritage, Sarmatian society paralleled, at first, that of the Scythians, but there were many differences. The Scythian gods were those of nature, while the Sarmatians venerated a god of fire to whom they offered horses in sacrifice. In contrast to the reclusive, domestic role of Scythian women, unmarried Sarmatian females, especially in the formative years of their society, took arms alongside men. Sarmatian female warriors may have inspired the Greek tales of the Amazons.

An early matriarchal form of society was later replaced by a system of male chieftains and eventually by a male monarchy. This transition may well have stemmed from the rapid development of horsemanship and a male cavalry corps, attributable to the invention of the metal stirrup and the spur. These innovations contributed greatly to success in military campaigns and even influenced the Roman style of combat.

Evolving burial customs offer an insight into the progress of the Sarmatian social structure. Early graves held only the remains of the deceased. The somewhat later inclusion of personal objects with the body followed the emergence of class differences. As society became more complex and affluent, more treasures were included with the corpse, until in the final period burial costumes and even jewelry were added to the ritual. The Kuban region is the site of the most elaborate tombs, which in general resemble those of the Scythians, although they are less elaborate in form and decoration. Horse trappings and weapons of the Sarmatians were also less elaborate than those of the Scythians, but they nonetheless evidenced great skill. Sarmatian spears were longer, but knives and daggers were just as varied in style. An outstanding specialty was the Sarmatian long sword, which featured a hilt of wood with gold lacing, topped with an agate or onyx knob. Sarmatian art was strongly geometric, floral, and richly coloured. Jewelry was a major craft, expressed in rings, bracelets, diadems, brooches, gold plaques, buckles, buttons, and mounts. Exceptional metalwork was found in the tombs, including bronze bracelets, spears, swords, gold-handled knives, and gold jewelry and cups.

Sarmatian Stage, major division of Miocene rocks and time (the Miocene Epoch began about 26,000,000 years ago and lasted about 19,000,000 years). The Sarmatian Stage, which occurs between the Pontian and Tortonian stages, was named for Sarmatia, ancient homeland of the Sarmatian tribes in what is now the southern Soviet Union, where important exposures occur. During the Miocene, many areas in western Europe became emergent, while large areas of eastern Europe were submerged by waters cut off from interchange with the oceans; these isolated, inland seas were freshened by the inflow of streams, resulting in the development of a very distinctive, lagoonal-type fossil fauna represented by peculiar species of clams, gastropods, and bryozoans. These animals were present in great abundance but with little variety; almost no other kinds of animals occur. The bryozoans frequently occur in such local abundance that they form reeflike masses. Sarmatian depositional basins fluctuated greatly from extremely salty to brackish.

Sarmiento, Domingo Faustino (b. Feb. 14, 1811, San Juan, Arg.—d. Sept. 11, 1888, Asunción, Paraguay), educator, statesman, and writer who rose from rural schoolmaster to become Argentina's first civilian president (1868–74). As president, he laid the foundations for later national progress by fostering public education, stimulating the growth of commerce and agriculture, and encouraging the development of rapid transportation and communication. As a writer, he is best remembered for his sociological–biographical study *Civilización y barbarie: vida de Juan Facundo Quiroga, y aspecto físico, costumbres, y hábitos de la República Argentina* (1845; *Life in the Argentine Republic in the Days of the Tyrants; or, Civilization and Barbarism,* 1868), a plea for industrialization and urbanization as opposed to the culture of the gauchos of the Argentinian pampas.



Sarmiento
Organization of American States

Largely self-taught, Sarmiento began his career as a rural schoolteacher at the age of 15 and soon entered public life as a provincial legislator. His political activities and his outspokenness provoked the rage of the military dictator Juan Manuel de Rosas, who exiled him to Chile in 1840. There Sarmiento was active in politics and became an important figure in journalism through his articles in the Valparaíso newspaper *El Mercurio.* In 1842 he was appointed founding director of the first normal school in South America and began to give effect to a lifelong conviction that the primary means to national development was through a system of public education.

During that period in Chile, Sarmiento wrote *Facundo,* an impassioned denunciation of Rosas' dictatorship in the form of a biography of Juan Facundo Quiroga, Rosas' tyrannical gaucho lieutenant. The book has been criticized for its erratic style and oversimplifications, but it has also been called the single most important book produced in Spanish America.

In 1845 the Chilean government sent Sarmiento abroad to study educational methods in Europe and the United States. After three years he returned, convinced that the United States provided the model for Latin America to follow in its development. Sarmiento returned to Argentina to help overthrow Rosas in 1852; he continued his writing and educational activities and reentered Argentinian politics.

Sarmiento was elected president of Argentina in 1868 and immediately began to apply his liberal ideals—his belief in democratic principles and civil liberties and his opposition to dictatorial regimes in any form—to the building of a new Argentina. He ended the war with Paraguay inherited by his administration and concentrated on domestic achievements. To a largely illiterate country he brought primary and secondary schools, normal schools and schools for professional and technical training, and libraries and museums.

When his term ended in 1874, Sarmiento continued to be active in public life. Most of the 52 volumes of his published work are devoted to educational themes.

Sarmiento de Acuña, Diego: *see* Gondomar, Diego Sarmiento de Acuña, conde de.

Sārnāth, archaeological site north of Vārānasi, Uttar Pradesh state, northern India, where, according to tradition, the Buddha first began teaching his followers; the site contains a *stūpa* (shrine) and the famous lion-capital memorial pillar, which was erected by the 3rd-century-BC Maurya emperor Aśoka and is now the state emblem of India.

Sarnen, capital of Obwalden half canton, central Switzerland, at the efflux of the Sarner Aa (river) from the northern end of the Sarner See (Lake Sarnen), southwest of Luzern. In its town hall (1729–31), the *Weisses Buch* ("White Book") contains the oldest chronicle extant (*c.* 1470) of the history of Swiss liberation; the book is also the principal source of the legend of William Tell, the Swiss patriot who was sentenced to shoot, with a crossbow, an apple from his son's head. The Landsgemeinde (open-air elections of the half canton, with voting by show of hands), are held annually on the Landenberg, which was once the site of a Habsburg castle. Notable buildings include the parish church (1739–42), the Schützenhaus (1752), Benedictine and Capuchin monasteries, and a college. Sarnen is a tourist centre on the Luzern–Brünig electric railway; industries include precision engineering, woodworking, and textile manufacture. The population is German speaking and Roman Catholic. Pop. (1980) 7,372.

Sarnia, city, seat of Lambton County, southeastern Ontario, Canada, on the St. Clair River, at the southern end of Lake Huron, 55 mi (90 km) west of London. First visited by French explorers as early as 1627, its site was settled in 1807, and the present city was founded in 1833 by Malcolm Cameron. It was named in 1836 after the Roman word for the English Channel island of Guernsey. Oil was discovered in the county in 1858, and by the turn of the century Sarnia had become a major petroleum centre. The city has complete harbour facilities, oil refineries (crude oil being supplied by pipeline from Alberta), extensive petrochemical industries, a salt industry, grain elevators, and a diversity of small manufactures. The publicly owned Polymer Corporation, built in 1942, pioneered the manufacture of synthetic rubber in Canada. A bridge, railway tunnel, and ferry service connect Sarnia with Port Huron, Mich., on the west side of the river. Inc. town, 1856; city, 1914. Pop. (1981) 50,892.

Sarno, town, Salerno province, Campania region, southern Italy, at the foot of Saretto hill near the sources of the Sarno (ancient Sarnus) River, just north of Salerno. Near Sarno in AD 553 Teias, king of the Goths, was defeated and slain by the Byzantine general Narses. Malaria retarded the growth of the town for centuries. The ruined medieval castle belonged to Francesco Coppola, count of Sarno, who took part in the barons' conspiracy in 1485 against the Aragonese king of Naples, Ferdinand I. The countship of Sarno was also held by the Orsini, Suttavilla, and Colonna families, before passing to the crown of Naples. Walter de Brienne, duke of Athens, is buried in the 13th-century church of Sta. Maria della Foce (rebuilt 1701).

Sarno is an agricultural centre with hemp and cotton mills; there are hot mineral springs nearby. Pop. (1981 prelim.) mun., 30,497.

Sarnoff, David (b. Feb. 27, 1891, Minsk, Russia—d. Dec. 12, 1971, New York City), U.S. pioneer in the development of both radio and television broadcasting.

As a boy in Russia Sarnoff spent several years in preparing for a career as a Jewish scholar



Sarnoff, 1971
AP/Wide World Photos

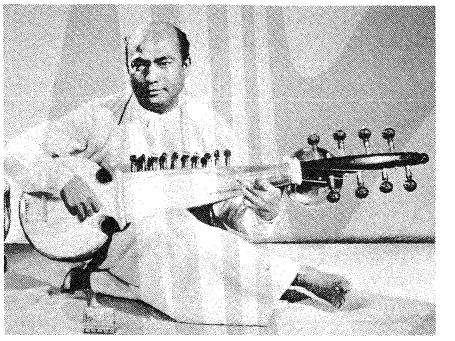
of the Talmud. He emigrated with his family in 1900 and settled first in Albany, N.Y., and then in New York City. While going to school, he helped support the family by selling newspapers, running errands, and singing the liturgy in a synagogue. In 1906 he left school to become a messenger boy for a telegraph company and with his first money bought a telegraph instrument. He soon became proficient in Morse operation and found work as a radio operator for the Marconi Wireless Telegraph Company.

After service on shore and at sea over the next few years, Sarnoff became operator of the most powerful radio station in the world, established by John Wanamaker atop his Manhattan department store. There, on April 14, 1912, Sarnoff picked up the distress signal from the sinking "Titanic"; he remained at his instrument for 72 hours, receiving and passing on the news. Rewarded by the Marconi company with rapid promotion, he became an important official of the company and in 1916 first proposed the "radio music box," or commercially marketed radio receiver. The proposal was several years in gaining acceptance, but in 1921, as general manager of the newly formed Radio Corporation of America (RCA), he demonstrated its market potential in broadcasting the Dempsey–Carpentier boxing match, which created a sensation. Within three years RCA sold more than $80,000,000 worth of receiving sets. In 1926 he formed the National Broadcasting Company (NBC).

By that time Sarnoff had perceived the potential of television, which the contributions of several inventors were making technically feasible. In 1928 he launched an experimental NBC television station for research purposes; by 1939 he was able to give a successful demonstration of the new medium at the New York World's Fair. Development was delayed by World War II, during which Sarnoff, a reserve officer, served on Gen. Dwight D. Eisenhower's staff as a communications consultant and was promoted to brigadier general. He became president of RCA in 1930 and chairman of the board in 1947, retiring in 1970.

saro, also called GIANT OTTER, rare South American species of otter (*q.v.*).

sarod, also called RABOB, northern Indian musical instrument of the lute family, played in classical dance orchestras and as a solo instrument with tabla (drums) and tamboura (drone-lute) from about 950. It is played either by plucking or by bowing.



Ali Akbar Khan playing a sarod
By courtesy of the American Society for Eastern Arts

The sarod has a deep body with a skin belly, a broad neck with an unfretted metal fingerboard, four melody strings, and several sympathetically vibrating strings. The melody strings are tuned c′–f′–g′–c″, beginning with middle C.

sarong, principal silk, cotton, or synthetic fabric garment worn in the Malay Archipelago and the Pacific islands. Brightly coloured fabric four or five yards (up to four and a half



Women in sarongs, detail of "We Greet Thee, Mary," oil painting by Paul Gauguin, 1891; in the Metropolitan Museum of Art, New York City
By courtesy of the Metropolitan Museum of Art, New York City, bequest of Samuel A. Lewisohn, 1951

metres) long is wrapped around the lower part of the body and tucked in or tied at the waist, forming a draped dress or skirt varying in length from knees to ankles.

The most prized sarongs, heavily interwoven with gold thread, come from Batu Bara and Sumatra. The sarong has been worn by both men and women.

Saronic Gulf, Modern Greek SARONIKÓS KÓLPOS, also called GULF OF AEGINA, gulf of the Aegean Sea between Ákra (cape) Soúnion of the Attica peninsula and Ákra Skíllaion of the Argolis peninsula of the Greek Peloponnese. A maximum of 50 mi (80 km) long northwest–southeast and about 30 mi wide, it is linked on the west to the Gulf of Corinth by the Corinth Canal. At its widest point the gulf is divided by three of the Saronic islands: Salamís, Aíyina (Aegina), and Póros. Piraeus, the port of Athens and largest port of Greece, is situated due east of Salamís; the ports of Elevsís and Mégara lie north and northwest, respectively, of Salamís. Off the much indented coast of Salamís, Athenian naval and land forces achieved a crushing victory over a massive Persian naval force in 480 BC.

saros, in astronomy, interval of 18 years 11⅓ days (10⅓ days when five leap years are included) after which the Earth, Sun, and Moon return to nearly the same relative positions and the cycle of lunar and solar eclipses begins to repeat itself; *e.g.*, the solar eclipse of June 30, 1973, will be followed by one of roughly the same latitude and duration on July 11, 1991. As the relative positions of the bodies are slightly changed after each saros, an eclipse cycle ends after a number of saroses—about 71 for solar eclipses and 48 for lunar. Each saros contains about 43 solar and 28 lunar eclipses.

Sarouk carpet: *see* Sarūk carpet.

Saroyan, William (b. Aug. 31, 1908, Fresno, Calif., U.S.—d. May 18, 1981, Fresno), U.S. writer who made his initial impact during the Depression with a deluge of brash, original, and irreverent stories celebrating the joy of living in spite of poverty, hunger, and insecurity.

The son of an Armenian immigrant, Saroyan left school at 15 and educated himself by reading and writing. His first collection of stories, *The Daring Young Man on the Flying Trapeze* (1934), was soon followed by another collection, *Inhale and Exhale* (1936). His first play, *My Heart's in the Highlands*, was brilliantly produced by the Group Theatre in 1939. In 1940 Saroyan refused the Pulitzer Prize for his play *The Time of Your Life* (performed 1939) on the grounds that it was "no more great or good" than anything else he had written.

Saroyan was concerned with the basic goodness of all people, especially the obscure and naive, and the value of life. His mastery of the vernacular makes his characters vibrantly alive. Most of his stories are based on his childhood and family, notably the collection *My Name Is Aram* (1940) and the novel *The Human Comedy* (1943). His novels, such as *Rock Wagram* (1951) and *The Laughing Matter* (1953), were inspired by his own experiences of marriage, fatherhood, and divorce.

From 1958 on, Saroyan lived mostly in Paris for "tax purposes," though he continued to maintain a home in Fresno, Calif., where he had been born and raised. The autobiographical element was strong in all his work, usually disguised as fiction; but some of his later memoirs, consisting of vignettes and brief essays written largely in Paris and Fresno, have their own enduring value. They include *Here Comes, There Goes You Know Who* (1961), *Not Dying* (1963), *Days of Life and Death and Escape to the Moon* (1971), and *Places Where I've Done Time* (1975).

Sarpan (Mariana Islands): *see* Rota.

Sarpedon, in Greek legend, son of Zeus, the king of the gods, and Laodameia, the daughter of Bellerophon; he was a Lycian prince and a hero in the Trojan War. Sarpedon fought with distinction on the side of the Trojans but was slain by the Greek warrior Patroclus. A struggle took place for the possession of his body until Apollo rescued it from the Greeks, washed it, anointed it with ambrosia, and handed it over to Hypnos and Thanatos (Sleep and Death), by whom it was conveyed for burial to Lycia. There a sanctuary (Sarpedoneum) was erected in his honour.

In later tradition Sarpedon was the son of Zeus and Europa (*q.v.*) and the brother of King Minos of Crete. Expelled from Crete by Minos, he and his comrades sailed for Asia Minor, where he finally became king of Lycia.



Hypnos and Thanatos carrying the body of Sarpedon, detail of a painting on a kylix from Vulci, signed by Pamphaios, *c.* 510 BC; in the British Museum

The Mansell Collection

Sarpi, Paolo, pseudonym PIETRO SOAVE POLANO (b. Aug. 14, 1552, Venice—d. Jan. 14, 1623, Venice), Italian patriot, scholar, and state theologian during Venice's struggle with Pope Paul V. Between 1610 and 1618 he wrote his *History of the Council of Trent,* an important work decrying papal absolutism. Among Italians, he was an early advocate of the separation of church and state.



Sarpi, detail of a portrait (the black spot on his face covers the scar from an unsuccessful attempt on his life in 1607); in the Bodleian Library, Oxford, Eng.

Thomas-Photos, Oxford, Eng.

Early life and career. Sarpi was the son of Francesco Sarpi, an unsuccessful businessman, and Isabella Morelli, of a prominent but not noble Venetian family. His father died when Sarpi was a child, and he was brought up in poor circumstances by his pious mother and his maternal uncle Ambrogio, a priest. Delicate, studious, and clever, at 14 Sarpi joined the Servite order and at 20 became court theologian to the duke of Mantua, a post which gave him leisure to study Greek, Hebrew, mathematics, anatomy, and botany. Young Sarpi was known as La Sposa—"The Bride"—because of his modesty and moral seriousness. Of medium height, with a large brow, long nose, black eyes, and thin beard, he lived simply and suffered from poor health. He is reported to have possessed a photographic memory and to have been a most persistent scholar.

At 27 Sarpi was appointed provincial of his order and won a reputation as a firm but sensible ruler. He visited Rome several times and became friendly with Pope Sixtus V and the great theologian Robert Bellarmine. Continuing his anatomical studies, he discovered the valves of the veins that facilitate the circulation of the blood, and he was the first to demonstrate that the pupil of the eye dilates under the action of light. His many friends included Galileo, who thought no one in Europe could surpass Sarpi in mathematics, while Sarpi said of the astronomer's condemnation by Rome, "The day will come, I am almost sure, when men, better versed in these matters, will deplore the disgrace of Galileo and the injustice dealt so great a man."

His defense of the Republic of Venice. Venice, with its cosmopolitan population, had long followed a liberal religious policy, resisting any intrusion by Rome into its internal affairs. In 1606 Paul V demanded that Venice repeal a law restricting church building and hand over to him two priests, one charged with murder, whom the Venetian government intended to try before civil courts. When Venice refused, Paul excommunicated the Senate and the Doge (the Venetian head of state) and put the republic under an interdict, meaning that all priests were debarred from their functions.

Sarpi, having been appointed consultor to the government, wrote powerfully in support of the Venetian case. He argued that the pope was infallible only in matters of faith and that his interdict was invalid. Sarpi's basic tenet was that "princes have their authority from God, and are accountable to none but him for the government of their people." It was in the public interest, he said, to fix limits on church building in a small city like Venice, for ecclesiastical property—already extensive—paid no taxes to the state. As for the two priests, while the church had every right to try them for crimes committed as priests, for crimes such as murder and adultery the state courts must be responsible. Sarpi concluded that Venetians were not bound to observe the interdict, and his advice was followed.

Sarpi wrote in a clear, witty style and argued not from legal textbooks but from the evident facts of history. He constantly argued, for example, that the pope's power should not exceed that of St. Peter. Sarpi's writings played an important part in sustaining Venetian morale and in winning sympathy abroad. Paul V had a powerful ally in Spain, then dominant in Italy, and when he threatened recourse to arms, Venice secured the support of France and even threatened to call on Protestant countries. Finally the Pope, fearing Venice would become Protestant, agreed to a settlement. The interdict was ended, and Venice handed over the two priests, reserving, however, its right to try churchmen before civil courts. "The Republic," said Sarpi, "has given a shake to papal claims. For whoever heard till now of a papal interdict, published with all solemnity, ending in smoke?"

Sarpi refused to answer a summons to appear before the Roman Inquisition. On Oct. 5, 1607, he was stabbed during an attack on him in the street. He blamed the Roman Curia but the charge has never been proved.

Sarpi's writings. Between 1610 and 1618 Sarpi wrote the first full history of the Council of Trent (1545–63), using Venetian archives and private papers, notably those of Arnauld du Ferrier, French ambassador to the council. Sarpi strongly criticized the council for not giving bishops more autonomy, for hardening differences with the Protestants, and for increasing the Curia's absolutism. The only one of Sarpi's writings to be printed in his lifetime, the *History of the Council of Trent,* appeared in London in 1619, under the pseudonym Pietro Soave Polano. Though put on Rome's *Index* of prohibited books, it went through several editions and five translations in 10 years.

The *History,* like most of Sarpi's writings, is a partisan work, written with one eye on the Protestants whom Sarpi saw as Venice's potential allies against Rome and Spain. Similarly, in his extensive correspondence, Sarpi sought the friendship of all who took an independent line toward Rome, including French Huguenots and German Protestants, but there is no evidence to suggest that he himself was, in doctrine, anything but an orthodox Roman Catholic. Sarpi's quarrel was never with the Roman Church but—as he saw it—with an interfering Roman Curia.

In his later life Sarpi was something of a hero to the Venetians and was sought out by foreign visitors. He continued to live frugally and, though excommunicated, he celebrated mass to the end. He died in 1623, and his last words—"Esto perpetua" ("May she endure")—were, characteristically, a reference to Venice. (V.C.)

BIBLIOGRAPHY. Paolo Sarpi, *Opere* (1761–68), is the first collected, and still the most complete, edition of Sarpi's writings, though it will eventually be superseded by the critical edition of individual works in the course of publication by Laterza of Bario. The *Lettere* (1863) throw light on Sarpi's character and his relations with a wide variety of Italian and foreign thinkers. *Istoria del Concilio Tridentino* (1935, reprinted 1966) is a critical edition by G. Gambarini of Sarpi's largest and most influential work, based on the manuscript by one of Sarpi's copyists in the Biblioteca Marciana, Venice. Portions of the *Istoria* have been translated by Peter Burke in *History of Benefices; and Selections from History of the Council of Trent* (1967). The best existing biography is the uncritical and laudatory *Vita del padre Paolo dell'ordine de' servi,* by Fulgenzio Micanzi (1646).

Sarraceniales, order of New World pitcher plants, belonging to the class known as dicotyledon (*q.v.*; characterized by the presence of two seed leaves). It consists of the Sarraceniaceae family of perennial herbs, with its three genera and about 15 species. Most populations thrive in climates essentially temperate, but *S. purpurea,* the common pitcher plant, ranges from Labrador and Great Bear Lake (near the Arctic Circle) to subtropical Florida. Several species are restricted to wet meadows or to very acid bogs.

In general, members of the Sarraceniales have a short, below-ground stem, from which leaves radiate outward and upward in varying angles. The pitcher plant (*q.v.*) is an open pitfall for insects and can take the form of a trumpet, a pitcher, or an urn.

A brief treatment of Sarraceniales follows. For full treatment, *see* MACROPAEDIA: Angiosperms.

A crop of pitchers develops in spring. Tubeless pitchers may develop in autumn and, under shady conditions, at other times of the year. Ants and other insects are lured by the glistening nectar glands or other unusual surfaces located on the pitcher. The lip of the pitcher is beset with stiff, downward-pointing hairs or other devices to prevent the insect from crawling out after it has fallen in. Exhausted, the insect settles into the digestive liquor at the bottom of the pitcher. Protein-digesting enzymes and bacterial activity release nitrates and other useful nutrients from the insect's body, which are absorbed by the pitcher plant to supplement the meagre nutrient supply of its environment. Accumulated skeletons of prey remain in the pitcher until the plant dies at the end of the season.

Although this feature is typical of pitcher plants in general, the name pitcher plant typically refers to members of *Serracenia,* the greatest numbers of which are concentrated in northern Florida and the southern parts of Georgia and Alabama. The cluster of leaves produced by species of *Sarracenia* ranges in size from 4 inches (10 centimetres) in *S. rubra* to more than 4 ft (120 cm) in *S. leucophylla.* Its habitat ranges from sand and gravel along stream banks to wet meadows and savannas. *S. rubra,* the sweet pitcher plant, can grow in shade; all others thrive in full sunlight.

Another genus, *Darlingtonia,* includes only *D. californica,* the California pitcher plant. It ranges from Oregon to northern California and thrives in redwood and red fir forests to 6,000 ft (2,000 m) above sea level, where temperatures remain below about 65° F (18° C). Its overarching spotted hood and a unique landing ramp that extends from the top of the curiously twisted urn account for its common name of cobra lily. Using the landing projection, insects often enter the mouth of the pitcher from the side of the domed hood. Translucent areas in the hood encourage potential prey to approach the rim of the pitcher. Insects often fly against these "windows" and fall into the liquor at the pitcher's bottom.

The third genus, *Heliamphora,* grows in the rain-forest mountains of Guyana and Venezuela. Its species form cushions on ridge crests and mingle with the moss *Sphagnum* in swampy depressions. Stems of some species of *Heliamphora* rise to more than 4 ft and are branched and slightly shrubby. Their pitchers attain a height of 20 in.

In *Darlingtonia,* rhizomes elongate to 12 in. in 15 years. In successive years, buds arise at nodes (stem joints) to grow into new plants, giving rise to colonies vegetatively. In addition to this method of propagation, all pitcher plants produce seeds copiously.

Flowering stems generally bear a single flower on a leafless stalk (scape); these scarcely rise above the leaves in many species. In *Darlingtonia,* however, scapes bear scaly bracts and rise to nearly 3 ft. In *Heliamphora,* scapes are branched.

Flower buds form in August in some species of *Sarracenia* but remain hidden in the base of the plant until the scape elongates in spring. Flowers open as early as April in the southern United States but not until August in Labrador.

Sepals and petals of the Sarraceniales commonly number five and stamens are numerous and shed pollen copiously. Five carpels are joined to form the pistil. It is differentiated into a basal, five-chambered ovary (three-chambered in *Heliamphora*) and an expanded style, shaped like an umbrella. Stigmas are located at five points corresponding to rib-tips of an umbrella; this style is unique among plants and is often as showy as the perianth (sepals and petals).

Showy leaves, large colourful flowers, and scented nectars attract many kinds of insects, but especially bees, which are the chief pollinators. Cross-pollination occurs when insects carry fresh pollen to the receptive stigmas of older flowers.

After fertilization, the ovule becomes the seed, and the ovary the fruit. Dry capsules that shed their seeds are the universal fruit type of this order. In southern regions, seeds germinate in late summer, and seedlings are established before first frost.

Sarraut, Albert(-Pierre) (b. July 28, 1872, Bordeaux, Fr.—d. Nov. 26, 1962, Paris), French Radical-Socialist statesman most noted for his colonial policy and liberal rule as governor general of Indochina.

A member of the Chamber of Deputies (1902–24), Sarraut also served as undersecretary of state (1906–09), undersecretary of war (1909–10), and minister of education (1914–15), and twice as governor general of Indochina (1911–14, 1916–19), where he encouraged native participation in the civil service and the use of local laws and languages. As minister for the colonies (1920–24, 1932–33), he sought to coordinate French colonial



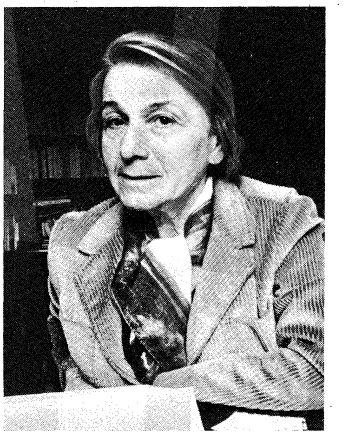
Sarraut, *c.* 1930
H. Roger-Viollet

policy and promote development for overseas possessions, publishing *La Mise en valeur des colonies françaises* (1923; "The Improvement of French Colonies") and *Grandeur et servitude coloniales* (1931; "Colonial Grandeur and Slavery").

A senator from 1926 to 1940, Sarraut was minister of the interior (1926–28, 1934, 1937–40) and for the navy (1930–31) and twice premier (1933, 1936). Appointed premier in January 1936, he was angered by the German remilitarization of the Rhine, but did not act. He resigned as premier in June.

Politically not active during World War II, Sarraut succeeded his brother as editor of the family newspaper, *Dépêche de Toulouse,* in 1943; he was arrested by the Germans in 1944 and released in 1945. He became a member of the advisory assembly of the French Union in 1947, serving as its president from 1949 to 1958.

Sarraute, Nathalie, *née* NATHALIE ILYANOVA TCHERNIAK (b. July 18, 1902, Ivanova, Russia), French novelist and essayist, one of the earliest practitioners and a leading theorist



Nathalie Sarraute
Marc Garanger

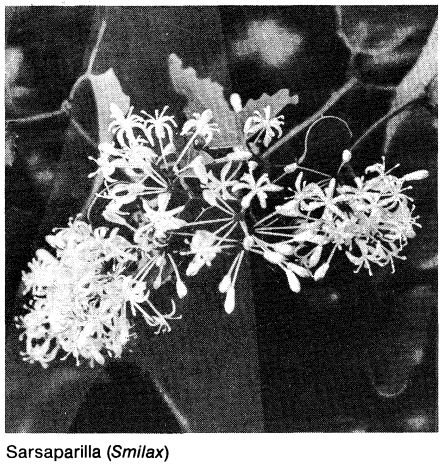
of the *nouveau roman,* the French post-World War II "new novel," or "anti-novel," a phrase applied by Jean-Paul Sartre to Sarraute's *Portrait d'un inconnu* (1947; *Portrait of a Man Unknown,* 1958). She was one of the most widely translated and discussed of the *nouveau roman* school. Her works reject the "admirable implements" forged by past Realistic novelists such as Balzac, particularly the use of biographical description to create full-bodied characters.

Sarraute was two years old when her parents were divorced, and her mother took her to Geneva and then to Paris. Except for brief visits to Russia and an extended stay in St. Petersburg (1908–10), she lived in Paris thereafter, and French was her first language. She attended Oxford University (1921) and graduated with a *licence* from the University of Paris, Sorbonne (1925); she was a member of the French bar, 1926–41, until she became a full-time writer.

Sarraute challenged the mystique of the traditional novel in her theoretical essay *L'Ère du soupçon* (1956; *The Age of Suspicion,* 1963) and experimented with technique in *Tropismes* (1938 and 1957; *Tropisms,* 1963), her first collection of sketches. In this work she introduced the notion of "tropisms," a term borrowed from botany and meaning elemental impulses alternately attracted and repelled by each other. Sarraute described these impulses as imperceptible motions at the origin of our attitudes and actions, and forming the substrata of such feelings as envy, love, hate, or hope. Within this aggregate of minute stirrings, Sarraute portrays a tyrannical father pushing his aging daughter into marriage (*Portrait d'un inconnu*), an elderly lady enamoured of furniture (*Le Planétarium,* 1959; *The Planetarium,* 1960), and a literary coterie reacting to a newly published novel (*Les Fruits d'or,* 1963; *The Golden Fruits,* 1964). Later works include *Elle est là* (1978; "She Is There"), *L'Usage de la parole* (1980; "The Usage of Speech"), and an autobiography, *Enfance* (1983; *Childhood,* 1984).

Sarrazin, Jean-François, Sarrazin also spelled SARRASIN: *see* Sarasin, Jean-François.

sarsaparilla, aromatic flavouring agent made from the roots of several tropical vines belonging to the *Smilax* genus of the lily family



Sarsaparilla (*Smilax*)
A.J. Huxley—EB Inc.

(Liliaceae). Once a popular tonic, sarsaparilla is now used to flavour and mask the taste of medicines. In combination with wintergreen and other flavours it is used in root beer and other carbonated beverages.

The sarsaparilla plants (Spanish *zarza,* "bramble," and *parrilla,* "little vine") are native to the southern and western coasts of Mexico to Peru. They are large, perennial, climbing or trailing vines with short, thick, underground stems producing many prickly, angular, aboveground stems. These are supported by tendrils springing from the bases of large, alternate, stalked leaves.

The commercial species providing sarsaparilla are principally *Smilax aristolochiaefolia, S. regelii,* and *S. febrifuga,* respectively known as Mexican, Honduran, and Ecuadorian sarsaparillas. Other commercial *Smilax* species include Ecuadorian (Guayaquil) and Central American (Jamaican or Guatemalan). After drying in the sun, the roots are gathered loosely into bundles or bound tightly into cylinders, depending on the place of origin, and then exported.

Several sterols and a crystalline glycoside, sarsaponin, which yields sarsapogenin on hydrolysis, have been isolated from the root. Sarsapogenin is related to steroids such as progesterone and is used in their synthesis.

In North America the strongly aromatic roots of the wild sarsaparilla (*Aralia nudicaulis*) and false or bristly sarsaparilla (*Aralia hispida*) are sometimes substituted for true sarsaparilla.

Sarsfield, Patrick (b. Lucan, County Dublin, Ire.—d. August 1693, Huy, Austrian Netherlands), Jacobite soldier who played a leading role in the Irish Roman Catholic resistance (1689–91) to England's King William III. Sarsfield remains a favourite hero of the Irish national tradition.

His grandfather, Rory O'More, was a leader of an Irish Catholic uprising against the English in 1641. Sarsfield himself served in the army of King Louis XIV of France from 1671 to 1678, and, after the accession of the Catholic James II to the English throne in 1685, he helped James's commander in Ireland, Richard Talbot (later earl of Tyrconnell), purge Protestants from the Irish Army. When James was deposed by the Protestant William of Orange (later King William III) in 1688, Sarsfield accompanied James to France and then to Ireland.

During the early months of the Irish Jacobite war against William, Sarsfield distinguished himself as a cavalry commander and was promoted to major general. On July 1, 1690, William severely defeated the Jacobites in the Battle of the Boyne. Sarsfield rallied the beaten army, organized the defense of Limerick, and in August made a spectacularly successful attack on William's artillery train at Ballyneety. He negotiated the final Jacobite surrender at Limerick (October 1691) and then joined Louis XIV's army in the Spanish Netherlands, where he was mortally wounded fighting the English at Neerwinden, near Landen, on Aug. 19, 1693. James had made Sarsfield earl of Lucan in 1691, but the title was recognized only by the Jacobites.

Sarsi (people): *see* Sarcee.

Sarthe, *département,* Pays de la Loire region, northwestern France, created from the eastern part of the historic province of Maine and from small portions of Anjou. With an area of 2,398 sq mi (6,210 sq km), it is drained by the Sarthe River and its tributaries. The Sarthe flows north–south through Le Mans, the capital; its tributary, the Loir, flows east–west above the southern border, joining it in neighbouring Maine-et-Loire. Sarthe *département* consists largely of undulating fields and woodland. In the north there are two ancient massifs (mountain masses), and the land rises to 1,115 ft (340 m) in the picturesque Forêt (forest) de Perseigne. In the northeast the Perche hills, covered with beeches, oaks, and pasture land, rise to 830 ft (250 m). The climate is mild, with warm summers and abundant rainfall in all seasons.

The economy is predominantly agricultural—cattle, cereals, and potatoes—except for the Le Mans area, where there are electronic, electrical, and motor engineering works and where textiles are manufactured. Almost one-third of the population of Sarthe is concentrated in this city. A famous motor-racing circuit near Le Mans attracts large crowds annually. La Flèche is the seat of a noted officers' school, located in a former Jesuit college founded in 1607; at Solesmes is the well-known Benedictine monastery celebrated for its ceremonies in Gregorian chant. The *département* has three *arrondissements*: Le Mans, La Flèche, and Mamers; and it is in the educational division of Caen. Pop. (1982) 504,768.

Sarthe River, river, rising in the Perche hills north of Mortagne-au-Perche, Orne *département,* northwestern France. The Sarthe flows alternately west and south to a point near Angers, where it joins the Loire and Mayenne rivers to form the Maine, a tributary of the Loire. The Sarthe, flowing south from its source, and its tributary, the Huisne, flowing southwest, join at Le Mans in the centre of the *département* of Sarthe. The river is 177 mi (285 km) long and is navigable by small craft below Le Mans. Its basin is about 3,100 sq mi (8,000 sq km) in area.

Sarti, Giuseppe, byname IL DOMENICHINO (baptized Dec. 1, 1729, Faenza, Papal States—d. July 28, 1802, Berlin), Italian conductor and composer of liturgical music and more than 50 operas.

After studying organ and composition at an early age with Giovanni Battista Martini in Bologna, Sarti became organist of the Faenza cathedral (1748) and director of the theatre there. His first opera, *Pompeo in Armenia* (1752), established his musical capabilities. After the success of *Il re pastore* in Venice (1753; "The Shepherd King"), King Frederick V of Denmark appointed him director of Italian opera and then court music director, in which post Sarti served from 1753 to 1765.

Upon returning to Italy he became director of the Conservatorio dell'Ospedaletto in Venice (1775–79) and then choirmaster of the Milan cathedral (1779–84) before accepting a post from Catherine II to be Russia's court conductor. While in Russia (1784–1802), Sarti investigated the laws of acoustics and invented a device for calculating the vibrations of sounds to determine pitch standards. The Academy of Science in St. Petersburg voted him an honorary membership for his discoveries. His more popular operas were *Ciro riconosciuto* (1756; "Cyrus Recognized"), *Didone abbandonata* (1762), *Le gelosie villane* (1776; "Rustic Jealousies"), *Achille in Sciro* (1779), *Giulio Sabino* (1781), *Fra i due litigánti il terzo gode* (1782; "Enjoying Yourself with Two Quarrelers"), and *Armida e Rinaldo* (1786).

Sarto, Andrea del: *see* Andrea del Sarto.

Sarton, George Alfred Leon (b. Aug. 31, 1884, Ghent—d. March 22, 1956, Cambridge, Mass., U.S.), Belgian-born U.S. scholar and writer whose voluminous research and publications concerning the history of science did much to make the subject an independent discipline.

A student of chemistry, celestial mechanics, and mathematics at the University of Ghent (Ph.D. mathematics, 1911), Sarton immigrated to England at the onset of World War I. In 1915 he arrived in the United States bringing with him the international quarterly review *Isis,* which he had founded in 1912, the first periodical to coordinate the results of historical research in all the sciences. He later (1936) founded a second journal, *Osiris,* devoted to lengthier papers on the history and philosophy of science, editing both periodicals until his death.

Sarton was appointed research associate at the Carnegie Institution, Washington, D.C., in 1918 and two years later became a lecturer at Harvard University, where he served

as professor of the history of science (1940–51). After publication of the first volume of his classic work, *Introduction to the History of Science,* 3 vol. (1927–47; from Homer through the 14th century), he travelled through Syria, Egypt, Tunisia, Algeria, and Morocco (1931–32) to learn the Arabic language and to study original manuscripts necessary for completion of the second volume.

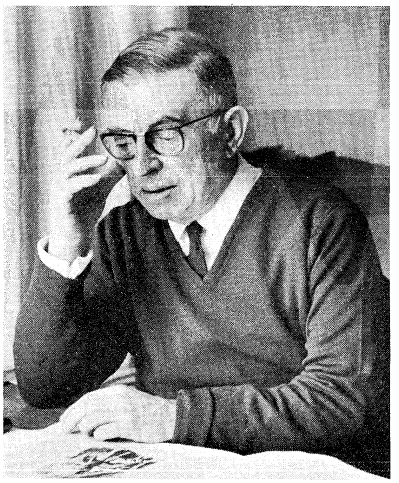
At the time of his death, Sarton had completed the first two—*Ancient Science Through the Golden Age of Greece* (1952) and *Hellenistic Science and Culture in the Last Three Centuries BC* (1959)—of a projected nine volumes that he had planned for a history of all the sciences up to 1900.

Sartor, Johann: *see* Agricola, Johann.

sartorius muscle (from the Latin *sartor,* "mender"), long, narrow, ribbonlike thigh muscle beginning at the front of the crest of the pelvic girdle, extending obliquely down the front and side of the thigh, and inserted at (attached to) the inner and upper portion of the tibia (shinbone). It received its name because it is especially useful in assuming the cross-legged position that ancient tailors used in their work.

Action includes flexion of the thigh and of the leg at the knee and outward rotation of the femur (thighbone).

Sartre, Jean-Paul (b. June 21, 1905, Paris—d. April 15, 1980, Paris), French novelist, playwright, and exponent of Existentialism—a philosophy acclaiming the freedom of the individual human being. He was awarded the Nobel Prize for Literature in 1964, but he declined it.



Sartre, photograph by Gisèle Freund, 1968
Gisele Freund

Early life and writings. Sartre lost his father at an early age and grew up in the home of his maternal grandfather, Carl Schweitzer, uncle of the medical missionary Albert Schweitzer and himself professor of German at the Sorbonne. The boy, who wandered in the Luxembourg Gardens of Paris in search of playmates, was small in stature and cross-eyed. His brilliant autobiography, *Les Mots* (1963; *Words,* 1964), narrates the adventures of the mother and child in the park as they went from group to group—in the vain hope of being accepted—then finally retreated to the sixth floor of their apartment "on the heights where (the) dreams dwell." "The words" saved the child, and his interminable pages of writing were the escape from a world that had rejected him but that he would proceed to rebuild in his own fancy.

Sartre went to the Lycée Henri IV in Paris and, later on, after the remarriage of his mother, to the lycée in La Rochelle. From there he went to the prestigious École Normale Supérieure, from which he was graduated in 1929. Sartre resisted what he called "bourgeois marriage," but while still a student he formed with Simone de Beauvoir a union that remained a settled partnership in life. Simone de Beauvoir's memoirs, *Mémoires d'une jeune fille rangée* (1958; *Memoirs of a Dutiful Daughter,* 1959) and *La Force de l'âge* (1960; *The Prime of Life,* 1962), provide an intimate account of Sartre's life from student years until his middle 50s. It was also at the École Normale Supérieure and at the Sorbonne that he met several persons who were destined to be writers of great fame; among these were Raymond Aron, Maurice Merleau-Ponty, Simone Weil, Emmanuel Mounier, Jean Hippolyte, and Claude Lévi-Strauss. From 1931 until 1945 Sartre taught in the lycées of Le Havre, Laon, and, finally, Paris. Twice this career was interrupted, once by a year of study in Berlin and the second time when Sartre was drafted in 1939 to serve in World War II. He was made prisoner in 1940 and released a year later.

During his years of teaching in Le Havre, Sartre published *La Nausée* (1938; *Nausea,* 1949), his first claim to fame. This novel, written in the form of a diary, narrates the feeling of revulsion that a certain Roquentin undergoes when confronted with the world of matter—not merely the world of other people but the very awareness of his own body. According to some critics, *La Nausée* must be viewed as a pathological case, a form of neurotic escape. Most probably it must be appreciated also as a most original, fiercely individualistic, antisocial piece of work, containing in its pages many of the philosophical themes that Sartre later developed.

Sartre took over the phenomenological method, which proposes careful, unprejudiced description rather than deduction, from the German philosopher Edmund Husserl and used it with great skill in three successive publications: *L'Imagination* (1936; *Imagination: A Psychological Critique,* 1962), *Esquisse d'une théorie des émotions* (1939; *Sketch for a Theory of the Emotions,* 1962), and *L'Imaginaire: Psychologie phénoménologique de l'imagination* (1940; *The Psychology of Imagination,* 1950). But it was above all in *L'Être et le néant* (1943; *Being and Nothingness,* 1956) that Sartre revealed himself as a master of outstanding talent. Sartre places human consciousness, or no-thingness (*néant*), in opposition to being, or thingness (*être*). Consciousness is not-matter and by the same token escapes all determinism. The message, with all the implications it contains, is a hopeful one; yet the incessant reminder that human endeavour is and remains useless makes the book tragic as well.

Post-World War II work. Having written his defense of individual freedom and human dignity, Sartre turned his attention to the concept of social responsibility. For many years he had shown great concern for the poor and the disinherited of all kinds. While a teacher, he had refused to wear a tie, as if he could shed his social class with his tie and thus come closer to the worker. Freedom itself, which at times in his previous writings appeared to be a gratuitous activity that needed no particular aim or purpose to be of value, became a tool for human struggle in his brochure *L'Existentialisme est un humanisme* (1946; *Existentialism and Humanism,* 1948). Freedom now implied social responsibility. In his novels and plays Sartre began to bring his ethical message to the world at large. He started a four-volume novel in 1945 under the title *Les Chemins de la liberté,* of which three were eventually written: *L'Âge de raison* (1945; *The Age of Reason,* 1947), *Le Sursis* (1945; *The Reprieve,* 1947), and *La Mort dans l'âme* (1949; *Iron in the Soul,* 1950; U.S. title, *Troubled Sleep,* 1950). After the publication of the third volume, Sartre changed his mind concerning the usefulness of the novel as a medium of communication and turned back to plays.

What a writer must attempt, said Sartre, is to show man as he is. Nowhere is man more man than when he is in action, and this is exactly what drama portrays. He had already written in this medium during the war, and now one play followed another: *Les Mouches* (produced 1943; *The Flies,* 1946), *Huis-clos* (1944; *In Camera,* 1946; U.S. title, *No Exit,* 1946), *Les Mains sales* (1948; *Crime passionel,* 1949; U.S. title, *Dirty Hands,* 1949; acting version, *Red Gloves*), *Le Diable et le bon dieu* (1951; *Lucifer and the Lord,* 1953), *Nekrassov* (1955), and *Les Séquestrés d'Altona* (1959; *Loser Wins,* 1959; U.S. title, *The Condemned of Altona,* 1960). All of the plays, in their emphasis upon the raw hostility of man toward man, seem to be predominantly pessimistic; yet, according to Sartre's own confession, their content does not exclude the possibility of a morality of salvation. Other publications of the same period include a book, *Baudelaire* (1947), a vaguely ethical study on the French writer and poet Jean Genet entitled *Saint Genet, comédien et martyr* (1952; *Saint Genet, Actor and Martyr,* 1963), and innumerable articles that were published in *Les Temps Modernes,* the monthly review that Sartre and Simone de Beauvoir founded and edited. These articles were later collected in several volumes under the title *Situations.*

Political activities. After World War II, Sartre took an active interest in French political movements, and his leanings to the left became more pronounced. He became an outspoken admirer of the Soviet Union, although he did not become a member of the Communist Party. In 1954 he visited the Soviet Union, Scandinavia, Africa, the United States, and Cuba. Upon the entry of Soviet tanks into Budapest in 1956, however, Sartre's hopes for Communism were sadly crushed. He wrote in *Les Temps Modernes* a long article, "Le Fantôme de Staline," that condemned both the Soviet intervention and the submission of the French Communist Party to the dictates of Moscow. Over the years this critical attitude opened the way to a form of "Sartrian Socialism" that would find its expression in a new major work, *Critique de la raison dialectique* (1960; Eng. trans., of the introduction only, under the title *The Problem of Method,* 1963; U.S. title, *Search for a Method*). Sartre set out to examine critically the Marxist dialectic and discovered that it was not livable in the Soviet form. Although he still believed that Marxism was the only philosophy for the current times, he conceded that it had become ossified and that, instead of adapting itself to particular situations, it compelled the particular to fit a predetermined universal. Whatever its fundamental, general principles, Marxism must learn to recognize the existential concrete circumstances that differ from one collectivity to another and to respect the individual freedom of man. The *Critique,* somewhat marred by poor construction, is in fact an impressive and beautiful book, deserving of more attention than it has gained so far. A projected second volume was abandoned. Instead, Sartre prepared for publication *Les Mots,* for which he was awarded the 1964 Nobel Prize for Literature, an offer that was refused.

Last years. From 1960 until 1971 most of Sartre's attention went into the writing of a four-volume study called *Flaubert.* Two volumes with a total of some 2,130 pages appeared in the spring of 1971. This huge enterprise aimed at presenting the reader with a "total biography" of Gustave Flaubert, the famous French novelist, through the use of a double tool: on the one hand, Karl Marx's concept of history and class and, on the other, Sigmund

Freud's illuminations of the dark recesses of the human soul through explorations into his childhood and family relations. Athough at times Sartre's genius comes through and his fecundity is truly unbelievable, the sheer volume of the work and the minutely detailed analysis of even the slightest Flaubertian dictum hamper full enjoyment. As if he himself were saturated by the prodigal abundance of his writings, Sartre moved away from his desk during 1971 and did very little writing. Under the motto that "commitment is an act, not a word," Sartre often went into the streets to participate in rioting, in the sale of left-wing literature, and in other activities that in his opinion were the way to promote "the revolution." Paradoxically enough, this same radical Socialist published in 1972 the third volume of the work on Flaubert, *L'Idiot de la famille,* another book of such density that only the bourgeois intellectual can read it.

The enormous productivity of Sartre came herewith to a close. His mind, still alert and active, came through in interviews and in the writing of scripts for motion pictures. He also worked on a book of ethics. However, his was no longer the power of a genius in full productivity. Sartre became blind and his health deteriorated. In April 1980 he died of a lung tumour. His very impressive funeral, attended by some 25,000 people, was reminiscent of the burial of Victor Hugo, but without the official recognition that his illustrious predecessor had received. Those who were there were ordinary people, those whose rights his pen had always defended. (W.De.)

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Sarudahiko, also spelled SARUTAHIKO, in Japanese mythology, an earthly deity who offered himself as a guide to the divine grandchild Ninigi, when he descended to take charge of the earth. His brilliance while he waited on the crossroad was so great it reached up to heaven, and the goddess Amenouzume was sent down to inquire who he was and why he waited there. The two are often associated together in folk art.

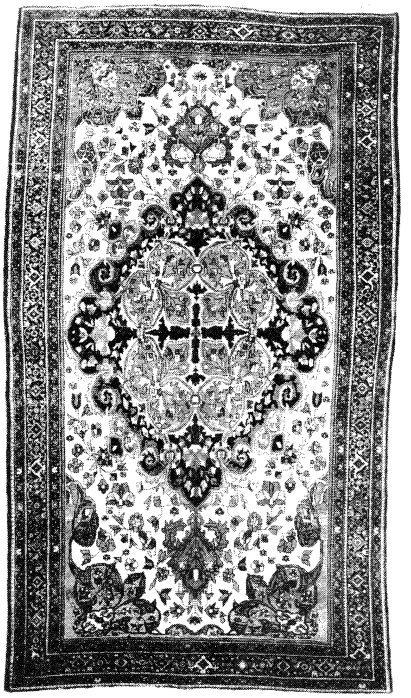
Sarudahiko is popularly worshipped among Shintō followers as a god of the crossroads, as an example of loyal service to the emperor, and as an embodiment of male sexuality. He is depicted as having a red face, a huge protruding nose (which is of phallic significance), and large round eyes.

sarugaku, form of popular Japanese entertainment dating from at least the 11th century, which reached its high point by the 14th century. Originally, *sarugaku* involved mainly acrobatics, juggling, and mime. During the Heian period (794–1185) it was combined with drum dancing. Sarugaku helped give rise to the Nō and kyogen forms of drama.

Saruhan DYNASTY, Turkmen dynasty (*c.* 1300–1410) that ruled in the Manisa region of western Anatolia.

The dynasty was founded by Saruhan, a tribal chief and frontier prince in the service of the Seljuqs of Anatolia who traced his descent to the Khwārezm-Shāhs of Central Asia; after its conquest of Manisa (1313), the dynasty's principality extended its territories to the Aegean Sea. Surrounded by the Turkmen principalities of Aydın, Germiyan, and Karası, Saruhan became a seafaring state with a large fleet. It was active in the Mediterranean trade and supplied leadership, together with Aydın, to the *gazis* (warriors for the Islāmic faith) in their incursions into Byzantine coastal territories. The loss of Izmir (1344) to Western crusaders by the Aydın principality and the rise of the Ottomans as the dominant power on the Byzantine frontier closed the channels of trade and coastal raids for Saruhan. In 1390 it was annexed by the Ottoman sultan Bayezid I; but its independence was restored by the Central Asian ruler Timur (Tamerlane) in 1402. Finally, *c.* 1410, the last Saruhan ruler, Hızır, was killed by the Ottoman prince Mehmed Çelebi (later Sultan Mehmed I), and Saruhan was reincorporated into the Ottoman Empire.

Sarūk carpet, Sarūk also spelled SAROUK, originally, floor covering handwoven in the village of Sārūq, north of Arāk (Solṭānābād) in western Iran; later, floor covering commercially produced mainly in Arāk but also in the weaving villages nearby for the U.S. market.



Sarūk carpet from Iran, 20th century; in the possession of Neshan G. Hintlian, Washington, D.C.

In possession of Neshan G. Hintlian, Washington, D.C.; photograph, Otto E. Nelson—EB Inc.

The early carpets were of very good quality, with short pile and a variety of designs. When medallion decorative schemes in curvilinear drawing were introduced in the early years of the 20th century, there were many signs of clumsiness resulting from unfamiliarity with the new methods of setting out.

Sarūk carpets produced on a large commercial scale are characterized by a longer pile and rose-coloured fields filled with disconnected floral sprays and plant forms. It is notorious that many of these carpets have been bleached chemically upon arrival in the United States and then the field colour painted in anew. Sarūk carpets are Senna (Sehna) knotted on a cotton foundation. Mahal and Muskabad are village carpets of varying quality that come from the neighbourhood of Arāk.

Sarum chant, liturgical chant of the Sarum Use, the medieval church rite centred at Salisbury, Eng. The name derives from the Latin name for Salisbury, *Sarisberia.*

Gregorian chant was carried to England in 596 by Roman teachers who accompanied St. Augustine to Canterbury. A centre was established at Wearmouth Abbey to teach the Gregorian chants to those who came from every part of England. The first bishop of Salisbury was St. Osmund, a Norman, appointed in 1078. He compiled a missal, the liturgical book for the mass, and a breviary, the liturgical book for the canonical hours, both of which closely followed Roman usage but allowed for a Sarum Use conditioned by Norman traditions and Gallican, or Frankish rite, influences. The Sarum Use spread from its home in the south of England to much of Scotland and Ireland and influenced neighbouring uses of York, Lincoln, Bangor, and Hereford.

The Sarum chants resemble Gregorian ones in the use of free rhythm, modes (scale patterns and associated melodic traits), psalm tones (formulas for intonation of psalms), musical form, and the addition of tropes (musical and textual interpolations) to the chants of the mass and hours. The Sarum chants utilize a smaller range, have a more formal structure, and use more transposition (change in pitch level) than do the Gregorian chants. Composition of several new Alleluia verses and hymns continued as late as 1500.

Sarum chants were used in the polyphonic (multipart) pieces of many 15th- and 16th-century composers in England and on the Continent; for example, those by Walter Frye (fl. *c.* 1450), Johannes Regis (d. 1485), and Josquin des Prez (d. 1521). The Sarum Use was abolished in England in 1547 during the Reformation. In 1833 leaders of the Oxford Movement stimulated new settings of Anglican chant in an effort to return to original Anglican ceremonies, and they encouraged a revival of Gregorian and especially Sarum chant.

Saruwaged Range, mountain range on the Huon Peninsula, northeastern New Guinea, on the border of Morobe and Madang provinces, Papua New Guinea. The range, rising to 13,520 ft (4,121 m) at Mt. Bangeta, lies on the northern edge of the great Central Depression. Streams flowing from its southern flanks course south to feed the Markham River.

Sarvāstivāda (Sanskrit: Doctrine That All Is Real), important early Buddhist school of philosophy. A fundamental concept in Buddhist metaphysics is the assumption of the existence of *dharmas,* cosmic factors and events that combine momentarily under the influence of a person's past deeds to form a person's life flux, which he considers his personality and career. Differences arose among the various early Buddhist schools concerning the ontological reality of these *dharmas.* While, like all Buddhists, the Sarvāstivādins are idealists and consider everything empirical an illusion, they maintain that the *dharma* factors are eternally existing realities. The *dharmas* are thought to function momentarily, producing the empirical phenomena of the world, which is illusory, but to exist outside the empirical world. In contrast, the Sautrāntikas (those for whom the *sūtras* are authoritative) maintained that the *dharma* factors are not eternal but momentary, and the only actually existing *dharmas* are the ones presently functioning.

The Sarvāstivāda school is also known as the Vaibhāṣika because of the *c.* 2nd-century AD commentary *Mahāvibhāṣa* ("Great Elucidation"). This text was commented upon by the important 4th- or 5th-century Buddhist thinker Vasubandhu in his commentary *Abhidharmakośa,* prior to his conversion to the Mahāyāna tradition of Buddhism. Thus, elements of the Sarvāstivāda school came to influence Mahāyāna thought.

Sarykol Range, Russian SARYKOLSKY KHREBET, mountain range on the border of the Gorno-Badakhshan autonomous *oblast* (region) of the Tadzhik Soviet Socialist Republic and the People's Republic of China. Lying in the eastern Pamirs parallel to the Kashgar (or Mustagh-Ata) Range to the east, it extends for 215 mi (350 km) from the valley of the Markansu River in the north to the Beik Pass in the south. Its average elevation is about 16,500 ft (5,000 m), and it reaches its highest point at Mount Lyavirdyr at 20,837 ft. The Sarykol Range forms the main watershed of the Amu Darya and Tarim River basins. It is composed of schists together with granites in the north and gneisses in the south. The sparse vegetation is of the high mountain-desert variety, and there is relatively little glaciation.

Sarzana, town, La Spezia province, Liguria region, northern Italy, on the fertile plain of the Magra River, just east of La Spezia. Mentioned as a fortress in 963 and as a town in 1084, it is believed to have been founded by fugitives from the abandoned town of Luni near the Etruscan Luna, the episcopal see of which was transferred to Sarzana in 1202. It was held by the Pisans and the Florentines before passing to Genoa in 1572. Notable landmarks include the old Pisan citadel (1263), rebuilt by Lorenzo de' Medici in 1488; the cathedral of Sta. Maria Assunta (1355–1474), with a painted Crucifixion (1138) from Luni; the Fortezza di Sarzanello (1322), built by Castruccio Castracani on the site of a 10th-century fortress; and the remains of 15th-century town walls. Pope Nicholas V was born at Sarzana. An agricultural and commercial centre on the main Rome–Genoa road and rail routes, the modern town has an important trade in early market-garden produce. Pop. (1981 prelim.) mun., 19,259.

Sarzec, (Gustave-Charles-) Ernest (Chocquin) de (b. 1832, Rennes, Fr.—d. 1901, Vienna), French archaeologist whose excavation of the mound of Tello (ancient Girsu, Arabic Tall Lūḥ), in present-day southern Iraq, uncovered the Sumerian capital of Lagash and revealed much of what is known about the art, language, and history of the most ancient of Mesopotamian civilizations.

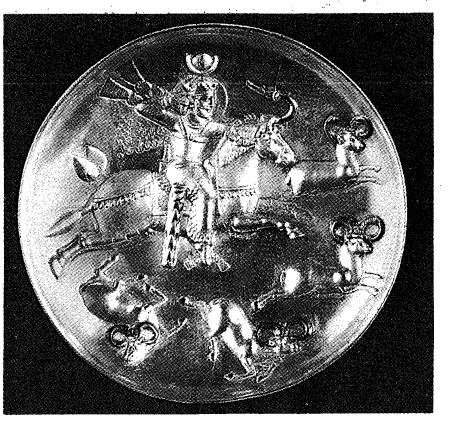
In 1874, while serving as French vice consul at Basra (al-Baṣrah), Ottoman Mesopotamia, now in Iraq, Sarzec learned that old statuettes had been observed at Tello. Securing the exclusive right to excavate the site, he began digging in 1877 and continued working there intermittently until 1901, systematically excavating the entire area and offering the modern world its first glimpse of Sumerian culture.

His discovery in 1880 of a diorite portrait sculpture of Gudea (*c.* 2150–2050 BC), the seventh governor of Lagash, and other art works was one of the celebrated achievements of 19th-century Assyriology. In addition to architectural remains and many works of art, weapons, vessels, and other artifacts, he found evidence of Sumer's greatest legacy to Babylonia—writing. From the temple archives he secured about 30,000 inscribed clay tablets yielding much information on temple administration, commerce, farming, and stock raising. In conjunction with L. Heuzey he published *Découvertes en Chaldée* (1884–1912; "Discoveries in Chaldea"). The extensive collection of Sumerian art in the Louvre is largely the result of Sarzec's work.

Sasak, also spelled SASSAK, largest ethnic group on Lombok, one of the Lesser Sunda Islands in Indonesia, constituting most of the island's population and numbering about 2,000,000 in 1977. The Sasak are of Deutero-Malay stock and speak Sasak or Sasak-Balinese. Concentrated most densely in the central third of the island, they are subsistence farmers of wet rice, coffee, vegetables, coconuts, bamboo, sugarcane, and pandanus. The Sasak live in small villages (5–20 families) or in large villages numbering several thousand in population. Houses are built around a *kampu,* where ceremonies take place. Originally the only inhabitants of Lombok, the Sasak were under the political domination of Bali from the 18th century until 1895, when the Dutch conquered the island. Today, the Sasak continue to recognize caste social divisions and observe one of two forms of religion: Waktu Telu (traditional practices with Islāmic modifications) in the smaller villages and Waktu Lima (strict Islām) in the larger settlements. Village officials, including a headman, are chosen from among both Muslim and traditional religious leaders. Islāmization has strengthened the patrilineal structure of the Sasak, reinforcing male dominance in family structure, inheritance, and economic control.

Sāsān (fl. 1st century AD?), eponymous ancestor of the Sāsānian dynasty in ancient Persia. Details of his life vary, but most scholars believe he was originally a prince in the province of Persis and a vassal of Gochihr, the chief petty king in Persis. His son or descendant was Bābak, who was the father of Ardashīr I, the founder of the Sāsānian Empire. According to one tradition, Sāsān married a daughter of Gochihr, and later their son Bābak revolted and killed Gochihr. According to another tradition, however, Sāsān and Bābak were not related, but Sāsān was a shepherd of King Bābak in Persis. After dreaming that Sāsān's son would one day rule the world, Bābak gave Sāsān his daughter in marriage, and from this union Ardashīr was born.

Sāsānian DYNASTY, also spelled SĀSSĀNIAN, also called SĀSĀNID (AD 224–651), ancient Iranian dynasty evolved by Ardashīr I in years of conquest, AD 208–224, and destroyed by the Arabs during the years 637–651. The dynasty was named after Sāsān, an ancestor of Ardashīr I.



Sāsānian silver plate, engraved, embossed, and inlaid with niello, showing Firūz I (457–484) shooting ibex, 5th century; in the Metropolitan Museum of Art, New York City

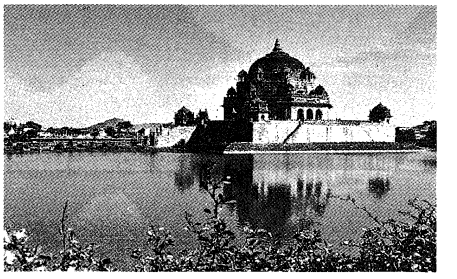
By courtesy of the Metropolitan Museum of Art, New York City, Fletcher Fund, 1934

Under the leadership of Ardashīr I (reigned 224–241), the Sāsānians overthrew the Parthians and created an empire that was constantly changing in size as it reacted to Rome and Byzantium to the west and to the Kushans and Hephthalites to the east. At the time of Shāpūr I (reigned AD 241–272), the empire stretched from Sogdiana and Iberia (Georgia) in the north to the Mazun region of Arabia in the south; in the east it extended to the Indus River and in the west to the upper Tigris and Euphrates river valleys.

A revival of Iranian nationalism took place under Sāsānian rule. Zoroastrianism became the state religion, and at various times followers of other faiths suffered official persecution. The government was centralized, with provincial officials directly responsible to the throne, and roads, city building, and even agriculture were financed by the government.

Under the Sāsānians Iranian art experienced a general renaissance. Architecture often took grandiose proportions, such as the palaces at Ctesiphon, Fīrūzābād, and Sarvestan. Perhaps the most characteristic and striking relics of Sāsānian art are rock sculptures carved on abrupt limestone cliffs, for example at Shāhpūr (Bishapur), Naqsh-e Rostam, and Naqsh-e Rajab. Metalwork and gem engraving became highly sophisticated. Scholarship was encouraged by the state, and works from both the East and West were translated into Pahlavi, the language of the Sāsānians.

Sasarām, also spelled SAHSARAM, town, administrative headquarters of Rohtas district, Bihār state, northeastern India. Located at a major road and rail junction, it is an agricultural trade centre; carpet and pottery manufacture are important. The red sandstone mausoleum of Emperor Shēr Shāh of Sūr (1540–45), an excellent example of Pathān architecture, stands in the middle of an artificial lake. Sasarām also contains the mausoleum of Shēr Shāh's father and the unfinished tomb of his son. Nearby is a rock edict of the 3rd-century-BC Indian emperor Aśoka. The town was constituted a municipality in 1869. Pop. (1981) 73,457.



Mausoleum of Emperor Shēr Shāh, Sasarām, Bihār, India

Christina Gascoigne

Sasebo, city, Nagasaki Prefecture (*ken*), Kyushu, Japan, near the mouth of Ōmura-wan (Ōmura Bay). Originally a small village on a good natural harbour, it expanded rapidly in the late 19th century as a naval base. The town was partially destroyed during World War II but later revived as a base for the Maritime Self-Defense Force, established in 1973. The city is also a commercial and fishing port. Pop. (1983 est.) 250,190.

sashimi, specialty of Japanese cuisine, fresh fish served raw. The fish, which must be utterly fresh, is sliced paper thin or alternately one-quarter to one-half inch (0.75–1.5 centimetres) thick, cubed, or cut in strips, according to the nature of the fish. The sashimi is accompanied by *wasabi* (green horseradish paste) and a dipping sauce of salty or pungent character. Sashimi is always part of a formal Japanese meal, served early while the palate is still clear in order for its nuances to be appreciated.

The most popular fish used are ocean fish: tuna, yellowtail, mackerel, sea bream, and

flounder. Freshwater fish such as perch, eel, and carp are also eaten raw, as are shrimps, clams, lobster, and abalone. Sake is traditionally drunk with sashimi.

Saskatchewan, province of western Canada, the only Canadian province whose boundaries are wholly artificial. It is bounded by Alberta to the west, Manitoba to the east, the Northwest Territories to the north, and the U.S. states of Montana and North Dakota to the south. Its area is 251,866 square miles (652,330 square km). The capital is Regina, in the central south.

A brief treatment of Saskatchewan follows. For full treatment, *see* MACROPAEDIA: Canada.

The southern half of Saskatchewan is mostly an extension of the Great Plains of central North America. Its northern half, situated on the Canadian Shield, is sparsely populated bush country with many lakes and tundra. Its varied wildlife includes brown bear, moose, deer, antelope, and mountain lion; smaller animals are coyote, fox, lynx, gopher, and rabbit. The province is on the main western flyway of migratory waterfowl, songbirds, hawks, and owls, many of which nest in the province.

Cree Indians who inhabited Saskatchewan for at least 5,000 years were hunters of buffalo until contact with Europeans turned them toward the fur trade; their name for one of the region's rivers, *Kis-is-ska-tches-wan* ("Rapid River"), has been adopted for the province. In 1691 Henry Kelsey, the first European in the region, explored the plains for the Hudson's Bay Company. In 1868 the land was surrendered by the company to the British crown, and in 1870 it was made part of the newly formed Dominion of Canada. The extension of the Canadian Pacific Railway brought large numbers of European settlers starting in 1882. Subsequently, the second Riel Rebellion, led by Louis Riel, broke out when a large number of Métis (persons of mostly mixed Indian and European blood) seized the government and sought to establish their rights to western lands. The rebellion was suppressed in 1885 by the Royal North West Mounted Police. The province was created by the Saskatchewan Act of 1905. It was assigned control of its own natural resources in 1930. Rule by various members of the Liberal Party was interrupted from 1944 to 1964, when the Cooperative Commonwealth Federation established the first avowedly socialist government on the North American continent. In 1962 it established the continent's first medical-care program, accompanied by a doctors' strike.

The population of British origin is less than 40 percent. Saskatchewan contains many settlements readily identifiable as Ukrainian, French Canadian, German, and of other nationalities including an appreciable number of immigrants from the Far East and India. Ethnic variety is matched by religious affiliation: about one-third of the population adheres to the United Church of Canada. Other religious groups include Roman Catholics, Lutherans, Anglicans, Ukrainian Catholics, and Mennonites. The population growth has been generally slow because of the high emigration rate, which exceeds immigration.

The Saskatchewan economy is traditionally based on extractive industries: oil, gas, and potash. Potash is found in a narrow band running diagonally across the province from west to east, while oil and gas are located in the south. There are rich uranium deposits in the north. Salt, sodium sulfite, and a variety of clays are also found. Other important industries are furs and agriculture. The grain belt, made up mainly of wheat but also including large acreages of barley, oats, and rapeseed (canola), lies between the southern border and the 54th parallel of latitude. Manufacturing has played a minor role.

Saskatchewan has always demanded a significant amount of government intervention, including a protective tariff, because of its dependence on external markets, a situation caused by the province's inability to consume its own chief products. The transcontinental railroads were important in the settlement of Saskatchewan. They were built with federal support to carry settlers and supplies in and grain out. Freight by rail is still important, but passengers travel now by automobile, bus, and airplane.

Saskatchewan's constitution is based on the Saskatchewan Act (of admission) of 1905. The provincial government consists of a unicameral Legislative Assembly, elected every five years by universal adult suffrage. The premier, the leader of the majority party in the assembly, selects the Executive Council, which he heads. The lieutenant governor is appointed by Canada's governor-general to represent the monarch. Senators are appointed by the governor-general of Canada, and members of the House of Commons are popularly elected to represent Saskatchewan in Ottawa. The province administers the judiciary, but all judges above the rank of magistrate are appointed by the federal government. Most of the province is policed by the Royal Canadian Mounted Police under a provincial-federal contract. Saskatchewan has three main political parties: the Liberals and Progressive Conservatives, advocating free enterprise and showing strength in rural areas, and the New Democrats, advocating democratic socialism and running strong in the cities.

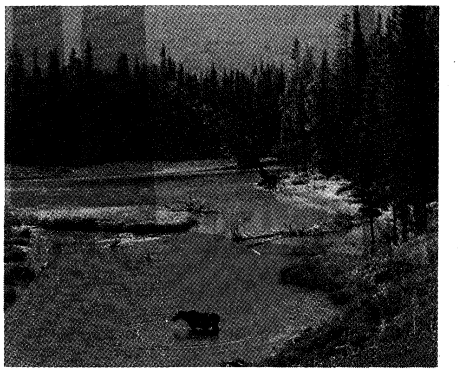
Primary and secondary education is compulsory and free in public and provincially aided, religiously affiliated schools. Kindergarten is optional but nearly universally attended. Vocational and technical training is available at the secondary level. The University of Saskatchewan, established 1907, has large campuses at Regina and Saskatoon and also maintains the Institute of Northern Studies and the Institute of Space and Atmospheric Studies at Saskatoon.

The Saskatchewan Arts Board, established in 1959, supports drama, art, music, literature, and handicrafts programs, and the university has an art school at the Regina campus. Saskatoon and Regina are noted for their art galleries, which include the works of Paul Kane, who in 1846 visited the region and sketched and painted the Cree Indians, buffalo, and pioneers. Both cities also have symphony orchestras and professional theatres. Regina is the site of the Saskatchewan Museum of Natural History and the Royal Canadian Mounted Police Museum. Saskatoon is the site of the Western Development Museum. Many of the towns and villages populated by descendants of German, Ukrainian, Polish, Russian, and Scandinavian settlers have annual festivals with ethnic costumes, music, dance, and food. Pop. (1989 est.) 1,007,100.

Consult the INDEX *first*

Saskatchewan River, largest river system of Alberta and Saskatchewan provinces, Canada, rising in the Canadian Rockies of western Alberta in two great headstreams, the North and South Saskatchewan rivers (800 miles [1,287 km] and 865 miles [1,392 km] long, respectively); these cross the Saskatchewan provincial boundary 200 miles (320 km) apart and unite east of Prince Albert. The combined streams continue eastward for 340 miles (550 km) to enter Lake Winnipeg (Manitoba) via Cedar Lake; at Grand Rapids, the point of influx, there is hydrodevelopment along a short, turbulent stretch of water. The Saskatchewan is 1,205 miles (1,939 km) long from the head of the Bow River, chief headstream of the South Saskatchewan, and drains an area of 148,000 square miles (383,000 square km).

The river, named from a Cree Indian word meaning "rapid river," was for long an important fur-trading route after first being explored by Henry Kelsey in 1690. Now of little navigational value, it is widely used for hydroelectric power and irrigation. The river is the site of several major dams (the larger



A moose in the North Saskatchewan River, Alberta
George Hunter

of which is the Gardiner Dam, impounding Diefenbaker Lake, south of Saskatoon), and its basin contains Canada's largest irrigation district (more than 1,000,000 acres [400,000 hectares] along the South Saskatchewan River). Important cities, including Edmonton, Calgary, Lethbridge, Red Deer, Medicine Hat, Saskatoon, and Prince Albert, are located on the Saskatchewan or on its tributaries—the Battle, Bow, Oldman, and Red Deer rivers.

Saskatoon, city, south-central Saskatchewan, Canada, on the South Saskatchewan River. Founded in 1883 as the proposed capital of a temperance colony, its name was derived from *Mis-sask-guah-too-min,* a Cree Indian word for a local edible red berry. Following the arrival of the railroad from Regina (161 miles [259 km] southeast) in 1890 and its amalgamation with two adjoining settlements (1906), Saskatoon experienced rapid growth. As it is Saskatchewan's second largest city, Saskatoon is a distribution centre for an important potash-mining and wheat-growing region. Diversified industries include flour milling, food and dairy processing, meat-packing, brewing, tanning, oil refining, and the manufacture of chemicals, fertilizers, electronic equipment, clothing, and road machinery. Saskatoon is a major transportation hub (served by both national railroads), is the focus of provincial highways, and has a busy airport.

It is a cultural and educational centre with its own symphony orchestra; its Mendel Art Gallery and Civic Conservatory and its Memorial Art Gallery have notable collections of Canadian artists, and the central display at its Western Development Museum is a pioneer village street. Saskatoon is the seat of the University of Saskatchewan (1907), and its associated colleges include St. Thomas More (1936), St. Andrew's (1912), the College of Emmanuel and St. Chad (two Anglican schools that amalgamated in 1964), and Lutheran Theological Seminary (1913). A provincial school for the deaf and the Saskatchewan Research Council headquarters are also in the city. Pioneer Days and the Saskachimo Exposition (one of Canada's biggest historical-agricultural pageants) are annual (July) events. The huge Gardiner Dam on the South Saskatchewan River, impounding Diefenbaker Lake, is 65 miles (105 km) south. Inc. village, 1901; town, 1903; city, 1906. Pop. (1986) city, 177,641; metropolitan area, 200,665.

Sasolburg, town, northern Orange Free State, South Africa, south of Johannesburg. Established in 1954, it was built by Sasol Ltd. (the former South African Coal, Oil, and

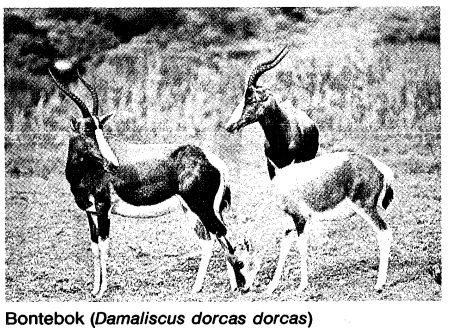
Gas Corporation Ltd.) to house employees at the world's first oil-from-coal plant producing commercial quantities of oil. The location was selected for its proximity to large coal deposits, the Vaal River, and the Witwatersrand markets. A variety of petrochemicals are also produced. Sasolburg attained official town status in 1967. Pop. (1985) 29,310.

Sasquatch (from Salish *se'sxac,* "wild men"), also called BIGFOOT, a large, hairy humanlike creature believed by some persons to exist in the northwestern United States and western Canada. It seems to represent the North American counterpart of the Abominable Snowman, or Yeti.

The British explorer David Thompson is sometimes credited with the first discovery (in 1811) of a set of Sasquatch footprints, and hundreds of alleged prints have been adduced since then. Visual sightings and even alleged photographs and filmings (notably by Roger Patterson at Bluff Creek, Calif., in 1967) have also contributed to the legend, though none of the purported evidence has been verified.

Sasquatch is variably described as a primate ranging from 6 to 15 feet (2 to 4.5 m) tall, standing erect on two feet, often giving off a foul smell, and either moving silently or emitting a high-pitched cry. Footprints have measured up to 24 inches (60 cm) in length and 8 inches (20 cm) in width. A Soviet scientist, Boris Porshnev, suggested that Sasquatch and his Siberian counterpart, the Almas, could be a remnant of Neanderthal man, but most scientists do not recognize the creature's existence.

sassaby (genus *Damaliscus*), any of a few species of antelope belonging to the family Bovidae (order Artiodactyla) and inhabiting sub-Saharan grasslands, floodplains, and dense brush from western to eastern Africa and southward to southern Africa. Modern classifications are not uniform, but generally two subgenera and three species are recognized: the subgenus *Beatragus,* consisting of a single species, *D. hunteri* (Hunter's hartebeest, or hirola), found in eastern Kenya and southwestern Somalia; and the subgenus *Damaliscus,* consisting of two species, *D. dorcas* (the bontebok [subspecies *D. dorcas dorcas*] and the



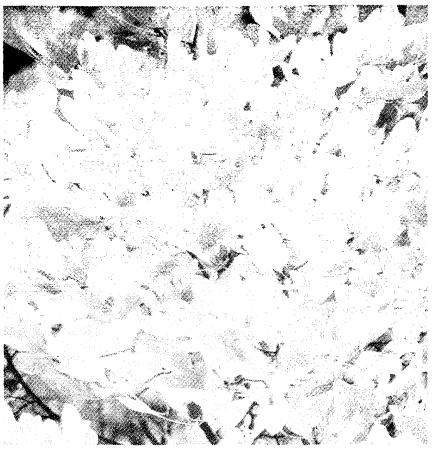
Bontebok (*Damaliscus dorcas dorcas*)
Francisco Erize—Bruce Coleman Ltd.

blesbok [subspecies *D. dorcas phillipsi*]) and *D. lunatus* (topi), ranging widely from Senegal to Ethiopia and to South Africa.

The sassabies stand shoulder-height about 90 to 120 cm (35 to 47 inches) and measure in body-and-head length from 130 to 200 cm (50 to 80 inches). The graceful lyre-shaped horns may extend as much as 70 cm (28 inches). The hair, generally iridescent and soft, ranges from gray to almost black or from red to rich brown and is often marked by contrasting white patches on the face, legs, or hips. The sassabies feed on grass.

Once numbering in the tens of thousands, these antelopes have been decimated by hunting and encroachments by settlers.

sassafras, also called AGUE TREE (species *Sassafras albidum*), North American tree of the laurel family (Lauraceae), the aromatic leaf, bark, and root of which are used as a flavouring, as a traditional home medicine,



Sassafras (*Sassafras albidum*)
Walter Chandoha

and as a tea. The roots yield about 2 percent oil of sassafras, once the characteristic ingredient of root beer.

The tree is native to sandy soils from Maine to Ontario and Iowa and south to Florida and Texas. It is usually small but may attain a height of 20 m (65 feet) or more. It has furrowed bark, bright green twigs, and small clusters of yellow flowers followed by dark blue berries. Sassafras has three distinctive forms of leaves, often on the same twig: three-lobed, two-lobed (or mitten-shaped), and entire.

Sassak (people): *see* Sasak.

Sassandra River, river in western Africa, rising as the Tienba in the highlands between Odienné and Boundiali, northwestern Côte d'Ivoire, and becoming the Sassandra 36 miles (58 km) east-northeast of Touba at its confluence with the Férédougouba (Bagbé) River from eastern Guinea. It then follows a 400-mile (650-kilometre) south-southeasterly course through Côte d'Ivoire and empties into the Gulf of Guinea at Sassandra, an Atlantic port. Its upper reaches flow through a savanna region and have been panned for diamonds; its lower course marks the eastern boundary of the 1,641-square-mile (4,250-square-kilometre) Taï Reserve (known for pygmy hippopotamuses) and flows through an area noted for timber (sipo and mahogany), coffee, and bananas. Frequent rapids impede the navigability of the river, but small craft can penetrate 50 miles (80 km) upstream.

Sāsānian DYNASTY: *see* Sāsānian dynasty.

Sassari, city, capital of Sassari *provincia,* Sardinia, Italy, near the north coast of the island on the edge of the limestone hills above the plain of Riu Mannu, north-northwest of Cagliari. In the 12th century, Sassari, then called Tathari, grew as the coastal peoples retreated inland from the raiding Saracens. It became important as the capital of the *giudicato* (judiciary circuit, a territorial division) of Torres and remained a free town under Pisan rule. Ceded to Genoa after 1284, it passed under Aragonese rule in 1323 but was the scene of several rebellions against Aragon. The archbishopric of Porto Torres was transferred to Sassari in 1441, and the University of Sassari was founded in 1562. In 1718 Sassari passed with the rest of Sardinia to the house of Savoy. It suffered heavy Allied bombing in World War II.

Notable monuments include the cathedral with a Baroque facade; the Romanesque churches of Santa Maria di Betlem and Santa Donata; and the G.A. Sanna National Museum, housing archaeological finds from all parts of the island, dating back to prehistoric times, and a picture gallery. Rail and road connections link Sassari with Porto Torres, its port, and with Olbia and Cagliari. Its industries are mainly agriculturally based. Pop. (1988 est.) mun., 120,497; *provincia,* 449,951.

Sassetta, original name STEFANO DI GIOVANNI (d. *c.* 1450, Siena [Italy]), Gothic-style painter considered to be the greatest Sienese painter of the early 15th century.

The date and place of his birth are uncertain. He seems to have been trained in Siena, and the force of the Sienese tradition is evident in the vivid colours and elegant use of line in the surviving panels of his first commissioned work, an altarpiece for the Arte della Lana in Siena (1423–26). His interest in the work of the first generation of Florentine Renaissance painters is reflected in the coherent spatial relationships of the monumental altarpiece of the "Madonna of the Snow," painted for Siena Cathedral in 1430–32. From this point on, under Gothic influence, Sassetta's style assumes an increasingly decorative character, manifest initially in a polyptych in San Domenico at Cortona (probably 1437) and reaching its climax in a cycle of scenes from the legend of St. Anthony the Abbot. His best-known and most ambitious work was carried out for San Francesco at Sansepolcro (1437–44) and was originally a double-sided altar-



"The Funeral of St. Francis," tempera on panel by Sassetta, 1437–44; in the National Gallery, London
By courtesy of the trustees of the National Gallery, London; photograph, J.R. Freeman & Co. Ltd.

piece (now dispersed) with a Virgin and Child and four saints on the front and scenes from the life of St. Francis on the reverse side. The St. Francis scenes mark the peak of Sassetta's career as a narrative artist and are exemplary of his late style, with their sophisticated colour sense and their subtle, rhythmic compositions. Sassetta never completely abandoned his interest in Florentine painting, and it is thought to be the fusion of traditional and contemporary elements in his work that turned Sienese painting from the Gothic to the Renaissance style.

Sassone, Il (opera composer): *see* Hasse, Johann Adolph.

Sassoon, Siegfried (Lorraine) (b. Sept. 8, 1886, Brenchley, Kent, Eng.—d. Sept. 1, 1967, Heytesbury, Wiltshire), English poet and novelist, known for his antiwar poetry and for his fictionalized autobiographies, praised for their evocation of English country life.

Sassoon enlisted in World War I and was twice wounded seriously while serving as an officer in France. It was his antiwar poetry, such as *The Old Huntsman* (1917) and *Counterattack* (1918), and his public affirmation of pacifism, after he had won the Military Cross and was still in the army, that made him widely known. His antiwar protests were at first attributed to shell shock, and he was confined for a time in a sanatorium, where he met and influenced another pacifist soldier-poet, Wilfred Owen, whose works he published after Owen was killed at the front. His autobiographical works include *The Memoirs of George Sherston,* 3 vol. (1928–36), and *Siegfried's Journey,* 3 vol. (1945), and more of his poems were published as *Collected Poems* (1947) and *The Path to Peace* (1960). His later poetry was increasingly devotional.

Sastri, Srinivasa, in full VALANGIMAN SANKARANA-RAYANA SRINIVASA SASTRI (b. Sept. 22, 1869, Madras, India—d. April 17, 1946, Madras), liberal Indian statesman and founder of the Indian Liberal Federation, who served his country under British colonial rule in many important posts at home and abroad.

Sastri was born of poor Brahman parents. He began his career as a schoolmaster, but his interest in public causes and his powers of oratory soon combined to bring him national fame. In 1907 he joined the political and reform movement of the Servants of India Society, of which he became president in 1915. He was a member of the Madras Legislative Council and was elected to the central legislature in 1916. He welcomed the Government of India Act of 1919, by which, for the first time, control over some aspects of provincial government passed to Indian ministers responsible to the Indian electorate. Elected to the new council of state established under the reforms, he found himself increasingly out of sympathy with the dominant group in the nationalist Congress Party, which declined to cooperate in the reforms and preferred methods of civil disobedience. He therefore left the Congress Party and founded the Indian Liberal Federation, of which he was president, in 1922.

In the same year, the government sent him to Australia, New Zealand, and Canada in an effort to improve the position of Indians living in those countries. In 1926 he was sent to South Africa for a similar purpose, and in 1927 he was appointed India's agent-general there. Two years later he was appointed a member of the Royal Commission on Labour in India. The Indian government also appointed him to report on the conditions of Indian labour in Malaya. During 1930–31 he took an active part in the Round Table Conference in London to discuss proposals for Indian constitutional reform. From 1935 to 1940 he served as the vice-chancellor of the Annamalai University in Madras state.

Śatadru River (Tibet-India-Pakistan): *see* Sutlej River.

Satan, in Judaism and Christianity, the prince of evil spirits and adversary of God.

The word *Satan* is the English transliteration of a Hebrew word for "adversary" in the Old Testament. With the definite article the Hebrew word denotes "the adversary" par excellence, mainly in the Book of Job, where the adversary comes to the heavenly court with the "sons of God." His task is to roam through the earth (like a contemporaneous Persian official) seeking out acts or persons to be reported adversely (to the king); his function thus is the opposite of that of the "eyes of the Lord," which roam through the earth strengthening all that is good. Satan is cynical about disinterested human goodness and is permitted to test it under God's authority and control and within the limits that God sets.

In the New Testament the Greek transliteration *Satanas* is used, and this usually appears as *Satan* in English translations. He is spoken of as the prince of evil spirits, the inveterate enemy of God and of Christ, who takes the guise of an angel of light. He can enter a man and act through him; hence, a man can be called Satan because of his acts or attitude. Through his subordinate demons Satan can take possession of men's bodies, afflicting them or making them diseased. To him sinners are delivered for the destruction of the flesh that the spirit may be saved. After the preaching of the 70 disciples, during which devils were subjected to them, Jesus saw Satan fall like lightning from heaven (Luke 10:18). According to the visions in the Book of Revelation, when the risen Christ returns from heaven to reign on earth, Satan will be bound with a great chain for a thousand years, then be released, but almost immediately face final defeat and be cast into eternal punishment. His name, Beelzebul, used in the Gospels mainly in reference to demoniac possession, comes from the name of the god of Ekron, Baalzebub (II Kings 1). He is also identified with the devil (*diabolos*), and this term occurs more frequently in the New Testament than Satan. In the Qur'ān the proper name *Shaitan* ("Satan") is used.

Among early Christian writers, the figure of Satan played a larger part in the discussion of the nature of evil, the meaning of salvation, and the purpose and efficacy of the atoning work of Christ. Early and medieval church writers discussed at length problems raised by belief in the existence of a spiritual being such as Satan in a universe created and sustained by an all-powerful, all-wise, and all-loving God. Under the influence of the 18th-century revolt against belief in the supernatural, liberal Christian theology tended to treat the biblical language about Satan as "picture thinking" not to be taken literally—as a mythological attempt to express the reality and extent of evil in the universe, existing outside and apart from man but profoundly influencing the human sphere.

satanism, also called DEVIL WORSHIP, worship of Satan, or the devil, the personality or principle regarded by the Judeo-Christian tradition as embodying absolute evil in complete antithesis to God. This worship may be regarded as a gesture of extreme protest against Judeo-Christian spiritual hegemony. Satanic cults have been documented in Europe and America as far back as the 17th century, but their earlier roots are difficult to trace, just as the number of real satanists in any period is frequently overestimated. Churchmen have readily attributed satanism to "witches," and to such heretics as Gnostics, Cathars, and Bogomils, but that charge does not correspond with the heretics' own understanding of their beliefs, and the alleged satanism of those persecuted in the heyday of witch-burning may rest on no better foundation than the overheated imagination of witch-finders and confessions obtained by torture. By the same token, devil worship ascribed to non-Christian religions is usually based on polemic or misunderstanding. Modern witchcraft and neopaganism are not to be confused with satanism, since these groups worship not Satan but pre-Christian gods. Satanism, as devotion to the Judeo-Christian source of evil, can only exist in symbiosis with that tradition, for it shares but inverts its worldview.

Satanist worship has traditionally centred on the "black mass," a corrupted rendition of the Christian Eucharist, and ritual magic evocations of Satan. Some recent satanist groups have supplanted those practices with rites of self-expression reminiscent of psychodrama and hyperventilation.

Sātāra, town, southwestern Mahārāshtra state, western India, west of the confluence of the Krishna and Venna rivers, southeast of Pune (Poona). The town was named for the walls of its fort, numbering 17 (Marathi: *satarā*); the fort was built by the Śilāhāra and later strengthened by the Marāṭhās. It was repaired by the British, who occupied the area in 1848, and was used as a troop garrison after the 1857 Indian mutiny. The town spreads around the base of the fort. Engineering works and sugar processing are the chief



Millet agriculture near Sātāra, Mahārāshtra, India
B. Bhansali—Shostal/EB Inc.

industries. Sātāra has several colleges affiliated with Shivaji University. It also has a museum containing old manuscripts and weapons, the old raja's palace, and the forts of Sajjangad and Chandan Vandan (nearby).

Sātāra lies in a fertile agricultural region (sugarcane, wheat, tobacco, peanuts [groundnuts], pulses, and millet) and is renowned for its animal husbandry. Pop. (1981) 83,336.

Consult the INDEX *first*

Sātavāhana DYNASTY, Indian family that, according to some interpretations based on the *Purāṇa*s (ancient religious and legendary writings), belonged to the Andhra *jāti* ("tribe") and was the first Deccanese dynasty to build an empire in *daksināpatha—i.e.,* the southern region. At the height of their power the Sātavāhanas held distant areas of western and central India.

On the strength of Purāṇic evidence the beginnings of Sātavāhana ascendancy can be dated to late in the 1st century BC, although some authorities trace the family to the 3rd century BC. Initially, Sātavāhana rule was limited to certain areas of the western Deccan. Inscriptions found in caves, such as those at Nānaghāt, Nāsik, Kārlī, and Kanheri, commemorate the early rulers Simuka, Krishna, and Śātakarṇi I.

The accessibility, from the early Sātavāhana kingdom, of the western-coastal ports, which prospered in this period of Indo-Roman trade, and the close territorial proximity with the western Kṣatrapas resulted in an almost uninterrupted series of wars between the two Indian kingdoms. The first stage of this conflict is represented by Kṣatrapa Nahapāna's penetration into the Nāsik and other areas of the western Deccan. Sātavāhana power was revived by Gautamīputra Śātakarṇi (reigned *c.* AD 106–130), the greatest ruler of the family. His conquests ranged over a vast territorial expanse stretching approximately from Rājasthān in the northwest to Andhra in the southeast and from Gujarāt in the west to Kaliṅga in the east. Some time before 150, the Kṣatrapas recovered most of these areas from the Sātavāhanas and twice inflicted defeats upon them.

Gautamīputra's son Vāśiṣṭhīputra Pulumāvi (reigned *c.* 130–159) ruled from the west. The

tendency seems to have been to expand to the east and the northeast. Inscriptions and coins of Vāśiṣṭhīputra Puḷumāvi are also found in Andhra, and Śivaśrī Śātakarṇi (reigned *c.* 159–166) is known from coins found in the Krishna and Godāvari districts. The distribution area of Śri Yajña Śātakarṇi's (reigned *c.* 174–203) regional coins is spread over the Krishna and Godāvari districts, the Chānda district of Madhya Pradesh, Berār, northern Konkan, and Saurāṣṭra.

Śri Yajña is the last important figure in the history of the Sātavāhana dynasty. He achieved success against the Kṣatrapas, but his successors, known mostly from Purāṇic genealogical accounts and coins, ruled over a comparatively limited area.

The "local" character of later numismatic issues and their distribution pattern indicates the subsequent fragmentation of the Sātavāhana empire. The Andhra region passed on first to the Ikṣvākus and then to the Pallava. Different areas in the western Deccan experienced the emergence of new local powers; *e.g.,* the Cūtūs, the Ābhīras, and the Kurus. In the Berār region the Vākāṭakas emerged as a formidable political force in the early 4th century. By this period the dismemberment of the Sātavāhana empire was complete.

Despite achievements of the northern Mauryas in the Deccan in the 4th–3rd centuries BC, it was under the Sātavāhanas that the historical period proper began in this region. Although there are no clear indications as to whether a centralized administrative system was evolved, an extensive system of currency was introduced throughout the empire. The Indo-Roman trade reached its peak in this period. The resultant material prosperity is reflected in the liberal patronage of Buddhist and Brahmanical communities, enumerated in contemporary inscriptions.

satellite, natural or artificial object that revolves around a larger astronomical object, usually a planet. The Moon is the most obvious example.

All of the planets in the solar system except Mercury and Venus have natural satellites. More than 40 such objects have so far been discovered. Saturn has the most satellites, with 17 certain and at least 5 more yet to be confirmed. The natural satellites vary greatly in size. Some of them measure only several kilometres in diameter, as in the case of the two tiny moons of Mars and the outer satellites of Jupiter. A few are larger than Mercury, as for example Saturn's Titan and Jupiter's Ganymede and Callisto, each of which is more than 5,200 kilometres (3,230 miles) in diameter. The satellites also differ significantly in composition. The Moon, for example, consists almost entirely of rocky material. On the other hand, the composition of Saturn's Enceladus is 50 percent or more ice.

The idea of an artificial satellite probably originated about 1870. The first such space vehicle to be actually placed in orbit was Sputnik 1, launched on Oct. 4, 1957, by the Soviet Union. Since then, many hundreds have been sent into Earth orbit. Various artificial satellites have also been launched into orbit around Venus and Mars, as well as the Moon. Spacecraft of this type are used for scientific research and for other purposes, such as communication, weather forecasting, Earth resources management, and military reconnaissance.

satellite communication, use of artificial satellites travelling in orbit to provide communication links between various points on Earth.

A brief treatment of satellite communication follows. For full treatment, *see* MACROPAEDIA: Telecommunications Systems.

The first satellite communication experiment was the U.S. government's Project SCORE, which launched a satellite on Dec. 18, 1958. One of the best known early satellites was Echo 1, a balloon made of plastic coated with a thin layer of aluminum, which was launched on Aug. 12, 1960. Echo 1 was passive (*i.e.,* merely reflecting signals sent to it) and was used for experimental telephone, data, and facsimile transmission. Telstar 1, launched on July 10, 1962, was the first active satellite (*i.e.,* using a receiver and transmitter) and was the first to transmit live television signals and telephone conversations across the Atlantic Ocean. Syncom 2, the first synchronous communication satellite (*i.e.,* maintaining the same point above the Earth), was launched on July 26, 1963. Syncom 3, launched on Aug. 19, 1964, relayed the first sustained transpacific television picture. The first commercial communication satellite, Intelsat 1 (Early Bird), was launched on April 6, 1965.

In satellite communication, signals are transmitted from an Earth station to the satellite; equipment aboard the satellite receives the signals, amplifies them, and rebroadcasts them to another Earth station. Communication satellites generally have several transponders, or radio repeaters. Each transponder includes a receiver, with a channel of uplink (receiving) microwave frequencies, a shifter to lower the signal to a downlink (transmitting) frequency, and an amplifier to produce adequate output power. The number of transponders determines the capacity of a satellite. One channel can typically carry a colour television signal or 1,200 telephone signals in one direction.

Communication satellites are put into orbit by means of rocket launch vehicles, or boosters. Throughout the life of the satellite the attitude (direction of pointing) must be controlled and the station kept (the orbit adjusted) to compensate for irregularities in the gravitational fields of the Earth, Sun, and Moon, as well as the pressures of the solar wind and light from the Sun.

Solar cells have become the most common source of electric power in communication satellites, although some experimental satellites have used thermoelectric generators heated by radioisotopes. A synchronous satellite, which is eclipsed by the Earth during two 44-day seasons each year, for times as long as 70 minutes, carries batteries to provide power during eclipse. The most common source of microwave power for transmitting signals from communication satellites is the travelling-wave tube.

Several satellites used in communication among a group of Earth stations form a satellite communication system. A system may provide international communication, as does Intelsat, both international and domestic communication, or domestic communication only. Some systems provide mobile communication, primarily to ships, and others are for military use. Some are reserved for use by amateur radio operators.

Intelsat originated in August 1964 when 11 countries signed agreements to form a global communication system. It has since become an international legal entity, in which more than 100 countries hold investment shares. Comsat, established in 1962, is the U.S. participant. Intelsat is responsible for the design, development, and maintenance of the space segment of the system; Earth stations are owned and operated by entities in the countries in which they are located. Nations that are not members of Intelsat can obtain satellite communication through Comsat General, a subsidiary of Comsat. By the 1980s the Intelsat system included some 400 Earth stations located in 150 countries. It provides about 20,000 two-way telephone circuits, as well as television and other transmission. The Soviet Intersputnik organization provides communication within the Soviet Union and among countries of the Soviet bloc.

Several domestic satellite systems have been established because the communication they provide would be difficult to obtain in any other way. Canada's Telesat system, for example, provides communication to the sparsely populated regions of the Northwest Territories, as well as to the nation's urban areas. Indonesia's Palapa system provides communication among islands that would be difficult to link otherwise. Domestic satellite systems also have other, more specialized uses; for example, the distribution of cable television and transmissions for the making of plates from which newspapers and magazines can be printed simultaneously in many locations.

satellite observatory, Earth-orbiting spacecraft that makes it possible to observe cosmic objects from above the atmosphere. Modern astronomers use such observatories because of atmospheric absorption and astronomical seeing (*q.v.*). Absorption by molecules and atoms in the upper atmosphere selectively blocks all but visible light and radio waves from reaching the Earth's surface. Astronomical seeing causes images to be blurred as they pass through the lower part of the atmosphere.

An observatory in space can potentially detect all energies of radiation, but there is usually some limitation caused by the instruments used. Since the early 1970s, the United States has launched satellite observatories designed for a variety of tasks. The Orbiting Astronomical Observatories and the International Ultraviolet Explorer, for example, studied faint objects in the ultraviolet region of the spectrum, while the High-Energy Astronomical Observatories permitted the investigation of X-ray and gamma-ray sources. Other satellite observatories, such as the Orbiting Solar Observatories, have been specially designed for studying the Sun, usually simultaneously at many energies.

satī (Indian rite): *see* suttee.

Satie, Erik (-Alfred-Leslie) (b. May 17, 1866, Honfleur, Calvados, Fr.—d. July 1, 1925, Paris), French composer whose spare, unconventional, often witty style exerted a major influence on 20th-century music, particularly in France.

He studied at the Paris Conservatoire, dropped out, and later worked as a café pianist. In about 1890 he became associated with the Rosicrucian movement and wrote several works under its influence, notably the *Messe des pauvres* (*Mass of the Poor,* composed 1895). In 1893, when he was 27, Satie had a stormy affair with the painter Suzanne Valadon. From 1898 he lived alone in Arcueil, a Paris suburb, cultivating an eccentric mode of life and permitting no one to enter his apartment. Approaching 40, he went to study at the Schola Cantorum under Vincent d'Indy and Albert Roussel for three years. About 1917 the group of young composers known as "Les Six" adopted him as their patron saint. Later the School of Arcueil, a group including Darius Milhaud, Henri Sauguet, and Roger Désormiere, was formed in his honour.

Satie's music represents the first definite break with 19th-century French Romanticism; it also stands in opposition to Impressionism. Closely allied to the Dada and Surrealist movements in art, it refuses to become involved with grandiose sentiment or transcendent significance, disregards traditional forms and tonal structures, and characteristically takes the form of parody, with flippant titles, such as *Trois morceaux en forme de poire* (*Three Pieces in the Shape of a Pear*) and *Embryons Desséchés* (*Desiccated Embryos*), and directions to the player that mock those of the Impressionists: "with much illness" or "light as an egg."

Satie's flippancy and eccentricity, an inti-

mate part of his musical aesthetic, epitomized the avant-garde ideal of a fusion of art and life into an often startling but unified personality. He sought to strip pretentiousness and sentimentality from music and thereby reveal an austere essence. This desire is reflected in piano pieces such as *Trois Gnossiennes* (1890), notated without bar lines or key signatures. Other early piano pieces, such as *Trois Sarabandes* (1887) and *Trois Gymnopédies* (1888), use then-novel chords that reveal him as a pioneer in harmony. His ballet *Parade* (1917; choreographed by Léonide Massine, scenario by Jean Cocteau, stage design and costumes by Pablo Picasso) was scored for typewriters, sirens, airplane propellers, ticker tape, and a lottery wheel and anticipated the use of jazz materials by Stravinsky and others. The word Surrealism was used for the first time in Apollinaire's program notes for *Parade*. Satie's masterpiece, *Socrate* (1918), for four sopranos and chamber orchestra, is based on the dialogues of Plato. His last, completely serious piano works are the five *Nocturnes* (1919). The Picabia–Satie ballet *Relâche* (1924) contains a Surrealistic film sequence by René Clair; the film score, *Entr'acte,* or *Cinéma,* is an example of his ideal background or "furniture" music.

Satie was dismissed as a charlatan by musicians who misunderstood his irreverence and wit. They also deplored the nonmusical influences in his life—during his last ten years his best friends were painters, many of whom he had met while a café pianist. Satie was nonetheless deeply admired by composers of the rank of Darius Milhaud, Maurice Ravel, and, in particular, Claude Debussy—of whom he was an intimate friend for close to 30 years. His influence on Impressionism, although he mocked it, and on the later school of Neoclassicism was profound.

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satiety, desire to limit further food intake, as after completing a satisfying meal. The hypothalamus is the point in the central nervous system that regulates the amount of food desired. Eating is thought to increase the body temperature, and as the temperature in the hypothalamus rises, the process of feeding decreases. Satiety is reached long before the food is digested or absorbed. In humans, a number of factors may be involved in limiting food consumption. The feeling of fullness caused by distention of the stomach can stop further eating. A large quantity of sugar in the bloodstream seems to inhibit ingestion. The amount of stored fat tissue may also help to limit consumption. Emotional or psychological factors can cause or delay satiety. A person who is upset may be totally satisfied by only a few bites of food. People on diets can limit their food intake without reaching satiety; the body may crave more nourishment but the desire to eat more can be overruled.

In dogs, the volume of food consumed is important in satiety. If the nutritional value is reduced but the quantity remains the same, the animal may suffer from severe nutritional deficiencies before its body craves more adequate nutrition. In the rat, the opposite seems to be true; the bulk of food has little influence on the amount eaten; the nutritional value controls ingestion.

satin, any fabric constructed by the satin weave method, one of the three basic textile weaves. The fabric is characterized by a smooth surface and usually a lustrous face and dull back; it is made in a wide variety of weights for various uses, including dresses, particularly evening wear; linings; bedspreads; and upholstery.

Though originally a silk fabric, it is now made of yarns of other fibres. An all-cotton fabric woven in the satin structure is known as sateen.

satin glass, in the decorative arts, glass with a dull mat finish achieved by immersion in hydrofluoric or other abrasive acid. In the 19th century the process was synonymous with "frosting" and was a technique associated especially with the fancy art glass produced in the United States in the latter part of the century. One example of satin glass is mat-finished peachblow glass. Satin glass was made, in particular, by Hobbs, Brockunier & Company of Wheeling, W.Va.; at the Mount Washington Glass Works of New Bedford, Mass.; and at the New England Glass Company of East Cambridge, Mass. Similar glass was made in England and on the Continent during the same period. The translucent quality of satin glass made it especially desirable for use in lampshades; a form of satin glass still has a universal practical use in "pearl," or frosted, light bulbs.



Peachblow satin glass vases, Hobbs, Brockunier & Co., Wheeling, W.Va., 1886; in the Mansion Museum, Oglebay Park, Wheeling, W.Va.

By courtesy of Mansion Museum, Oglebay Park, Wheeling, W.Va.

satin spar, massive (noncrystalline) variety of the mineral gypsum (*q.v.*).

satinwood (*Chloroxylon swietenia*), tree of the Rutaceae family native to East India and Sri Lanka (Ceylon), or its hard yellowish-brown wood, which has a satiny lustre and is used for fine cabinetwork and farming tools. There are also satinwoods of the West Indies (*Fagara flava*) and of Africa (*F. macrophylla*), both of the orange, or rue, family (Rutaceae).

satipaṭṭhāna (in Buddhist philosophy): *see* smṛtyupasthāna.

satire, artistic form, chiefly literary and dramatic, in which human or individual vices, follies, abuses, or shortcomings are held up to censure by means of ridicule, derision, burlesque, irony, or other methods, sometimes with an intent to bring about improvement.

A brief treatment of satire follows. For full treatment, *see* MACROPAEDIA: Literature, The Art of.

The ancient Romans, particularly the 1st century-AD rhetorician Quintilian, claimed satire as their own invention, although it actually derived partially from Greek comedy. Originally satire was a rudimentary form of drama, possibly quasi-religious, consisting in dialogue but lacking appreciable plot. As satire developed into the tone in which words were delivered rather than a rigid form of delivery (as verse or prose), it partook of poetry as well as everyday language, fable as well as reportage, dialogue as well as monologue. The 20th-century comic night-club act may be seen in one sense as a return to the early form of the genre. Significantly, when the word satire became again widely used in the West from about 1960 onward (British and U.S. critics had generally considered the term obsolete or antiquated in essays published previously), it was television shows, such as Britain's *That Was the Week That Was* and, a little later in the United States, *Rowan and Martin's Laugh-In,* which provided vehicles for acerbic, anarchic, protean entertainment, with fast moving sketches, gags, songs, and dances—much as satire was originally presented.

The 20th-century English poet Edward Lucie-Smith pointed out that, however much the satirist claims to criticize from a lofty position, he may easily end up simply venting his spleen. The 1st-century-AD Roman poet Juvenal and the 18th-century Irishman Jonathan Swift are often regarded as examples. In such cases satire may be thought of as standing between comedy and tragedy. In contrast, Juvenal's 1st-century-BC compatriot Horace wrote in a much milder vein, a tradition carried on by Jane Austen, for instance, in her juvenile work *Love and Freindship* (*sic*).

The 19th-century German philosopher Friedrich Nietzsche said "Not by wrath does one kill but by laughter." In the age of totalitarian governments, however, satire is more likely to bring destruction on its practitioner, as in the case of the Russian poet Osip Mandelstam, who was liquidated by Stalin for lampooning him. In the West, former British Prime Minister Sir Alec Douglas-Home once attributed the downfall of his 1963–64 government to the fashion for satire in the early 1960s.

In the visual arts the caricature has been the chief vehicle for satire (as in the work of the 19th-century French graphic artist and sculptor Honoré Daumier), although the anecdotal pictures of the 18th-century British painter William Hogarth are an exception. In music a composer such as the 19th-century Frenchman Hector Berlioz could give a satiric twist to the traditional tune of the liturgical *Dies Irae* for his witches' sabbath in the *Symphonie fantastique.* In dance the Kirov Ballet of Leningrad brilliantly evoked the siege of their city by the Nazis in World War II by affixing devil's horns to the soldiers' helmets and choreographing the goosestep to parody militarist aggression.

In the late 20th century, satire in the West was widely propagated by periodicals, such as *Le Canard Enchainé* in France, *Private Eye* in Britain, and the *National Lampoon* in the United States, and by comedic troupes in night clubs or on television. In the Soviet Union, the magazine *Krokodil* was notable for its presentation of light satire within the context of strictly controlled media.

Satīt, Nahr (The Sudan): *see* Takazē River.

Satna, town, administrative headquarters of Satna district, Madhya Pradesh state, central India, on the Tons River, a tributary of the Ganges. The town was the former headquarters of the British political agent in Baghelkhand. A major road and rail junction, the town is an important distribution centre for agricultural products and cloth fabrics. Major industries include flour and oilseed milling, handloom weaving, and cement manufacturing; there is a thermal power station. Satna has four colleges, including a government postgraduate school, affiliated with Awadesh Pratap Singh University. At the nearby village of Bharhūt, 2nd-century-BC Buddhist *stūpa* remains were discovered in 1873.

Satna district (2,894 sq mi [7,495 sq km]), carved from the former Rewa and several other princely states, comprises a plateau region of

the Vindhya Range, intersected by several hill ranges. The Son, Tons, Satna, and Paisunī are the chief rivers. Millet, corn (maize), pulses, oilseeds, and fodder are the major crops, and limestone deposits are worked. Pop. (1981) town, 90,476; metropolitan area, 96,667; district, 1,153,387.

Satnāmī sect, any of several groups in India that have adopted a combination of Hindu and Muslim practices. The earliest group was founded by Bīrbhan in the 16th century, during a period of general syncretic activity that attempted to bring together the faiths of Islām and Hinduism. The Satnāmīs worshipped the supreme God as *satnām* (from Sanskrit *satyanāman,* "he whose name is truth"), a parallel to the use in Islām of *al-ḥaqq* (Arabic: "truth") as another name of Allāh. They did not worship images, rejected all class and caste distinctions, and denied any difference between Allāh and the supreme God of Hinduism. They were characteristically Hindu, insofar as they accepted the theses of orthodox Vedānta philosophy and worshipped Rāma and Krishna, the incarnations of Lord Vishnu. Another sect of the same name was organized by the Rājput religious leader Jagjīvan Dās at the end of the 17th century.

The modern Satnāmī sect, which may represent a revival of the earlier movements, was founded by Rai Dās (early 19th century), a saint of the Camār caste, and is almost exclusively a Camār religious movement. Among the Camār caste (originally tanners by profession and therefore considered highly polluted), the sect is closely associated with the saint Śiva Nārāyaṇa. It has been suggested that the popularity of the Satnāmī sect among the Camārs may be a result of their desire to create an identity as a sectarian group and thus raise the prestige of their caste.

Satō Eisaku (b. March 27, 1901, Tabuse, Yamaguchi Prefecture, Japan—d. June 3, 1975, Tokyo), prime minister of Japan between 1964 and 1972, who presided over Japan's post-World War II reemergence as a major world power. For his policies on nuclear weapons, which led to Japan's signing the Treaty on the Non-proliferation of Nuclear Weapons, he was awarded (with co-winner Sean MacBride) the Nobel Prize for Peace in 1974.

After graduating with a degree in law from Tokyo Imperial University in 1924, Satō joined the Ministry of Railways, becoming the chief of its bureau of control in 1941 and vice minister for transportation in 1948. That same year he joined the Liberal Party and was elected in 1949 to the lower house of the Diet (parliament). Becoming minister of construction in 1952, he resigned his post the following year to become chief secretary of the Liberal Party. When the Liberal Party was merged with the Democratic Party, Satō became one of the leading members of the new coalition called the Liberal-Democratic Party. During the late 1950s he served as minister of finance in the Cabinet of his older brother and political mentor, Kishi Nobusuke. Kishi was succeeded in 1960 by Ikeda Hayato, in whose Cabinet Satō also served.

After Ikeda resigned because of ill health, the Diet in November 1964 chose Satō as his successor. As prime minister Satō presided over the continued growth of the Japanese economy and the improvement of Japanese relations with other Asian countries. Although Satō increased Japanese trade with the People's Republic of China to some extent, the People's Republic distrusted his policies toward Taiwan and his support of the United States cause in the Vietnam war. In 1969 Satō reached an agreement with U.S. Pres. Richard M. Nixon for future return of the Ryukyu Islands to Japan, the removal of all nuclear weapons from the area, and the continued maintenance of the U.S.–Japanese Security Treaty of 1951. Satō came under heavy criticism for provisions in the agreement that allowed U.S. military forces to remain on Okinawa-jima after its return to Japan.

In the early 1970s problems with the United States over Japan's huge surplus in Japanese–U.S. trade put increased pressure on Satō. He attempted to seek new Japanese markets in Europe and the Soviet Union, but his unpopularity continued, especially after President Nixon visited China in February 1972, preempting similar Japanese efforts. He resigned in June 1972, shortly after the Ryukyus were officially returned to Japan. Satō was unable to ensure the election of his chosen successor, and his passing from the scene seemed to mark the end of the old guard that had dominated Japanese politics since 1945.

Satō Haruo (b. April 9, 1892, Shingū, Wakayama Prefecture, Japan—d. May 6, 1964, Tokyo), Japanese poet, novelist, and critic whose fiction is noted for its poetic vision and romantic imagination.

Satō came from a family of physicians with scholarly and literary interests. He entered Keiō University in Tokyo to study with the novelist Nagai Kafū in 1910, but he had already joined the Myōjō group of poets centring around Yosano Akiko (*q.v.*) and her husband Tekkan, and he left Keiō without graduating.

He began to attract attention with the short story "Supeinu ken-no-ie" (1916; "The House of a Spanish Dog," 1961), a piece of fantasy with a dreamlike tone. The prose poems *Den'en no yūutsu* (1919; "Rural Melancholy") and *Tokai no yūutsu* (1922; "Urban Melancholy") established his style of lyrical world-weary self-reflection. Satō met the novelist Tanizaki Jun'ichirō in 1916, the beginning of a friendship that ended several years later when he became involved with Tanizaki's wife. His first independent volume of poetry, *Junjō shishū* (1921; "Poems of Mourning"), was inspired by his sorrow at parting from her; but eventually they were married in 1930. He turned to criticism in later years; outstanding is *Akiko mandara* (1955; "A Mandala for Akiko"), a memorial to Yosano Akiko.

Satō Nobuhiro (b. July 18, 1769, Nishimonai, Dewa Province, Japan—d. Feb. 17, 1850, Edo), scientist and an early advocate of Westernization in Japan. He favoured the development of an authoritarian type of government based on Western science and political institutions.

Satō was born into a family of agricultural and mining specialists. At an early age he attempted to add to his knowledge by learning the Dutch language (the Dutch were the only Westerners then permitted in Japan) and by studying Western treatises on science, history, and military tactics.

He wrote some of the first Japanese studies of Western geography, history, science, and artillery. By travelling extensively throughout Japan, he learned about the actual conditions of the people and advised government leaders on the establishment of coastal defenses against the Russians, whose ships could be seen off northern Japan by the beginning of the 19th century.

Satō was influenced by Japanese nationalist thought, and he began to develop a program designed to propel Japan to the status of a world power. His program for imperialist expansion involved the establishment of a new Japanese governmental system that would indoctrinate the people with a nationalistic ethos through rigid control of the population.

Satō Nobusuke (Japanese premier): *see* Kishi Nobusuke.

Sato Norikiyo: *see* Saigyō.

Satori, Chinese WU, in Zen Buddhism of Japan, the inner, intuitive experience of Enlightenment; Satori is said to be unexplainable, indescribable, and unintelligible by reason and logic. It is comparable to the experience undergone by Gautama Buddha when he sat under the Bo tree (*see* bodhi) and, as such, is the central Zen goal. Satori is analogous to the conversion experience or spiritual rebirth of other religious traditions in that it constitutes a complete reordering of the individual in his relation to the universe. Satori usually is achieved only after a period of concentrated preparation and may occur spontaneously as a result of a chance incident, such as a sudden noise. The relative importance of the period of concentrated attention or the sudden "breaking through" is weighed differently by the two major branches of Zen: the Sōtō emphasizes quiet sitting (*zazen*), whereas the Rinzai devotes more attention to the various methods of bringing about an abrupt awakening. (*See also* kōan).

Sātpura Range, range of hills, part of the Deccan Plateau, western India, that stretches for 200 mi (320 km) across the widest part of peninsular India, through Mahārāshtra and Madhya Pradesh states. The range, the name of which means "seven folds," forms the watershed between the Narmada (north) and Tāpti (south) rivers. With peaks more than 4,000 ft (1,200 m) high, the Sātpura Line includes the Mahādeo Hills, Maikala Range, and Choṭa Nāgpur plateau, all of which lie east of the Sātpura Range proper. The line is sometimes considered to include the Vindhya Range to the north.

Although it is economically poor, the Sātpura Range contains some worked manganese and coal deposits in its southeastern flanks. It is largely forested, dissected plateau country, and it contains valuable teak stands in the west. In the upper Wainganga and Pench valleys of the Mahādeo Hills there is some agriculture, and on the higher hills Gond hill tribes practice *jhum* cultivation (burning, planting, and moving on). In Madhya Pradesh, Pachmarhī is a resort town and Chhindwāra is a minor administrative centre.

satrap, provincial governor in the Achaemenian Empire. The division of the empire into provinces (satrapies) was completed by Darius I (reigned 522–486 BC), who established 20 satrapies with their annual tribute.

The satraps, appointed by the king, normally were members of the royal family or of Persian nobility, and they held office indefinitely. As the head of the administration of his province, the satrap collected taxes and was the supreme judicial authority; he was responsible for internal security and raised and maintained an army. To guard against abuse of powers, Darius instituted a system of controls over the satrap. Top satrapy officials and the commander of the garrison troops stationed in the province were directly responsible to the king, and periodical inspections were carried out by royal officials. With the weakening of central authority after the mid-5th century BC, however, the satraps often enjoyed virtual independence. The satrapal administration was retained by Alexander III the Great and his successors.

Satrap was also used to designate certain Śaka chiefs who ruled over parts of northern and western India during the first half of the 1st millennium BC.

Satriano, Carlo Filangieri, principe di (prince of): *see* Filangieri, Carlo.

Satsu-no-umi (Japan): *see* Chūzenji-ko.

Sattahip, port, in Chon Buri *changwat* (province), in the Eastern region of Thailand, on the northern Gulf of Thailand coast, at the head of a small bay protected by Ko (island) Phra. It was developed as a naval base

in 1920–23 and continued to serve predominantly military purposes in the 1970s. It is linked to Bangkok by river and by a coastal road, and its deepwater facilities are regarded as a potential commercial alternative to Bangkok's shallower port. Pop. (1980) urban sanitary district, 13,812.

Satu Mare, *judeţ* (district), northwestern Romania, occupying an area of 1,700 sq mi (4,405 sq km). The district is bounded on the north by the Ukrainian S.S.R. of the Soviet Union, and on the west by Hungary; it consists mostly of rolling hills and is drained northwestward by the Someş River and its tributaries. Satu Mare (*q.v.*) city is the district capital and has industries that produce metal products, timber and other building materials, and textiles. The towns of Carei, Bixad, and Ardud are timber centres. Karolyi Castle (15th century) and a Baroque-style Catholic church are located in Carei. Bixad is known for its wooden churches and folk art. Ruins of a 16th-century fortress are found in Ardud, and a folk museum is situated in Negreşti-Oaş, an andesite-mining centre. Pottery with distinctive multicoloured floral motifs is produced in Vama town. Agricultural activities of the area consist of vegetable, orchard, and vineyard cultivation. Tăşnad, Livada, Pomi, and Tarna Mare are other towns of the district. Highway and railway connections extend between Satu Mare city and the larger towns in the district. An airport is located near Satu Mare city. Pop. (1982 est.) 405,739.

Satu Mare, Hungarian SZATMÁR NÉMETI, city, capital of Satu Mare *judeţ* (district), northwestern Romania, on the northeastern fringe of the Great Hungarian Plain. It lies on the right bank of the Someş River, 8 mi (13 km) from the Hungarian border and 17 mi from the Soviet border. It was founded by boatmen carrying salt down the Someşul River and served as a market centre. The first historical mention of the town was in 1214, when its fortress was destroyed by the Mongols. The Treaty of Szatmár (1711), which guaranteed religious freedom and liberty for the Hungarians, was signed after their revolt against the Habsburg monarchy. Satu Mare is now an important railway junction with connections to Hungary and the Soviet Union. Manufactures include textiles, machinery, and a variety of consumer products. Pop. (1982 est.) 117,664.

Satun, also spelled SATUL, town and *changwat* (province) in the Southern region of Thailand, on the Malay Peninsula. Satun town, the provincial capital, remains a small community at the end of a branch road; its shallow coastal waters are unsuitable for port development. The province (area of 957 sq mi [2,479 sq km]) was historically part of Kedah state (now in Malaysia). It includes several offshore islands. Rice, rubber, and coconuts are the main agricultural products, and there is some lumbering and tin mining. Pop. (1980) town, 15,652; province, 156,485.

saturation, any of several physical or chemical conditions defined by the existence of an equilibrium between pairs of opposing forces or of an exact balance of the rates of opposing processes. Common examples include the state of a solution left in contact with the pure undissolved solute until no further increase in the concentration of the solution occurs and the state of a vapour similarly left in contact with the pure solid or liquid form of the substance. In the first example the solution is saturated when the rate at which the pure substance dissolves in the solvent to enter the solution is exactly equal to the rate at which the dissolved substance leaves the solution (*e.g.*, by crystallizing). In the second example the rate at which the pure condensed (liquid or solid) material vaporizes is precisely that at which the vapour condenses.

A saturated solution or vapour contains the largest concentration of the dissolved or vaporized material attainable under given conditions of pressure and temperature. Although it is possible, in certain circumstances, to bring about supersaturation (a state in which the concentration exceeds the equilibrium value), such solutions or vapours are unstable and spontaneously revert to the saturated state. *See also* saturated air.

Saturday, seventh day of the week (*q.v.*).

Saturn, Latin SATURNUS, in Roman religion, the god of sowing or seed. The Romans equated him with the Greek agricultural deity Cronus. The remains of Saturn's temple at Rome, eight columns of the pronaos (porch), still dominate the west end of the Forum at the foot of the Clivus Capitolinus. It served as the treasury (*aerarium Saturni*) of the Roman state. Saturn's cult partner was the obscure goddess Lua, whose name is connected with *lues* (plague, or destruction); but he was also associated with Ops, another obscure goddess (perhaps of the earth's fertility), the cult partner of Consus, probably a god of the storage bin.

Saturn's great festival, the Saturnalia, became the most popular of Roman festivals, and its influence is still felt on the celebration of Christmas and the Western world's New Year. The Saturnalia was originally celebrated on December 17, but it was later extended to seven days. It was the merriest festival of the year: all work and business were suspended; slaves were given temporary freedom to say and to do what they liked; certain moral restrictions were eased; and presents were freely exchanged. The weekday Saturday (Latin *Saturni dies*) was named for Saturn.

Saturn, in astronomy, sixth planet from the Sun. It is named after the Roman god of agriculture.

A brief treatment of Saturn follows. For full treatment, *see* MACROPAEDIA: Solar System.

Saturn is the second largest non-stellar object in the solar system, after Jupiter. It is about 95 times as massive as the Earth and has nearly 750 times the volume. Saturn has at least 20 icy satellites, nine of which were discovered before 1900. It is also surrounded by an extensive ring system consisting of seven individual rings (*see below*).

Spectroscopic research conducted over a large range of the electromagnetic spectrum from a variety of observational platforms indicates that the outer layers of Saturn are gaseous; they are composed principally of hydrogen, with helium depleted by a factor of two compared with the Sun. The planet emits almost 80 percent more radiation in the thermal infrared portion of the electromagnetic spectrum than it receives from the Sun. Laboratory and computer modelling experiments performed on hydrogen under pressures of several million atmospheres indicate that it becomes a highly conducting liquid metal. Models of the interior of Saturn thus suggest that one-quarter of its mass resides in a rocky core that is surrounded by a shallow layer of liquid metallic hydrogen encased by an envelope of molecular hydrogen. The rapid rotation of the planetary liquid metallic core (10 hours 39 minutes 24 seconds) induces a variation in electric current strength in this region that is manifested as a magnetosphere stretching 24 R_S (where R_S is Saturn's equatorial radius of 60,330 kilometres [37,405 miles]) on the sunward side, the magnetopause, and 80 R_S on the other side, the magnetotail. Charged particles consisting primarily of electrons, protons, and heavy ions—captured partly from the atmosphere of Saturn's largest satellite, Titan (*q.v.*)—are trapped by the planetary magnetic field into Van Allen radiation belts that enclose 13 of the planet's satellites and the ring system. Low-frequency radio waves are emitted at a characteristic period used to define the planetary rotation rate as well as sudden electrostatic discharges associated with the formation of narrow radial markings, called spokes, at a distance of 1.8 R_S from Saturn's centre. Narrow polar aurora produced by a cascade of charged particles sucked in from the solar wind do not appear to have the same spatial extent as their counterparts on Jupiter. Although it appears that lightning occurs in Saturn's atmosphere, no conclusive evidence has been brought forward as yet.

The inclination of Saturn's rotational axis to the ecliptic (*i.e.*, the plane passing through the Sun and Earth) is approximately 27°, nine times larger than Jupiter's. Seasonal climatic changes are therefore likely, and tentative evidence exists for a one-season thermal lag manifested by the contrast in the appearance of the visible cloud tops in the two hemispheres. Spectroscopic evidence for a relatively large amount of photochemically unstable phosphine at the cloud-top level suggests that vigorous vertical mixing processes occur. This may help to account for both the production of stratospheric smogs and the consequent apparent lack of distinctive large-scale cloud features at any but polar latitudes.

The circulation of the winds in Saturn's atmosphere is not highly correlated with the location of the cloud bands. Red- and brown-coloured ovals resembling Jupiter's Great Red Spot are observed at mid-latitudes, and a cloud feature morphologically similar to a classical fluid vortex street flow has been identified in photographs taken by the U.S. Voyager planetary probes.

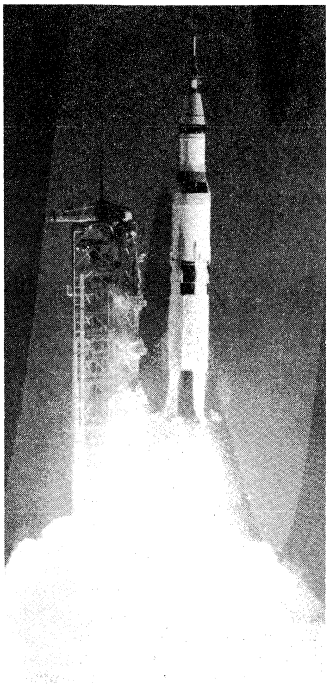
Saturn's rings were first observed in 1610 by Galileo with the aid of a very primitive telescope in which they looked like "handles." By 1659 Christiaan Huygens, using an improved telescope, had recognized their true nature: they were thin, flat, detached rings. The rings average less than a few hundred metres thick, and lie in the plane of the planet's equator, which has a fixed orientation in space. Because Saturn's equatorial plane is tilted by 27° from its orbital plane, the rings are seen from different angles as Saturn moves through its orbit, producing a variety of aspects that change from edge-on to opened-up about every 7½ years. Because of their small thickness, the rings cannot be seen edge-on. The rings are made up of countless separate particles of all sizes, ranging from grains of fine dust to bodies measuring possibly tens of kilometres across. The larger particles, which could even be called moons, are much less numerous. Individual particles have not been observed, but their sizes are inferred from the way they reflect sunlight and radar waves. Water ice has been observed on their surfaces, and it probably comprises the bulk of the ring material. The particles are all in separate orbits around Saturn, with those closer to the planet moving more rapidly.

The main rings of Saturn are the central or B ring (from 1.5 to 2 R_S); the outer or A ring (from 2.1 to 2.3 R_S), separated from the B ring by a relatively empty region called the Cassini Division; and the inner or C ring (from 1.2 to 1.5 R_S). Each of these regions exhibits a great variety of fine structure, most likely because of different forms of gravitational effects by satellites outside or possibly within the rings. Other fainter rings, two of which (F and G) are very narrow and one (E) very broad, have recently been discovered around Saturn.

Saturn's rings may have formed in place by direct condensation of icy material from the cooling cloud of gas and dust that also formed the planet. Because of tidal effects, this material could never collect itself into a satellite. Alternatively, the rings may have resulted from the fragmentation of a satellite

or satellites that entered the region of tidal destruction. Collisions with meteoroids may have contributed significantly to the breakup of such moons.

Saturn, in space flight, any of a series of large two- and three-stage vehicles for launching spacecraft, developed by the United States beginning in 1958 in connection with the Apollo Moon-landing program. Saturn I, the first



First launching of the Saturn V space vehicle, November 1967

By courtesy of the National Aeronautics and Space Administration

U.S. rocket specifically developed for space flight, was a two-stage vehicle that placed test versions of Apollo spacecraft into orbit, and also launched unmanned spacecraft. The first firing, on Oct. 27, 1961, was followed by nine subsequent launches, all successful.

Saturn V, a three-stage vehicle, was used for manned Apollo lunar flights. The first Saturn V was launched in November 1967. In flying to the Moon, the first stage, weighing nearly 5,000,000 pounds, lifted the second and third stages along with the spacecraft to a speed of 5,400 miles per hour and to a point 41 miles above the Earth. The second stage, weighing more than 1,000,000 pounds, then took over, increasing speed to more than 14,000 miles per hour. At a point 120 miles above the Earth, the second stage was jettisoned, and the third stage ignited briefly to accelerate the spacecraft to 17,000 miles per hour, putting the spacecraft into Earth orbit. The astronauts then reignited the single engine of the third stage, which burned for 5½ minutes, cutting off at an altitude of about 190 miles and a speed of 24,300 miles per hour. From that point, the rocket traveled through space until it reached a Moon orbit. *See also* Apollo program.

saturniid moth, also called GIANT SILKWORM MOTH, any of the approximately 800 species of the cosmopolitan (principally tropical) insect family Saturniidae (order Lepidoptera). The thick, silken cocoon of saturniid moths is sometimes used for commercial silk. Adults have stout, hairy bodies and broad wings, often vividly coloured and patterned. Most species have a central eyespot marking each wing. The io moth (*Automeris io*), for example, is characterized by yellow males and red-brown females, and both sexes have a large, dark eyespot on each hindwing. The wingspan of most North American species does not exceed 15 centimetres (6 inches). Adults have reduced, or vestigial, mouthparts, and many never feed. The feathery antennae of males are used to detect the scent of distant females. The large, usually green, larvae feed chiefly on tree foliage. Most species have colourful knots or spines and sometimes irritant barbs. Some spin cocoons; others pupate in the ground. Saturniids have been used in genetic studies of hybridization and variation. The giant cecropia moth (*Hyalophora cecropia*) has been used in studies of hormonal control of transformation and hibernation.

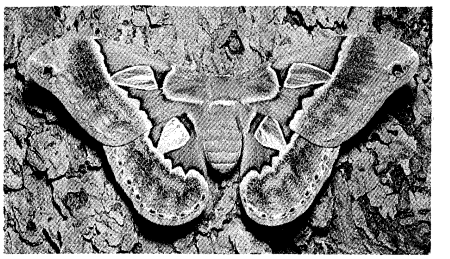
The larvae of the polyphemus moth (*Antheraea polyphemus*) are green with white lines and are marked by gold knobs; they feed on oak, maple, and birch leaves and pupate in a cocoon in a leaf on the ground. *Antheraea* species, including *A. polyphemus,* are sometimes used as a source of commercial silk; *e.g., A. assama* for muga silk; the Chinese oak silkworm, *A. pernyi,* for shantung silk; and the Indian moth, *A. paphia,* for tussah silk. Another silk-producing species is the large atlas moth (*Attacus atlas*), whose wingspread often exceeds 25 cm (10 in.).

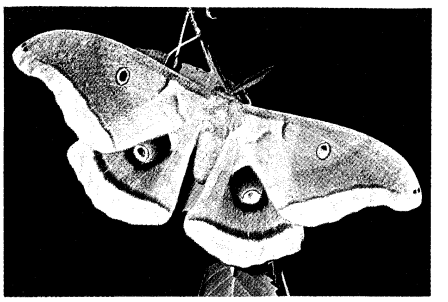
The heavily scaled wings of the emperor moth (*Saturnia pavonia*), which occurs in temperate regions of Europe and Asia, are marked by transparent eyespots, which presumably serve a protective function in frightening predators. Larval forms feed on shrubs. The promethea moth (*Callosamia promethea*)—also called spice-bush moth because the larvae feed on spice bush, sassafras, lilac, and related plants—is a common North American saturniid moth. The female moth is maroon in colour, and the male is blackish. The cocoon, formed inside a leaf, is secured to a tree by silk. The beautiful adult luna moth (*Actias luna*), which has a wingspread of about 10 cm (4 in.), is light green with thin brown borders on each wing and has tail-like projections on the hindwings. It usually occurs in the southern parts of North America.

The caterpillar of the cynthia moth (*Samia cynthia* or *walkeri*), also known as the ailanthus silk moth, native to Asia and introduced into North America, feeds chiefly on leaves of the ailanthus tree and the castor oil plant. The olive green adult has a distinctive pattern of crescents on its wings. The cocoons, often rolled inside leaves and suspended from a tree, yield a poor-quality silk that is sometimes used commercially.

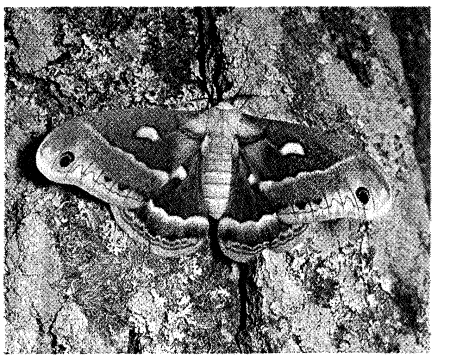
The largest moth native to North America, the cecropia moth (*Hyalophora cecropia*), attains a wingspread of about 15 cm (6 in.). It is brown with white, red, and gray markings and large, distinctive, crescent-shaped wing spots. The larva grows to 10 cm (4 in.) in length. The hercules moth (*Coscinoscera hercules*) from Australia has a wing area that reportedly exceeds that of any other insect. This moth, sometimes mistaken for a bird, has broad, dark-brown wings with tails on the hind pair and a wingspan of about 28 cm (11 in.).

Saturninus, Lucius Appuleius (d. 100 BC), Roman politician who, with Gaius Servilius Glaucia, opposed the Roman Senate from 104 to 100, at first with the cooperation of Gaius Marius. He was quaestor shortly before 104. As tribune in 103 he sought the support of the proletariat in Rome with a law that drastically reduced the price of the monthly grain ration. By other bills he assigned land grants in Africa, which amounted to more than 60 acres per man, to Marius' soldiers discharged after service in the Jugurthine War (111–105), and he established the first permanent court to try charges of treason. The two conservative censors of 102 attempted unsuccessfully to expel Saturninus and Glaucia from the











(Top to bottom) Mexican emperor moth (*Rothschildia orizaba*), polyphemus moth (*Antheraea polyphemus*), cynthia moth (*Samia cynthia*), cecropia moth (*Hyalophora cecropia*), Asian luna moth (*Actias selene*)

(Top) Alexander B. Klots, (top centre) William E. Ferguson, (centre) Stephen Dalton—EB Inc., (bottom centre, bottom) G.E. Hyde—EB Inc.

Senate. The next year Saturninus was able to win acquittal on a capital charge because he had the backing of the equites, whose support had been won by Glaucia's bill restoring to them the exclusive right of constituting the juries in the permanent courts.

In 100 Saturninus was tribune again, Marius consul for the 6th time, and Glaucia praetor. Turmoil surrounded passage of Saturninus' proposals for land allotments in Transalpine Gaul for Marius' soldiers discharged after service in the Cimbric War, and for the establishment of Latin colonies for other veterans in Sicily, Macedonia, and Achaea. Saturninus was elected tribune again for 99, but Marius, now aware of the danger of his extremist policies, broke with him. The consular elections, for which Glaucia's candidacy was disallowed, broke down in disorder, one of the candidates being murdered. Saturninus and Glaucia with their followers seized the Capitoline Hill; the Senate reacted by calling upon Marius to restore order. Saturninus and Glaucia surrendered to Marius, who locked them in the Senate house. Their enemies, tearing off the roof, stoned them to death. Most of Saturninus' radical legislation was rescinded by the Senate after his death.

Although surviving accounts of Saturninus derive from hostile sources, it is clear that he lacked the integrity and statesmanship of Gaius Sempronius Gracchus, in whose footsteps he followed.

satyāgraha (Hindi: "truth force"), philosophy introduced in the 20th century by Mahatma Gandhi of India; in practice, it is manifested as a determined but nonviolent resistance to some specific evil. *Satyāgraha* was the guiding philosophy for the Indian people in their fight against British imperialism and has been adopted by protest groups in other countries.

Satyāgraha may be translated from Hindi as "the devotion to truth," or as "truth force." A *satyāgrahi*—a person practicing *satyāgraha*—achieves correct insight into the real nature of an evil situation by observing a nonviolence of the mind, by seeking truth in a spirit of peace and love. In so doing, the *satyāgrahi* encounters truth in the absolute. By his refusal to submit to the wrong or to cooperate with it in any way, the *satyāgrahi* asserts this truth. Throughout his confrontation with the evil, he must adhere to nonviolence, for to employ violence would be to lose correct insight. A *satyāgrahi* always warns his opponents of his intentions; *satyāgraha* forbids any tactic suggesting the use of secrecy to one's advantage. *Satyāgraha* includes more than civil disobedience; its full range of application extends from the details of correct daily living to the construction of alternative political and economic institutions. *Satyāgraha* seeks to conquer through conversion; in the end, there is no defeat and no victory but rather a new harmony.

Gandhi drew from the writings of Leo Tolstoy and Henry David Thoreau, from the Christian Bible, and from the Bhagavadgītā and other Hindu writings in his formulation of the concept of *satyāgraha. Satyāgraha* is also rooted in *ahiṃsā*, the Hindu concept of nonviolence. Gandhi first conceived *satyāgraha* in 1906 in response to a law discriminating against Asians that was passed by the colonial government of the Transvaal in South Africa. In 1917 the first *satyāgraha* campaign in India was mounted in the indigo-growing district of Champaran. Over the following years, fasting and economic boycotts were employed as methods of *satyāgraha.*

Pragmatically, the efficacy of *satyāgraha* as a universal philosophy has been questioned. *Satyāgraha* implicitly appears to assume that the opposition will adhere to a certain level of morality to which the *satyāgrahi*'s truth may ultimately appeal. Gandhi himself maintained, however, that *satyāgraha* could prevail anywhere because it could convert anyone. *See also* civil disobedience.

Satyasiddhi-śāstra (Sanskrit: True Attainment Treatise), treatise in 202 chapters on the doctrine of the void (*śūnya*). The work stands as a philosophical bridge between Hīnayāna, or Theravāda, Buddhism, the form predominant in Sri Lanka (Ceylon) and Southeast Asia, and Mahāyāna Buddhism, the tradition predominant in East Asia. The author, Harivarman, a central Indian Brahman in origin, studied both Hīnayāna and Mahāyāna. The Chinese translation is entitled *Ch'eng-shih Lun* and the Japanese *Jōjitsu-ron.*

The *Satyasiddhi-śāstra* argues strongly against the absolute existence or ultimate ontological reality of any phenomenon. It was probably written in the early 4th century and was translated into Chinese at the start of the 5th century. In China it gave rise to the Satyasiddhi school, which was considered to be Hīnayānist, although the *Satyasiddhi-śāstra* itself was regarded in China as a Mahāyāna treatise. The text's Sanskrit original has perished, as have all commentaries on the work.

Satyr and Silenus, in Greek mythology, creatures of the wild, part man and part beast, who in classical times were closely associated with the god Dionysus. Their Italian counterparts were the Fauns (*see* Faunus). Satyrs



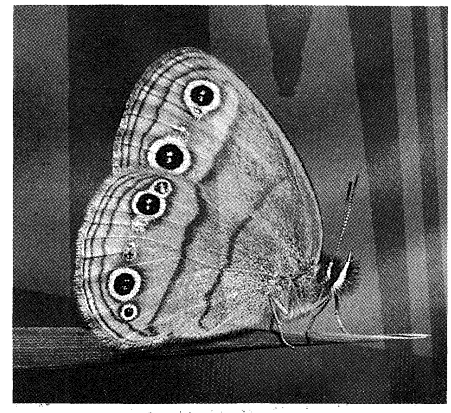
Head of the "Dancing Satyr," bronze statue found in the House of the Faun, Pompeii, 2nd century BC; in the Museo Archeologico Nazionale, Naples

Bruckmann Munchen

and Sileni were at first represented as uncouth men, each with a horse's tail and ears and an erect phallus, and they later came to be represented as men having a goat's legs and tail. The occurrence of two different names for the creatures has been explained by two rival theories: that Silenus was the Asian Greek and Satyr the mainland name for the same mythical being; or that the Sileni were part horse and the Satyrs part goat. Neither theory, however, fits all the examples in early art and literature. From the 5th century BC the name Silenus was applied to Dionysus' foster father, which thus aided the gradual absorption of the Satyrs and Sileni into the Dionysiac cult. In the Great Dionysia festival at Athens three tragedies were followed by a Satyr play (*e.g.,* Euripides' *Cyclops*), in which the chorus was dressed to represent Satyrs (*see* Satyr play). Silenus, although bibulous like the Satyrs in the Satyr plays, also appeared in legend as a dispenser of homely wisdom.

In art the Satyrs and Sileni were depicted in company with nymphs or Maenads whom they pursued. The Greek sculptor Praxiteles represented a new artistic type in which the Satyr was young and handsome, with only the smallest vestiges of animal parts. Hellenistic artists developed that concept into humorous or forceful representation of half-animal subjects as an escape from the merely human.

satyr butterfly, also called BROWN, any of certain species of butterflies belonging to the family Satyridae (order Lepidoptera), abundant during summer months in the woods and grasslands of the United States and Eu-



Little wood satyr butterfly (*Megisto cymela*)

E.R. Degginger

rope. The adults are dull brown or grey, while the larvae possess small, forked tail-like appendages on their abdomens. Adult butterflies have brown wings with a span of five to six centimetres and conspicuous circular markings on them. These false "eyes" on the wings may serve to frighten or distract predatory birds.

Satyr play, burlesque comedy performed as comic relief after a classical Greek tragic trilogy. Satyr plays are believed to have developed from the dithyramb, a hymn to Dionysus, concurrently with tragedy. They were evidently introduced at the Great Dionysia celebration at Athens in the late 6th century BC. They were written by the competing authors of the three tragedies and featured a legendary hero, frequently from the preceding trilogy. This character was joined by a cowardly, lecherous, and wine-loving chorus of 11 satyrs led by Silenus, the foster father of Dionysus, in a farcical plot or a parody of a myth. Euripides' *Cyclops* is the only complete Satyr play remaining.

Satyricon (1st century AD), comic, picaresque novel attributed to Petronius Arbiter (*q.v.*).

sauce, liquid or semiliquid mixture that is added to a food as it cooks or that is served with it. Sauces provide flavour, moisture, and a contrast in texture and colour. They may also serve as a medium in which food is contained, for example, the velouté sauce of creamed chicken. Seasoning liquids (soy sauce, hot pepper sauce, fish sauce, Worcestershire sauce) are used both as ingredients in cooking and at table as condiments.

Many sauces begin with a roux, a mixture of flour and fat that is cooked for a few minutes to eliminate the raw taste from the flour and to enable it to absorb a maximum amount of liquid. For brown sauces the roux is cooked until the flour begins to colour. To the roux is added the liquid component of the sauce: milk or cream, stock, wine, pan juices from a roast, etc. Seasoning and solids (*e.g.,* onion, mushrooms, bits of truffle) are then added and the sauce is cooked to the desired thickness. The French white sauce, béchamel, and brown sauce, espagnole, are the bases of dozens of complex variations. Some sauces are thickened by the addition of bread crumbs.

Sauces thickened with egg yolks include mayonnaise and its variations, which are cold emulsions of egg yolks and vegetable oil, and hollandaise and its variations, which are hot emulsions of egg yolks and butter. Typical ad-

ditions to these sauces are herbs, garlic, orange rind, or minced vegetables. Greek *avgolemono* sauce of stock, lemon juice, and egg yolks is extensively used with lamb, vegetables, and fish.

Butter, heated with herbs and flavourings, forms versatile sauces for fish, vegetables, poultry, and organ meats. Sometimes the butter is allowed to brown (beurre noir) for a distinctive taste that is sharpened with lemon juice, vinegar, or capers. For *beurre blanc,* a reduced seasoning liquid is beaten into softened butter before it can melt completely. Hard sauce, or brandy butter, is a stiff mixture of powdered sugar, butter, brandy, and spice that is served with mincemeat and Christmas puddings.

Oil and vinegar sauces, such as vinaigrette dressing, are most often used with salads and cold dishes. English mint sauce for lamb has a vinegar base, as do green sauces such as the Italian *salsa verde* and Argentine *chimichurri,* both served with plain-cooked meats.

Tomato sauces are purées of that vegetable with herbs, spices, other vegetables, and sometimes ham or bacon. Bolognese sauce is the classic Italian meat sauce for pasta, a tomato sauce with minced beef. Mexican *salsa cruda* is an uncooked mixture of chopped tomatoes, onions, jalapeño peppers, and cilantro, or coriander leaf, that is extensively used as a table condiment.

Fruit purées may be called sauces. Applesauce, cranberry and lingonberry sauce, and rhubarb sauce function as condiments with rich meats.

Dessert sauces include boiled custard, or *crème anglais,* chocolate sauces (usually made with sugar, cream, and butter), and fruit sauces. Fruit sauces are often made by mixing the fruit or fruit juice with sugar, spice, and liqueurs. Cooked fruit sauces are thickened with cornstarch or arrowroot powder, for a delicate, transparent finish. A family of sweet sauces is made by cooking butter and sugar until the sugar begins to caramelize.

sauceboat, metal or pottery bowl with a lip and handle, used for holding and serving sauces. The earliest type of silver sauceboat,



Silver English sauceboat by Charles Kandler, 1742; in the Ashmolean Museum, Oxford

By courtesy of the Ashmolean Museum, Oxford

introduced during the second decade of the 18th century, had a protuberant lip at either end, two central scroll handles, and a molded base. By the 1740s the predominantly boat-shaped vessel was standing on three or four cast feet and had a single lip and handle. Ornament tended to be restricted to the handle, feet, and rim. A few extravagant exceptions to this emerged in mid-century under the influence of the Rococo style. With the advent of Neoclassicism, the sauceboat was to a certain extent replaced by the sauce tureen, but it regained its place among domestic silver in the 19th century.

Saucesian Stage, lowermost and oldest major division of lower Miocene rocks and time on the Pacific coast of North America (the Miocene Epoch began about 23,700,000 years ago and lasted about 18,400,000 years). The Saucesian Stage, which preceded the Relizian Stage, was named for exposures studied at Los Sauces Creek, California. Three zones, or subdivisions, of Saucesian time are recognized, each characterized by a distinctive species of foraminiferan (protozoans related to the common amoeba that possess a shell). The Saucesian is correlated with the Aquitanian Stage of Europe.

Articles are alphabetized word by word, not letter by letter

Sauckel, Fritz (b. Oct. 27, 1894, Hassfurt, Lower Franconia, Ger.—d. Oct. 16, 1946, Nürnberg), Nazi politician who was Adolf Hitler's chief recruiter of slave labour during World War II.

While he was serving as a seaman during World War I, his ship was captured by the British, and he spent the remainder of the war as a prisoner in France. Sauckel joined the Nazi Party in 1923 and became one of its leading propagandists in Lower Franconia. He became the Nazi gauleiter of Thuringia in 1927 and subsequently served as minister of the interior and commissioner of that region.

From 1942 to 1945 during World War II, Sauckel was chief commissioner for the utilization of manpower and met Hitler's request for greater industrial production by rounding up slave labourers for use in Germany's factories. Traveling through Nazi-occupied territories in Europe, he recruited slave labour by force and ruthlessly exploited their capacity for work. After the war he was brought to trial at Nürnberg before the International Military Tribunal along with other Nazi leaders, and he was found guilty Oct. 1, 1946, of war crimes and crimes against humanity and was sentenced to hang. In the verdict Sauckel was described as being in charge of a program involving the deportation for slave labour of 5,000,000 people under cruel and insufferable conditions.

Saʿūd (ibn Abdul ʿAzīz al-Fayṣal as-Saʿūd) (b. Jan. 15, 1902, Kuwait—d. Feb. 23, 1969, Athens), son and successor of Ibn Saʿūd who was king of Saudi Arabia from 1953 to 1964.

After Ibn Saʿūd had conquered (1925) the Hejaz, a district in the Arabian Peninsula, he made his two eldest sons, Saʿūd and Fayṣal, his deputies in Najd and Hejaz, respectively. Saʿūd's primary responsibility was for the Bedouins. In 1933 he was named crown prince, and he and Fayṣal led a successful campaign against Yemen in the following year. When Ibn Saʿūd established a council of ministers in 1953, Saʿūd became its president, and in November of that year he became king with the support of his brothers.

He continued his father's program of modernization, with special emphasis on increased



Saʿūd

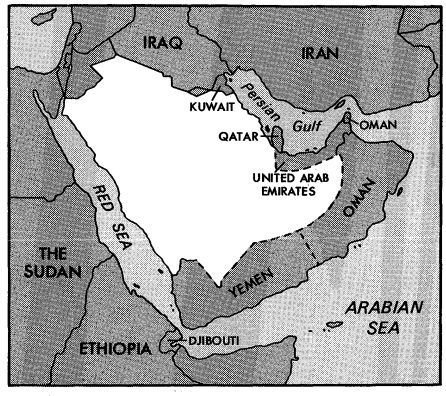
Camera Press

medical and educational facilities. Domestic affairs, however, were overshadowed by a crisis in the administration of the central government; in the early 1950s the first large-scale petroleum royalties began to be received, and financial and administrative affairs became too complex to be conducted simply on the personal authority of the king. Saʿūd had neither the ability nor the inclination to cope with these problems, and he so mismanaged the financial affairs of the state that he was forced to reconstitute the council of ministers and to give full executive powers to Fayṣal as its president. Saʿūd did not regain executive authority until 1960.

In 1963 Saʿūd was forced to spend a considerable amount of time abroad for medical treatment, and in his absence domestic opposition intensified against him. The dissident elements supported Fayṣal, and in March 1964 all powers were transferred to him as viceroy of the kingdom. In November of that year Saʿūd was formally deposed, and Fayṣal became the new king of Saudi Arabia.

saudade (Portuguese: "yearning"), overtone of melancholy and brooding loneliness and an almost mystical reverence for nature that permeates Portuguese and Brazilian lyric poetry. Saudade was a characteristic of the earliest Portuguese folk poetry and has been cultivated by sophisticated writers of later generations. In the late 19th century Antônio Nobre and Teixeira de Pascoais were the foremost of a growing cult of *saudosismo.* Especially in the poems collected in *Só* (1892), Nobre was intensely Portuguese in his themes, his mood (an all-pervading *saudade*), and his rhythms; whereas Teixeira de Pascoais typified the pantheist tendencies of Portuguese poetry. They inspired the movement known as the Renascença Portuguesa, centred on Porto in about 1910. The Portuguese Renaissance's poets, particularly Mário Beirão, Augusto Casimiro, and João de Barros, adopted *saudosismo* as the key to the nation's greatness.

Saudi Arabia, officially KINGDOM OF SAUDI ARABIA, Arabic AL-MAMLAKAH AL-ʿARABĪYAH AS-SAʿŪDĪYAH, country occupying four-fifths



Saudi Arabia

of the Arabian Peninsula, covering 865,000 square miles (2,240,000 square km). The capital is Riyadh. Extending for more than 1,200 miles (1,950 km) from northwest to southeast and about 770 miles (1,240 km) from southwest to northeast, Saudi Arabia is bordered by Jordan, Iraq, and Kuwait on the north; by Qatar, the United Arab Emirates, and Oman on the east; by a portion of Oman on the southeast; and by Yemen on the south and southwest. It is separated from Egypt, The Sudan, and Ethiopia by the Red Sea on the west; from Bahrain by the Gulf of Bahrain on the east; and from Iran by the Persian Gulf, also on the east. The population was estimated to be 12,972,000 in 1988.

A brief treatment of Saudi Arabia follows. For full treatment, *see* MACROPAEDIA: Arabia.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. Saudi Arabia's central plateau rises abruptly along the length of the country's narrow Red Sea coastal plain (the Tihāmah) into an imposing escarpment. These coastal highlands rise to more than 5,000 feet (1,500 m) in the Hejaz (al-Ḥijāz) to the north and to more than 10,000 feet (3,000 m) in Asir (ʿAsīr) to the south. The plateau descends northeastward, its lava and gravel wastelands merging with an arc of some of the world's most extensive sand deserts: an-Nafūd in the north, with an area of about 22,000 square miles (57,000 square km), and the Rubʿ al-Khali (the Empty Quarter) in the south, which, at about 250,000 square miles (650,000 square km), is the world's largest continuous sand area. Several long arcs of ridgelands, or cuestas, and al-Dahnāʾ (a 900-mile [1,450-kilometre] arc of sand) connect the northern and southern deserts. The Saudi Arabian landscape slopes gradually eastward from the desert until it forms the lowland swamps and salt flats of al-Hasa along the Persian Gulf. The Gulf coastline is irregular, and the coastal waters are very shallow.

There are no perennial rivers in Saudi Arabia. The entire freshwater supply is provided from underground water supplies, some surfacing as oases and the remainder from wells that tap groundwater that is replenished by percolation from the numerous interior wadis (intermittent streams characteristic of desert areas) and from deep-lying aquifers. The 0.5 percent of the country's land area considered arable is dependent on irrigation. Soils are poorly developed and reflect in composition the underlying bedrock from which they were formed. Large areas are covered with pebbles of different sizes. Alluvial deposits are found in wadis, basins, and oases.

Climatically, Saudi Arabia is almost entirely a desert. There are three predominant climatic zones: a small area of humid and mild temperature conditions in Asir near the Yemen border, with annual rainfall that can average more than 19 inches (480 mm); a steppe along the western highlands, less than 100 miles (160 km) wide in the north and widening to nearly 300 miles (480 km) near Mecca; and arid and semiarid desert which constitutes more than 95 percent of the total land area. In Rubʿ al-Khali a decade may pass with no rain at all. Temperatures nationwide tend to be cooler during the winter months (between 58° F [14° C] and 74° F [23° C]) and extremely hot in the summer, with temperatures from June to August exceeding 100° F (38° C) and frequently reaching 129° F (54° C). Humidity is low, except along the coasts, where it can be high and very oppressive.

The country's vegetation is characterized by small herbs and shrubs, which provide forage for sheep and goats herded by nomads. The ubiquitous date palm is the country's most widespread, naturally occurring tree. Wild animals include wolf, hyena, and fox and a few larger animals, such as the gazelle, leopard, and mountain sheep.

Saudi Arabia's estimated petroleum reserves represent nearly one-fourth of the world's total reserves. The country's estimated reserves of natural gas represent approximately 4 percent of the world total. Saudi Arabia also has reserves of high-grade iron ore, as well as bauxite, gold, copper, and lead.

The people. Saudi Arabia's population is predominantly Arab. The influence of black Africa is evident along the Red Sea coast, where there is a black population intermixed with Semitic stock. Influences from Iran, Pakistan, and India are evident in eastern Saudi Arabia. There are also large numbers of foreign workers living in the country.

Saudi Arabia is the historical home of Islām, and its population is almost entirely Sunnite Muslim. Most of the remaining population is also Muslim, but of the Shīʿite branch, the second major division of Islām. Only noncitizens, such as oil-industry employees, are Christian. Arabic is the official language, and English is widely understood, especially in the eastern part of the country, where the petroleum industry is concentrated.

The country has a relatively high birth rate, and about 45 percent of the population is younger than 15 years of age. Almost three-fourths of the total population is urban, although vast expanses of desert separate human settlements.

The economy. Saudi Arabia has a developing mixed economy in which both public and private sectors are important. The production and export of petroleum are the largest sector of the economy. Saudi Arabia's development has been guided by five-year plans since 1970. The gross national product (GNP) per capita, which is growing more rapidly than the population, is similar to those of many developed countries.

Agriculture employs about one-tenth of the total work force and accounts for about 4 percent of the GNP. Agricultural production is limited by lack of water, increasing salinity of the soil, and the small size of average holdings. In the 1980s the government instituted an extensive loan support program for farmers and allocated funds to exploit groundwater and improve the rural infrastructure. As a result of these efforts, the country has achieved self-sufficiency in wheat, eggs, and milk, among other items. Wheat, sorghum, barley, millet, and alfalfa are the main crops. About 70 percent of the country's food supply, however, must still be imported.

Saudi Arabia is the largest petroleum producer within the Organization of Petroleum Exporting Countries (OPEC) and is the third largest in the world, producing approximately one-twelfth of the world total. During the 1970s and early 1980s the state gradually acquired complete ownership of the Arabian American Oil Company (Aramco), which produces all Saudi petroleum. Government control over Aramco is exercised by the General Petroleum and Mineral Organization (Petromin), which is also responsible for exploring, refining, and marketing. Significant quantities of natural gas are produced by Aramco; other minerals exploited include limestone, marble, gypsum, clay, and salt.

The industrial sector (including petroleum) accounts for about two-fifths of the GNP and employs about one-fifth of the work force. The cornerstone of the Saudi industrialization program beginning in the mid-1970s was the construction of petroleum refineries and processing plants. Major ventures are carried out as joint ventures between the state and foreign companies. Other major industrial projects include plants producing petrochemicals, fertilizers, and rolled steel. The government has encouraged private enterprise to develop smaller-scale industries, such as baking, printing, and furniture manufacturing. Services account for about one-third of the GNP but employ half of the work force.

Electricity is supplied by four regional grids, each operated by a single company, and is generated entirely from petroleum.

Petroleum normally provides about two-thirds of the government's total revenues, which are somewhat lower than expenditures. Defense and internal security are the largest expenditures in the budget. The Saudi Arabian Monetary Agency controls the currency and manages the country's vast foreign assets. More than one-half of Saudi Arabia's commercial banks are joint ventures with majority Saudi participation; there are two merchant banks that function abroad.

The main markets for Saudi Arabia's petroleum are Japan, the United States, Italy, and France. In 1981 Petromin completed construction of Petroline, a trans-Arabian crude-oil pipeline from the Persian Gulf to the Red Sea that shortened the export route to western Europe and North America by 2,220 miles (3,570 km). Saudi Arabia's imports include a wide variety of manufactured goods and foodstuffs. The major suppliers are the United States, Japan, Germany, the United Kingdom, and Italy.

Government and social conditions. Saudi Arabia has an absolute monarchy dominated by the Saʿūd royal family. The most important members of the family select the king, subject to the approval of the ulama, or learned religious men. The king governs in accordance with the law of Islām, the Sharīʿah. His decisions must have the support of the royal family, the ulama, the principal tribal leaders, the armed forces, and the bureaucracy. The king appoints a Council of Ministers to help him formulate policy and direct the bureaucracy. The Saudi judicial system is based on the Sharīʿah; the king acts as the country's highest court of appeal.

The Saudis have greatly modernized their military by purchasing sophisticated armaments from the United States and other Western countries. Military service is voluntary.

The government's social-welfare system covers all workers and provides benefits for unemployment, work injury, sickness, maternity, disability, and old age. The system also offers free medicine and medical care to all citizens and foreign residents. Saudi physicians have access to some of the world's most advanced medical equipment at the King Faisal Medical City, located on the outskirts of Riyadh. Health and sanitary conditions in Saudi Arabia remain generally poor, however. Diseases such as malaria, trachoma, tuberculosis, dysentery, and cholera still infect large numbers of people. The infant mortality rate is relatively high—even for the Middle East—and the country's life-expectancy rate stands at only slightly more than 60 years. These health problems are aggravated by a shortage of medical personnel.

The government provides free education to all students. The educational system consists of six-year elementary schools, three-year intermediate schools, and three-year secondary schools. Saudi institutions of higher learning encompass two-year technical and commercial colleges and four-year universities. Some Saudi students are given scholarships for university study abroad; virtually all of these return to assume jobs in Saudi Arabia. Despite the country's high illiteracy rate—which stands at about one-half the population of more than 15 years of age—the government does not require children to attend school.

The privately owned press is as politically conservative as most of Saudi society and seldom criticizes the government. One of Saudi Arabia's major daily newspapers, *al-Madinah al-Munawara,* is closely associated with the royal family. Radio and television broadcasting is operated by the government.

Cultural life. The nation's cultural activity is dominated by strict adherence to Islām, although influences from more liberal Arab countries are filtering in and Saudi students who study abroad are exposed to Western influences. Poetry, formal prose, and oratory have been among the highest of arts since pre-Islāmic days, and poets and peripatetic storytellers abound. Perhaps the most important Saudi writer has been ʿUthmān ibn Bishr, a historical chronicler of the late 19th century. Literary works now appear in newspapers and periodicals, though nomads and illiterate villagers still have their own body of folk literature. Music and dance have always been part of Saudi everyday life, though the strict Wahhābī code forbids their public expression.

Visual arts are limited to geometric, floral, and abstract designs and to calligraphy.

History. Central and Northern Arabia seem to have been the original home of the Arabs. The important Arabian tribes of the pre-Islāmic period were the Thamūd, located in the northern Hejaz (al-Ḥijāz region) near the Red Sea, and the Liḥyānites, located in and around Dedan.

Arabic peoples outside the peninsula influenced and controlled much of Arabia in antiquity. The Lakhmid, located in the area known as Transjordan, was the first kingdom to use Arabic as its official language. Its influence extended to the borders of South Arabia. The Kindah of western Central Arabia wrested control of much of Central Arabia from the Lakhmids in the 4th and 5th centuries AD but were forced back in 528.

In 622 Muḥammad, of the Quraysh family of Mecca, preaching the oneness of Allāh, migrated to Medina and founded Islām, the most recent of the Western world's three great monotheistic religions. He gained additional converts in Medina, returned to capture Mecca, and made the two locations holy cities of his new religion. With the establishment of the Umayyad caliphate in Damascus in 661, however, the political centre of Islām left the Arabian Peninsula, never to return.

Medieval Arabia was marked by continuing struggles by local and foreign rulers to gain control of the peninsula. Most of these proclaimed obedience to the caliph but were autonomous and virtually independent. Before the Ottoman takeover in 1517, Arabia witnessed the warring activities of the Qarmaṭians, the Fāṭimids, the Seljuqs, the Ayyūbids, and the Mamlūks.

The beginnings of modern Arabian history are linked with the growing opposition to Ottoman rule and the emergence of a reform religious movement in the early 18th century. In 1745 Muḥammad ibn ʿAbd al-Wahhāb began preaching the purification of Islām of external and modern influences. He received the support of Muḥammad ibn Saʿūd of Dirʿīyah, and the resulting Wahhābīyah movement spread across the Arabian Peninsula. Their successes were checked by Ottoman and Egyptian resistance, but fighting continued throughout the 19th century. By 1904 Ibn Saʿūd (ʿAbd al-ʿAzīz II) had recovered all of the original Saʿūdī territory in Central Arabia (the Najd).

In 1927 the British, who had held Saʿūdī lands as a protectorate since 1915, acknowledged the independence and sovereignty of the Kingdom of the Hejaz and Najd. The two kingdoms were unified under the name Kingdom of Saudi Arabia in 1932.

Since the end of World War II, Saudi Arabia has supported the Palestinian cause in the Middle East, generally maintained close ties with the United States, and occupied a leadership role in OPEC. In 1981 Saudi Arabia became the seat of the Gulf Cooperation Council, a regional economic and defense cooperation pact involving countries of the Persian Gulf.

Sauer, Carl O(rtwin) (b. Dec. 24, 1889, Warrenton, Mo., U.S.—d. July 18, 1975, Berkeley, Calif.), American geographer who was an authority on desert studies, tropical areas, the human geography of American Indians, and agriculture and native crops of the New World.

He obtained his Ph.D. (1915) at the University of Chicago, then taught at the University of Michigan (1915–23) before serving as chairman of the department of geography (1923–54) at the University of California, Berkeley. For Sauer, geography was inseparable from human history inasmuch as the Earth, its resources, and its environment are profoundly affected by humanity. He thus found it quite natural to delve into anthropology, archaeology, and sociology as extensions of his geographic studies. In his writings Sauer expressed a wide variety of views, including the contention that Irish monks visited America long before Leif Eriksson and that the New World was widely settled some 40,000 years ago.

Sauer, Christopher: *see* Sower, Christopher.

Sauer, Emil (George Konrad) von (b. Oct. 8, 1862, Hamburg—d. April 27, 1942, Vienna), German pianist in the style of Liszt, teacher, and composer noted especially for his long and successful concert career.

He was a student of Nikolay Rubinstein at the Moscow Conservatory from 1879 to 1881 and of Franz Liszt in Weimar from 1884 to 1885. He made numerous concert tours from 1882 to 1936, including two to America (1898–99 and 1908). He was appointed head of the Meisterschule für Klavierspiel at the Vienna Academy in 1901, moved to Dresden in 1908, and returned to Vienna and the Academy in 1915, remaining there until he returned to Dresden in 1922. He wrote two piano concertos, two piano sonatas, and many studies for piano; he also edited the complete piano music of Johannes Brahms and the pedagogical works of Louis Plaidy and Theodor Kullak, among others. His autobiography, *Meine Welt,* was published in 1901. His reputation was as a virtuoso with a refined and accomplished technique rather than as a composer.

sauerbraten, in German cuisine, dish of spiced braised beef. A solid cut from the round or rump is marinated for three or four days in red wine and vinegar flavoured with onions, bay leaves, juniper berries, cloves, and peppercorns. After being dried and browned, the beef is braised in the strained marinade. Gingersnap crumbs are often used to thicken the pan juices; in the Rhenish version raisins are also added to the sauce. A buttermilk marinade is sometimes used. Traditional accompaniments to sauerbraten are noodles or potato dumplings.

sauerkraut, fermented white cabbage, a vegetable preparation important in the cooking of central Europe. Sauerkraut is prepared by finely shredding white cabbage and layering the vegetable with salt in a large crock or wooden tub. The cabbage is covered with a weighted lid and allowed to ferment, preferably at below 60° F (15.5° C) for at least a month. Commercially made sauerkraut is canned or sold in bulk. Caraway seeds, peppercorns, and juniper berries are sometimes added to the cabbage during fermentation. Sauerkraut is often served with smoked meats and sausages in dishes such as *choucroute garnie* and *Berner Platte.*

Sauerkraut is an ancient preparation. Known to the Romans, it was lost in the West and reintroduced from China via the Tatars in the 13th century. Some type of sauerkraut is made virtually wherever cabbage is a principal vegetable.

Sauerland, region, North Rhine-Westphalia *Land* (state), northwestern Germany. It is bounded on the north by the Ruhr River and its tributary, the Möhne, and on the south by the Sieg River and the Wester Forest, a mountainous area east of the Rhine. It lies to the east of the Bergisches Land (plateau) and has historically centred on the city of Arnsberg (*q.v.*). Its name (meaning "Bitter Land") is allegedly derived from the fierce resistance of its Saxon inhabitants against Charlemagne and the Franks, but it may refer to the relatively poor soil and often rugged hilly terrain. Formerly dependent largely on forestry and pasture farming, Sauerland has developed as an iron-ore mining region serving the heavily industrialized Ruhr area. Numerous dams and reservoirs in its deep river valleys supply water to the Ruhr area. Parts of the Sauerland have also developed tourist industries with climatic health resorts in the Rothaar, Ebbe, and Lenne mountains.

Sauganash, also spelled SAGAUNASH (b. 1780, Canada—d. Sept. 28, 1841, near Council Bluffs, Iowa Territory, U.S.), Potawatomi Indian chief whose friendship with the white settlers in Chicago was important in the development of that city.

Sauganash was of partly English or Irish ancestry. He was educated by Roman Catholic priests in Detroit and became fluent in French and English. He served the Shawnee leader Tecumseh as an interpreter until Tecumseh's death in the Battle of the Thames (Ontario) in 1813. For several years Sauganash was captain of the Indian department under the British government in Canada. In 1820 he moved to Fort Dearborn (now Chicago), declared his allegiance to the United States, and from 1826 was a justice of the peace.

His negotiations forestalled a Winnebago Indian uprising in 1827, and in 1832 he worked to prevent Indians in the Chicago area from joining the hostile Sauk and Fox led by Black Hawk in northwestern Illinois. His name was borne by Chicago's first commercial building of consequence, the Sauganash Hotel, opened by Mark Beaubien in 1829.

Saugeen Peninsula (Ontario, Canada): *see* Bruce Peninsula.

sauger, North American game and food fish related to the pikeperch (*q.v.*).

Saugor (India): *see* Sāgar.

Saugus, urban town (township), Essex County, northeastern Massachusetts, U.S., just north of Boston. It was settled in 1629, and its name is derived from an Algonkian Indian word meaning "small outlet." It was set off from Lynn in 1815. The Saugus Iron Works (1646) was the first successful ironworks and steelworks in colonial America. Saugus is now primarily residential with some light manufactures, including metal products and oil burners. The plant of the original ironworks and the Ironmaster's House (1648) have been restored as a national historic site. Inc. 1815. Pop. (1980) 24,746.

Sāūjbūlāgh (Iran): *see* Mahābād.

Sauk, also spelled SAC, an Algonkian-speaking North American Indian tribe closely re-



Keokuk, Sauk chief and successor to Black Hawk; painting by J.O. Lewis done at signing of the Treaty of Prairie du Chien, 1825

By courtesy of the Library of Congress, Washington, D.C.

lated to the Fox and the Kickapoo (*qq.v.*) who lived in the region of what is now Green Bay, Wis., when first encountered by the French in 1667. In summer the Sauk lived in permanent bark-house villages near fields where women raised corn (maize) and other crops. After the harvest the village separated into family groups that erected winter houses of poles covered with reed mats; in spring the tribe gathered on the Iowa prairies to hunt bison. Patrilineal clans regulated the inheritance of personal names and controlled certain religious ceremonies. Other ceremonies, however, were held by secret societies, such as Midewiwin, or the Grand Medicine Society, whose members were believed to be able to heal the sick and to enlist supernatural aid for the tribe. Many rituals involved the use of sacred medicine bundles, which were collections of magical objects. The Sauk were governed by a tribal council and hereditary chiefs; when war broke out, these were temporarily replaced by war chiefs selected for their military ability.

By the 19th century the Sauk had settled along the Mississippi River between Rock Island, Ill., and St. Louis, Mo. In 1804 some of their minor chiefs ceded most of the tribal lands to the United States, and, although the Sauk protested that this treaty was illegal, they were unable to prevent its enforcement. The resulting unrest led to the Black Hawk War (*see* Black Hawk), after which the Sauk were forced to relinquish more territory. They moved to Iowa, then Kansas, and finally settled in Oklahoma at the end of the 19th century. In the late 20th century there were about 1,000 Sauk.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Sauk Center, city, Stearns county, central Minnesota, U.S., on the Sauk River at the southern tip of Sauk Lake, 45 miles (72 km) northwest of St. Cloud. Settled in 1856 and laid out in 1863, it was named for the Sauk (Sac) Indians. The community developed as a service point for a farming area (corn [maize], hay, and dairying) and produces butter and animal feeds. It is best known, however, as the birthplace of Sinclair Lewis, America's first Nobel Prize-winning novelist. His boyhood home has been restored with original furnishings and family memorabilia, and the Sinclair Lewis Interpretive Center exhibits his original manuscripts and letters and includes a research library. Sauk Center was the model for the "Gopher Prairie" of *Main Street* (1920) and was also the setting for other novels by Lewis. Inc. village, 1876; city, 1889. Pop. (1984 est.) 3,816.

Saul, Hebrew SHA'UL (fl. 11th century BC, Israel), first king of Israel (*c.* 1021–1000 BC). According to the biblical account found mainly in I Samuel, Saul was chosen king both by the judge Samuel and by public acclamation. Saul was similar to the charismatic judges who preceded him in the role of governing; his chief contribution, however, was to defend Israel against its many enemies, especially the Philistines.

Biblical account of his life. The account of Saul's life comes from the Old Testament book of I Samuel. The son of Kish, a well-to-do member of the tribe of Benjamin, he was made king by the league of 12 Israelite tribes in a desperate effort to strengthen Hebrew resistance to the growing Philistine threat. For roughly two centuries, Israel had existed as a loose confederation of tribes, dependent for their unity upon bonds of religious faith and covenant that were renewed periodically in cultic ceremonies at the central shrine at Shiloh. By Saul's day, however, the tribal rallies were no match for the superior iron weapons and chariots of the Philistines, who were pressing ever deeper into the central highlands.

Two literary strands are discernible in the accounts in I Samuel involving Saul. One of these (9:1–10:16), reflecting a favourable attitude toward the monarchy, relates how the tall, handsome son of Kish was initially selected by Samuel, the seer, in a private encounter between the two men. From this same circle of tradition (chapter 11) comes the account of Saul's heroic deliverance of the town of Jabesh-Gilead from oppression by the Ammonites, which brought him to the attention of all Israel and resulted in his acclamation as king in a public ceremony at Gilgal. A second body of tradition (I Samuel 8, 10:17–27, and 12) is at pains to record Samuel's misgivings about the kingship. Although in this account he anoints Saul as a concession to popular pressure, Samuel warns of the loss of personal and tribal freedom that will follow and interprets the action as tantamount to a rejection of God.

Saul's reign. In many respects, Saul's reign bears a closer resemblance to the judges who preceded him than to the succession of kings who followed. His chief service to Israel, like that of the judges, lay in the sphere of military defense. Together with his stalwart son Jonathan and an army composed largely of volunteers, he won significant victories over the Philistines and succeeded in driving them out of the central hills. A successful campaign against the Amalekites in the south is also recorded (I Samuel 15). There is no evidence, however, that Saul made any appreciable changes in the nation's internal structures. The only royal official named in the accounts is the military commander Abner, Saul's cousin. In effect, Saul's reign was marked by few of the trappings of the typical Eastern monarchies, with no court bureaucracy, splendid palace, or harem. His capital at Gibeah is revealed by archaeology as a simple, rustic fortress.

The two men who significantly influenced Saul's career were Samuel and David. Even as Samuel's endorsement proved crucial in assuring Saul the kingship, probably nothing contributed so much to the king's subsequent disintegration as his break with the powerful and respected Samuel. Separate accounts attributed this to Saul's failure in religious duties—presumption in offering unauthorized sacrifice before battle and a reluctance to devote Amalek to destruction according to the principle of holy war. Samuel's rejection of Saul, which was complete and irrevocable, withdrew from the king the religious sanctions essential for popular support and Saul's own mental well-being.

David, who came into Saul's court because of either his military prowess or his skill as a harpist, according to varying accounts in I Samuel, is named both as the one who soothed the king with his sweet music and as the object of a fierce jealousy resulting from the young warrior's successes in battle. When secret attempts to take David's life proved no more successful than Saul's efforts to turn the hearts of his daughter Michal (David's wife) and his son Jonathan away from their winsome husband and friend, Saul declared openly his intention to slay David. Only David's flight to Philistia, which was beyond Saul's reach, saved him from the king's unprovoked and manic attacks. These accounts, though written from a perspective favourable to David, portray dramatically and convincingly the mental deterioration of Saul. Nothing is more revealing of the extent of the king's derangement than the story of his senseless slaughter of the 85 priests at Nob, noted in I Samuel 22.

Adding to the problems of Saul's final days, the Philistines mounted new attacks on the Israelite heartland. At no time strong enough to deliver a final blow to the persistent enemy, Saul gathered his forces at Mount Gilboa in an effort to cut off their drive into the Valley of Jezreel. A vivid story in I Samuel 28 relates how, on the eve of the fateful battle, Saul sought, through a necromancer at Endor, some word of encouragement from the dead Samuel. The oracle of Samuel's ghost, however, could only foretell the doom awaiting on the following day—the defeat of the Israelite forces and the death of Saul and his sons. The Israelites, once again confronted by the desperate conditions prevailing at Saul's accession to the throne, had to look to a new deliverer. The man best fitted for the job was David.

Assessment. Any fair evaluation of Saul's stormy career must look beyond the anti-monarchal tendencies of his biographers and the implicit comparisons with the more successful David. Best described as a tragic hero, Saul displayed a strength in battle and an ability to inspire his followers that place him high in the ranks of the military great. If unable finally to solve the Philistine problem, he nevertheless prevented their complete subjugation of the land. So enduring was the devotion of the men of Jabesh-Gilead that they risked their lives to remove Saul's exposed body from the Philistine fortress at Beth-shan and give it proper burial (I Samuel 31:11–13). The finest tribute paid the fallen leader is found in the immortal words of David's magnificent elegy in II Samuel 1, which begins, "Thy glory, O Israel, is slain upon thy high places! How are the mighty fallen!" (J.K.W.)

BIBLIOGRAPHY. Martin Noth, *Geschichte Israels* (1950; *The History of Israel,* 2nd ed., pp. 164–178, 1960); and John Bright, *A History of Israel,* pp. 163–174 (1959), provide the best historical assessments of Saul's reign. A somewhat romanticized but provocative personality study is in Fleming James, *Personalities of the Old Testament,* pp. 96–116 (1939).

Saulces de Freycinet, Louis-Claude de (explorer): *see* Freycinet, Louis-Claude de Saulces de.

Saule, in Baltic religion and mythology, the sun goddess, who determines the well-being and regeneration of all life on earth.

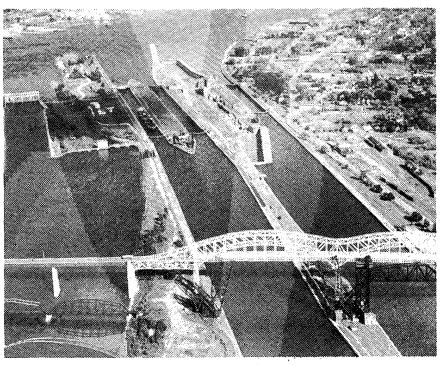
According to Baltic myth, Saule, the sun, rides each day through the sky on a chariot with copper wheels, drawn by horses who neither tire nor rest nor sweat. Toward evening Saule washes the horses in the sea, sitting on top of a hill, holding the golden reins in her hand. Then she goes beyond the silver gates into her castle at the end of the sea. The red ball of the setting sun, one aspect of Saule, is portrayed in Baltic art as a ring, a falling red apple, or a crown. As the full light of the sun, she is also represented by a daisy, a wheel, or a rosette.

One myth says that Saule's daughters were courted by the moon god, Mēness. Another myth, found in both Lithuanian and Latvian traditions, tells that Mēness married the sun goddess, but he proved to be as changeable as the moon and soon began to court the goddess of the dawn, the morning star. Pērkons (Lithuanian: Perkūnas), the Thunderer, cut the moon god to pieces for this slight to Saule.

Because of her association with growth and fertility, Saule was remembered in prayers by the farmers at both sunrise and sunset. The major event in her honour was the Līgo feast, a midsummer festival celebrated on June 23 (now St. John's Eve). On that day, the sun, wreathed in a garland of red flowers, was said to observe the summer solstice by dancing on a silver hill while wearing silver shoes. Great fires were lit on the hills to ward off evil spirits who might threaten health and fertility. Young people, wearing wreaths of flowers, danced and sang Līgo songs and leaped over the fires.

A harmless green snake, *žaltys*, was a special favourite of Saule's; it was considered good luck to have a *žaltys* in the house—and bad luck to kill one.

Sault Sainte Marie, city, seat of Algoma District, south central Ontario, Canada, on the north bank of St. Marys River, between Lakes Superior and Huron, opposite Sault Ste. Marie, Mich. The site was known to French explorers since the explorations of Étienne



Locks at Sault Ste. Marie, Ont., and the International Bridge
Horizons Photographs

Brûlé (1622); it was named Sault Ste. Marie (Rapids of Saint Mary) in 1669, when a Jesuit mission was established there by the French. As a part of New France, the area was ceded to the British in 1763, and in 1783 the North West Company founded a trading post there and built a small lock (completed in 1797–98) to handle canoes and small boats for trading purposes. The lock was destroyed by U.S. troops in the War of 1812 and rebuilt as a historical site late in the 19th century.

The growth of Sault Ste. Marie has been closely associated with the rapids and the locks and canal around them. The present Canadian lock was built for military purposes in the late 19th century and later widened to its present size: 18½ ft (5.6 m) deep, 60 ft wide, and 850 ft long. The canal itself is 1.38 mi (2.22 km) long. Cheap transportation and hydroelectrical power led to the city's development as a centre of heavy industry. Chief manufactures include iron and steel, paper and lumber, tar and chemicals, and beer. In addition, the "Soo," as the city is sometimes called, is a hunting, fishing, and iron-ore mining centre. It is linked to Sault Ste. Marie, Mich., by international rail and highway bridges and to other Canadian cities by the Trans-Canada Highway and by rail lines. Inc. town, 1887; city, 1912. Pop. (1981) 82,697.

Sault Sainte Marie, byname THE SOO, city, seat (1827) of Chippewa County, northern Michigan, U.S., at the northeastern end of the Upper Peninsula, on the rapids of the St. Marys River (there harnessed for hydropower and connecting Lake Superior with the lower elevation of Lake Huron). A port of entry, it is linked to its Canadian twin city, Sault Ste. Marie, Ont., by vehicular and railroad bridges. A hub of the St. Lawrence Seaway, its first set of locks to bypass the river's rapids went into operation in 1855. St. Mary's Falls Canal (including four parallel locks, popularly called Soo Locks) is operated by the U.S. Army Corps of Engineers and raises or lowers vessels 21 ft (6.5 m) between the two lakes in 6 to 15 minutes. There are sight-seeing tours by train and riverboat. Apart from canal activities, tourism is the economic mainstay, augmented by forest products and dairying.

First visited (1615–22) by Étienne Brûlé, the rapids (*sault* or *saut*) and river were named for the Virgin Mary, patron saint of the early French missionaries. Jacques Marquette founded a mission there in 1668, and the French took possession of the North American interior in a ceremony at the rapids in 1671. The British occupied the area from 1762 until 1783, when it was ceded to the United States by the Treaty of Paris. With the decline of the fur trade, the locks aided migration and development of the area following the discovery of copper and iron deposits in the Lake Superior region.

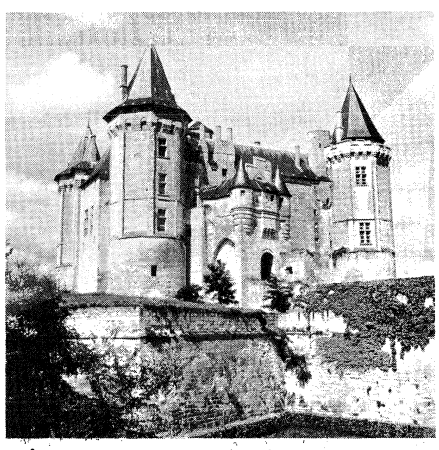
The Federal Building and Lake Superior State College (1946) occupy the former site of historic Ft. Brady (built 1822). The home of Henry Rowe Schoolcraft, the Indian agent whose writings inspired Longfellow to compose *The Song of Hiawatha*, is maintained as a memorial museum. Inc. village, 1879; city, 1887. Pop. (1980) 14,448.

Sauma, Rabban bar (ecclesiastic): *see* bar Sauma, Rabban.

Saumaise, Claude de (French classical scholar): *see* Salmasius, Claudius.

Saumur, town, Maine-et-Loire *département*, Pays de la Loire region, western France, on the Loire River. It is known for its cavalry school and for its wines.

The town, dominated by the château of the dukes of Anjou, is located on rising ground between the Loire River and its tributary the Thouet, 2 mi (3 km) above their confluence. It also occupies an island in the Loire and has spread to the right bank of the river. The castle, an imposing 14th-century fortress with four round towers, was strengthened with ramparts in the 16th century. It now houses a museum devoted to horses and riding. Saumur also has a museum of decorative arts. The Saumur Cavalry School, which occupies vast 19th-century quarters in the west of the town,



Château of the dukes of Anjou, Saumur, Fr.
Art Resource—EB Inc.

now provides training in the use of mechanized armour but has nevertheless retained the Cadre Noir (Black Training Team), the military horseback-riding instructors who first brought recognition to the school.

Old churches include the austere Romanesque Notre-Dame-de-Nantilly, with notable 15th–17th century tapestries. Cellars where Saumur wines are produced may be visited in the surrounding countryside.

The town grew up around a monastery and fort, built in the 10th century by the counts of Blois. In the 12th century it passed into the possession of the French crown. It became a Huguenot stronghold after the Reformation, and a renowned Protestant academy was established there. In 1685, however, the revocation of the Edict of Nantes, depriving French Protestants of their religious and civil liberties, led to massive emigration and to the closing of the academy. The town was damaged in 1940 during World War II, when the Cavalry School made a heroic three-day stand against superior German forces. The town has recently seen a great expansion of industry (processing of the traditional agricultural products of the region [wines, mushrooms, and vegetables] and of aluminum fabrication) and also of tourism. Pop. (1982) 30,037.

sauna, bath in steam from water thrown on heated stones, popular in gymnasiums and health clubs, with some units available for home use. The sauna may derive from baths described by Herodotus, who tells that the inhabitants of Scythia in central Eurasia threw water and hempseed on heated stones to create an intoxicating steam.

The Finnish people, however, with whom the sauna is most closely identified, made it a national tradition. The Finns built wooden enclosures near the edge of lakes and fjords. Inside were shelflike rows of flat stones that had fire space underneath, where wood was burned to heat the stones. When the stones were hot, cold water was thrown on them to create steam. While in the steam hut, bathers beat themselves with branches or paddles until their skin was red and tingling; then they dived into the cold water, or in winter they rolled in the snow. These extreme changes of body temperature were thought to have a beneficial effect on circulatory function.

Saur, Christopher: *see* Sower, Christopher.

Saura (people): *see* Savara.

Saura sect, Hindu sect widely dispersed throughout India in the Gupta and medieval periods; its members worshipped Sūrya, the sun, as the supreme deity. Sūrya as the sun was worshipped by Indians from the Vedic period onward for his help in destroying sins and bestowing blessings. The existence of a sect of sun worshippers is noted in the Indian epic the *Mahābhārata*. The Saura, like other sectarians, interpreted various texts as declaring the supremacy of Sūrya. Spiritual emancipation was believed to be obtained by adoring the sun (just-risen, on the meridian, and setting), by bearing its marks on the body (a circular red *tilaka*, or mark on the forehead), and by chanting his prayer.

The influence of the ancient Iranian cult of Mithra is evident as early as the 1st century AD. Thereafter, North Indian temple images of Sūrya show him in typical northern dress, such as boots, and the girdle around the waist known as the *avyaṅga* (Avesta *avyonhana*). The Magas (the Iranian priests, the Magis) were the special priests of the sun-gods and were assimilated into the Hindu caste structure as Brahmans. The temple constructed at Multān on the banks of the Candra Bhāga River (modern Chenāb, now in Pakistan) was an important centre of the cult in the 7th century AD.

Though the Saura is no longer a prominent sect in India, the chanting of the "Gāyatrī" mantra, a prayer to the sun, is a part of the orthodox Hindu's daily routine. Sūrya also figures as one of the five deities (together with Vishnu, Śiva, Śakti, and Gaṇeśa) worshipped by the Smārta sect.

Sauria (reptilian suborder): *see* lizard.

Saurimo, formerly HENRIQUE DE CARVALHO, town, capital of Lunda Sul province, northeastern Angola. Located at the northwestern edge of the province at an elevation of 3,557 ft (1,081 m) above sea level, it is a garrison town, local market centre, and the largest settlement in the province. Saurimo was formerly named after Henrique de Carvalho, a Portuguese explorer, who visited the region in 1884 and contacted the local (historically powerful) Lunda people. The town was originally established as a military post and eventually became the administrative centre of former Lunda district in 1918. Under Portuguese colonial adminis-

tration, Saurimo also became the site of an air force base. Corn (maize), cassava, beans, potatoes, and other food crops grown in the isolated hinterland are marketed in the town; local industry is based on the processing of agricultural products. Saurimo is connected by road south to the Benguela Railway at Luena. Pop. (1970 prelim.) 12,900.

Consult the INDEX *first*

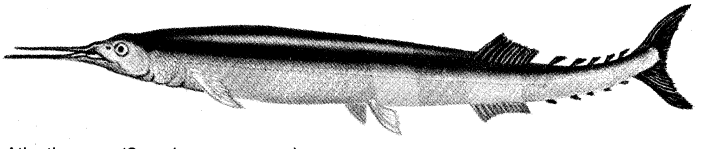
sauropterygian, any of the extinct reptiles of the order Sauropterygia, animals remarkably well-adapted to an aquatic life and including the nothosaurs, the plesiosaurs, and possibly the placodonts, all of Mesozoic age (from 65,000,000 to 225,000,000 years ago). The largest of these creatures were certain plesiosaurs that attained a length of 12 metres (40 feet). The characteristics of the Sauropterygia are associated with a mode of swimming accomplished by "rowing" motions of powerful limbs, contrasting with the more fishlike mode of locomotion in ichthyosaurs and mosasaurs.

The most primitive sauropterygians were the nothosaurs of the Triassic Period (from 190,000,000 to 225,000,000 years ago). In these small reptiles the body was long and slender; the limbs were comparable to those in terrestrial reptiles, suggesting some degree of mobility on land. The nothosaurs are structurally antecedent to plesiosaurs. *See also* Nothosaurus.

Plesiosaurs appeared at the end of the Triassic and remained prominent until the Late Cretaceous (about 70,000,000 years ago); specimens are most common in the Jurassic strata (from 136,000,000 to 190,000,000 years old) of England and Germany and the Upper Cretaceous of the United States. The tail was short; the trunk was broad and stout, with the ventral parts of shoulder and pelvic girdles greatly expanded for the attachment of powerful limb muscles. The limbs were compact and oarlike; toe joints were numerous. The long jaws contained pointed teeth appropriate for seizing fish. *See also* Plesiosaurus.

Often considered as a suborder of the Sauropterygia are the placodonts of the Middle Triassic. The body was structurally similar to that of nothosaurs but more compact. In *Placodus* and other typical forms, there were broad, flat tooth plates for crushing the mollusks on which they fed. Many placodonts developed dermal armour; *Henodus* had a shell comparable to that of a turtle.

saury, any of about four species of long, slim marine fishes of the family Scomberesocidae (order Atheriniformes). Sauries are small—up to about 35 centimetres (14 inches) long—and are characterized by beaklike but weakly toothed jaws and a row of small finlets behind the dorsal and anal fins. Found in tropical and temperate waters, they live near the surface and commonly jump and skim above the water. Representatives of the family include the Pacific saury (*Cololabis saira*) and the Atlantic saury (*Scomberesox saurus*), found in the Atlantic and the seas near Australia.



Atlantic saury (*Scomberesox saurus*)
Painting by Gilbert Emerson

sausage, meat product made of finely chopped and seasoned meat, which may be fresh, smoked, or pickled and which is then usually stuffed into a casing. Sausages of fish or poultry are also made. The word sausage, from the Latin *salsus* ("salted"), refers to a food-processing method that had been used for centuries. Various forms of sausages were known in ancient Babylonia, Greece, and Rome; and early North American Indians made pemmican, a compressed dried meat-and-berry cake. From the Middle Ages, various European cities became known for the local sausage, with such types as the frankfurter (Frankfurt am Main), bologna (Bologna, Italy), and romano (Rome) being named for their places of origin. Salami (named for the salting process, *salare,* Italian: "to salt") is a popular sausage with many varieties.

In modern food processing, the meat content, frequently beef or pork, may also include other meats, meat mixtures, and added meat-packing by-products. The addition of cereals and other nonmeat ingredients, or extenders, including water, is frequently subject to government regulation. Federal regulations in the United States allow up to 3.5 percent of specific nonmeat additives, singly or in combination, including such products as cereals, vegetable starch, and soy flour. Regulations also differ for preservatives, artificial colourings, and other additives.

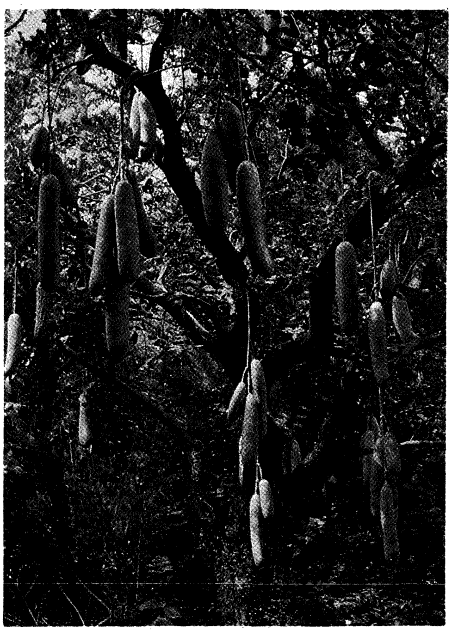
The wide variety of spices and condiments used in sausage making includes salt and, depending on the ethnic or regional origin of the recipe, coriander, nutmeg, cloves, garlic, vinegar, mace, pepper, chili peppers, or pistachio nuts. Casings may be the internal organs of meat animals, paraffin-treated fabric bags (for local products), or modern synthetic casings of plastic or reconstituted collagen (insoluble animal protein). Skinless sausages are produced by stuffing the ingredients into cellulose casing, then immersing the sausage in hot followed by cold water, forming a thin protein film allowing removal of the original cellulose.

Dry sausages developed mainly in warm areas where preservation was difficult; fresh and cooked sausages developed in cooler climates. Because they are processed to reduce moisture content, dry sausages offer proteins, B vitamins, and minerals in highly concentrated form. Sausage-processing methods include cooking, curing (by application of salt solution), and smoking (exposure to smoke, often following curing). The last two methods, originally employed for preservation, are now used mainly for their contribution to flavour.

According to the processing method employed, sausages are classified as fresh (not cooked or cured); uncooked smoked; cooked smoked; cooked; cooked meat specialties, including luncheon meats and sandwich spreads, usually in loaf form and without casings; and dry sausages. All but dry sausages require refrigerated storage; under cool storage conditions, dry types have long shelf life. Both fresh and uncooked smoked sausages must be cooked prior to serving; cooked smoked sausage is usually warmed before serving. Cooked sausages, cooked meat specialties, and dry sausages are ready to eat.

sausage tree (*Kigelia pinnata*), tropical tree, the only species of its genus (family Bignoniaceae, *q.v.*), 6 to 12 metres (20 to 40 feet) tall, bearing sausage-like fruits, 30 to 60 centimetres (1 to 2 feet) long, which hang down on long, cordlike stalks. It is native to Africa.

The flowers, about 10 cm wide, purplish-green in colour, and slightly irregular in shape or bent to one side, are produced on old wood and so hang that they can be easily visited by bats, the principal pollinators. They do not bloom until nightfall, when they begin to emit a mouselike odour, and bats begin to visit them for nectar and pollen. By morning the flowers have fallen.



Sausage tree (*Kigelia pinnata*)
Loren M. Root from Root Resources—EB Inc.

Sauser, Frédéric: *see* Cendrars, Blaise.

Saussure, Ferdinand de (b. Nov. 26, 1857, Geneva—d. Feb. 22, 1913, Geneva), Swiss linguist whose ideas on structure in language laid the foundation for much of the approach to and progress of the linguistic sciences in the 20th century.

While still a student, Saussure established his reputation with a brilliant contribution to comparative linguistics, *Mémoire sur le système primitif des voyelles dans les langues indo-européennes* (1879; "Memoir on the Original System of Vowels in the Indo-European Languages"). In it he explained how the knottiest of vowel alternations in Indo-European, those of *a,* take place. Though he wrote no other book, he was enormously influential as a teacher, serving as instructor at the École des Hautes Études (School of Advanced Studies) in Paris from 1881 to 1891 and as professor of Indo-European linguistics and Sanskrit (1901–13) and of general linguistics (1907–13) at the University of Geneva. His name is affixed, however, to the *Cours de linguistique générale* (1916; *Course in General Linguistics,* 1959), a reconstruction of his lecture notes and other materials by two of his students, Charles Bally and Albert Séchehaye. The publication of his work is frequently considered the starting point of 20th-century linguistics.

Saussure contended that language must be considered as a social phenomenon, a structured system that can be viewed synchronically (as it exists at any particular time) and diachronically (as it changes in the course of time). He thus formalized the basic approaches to language study and asserted that the principles and methodology of each approach are distinct and mutually exclusive. He also introduced two terms that have become common currency in linguistics—"parole," or the speech of the individual person, and "langue," or a systematic, structured language, such as English, existing at a given time within a given society. His distinctions proved to be mainsprings to productive linguistic research and can be regarded as starting points on the avenue of linguistics known as structuralism.

Jonathan D. Culler's *Ferdinand de Saussure* (1977) explores the linguist's theory and emphasizes its importance in semantics.

Saussure, Horace Bénédict de (b. Feb. 17, 1740, Geneva—d. Jan. 22, 1799, Geneva), Swiss physicist, geologist, and early Alpine explorer who developed an improved hygrometer to measure atmospheric humidity.



Horace Bénédict de Saussure, detail of an engraving by Ambroise Tardieu

By courtesy of the Bibliotheque Nationale Suisse, Bern

Saussure became professor of physics and philosophy at the Academy of Geneva in 1762 and four years later developed what was probably the first electrometer, an instrument used to measure electric potential. The word geology was introduced into scientific nomenclature by Saussure with the publication of the first volume of his *Voyages dans les Alpes* (1779–96; "Travels in the Alps"), a work that contains the results of more than 30 years of geological studies. In 1783 Saussure built the first hygrometer utilizing a human hair to measure humidity.

Saussure, Nicolas-Théodore de (b. Oct. 14, 1767, Geneva—d. April 18, 1845, Geneva), Swiss chemist and plant physiologist whose quantitative experiments on the influence of water, air, and nutrients on plants laid the foundation for phytochemistry.

Saussure was the son of the geologist Horace-Bénédict de Saussure, whom he assisted in a number of experiments and expeditions. Saussure's work built on that of Joseph Priestley, his teacher Jean Senebier, and Jan Ingenhousz. In 1797 he published three articles on carbonic acid and its formation in plant tissues in the *Annales de chimie* ("Annals of Chemistry"). In *Recherches chimiques sur la végétation* (1804; "Chemical Research on Vegetation"), Saussure proved Steven Hales's theory that plants absorb water and carbon dioxide in sunlight and increase in weight. He further demonstrated that plants are dependent upon the absorption of nitrogen from soil. Beginning in 1808 Saussure published a series of important articles which chiefly analyzed biochemical reactions in plant cells. He received numerous awards and, by 1825, was an associate member of almost all the European academies.

saussuritization, process by which calcium-bearing plagioclase feldspar is altered to a characteristic assemblage of minerals called saussurite; the typical assemblage formed includes zoisite, chlorite, amphibole, and carbonates. Residual fluids present during the late stages of magmatic crystallization can react with previously formed plagioclase feldspar to form saussurite; the saussurite will be spread through the plagioclase or located near its outer margin. The plagioclase may be reconstituted into a more sodium-rich variety (albite), although the original form of the crystal is retained. Later hydrothermal alteration can produce the same result. Basic rocks are especially susceptible to saussuritization owing to their high calcium content; the more calcium-rich portions of plagioclase in acidic rocks also are often saussuritized.

Sautrāntika, ancient school of Buddhism that emerged in India *c.* 2nd century BC as an offshoot of the Sarvāstivāda ("All-Is-Real Doctrine"), so called because of its reliance on the sutras, or words of the Buddha, and its rejection of the authority of the *Abhidharma,* a part of the canon.

The Sautrāntikas maintained that though events (dharmas) have only momentary existence, there is a transmigrating substratum of consciousness that contains within it seeds of goodness that are in every person.

The Sautrāntika sometimes is characterized as a transitional school that led to the development of the Mahāyāna tradition, and many of its views influenced later Yogācāra (a Mahāyāna school of idealism) thought.

Sautuola, Marcellino de (d. 1888, Santander, Spain), Spanish amateur geologist and archaeologist who excavated Altamira Cave, near Santillana, in northern Spain, containing the earliest known (*c.* 13,000–20,000 BC) examples of Stone Age painting.

His attention was first drawn to the cave in 1875, when he found it to contain large numbers of split bones and some black wall paintings. The bones were identified as belonging to the extinct giant stag, wild horse, and bison. He returned to the cave for further study in the summer of 1879. In addition to discovering fossil remains, including a skeleton of the giant cave bear, he found implements characteristic of the later Paleolithic Period and traces of black and dark-red pigments. Present with him one day was his 12-year-old daughter, Maria, who actually first sighted the famed coloured ceiling paintings in a side cavern, which came to be regarded as the "Sistine Chapel of Prehistory." Sautuola had accurate drawings of the paintings prepared and published a book on this momentous discovery in 1880. Initially his findings were generally regarded with disbelief, the influential French prehistorian E. Cartailhac denouncing them as a fraud. Not until other similar paintings had been found in southwestern France (1895–1901) was Sautuola's contribution finally vindicated.

Sauveur, Albert (b. June 21, 1863, Louvain, Belg.—d. Jan. 26, 1939, Boston), Belgian-born American metallurgist whose microscopic and



Sauveur

By courtesy of Harvard University Archives

photomicroscopic studies of metal structures make him one of the founders of physical metallurgy.

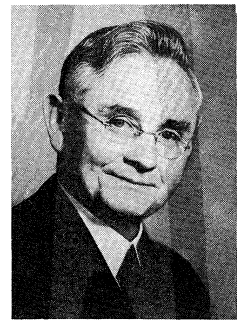
Sauveur emigrated to the United States and embarked on a career of metallurgic research that culminated in his appointment in 1924 as Gordon McKay professor of mining and metallurgy at Harvard. Sauveur's work in heat treatment of metals is still regarded as a scientific landmark, and his book *The Metallography and Heat Treatment of Iron and Steel* (1912) had great influence in the field.

Sava, SAINT, Latin SABAS (b. 1174—d. Jan. 14, 1237, Tŭrnovo, near Sofia, Bulg.; feast day January 14), monk and patronal founder of the Serbian Church, whose ecclesiastical policy in recognizing the jurisdiction of the patriarch of Constantinople (now Istanbul) ensured the adherence of Serbian Christianity to Eastern Orthodoxy. Sava was a Serbian noble of the Nemanja dynasty. He migrated to Mt. Athos in northeast Greece to lead a monastic life. There he was later joined by his father, Stephen Nemanja, who assisted him in establishing the monastery of Khilandar, which became a focal point of medieval Serbian culture and ecclesiastical leadership; thus, after his father's death, Sava returned (*c.* 1208) to Serbia to become superior of the monastery of Studenitsa, the religio-political centre of the emerging Serbian Church.

With papal support, Sava's brother was crowned (*c.* 1216) as Stephen II Nemanja, king of the Serbian nation. Sava countered the King's affinity to the Roman Church by traveling in 1219 to Nicaea—refuge of the exiled Patriarch of Constantinople—where he received the title of autocephalous archbishop of Serbia. Upon his return to Serbia, he crowned his brother again. Having organized his church into bishoprics headed by his former monastic colleagues and students, Sava embarked on a cultural and ecclesiastical renaissance that included the establishment of schools and the beginnings of a medieval Serbian literature; he personally contributed a chronicle of his father's reign. Sava died while returning from a diplomatic journey to Palestine, where he had sought recognition of the newly organized Bulgarian Orthodox Church.

Sava River, also spelled SAVE, German SAU, Hungarian SZÁVA, river, the longest entirely in Yugoslavia. Its basin, 36,960 sq mi (95,720 sq km) in area, covers almost half the country. It rises in the Triglav group of the Julian Alps as two rivers, the Sava Bohinjka and the Sava Dolinka, which join at Radovljica. It flows mainly east-southeastward for 584 mi (940 km) to enter the Danube River at Belgrade. Its floodplain is called Posavina; between the Sava and the Danube is the region called Srem, and between the Sava and the Drina is the Mačva region. These lowland areas are important agriculturally for crops and livestock. The Sava floodplain is the northeastern delimitation of the Dinaric Alps. The river is navigable to Sremska Mitrovica for passenger services and to Sisak, 362 mi from the Danube, for small freight vessels. Tributaries are the Soča, Savinja, Krka, Kupa, Lonja, Una, Vrbas, Bosna, Drina, and Kolubara rivers. Major riparian towns are Kranj, Zagreb, Sisak, Slavonski Brod, Šamac, Sremska Mitrovica, and Šabac.

Savage, Michael Joseph (b. March 23, 1872, Rothesay, Victoria [Australia]—d. March 27, 1940, Wellington, N.Z.), statesman who, as New Zealand's first Labour prime minister (1935–40), won public support for his administration's economic recovery and social welfare programs.



Michael Savage

Ronald D. Woolf—Camera Press

After working as a gold miner and a labour organizer in Australia, Savage emigrated to New Zealand in 1907, where he soon became active in the Auckland trade union movement. He joined the Labour Party on its formation in 1916, becoming its deputy leader in 1923 and parliamentary leader in 1933. He greatly contributed to the Labour victory in 1935, when he became prime minister and headed the ministries of external affairs, native affairs, and broadcasting.

As prime minister, Savage gained passage and popular approval of the antidepression economic measures of his finance minister, Walter Nash, and of the educational reform and social security legislation of education and health minister Peter Fraser. After leading Labour to one of its greatest electoral victories (1938) and supporting early mobilization for war (1939), Savage's health declined rapidly. Fraser became acting prime minister until Savage's death, when he succeeded Savage as head of the government (1940–49).

Savage, Richard (b. *c.* 1697, England—d. Aug. 1, 1743, Bristol), English poet and satirist and subject of one of the best short biographies in English, Dr. Johnson's *Account of the Life of Mr Richard Savage* (1744).

By his own account in the preface to the second edition of his *Miscellaneous Poems* (1728; 1st ed., 1726), Savage was the illegitimate son of Anne, countess of Macclesfield, and Richard Savage, the 4th earl of Rivers. His exact date of birth is uncertain. In any event, in November 1715 a young man taken into custody for having written treasonable (*i.e.*, Jacobite) doggerel identified himself as "Mr. Savage, natural son to the late Earl Rivers" and continued so to describe himself for the rest of his life. This was the poet Savage whose life Johnson chronicled. In 1727 Savage was tried for the murder of one James Sinclair in a tavern brawl but was acquitted.

In 1717 he published *The Convocation,* a poem about a religious dispute known as the Bangorian controversy, and in 1718 *Love in a Veil* (published 1719), a comedy adapted from the Spanish of Calderón, was produced at Drury Lane. There, in 1723, his Neoclassical tragedy *Sir Thomas Overbury* was also produced. His most considerable poem, *The Wanderer,* a discursive work revealing the influence of James Thomson's *The Seasons,* appeared in 1729, as did his prose satire on Grub Street, *An Author to be Let.* In 1737–38 he met Samuel Johnson, then newly arrived in London, and to Johnson's perceptive and compassionate biography he owes his continuing fame. Savage was a quarrelsome and an impecunious man. His friends, Alexander Pope prominent among them, eventually provided him money to convey him out of London. After a year in Wales, he died miserably in debtor's prison.

Savage River, town, western Tasmania, Australia, on the Savage River. Iron ore was discovered along the river's banks in 1877, but exploitation was uneconomical because of the low metal content and the problems of extraction and shipment. In 1965 a Japanese, Australian, and U.S. consortium was formed to develop the opencut iron deposits. The town of Savage River was built for the workers, and a road was built to Waratah (25 mi [40 km] northeast). To overcome transport difficulties presented by rough terrain, a mill was constructed at the mine to concentrate the ore to 67 percent iron. The concentrate is then crushed to a fine powder and combined with water to form a slurry, which is piped 53 mi north to Port Latta. There, the slurry is dried and pelletized for shipment to Japan. Pop. (1981) 1,141.

Savai'i, westernmost and largest island of Western Samoa, South Pacific Ocean, separated from Upolu by the Apolima Strait. About 50 mi (80 km) long and 25 mi across at its widest point, with an area of 659 sq mi (1,707 sq km), it is extremely mountainous, reaching its highest peak in Mt. Mauga Silisili (6,096 ft [1,858 m]).

Volcanic eruptions in the early 1900s brought ruin to many plantations. Since 1911 lava has ceased to flow and the volcanoes have become quiescent. Products include copra, bananas, cocoa, taros, and coffee. Some cattle are raised and wild pigs are plentiful. In 1970 a government-sponsored timber program began at Asau in the northwest with the construction of a sawmill; timber shipments began in 1972, but the scarcity of spare machinery parts and the extreme ruggedness of the lumbering areas have impeded the program's growth. The chief settlement is Tuasivi on the east coast. Pop. (1981 prelim.) 43,150.

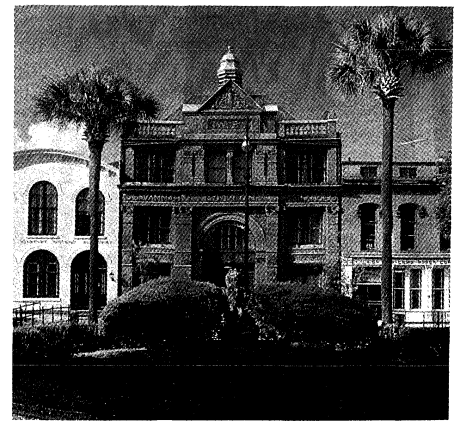
Savanes, economic *région,* northern Togo, West Africa, bordering Burkina Faso (formerly Upper Volta) on the north, Ghana on the west, Benin on the east, and la Kara *région* on the south. Elevation in Savanes ranges from 1,690 ft (515 m) on Mount Bikoro in the Plateau de Dapango of the northwest to less than 650 ft (200 m) on the Oti Valley in the east. The *région* receives about 16 in. (400 mm) of rain annually with one wet and one dry season. Savanes's area of 3,322 sq mi (8,602 sq km) encompasses the *préfectures* of Tôné and Oti. The land in the *région* yields principally millet, sorghum, and beans. Savanes's principal locale is Dapango, which has road links with Burkina Faso and Lomé, Togo's capital. The northwestern part of Parc National de la Kéran lies in southern Savanes. The Moba, Gurma, and Bassar peoples inhabit the northern half of the *région,* while the Anoufo, Ngam Ngam, and Lamba (Namba) peoples occupy the southern half. Pop. (1981) 326,826.

savanna, also spelled SAVANNAH, any tropical or subtropical grassland characterized by scattered trees or shrubs and a pronounced dry season. Savanna vegetation is found primarily in Africa and in South America, with smaller areas in Madagascar and Australia. Savanna vegetation in South Africa is sometimes known as bushveld, or veld. In northern South America, savanna areas with waterlogged soil are known as llanos. African savanna grasses are either high grasses (1.5 to 4.5 metres, or 5 to 15 feet, tall) or shortgrasses (30 centimetres, or about one foot, tall). The trees in African savanna are usually thorny and small leaved; many are species of acacia. Groups of trees such as palms or cactus-like *Euphorbia* species and single trees such as baobabs are also common.

Large herds of grazing animals, once common to all savanna areas, are now found only in Africa. Predatory animals include large members of the cat family such as lions, leopards, and cheetahs, as well as the Cape hunting dog and various eagles and falcons. Ostriches and several species of vultures are other characteristic animals of the African savanna.

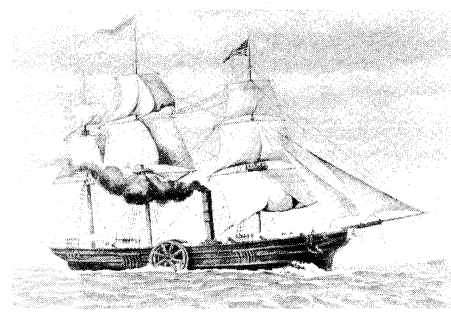
Savannah, industrial seaport city, seat (1777) of Chatham County, southeastern Georgia, U.S., at the mouth of the Savannah River. It was established in 1733 by James Oglethorpe, the founder of Georgia, who named it after the river. The city was planned around a system of squares, which have been made into small parks, planted with semitropical flora, and surrounded with Georgian Colonial and Greek Revival buildings, hundreds of which have been restored. It exceeds all Georgia cities in historic interest and is a leading tourist centre. The birthplace of the Georgia colony, Savannah was the colonial government seat and was the capital of the state until 1786. John and Charles Wesley arrived in 1736 to preach to the colonists and the Indians. George Whitefield came in 1738 and founded Bethesda, the first orphanage in America. During most of the U.S. War of Independence the town was occupied by Loyalist forces.

Port traffic, begun in 1744, increased steadily with the growth of a plantation (tobacco and cotton) economy and the development of transportation in the hinterland. The *Savannah,* the first steamboat to cross the Atlantic, sailed from there to Liverpool in 1819. During the American Civil War, Savannah was an important supply point for the Confederacy until Ft. Pulaski (17 mi [27 km] east, now a national monument) fell to Union troops on April 11, 1862. Commerce suffered because of the Union blockade, but the city—the objective of Gen. William Tecumseh Sherman's march to the sea—was not captured until Dec. 25, 1864. It recovered fairly rapidly despite a yellow-fever epidemic in 1876. Savannah's history in the 20th century revolves largely around its industrialization and growth as a maritime centre. It is a leading port in the southeastern United States for manufactured goods; major industries include shipbuilding and the production of paper, food, chemicals, and transportation equipment. Army installations (Ft. Stewart Hunter Army Airfield) are in the vicinity. The city is the seat of Savannah State College (1891) and Armstrong State College (1935). The birthplace of Juliette Gordon Low, who is considered the founder of the Girl Scout movement in the United States, is preserved as a memorial. The Savannah National Wildlife Refuge is 10 mi (16 km) upriver. Inc. 1789. Pop. (1984 est.) city, 145,014; metropolitan area (MSA), 232,900.



The Savannah Cotton and Naval Stores Exchange, Savannah, Ga.
David Muench—EB Inc.

Savannah, either of two historic U.S. ships, each representing a landmark in navigation. In 1819 the first *Savannah,* named for its home port in Georgia (although built in New York) became the first ship to cross the Atlantic employing steam power. Its small steam engine and pinewood fuel supply were good for only a part of the 24-day crossing. For



The *Savannah,* drawing, 1819
The Bettmann Archive

most of the voyage the *Savannah* relied on a full spread of sail, but the voyage demonstrated the practicability of steam navigation on the ocean. The sight of the 300-ton vessel off the Irish coast brought a cutter hastening to the ship's assistance, because its plume of black smoke had been mistaken for evidence of a fire on board.

The second *Savannah,* launched at Camden, N.J., in 1959, was the world's first nuclear-powered cargo ship, built experimentally by the U.S. government to demonstrate the potential of nuclear power for nonmilitary shipping. Displacing 22,000 tons, the *Savannah* was 595.5 feet (195 m) long and had accommodations for 60 passengers as well as 9,400 tons of cargo. Its cruising speed was about 20 knots, and in the 1960s it carried out a large number of demonstration cruises in the Atlantic and elsewhere. Despite its success, high costs discouraged early imitation by commercial shippers.

savannah dog: *see* bush dog.

savannah fox: *see* crab-eating fox.

Savannah River, river formed by the confluence of the Tugaloo and Seneca rivers at Hartwell Dam, Georgia, U.S. It constitutes the boundary between Georgia and South Carolina as it flows southeastward past Augusta and Savannah, Ga., into the Atlantic Ocean after a course of 314 miles (505 km). Its chief tributaries are the Broad and Little rivers (north of Augusta) and Brier Creek (south of Augusta). The Savannah River is navigable for shallow draft and barge traffic from its mouth to Augusta and for ocean vessels from the mouth to 5 miles (8 km) above Savannah. The river is used extensively for hydroelectric, flood control, and navigation purposes. Dams and reservoirs include Hartwell and Clark Hill near Augusta. The U.S. Nuclear Regulatory Commission's Savannah River Plant is in Aiken and Barnwell counties in South Carolina, down the river from Augusta. The Intracoastal Waterway crosses Savannah Harbor just below the port city of Savannah, site of a large naval-stores centre and of docks operated by the Georgia Ports Authority.

Early Spanish explorers called the river Río Dulce ("Sweet River"), and its Indian name was Isondega ("Blue Water"); the name Savannah was probably derived from the Spanish *sabana* ("flat country") or from the Sawana Indians.

Consult the INDEX *first*

Savannakhét, town in the central southern panhandle of Laos on the left bank of the Mekong River. It had a teacher-training school (1911), a public high school (1946), a Buddhist secondary school, a trade school, and the Savannakhét Technical College before the 1975 Communist takeover. Industries included manufacturing of soft drinks, ice making, and a sawmill. There is an airport, and a road originating in Savannakhét town links Muang Phalan and Muang Xépôn (Sépone) to Quang Tri in southern Vietnam.

The region surrounding Savannakhét is a lowland with dissected hills. The uplands surrounding this lowland are occupied by Alak, So, and Souei peoples of the Lao-Theng (Lao-Theung; Mountain Mon-Khmer) group, whereas the valleys are occupied by valley Lao and Phu Tai, who cultivate rice. Pop. (1975 est.) town, 53,000.

Savara, also called SAORA, SORA, or SAURA, tribe of eastern India, distributed mainly in the states of Orissa, Madhya Pradesh, Andhra Pradesh, and Bihār, with total numbers of about 400,000. Of these, more than 325,000 are in Orissa.

Most Savara have become Hinduized and generally speak the Oriya language. Their traditional form of Munda dialect is preserved among those living in the hills. The Savara of the hill country are divided into subtribes mainly on the basis of occupation: the Jati Savara are cultivators; the Arsi, weavers of cloth; the Muli, workers in iron; the Kindal, basket makers; and the Kumbi, potters. The traditional social unit is the extended family, including both males and females descended from a common male ancestor.

Savard, Félix-Antoine (b. Aug. 31, 1896, Quebec—d. Aug. 24, 1982, Quebec), French-Canadian priest, poet, novelist, and folklorist whose works show a strong French-nationalist bias and a love of the Canadian landscape.

Savard was ordained a Roman Catholic priest in 1922. He began to lecture in the faculty of arts at Laval University in Quebec in 1943 and was dean of arts there from 1950 to 1957. His works, which have been called both prose poems and novels, displayed a firsthand knowledge of Canadian logging and pioneering—*e.g., Menaud, maître-draveur* (1937; *The Boss of the River*), for which Savard received the literature prize both from the French Academy in 1945 and from the Grand Jury of Letters in 1961, *L'Abatis* (1943; "The Slaughter"), and *La Minuit* (1948; "Midnight"). He also wrote *Martin et le pauvre* (1959; "Martin and the Beggar"), the story of St. Martin of Tours, and *La Folle* (1960; "The Madwoman"), a drama in free verse. Among Savard's later works were *Le Bouscueil* (1972), *La roche Ursule* (1972; "The Ursula Stone"), a volume of poems entitled *Aux marges du silence* (1975; "At the Borders of Silence"), and *Discours* (1975; "Speeches").

Savarkar, Vinayak Damodar, byname VIR (b. May 28, 1883, Bhagur, India—d. Feb. 26, 1966, Bombay), Indian terrorist and leading figure in the Hindu Mahasabha ("Great Society of Hindus"), a militant Hindu nationalist organization.

While a student of law in London (1906–10), Savarkar helped to instruct a group of Indian revolutionaries in methods of sabotage and assassination that associates of his had apparently learned from expatriate Russian revolutionaries in Paris. During this period he wrote *The Indian War of Independence of 1857* (1909), in which he took the view that the Indian Mutiny of 1857 was the first expression of Indian mass rebellion against British colonial rule.

In March 1910 Savarkar was arrested on various charges relating to subversion and incitement to war and was sent to India for trial and convicted. In a second trial he was convicted of his alleged complicity in the assassination of a British district magistrate in India, and, after sentencing, he was transported to the Andaman Islands for detention "for life." He was brought back to India in 1921 and released from detention in 1924. He resided in Ratnagiri until 1937, when he joined the Hindu Mahasabha, which militantly defended the Hindus' claims of religious and cultural supremacy over Indian Muslims. He was elected president of the Mahasabha for seven consecutive years.

In 1943 Savarkar retired to Bombay. When Gandhi was assassinated in 1948 by a former member of the Mahasabha, Savarkar was implicated but in his subsequent trial was cleared of the charges.

Savary, Anne-Jean-Marie-René, DUC (duke) DE ROVIGO (b. April 26, 1774, Marcq, Fr.—d. June 2, 1833, Paris), French general, administrator, and trusted servant of Napoleon I.



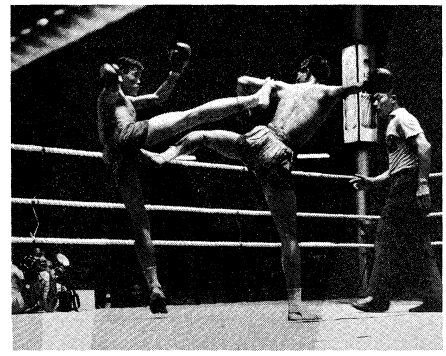
Savary, lithograph by F.-S. Delpech after a portrait by Nicolas Maurin
By courtesy of the Bibliotheque Nationale, Paris

Savary joined the army in 1790 and fought in the Rhine campaigns. Aide-de-camp first to General Louis Desaix de Veygoux in Egypt (1798) and, after Desaix's death in 1800, to Napoleon Bonaparte, Savary rose swiftly from chief of the *gendarmerie d'élite* (Napoleon's personal bodyguard) to general of division (1805). In 1804 he personally investigated the Cadoudal–Pichegru royalist conspiracy and supervised the kidnapping from Germany and subsequent execution of the duc d'Enghien, who was suspected of complicity but was, in fact, innocent of involvement. Savary took a notable part in the rout of the Prussians at Jena (1806) and the defeat of the Russians at Ostrołęka in Poland (1807).

After the Treaty of Tilsit (1807) restoring peace between France and Russia, Napoleon sent him as envoy to St. Petersburg (now Leningrad) and then to Spain, where he persuaded Charles IV and his son Ferdinand VII to submit their rival claims for the throne to Napoleon's arbitration. Created duc de Rovigo in 1808, he became minister of police two years later. During the Hundred Days in 1815, during which Napoleon attempted to rebuild his empire, Savary was rewarded by being made a peer and first inspector general of the constabulary.

After Napoleon's final defeat at the Battle of Waterloo, Savary was imprisoned and sentenced to death but managed to escape. He returned to France in 1819 upon reversal of his sentence and was still active in 1832, when he commanded the army in Algeria. His *Mémoires,* 8 vol. (1828), were published in both French and English.

savate (Middle French: "old shoe"), French sport of fighting by kicking, practiced until the first half of the 19th century. It occurred



Savate: kick boxing in Thailand
Black Star—EB Inc.

mainly among the lower orders of Parisian society. When savate died out, its more skillful elements were combined with those of English bareknuckle pugilism to produce *la boxe française.* The name savate continued to be used to describe any form of fighting in which the use of the feet was permitted. Two classic blows were a back heel aimed at the stomach

and a double mule kick in the face delivered from a handstand position.

The pioneer of *la boxe française,* or modern savate, was Charles Lecour, who opened a school in Paris in the 19th century. Lecour developed a form in which both punching and kicking were used. The sport became popular for a time, and public exhibitions were staged, but enthusiasm for it waned in the 20th century.

In Thailand, a form of boxing with the feet is an indigenous sport and is more popular than boxing with the fists. Thai kick boxing is very similar to savate. The sport is taught to boys at monasteries, and competitions are held regularly.

Sāvatthi (India): *see* Śrāvastī.

Save River (southeastern Africa): *see* Sabi River.

Save River (Yugoslavia): *see* Sava River.

Savelli, Cencio (pope): *see* Honorius III.

Savelli, Giacomo (pope): *see* Honorius IV.

Savelli, Luca (d. 1266), Roman senator who in 1234 led a revolution against Pope Gregory IX to further the commercial interests of the Roman middle class.

A member of a prominent family and nephew of Pope Honorius III, Savelli became senator (head of the municipal government) in 1234. He immediately declared Tuscany and Campania (the area around Naples), as well as many cities in church territory, to be under the jurisdiction of the commune of Rome and demanded that the pope pay an annual tribute. The pope and his cardinals fled to Rieti near Rome, while the rebels sacked the papal palace and the houses of the cardinals. From Rieti, Gregory appealed for aid to the rulers of Europe and unexpectedly received it from his former enemy, the Holy Roman emperor, Frederick II. Papal and imperial troops marched on Viterbo, recovering the Sabina, the area north of Rome, and Tuscany. The defeated Romans continued their rebellion, but in the spring of 1235 Savelli was removed from office, and his successor once more recognized the pope's sovereignty. No reprisals were taken against Savelli, whose son eventually became Pope Honorius IV.

Savery, Thomas (b. *c.* 1650, Shilstone, Devonshire, Eng.—d. 1715, London), English engineer and inventor who built the first steam engine.

A military engineer by profession, Savery was drawn in the 1690s to the difficult problem of pumping water out of coal mines. Using principles adduced by the French physicist Denis Papin and others, Savery patented (1698) a machine consisting of a closed vessel filled with water into which steam under pressure was introduced, forcing the water to a higher level; when the water was expelled, a sprinkler condensed the steam, producing a vacuum capable of drawing up more water through a valve below. To make the effect as nearly continuous as possible, Savery assembled two containing vessels in the same apparatus. An energetic advertising campaign brought him customers, and he manufactured a number of his engines not only for pumping out mines but also for supplying water to large buildings. Savery's engine had many limitations, notably its weakness under high-pressure steam (above 8 to 10 atmospheres); a few years later, when Thomas Newcomen independently designed his atmospheric-pressure piston engine from another of Papin's ideas, Savery, who held patent primacy, joined him in its development. Savery also had other inventions to his credit, including an odometer to measure the distances traveled by ships.

Savery, William (b. 1721—d. May 1787, Philadelphia), American cabinetmaker who was an important member of the group of



Walnut armchair attributed to the workshop of William Savery, Philadelphia, *c.* 1725–50; in the Art Institute of Chicago

By courtesy of The Art Institute of Chicago

Philadelphia craftsmen working in the Chippendale style during the 18th century.

Savery's work ranged from plain chairs to carved chests, with early pieces showing the influence of the Queen Anne style. The bulk of his production, however, was in the Chippendale style. It is probable that, like many other cabinetmakers, he constructed the pieces himself but left the embellishment to woodcarving specialists.

Early in the 1900s the discovery of Savery's label on a carved lowboy in the collection of the Manor House at Van Cortlandt Park in New York led authorities to attribute similar pieces to him. About 20 other pieces bearing his label were eventually found, and Savery was for a time considered the outstanding member of the Philadelphia group. Later investigations, however, indicated that other Philadelphia cabinetmakers, producing work of equal quality, were responsible for many pieces originally attributed to him.

A Chippendale-style armchair bearing Savery's label is on display at the Winterthur Museum in Delaware, and another marked with his initials is at the Henry Ford Museum in Dearborn, Mich. Other pieces attributed to Savery are displayed at the Detroit Institute of Arts, the Philadelphia Museum of Art, and the Art Institute of Chicago.

Savić, Ilija: *see* Garašanin, Ilija.

Savigny, Friedrich Karl von (b. Feb. 21, 1779, Frankfurt am Main—d. Oct. 25, 1861, Berlin), German jurist and legal scholar who was one of the founders of the influential "historical school" of jurisprudence. He advocated that the meaning and content of existing bodies of law be analyzed through research into their historical origins and modes of transformation.

Education and early career. Savigny was a descendant of landed nobility who had emigrated from Lorraine to Germany. He studied at the universities of Göttingen and Marburg, where he received his degree in 1800 and at once took up his teaching career. His wealth and social position enabled him to devote all of his considerable talents to scholarly work. In 1803 he established his reputation with *Das Recht des Besitzes* (*Treatise on Possession; or, The Jus Possessionis of the Civil Law,* 6th ed., 1848), a book that was the beginning of the 19th-century scholarly monograph in jurisprudence.

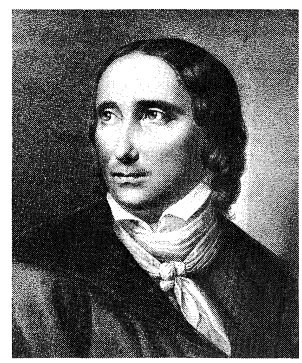
In 1808 Savigny went to the University of Landshut in Bavaria as a professor of Roman law, and in 1810 he was invited to the new University of Berlin, where he soon became one of the most famous and influential members of the faculty. He taught there for the rest of his career.

Legal philosophy. In 1814 the wave of German nationalism inspired by the war of liberation against Napoleon led the Heidelberg law professor A.F.J. Thibaut to demand a unified civil code for all the German states. Savigny opposed this demand for an immediate codification of German law in a famous pamphlet, "Vom Beruf unserer Zeit für Gesetzgebung und Rechtswissenschaft" ("Of the Vocation of Our Age for Legislation and Jurisprudence," 1831), that started juristic thought along a new path. To Savigny, a hasty legal codification was something to be avoided, since the one essential prerequisite for such a codification was a deep and far-reaching appreciation of the spirit of the particular community. Savigny's jurisprudential perspective was in part inspired by the Romantic movement, which took the form in Germany of a movement harking back to the simplest tribal origins of the German people, to their folk songs and tales and to their distinctive ethos, or *Volksgeist* ("national spirit"). To the Romantics, the national spirit thus became the ultimate datum to be explored in its various manifestations. From this point of view law is not something that can be devised by means of rational formal legislation but rather originates in the unique spirit of a particular people and is expressed spontaneously in custom and, much later, in the formal decisions of judges. In Savigny's classic words, law

> is first developed by custom and popular faith, next by judicial decisions—everywhere, therefore, by internal silently operating powers, not by the arbitrary will of a law-giver.

Savigny viewed law as a slow, almost imperceptible growth that is formed in much the same way as a language is. Accordingly, legislation and law codes can, at most, give mere verbal expression to a body of existing law whose meaning and content can only be discovered by careful historical investigations. Historical jurisprudence opposed not only attempts at codification but also those rationalist thinkers who sought to derive legal theories from general and universal principles without respect to the characteristics and customs of a particular people. Savigny sought rather to uncover the content of existing law through historical research.

In 1815, shortly after the appearance of this epochal pamphlet, he founded, together with K.F. Eichorn and J.F.L. Göschen, the *Zeitschrift für geschichtliche Rechtswissenschaft* ("Journal of Historical Jurisprudence"), which became the organ of the new



Savigny, lithograph by E. Winterhalder after a chalk drawing by Louise Claude Henry

Deutsche Fotothek Dresden, E.Ger.

historical school of jurisprudence. In the same year, he began publishing his *Geschichte des römischen Rechts im Mittelalter* (1815–31; "History of Roman Law in the Middle Ages"). This monumental work, in which Savigny used rigorous critical techniques and consulted a vast body of primary sources, became the foundation of the modern study of medieval law.

Savigny strove to establish a German science of civil law. His approach to legal methodology was first put forward in a lecture at Marburg in the academic year 1802–03 (published in 1951 as *Juristische Methodenlehre, nach der Ausarbeitung des Jakob Grimm*; "Legal Methodology as Elaborated by Jakob Grimm"). He held that legal science should be both historical and systematic, meaning that it should endeavour to show the inner coherence of the material handed down in the historical sources of Roman law.

Later works. Savigny gave embodiment to his systematic approach in his eight-volume treatise, *System des heutigen römischen Rechts* (1840–49; "System of Modern Roman Law"), a detailed analysis of Roman law as it evolved in modern Europe. This work also contained his system of international private law.

In 1817 Savigny was made a member of the Prussian Privy Council. In 1819 he was appointed to the Berlin Court of Appeal and Cassation for the Rhine Provinces. In 1826 he became a member of the commission for revising the Prussian code, and in 1842 he gave up his teaching position to accept a ministerial post as head of the newly founded department for revision of statutes. The revolution of 1848 ended his governmental career. In 1850 he published a collection of his monographs, *Vermischte Schriften* ("Miscellaneous Writings"), and in 1851–53 a two-volume work, *Das Obligationenrecht* ("The Law of Contracts"), a supplement to his work on modern Roman law.

Assessment. Savigny was a pioneering legal scientist who made lasting contributions to jurisprudence, particularly in revealing the continuity of present legal institutions with past ones; in laying the foundations of legal sociology; and in developing many of the critical methods that are now used by legal scholars everywhere.

BIBLIOGRAPHY. There is no definitive biography of Savigny. Much material about his life, with many letters, is contained in Adolf Stoll, *Friedrich Karl v. Savigny,* 3 vol. (1927–39). A well-balanced description of his life and work is in Erik Wolf, *Grosse Rechtsdenker der deutschen Geistesgeschichte,* 4th ed., pp. 467–542 (1963). Fundamental background is contained in Franz Wieacker, *Privatrechtsgeschichte der Neuzeit,* 2nd ed., pp. 348–399 (1967). See also Julius Stone, *The Province and Function of Law,* pp. 421–448 (1946).

Savile, George: *see* Halifax, George Savile, 1st marquess of.

Savimbi, Jonas Malheiro (b. Aug. 3, 1934, Portuguese Angola), Angolan politician, the leader of a long-continuing guerrilla insurgency against the postindependence government of Angola.

The son of a railroad stationmaster, Savimbi was educated in mission schools and then won a scholarship to study abroad. He studied medicine at the University of Lisbon in Portugal and then obtained a doctorate in political science at the University of Lausanne, Switz. In 1961 Savimbi joined the Angolan independence leader Holden Roberto's Popular Union of Angola (UPA), which was the rival of the Popular Movement for the Liberation of Angola (MPLA). He broke with the UPA's leader in 1966, and in that same year he formed the National Union for the Total Independence of Angola (UNITA), which fought against Portuguese colonial rule of the country.

Savimbi was the only Angolan guerrilla leader who remained fighting within Angola until the nation reached independence from Portugal in 1975; by this time he had expanded his initially small band of supporters into a guerrilla army numbering in the thousands. UNITA was based in southeastern Angola and relied for its support on the Ovimbundu people, who were the largest tribal group in the country. At various times, Savimbi obtained support from China, South Africa, and the United States as a counter to the Marxist, Soviet-supported MPLA, which controlled the central government. Savimbi continued to wage a disruptive guerrilla war against the MPLA throughout the 1970s and '80s, confident that in the end armed struggle would compel the MPLA to accept a coalition government in which UNITA could take part.

saving, process of setting aside a portion of current income for future use, or the flow of resources accumulated in this way over a given period of time. Saving may take the form of increases in bank deposits, purchases of securities, or increased cash holdings. The extent to which individuals save is affected by their preferences for future over present consumption, their expectations of future income, and to some extent by the rate of interest.

Total national saving is measured as the excess of national income over consumption and taxes and is the same as national investment, or the exeess of net national product over the parts of the product made up of consumption goods and services and items bought by government expenditures. Thus, in national income accounts, saving is always equal to investment. An alternative measure of saving is the estimated change in total net worth over a period of time.

Saving is important to the economic progress of a country because of its relation to investment. If there is to be an increase in productive wealth, some individuals must be willing to abstain from consuming their entire income. Progress is not dependent on saving alone; there must also be individuals willing to invest and thereby increase productive capacity.

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savings and loan association, a savings and home-financing institution which makes loans for the purchase of private housing, home improvements, and new construction. Formerly cooperative institutions in which savers were shareholders in the association and received dividends in proportion to the organization's profits, savings and loan associations are mutual organizations that now offer a variety of savings plans. Many offer the same services as do other savings institutions, such as tax-deferred annuities, direct deposit of Social Security checks, automatic deductions from accounts for mortgage payments and insurance premiums, and passbook loans.

Under a ruling of the Federal Home Loan Bank Board, which regulates federally chartered savings and loan associations, associations need not rely only on individual deposits for funds. They can borrow from other financial institutions and market mortgage-backed securities, money market certificates, and stock.

The savings and loan association plan for loan repayment, the direct-reduction loan plan, was the prototype of present-day loan-amortization plans requiring the home buyer to make a fixed payment each month; part of the payment is applied to the principal and part to interest, the former increasing each month as the latter decreases. Because high inflation rates have made such fixed-rate mortgages unprofitable, savings and loan associations in the United States are now allowed to renegotiate mortgages.

Savings and loan associations originated with the building societies of Great Britain in the late 1700s. They consisted of groups of workmen who financed the building of their homes by paying fixed sums of money at regular intervals to the societies. When all members had homes, the societies disbanded. The societies began to borrow money from people who did not want to buy homes themselves and became permanent institutions. Building societies spread from Great Britain to other European countries and the United States. They are also found in parts of Central and South America.

The Oxford Provident Building Association of Philadelphia, which began operating in 1831 with 40 members, was the first savings and loan association in the United States. By 1890 they had spread to all states and territories.

savings bank, financial institution that gathers savings, paying interest or dividends to savers. It channels the savings of individuals who wish to consume less than their incomes to borrowers who wish to spend more. This function is served by the savings deposit departments of commercial banks, mutual savings banks or trustee savings banks (banks without capital stock whose earnings accrue solely to the savers), savings and loan associations, credit unions, postal savings systems, and municipal savings banks. Except for the commercial banks, these institutions do not accept demand deposits. Postal savings systems and many other European savings institutions enjoy a government guarantee; savings are invested mainly in government securities and other securities guaranteed by the government.

Savings banks often originated as part of philanthropic efforts to encourage saving among people of modest means. The earliest municipal savings banks developed out of the municipal pawnshops of Italy. Local savings banks were established in The Netherlands through the efforts of a philanthropic society founded in 1783, the first bank opening in 1817. During the same time, private savings banks were developing in Germany, the first being founded in Hamburg in 1778.

The first British savings bank was founded in 1810 as a Savings and Friendly Society by a pastor of a poor parish; it proved to be the forerunner of the trustee savings bank. The origin of savings banking in the United States was similar; the first banks were nonprofit institutions founded in the early 1800s for charitable purposes. With the rise of other institutions performing the same function, mutual savings banks remained concentrated in the northeastern United States.

Savinkov, Boris Viktorovich, pseudonym V. ROPSHIN (b. Jan. 31 [Jan. 19, Old Style], 1879, Kharkov, Russia—d. May 1925, Moscow), revolutionary who violently opposed both the imperial and the Soviet regimes in Russia. He wrote several pseudonymous novels based on his career as a terrorist.

Savinkov joined the Socialist-Revolutionary Party in 1903 and was a leader of its terrorist organization. He was responsible for the assassination of the antiliberal government minister Vyacheslav Konstantinovich Plehve (1904) and of the grand duke Sergey Aleksandrovich (1905), the tsar's uncle and governor-general of Moscow.

During World War I, Savinkov served in the French army. After the February Revolution, he returned to Russia (1917) and became a military commissar and then deputy minister

of war. The leadership of the provisional government was, it seemed, being concentrated in a triumvirate: the prime minister A.F. Kerensky, Gen. L.G. Kornilov, and Savinkov. In August 1917, however, Savinkov supported Kornilov against Kerensky in an unsuccessful "mutiny" and was forced to resign.

After the Bolshevik Revolution, Savinkov established a clandestine military organization, the Union for the Defense of the Fatherland and Freedom. This group organized an uprising in Yaroslavl (July 6–21, 1918) that was intended to coincide with an Allied invasion of Russia and to stimulate a nationwide rebellion against the Bolsheviks.

After the uprising failed, Savinkov went to Paris to solicit Allied intervention against the Soviet government. Invited to Warsaw in January 1920 by Józef Piłsudski, head of the Polish state, Savinkov organized a Russian volunteer corps to fight with the Polish Army. But when the Polish–Soviet peace treaty was signed at Riga (March 18, 1921), he returned, disillusioned, to Paris.

Savinkov apparently was tricked into returning to the U.S.S.R. Arrested in Minsk on Aug. 18, 1924, he received a death sentence 11 days later. This was commuted to imprisonment, but the next year he was stated to have committed suicide in Lubianka Prison, Moscow.

Savo, island in the eastern Solomon Islands, southwestern Pacific Ocean. Rising 1,673 ft (510 m) from the ocean, the island is 5 mi (8 km) long and 2 mi wide. It has no good anchorages. Its active volcano gives off hot waterfalls and sulfur vents and is believed to have dangerous eruptive potential. It last erupted in 1847.

Savo was the scene in 1942 of a major U.S.–Japanese sea battle in which many ships were sunk. The water southeast of the island is now known as Ironbottom Sound. Pop. (1976) 1,569.

Savoe-zee (Indonesia): *see* Savu Sea.

Savoie, *département,* Rhône-Alpes region, southeastern France, in the northern Alps on the Italian frontier. It has an area of 2,330 sq mi (6,036 sq km) and was formerly the southern part of the duchy of Savoy that was reunited with France in 1860.



Arc Valley, Savoie, Fr.
Art Resource—EB Inc.

The Rhône River and its tributary, the Guiers, form a natural boundary in the west to the western section of the *département* occupied by the wooded Les Bauges and La Grande Chartreuse ranges in the Pre-Alps. They rise on either side of the valley of Lac (lake) du Bourget and Chambéry, the capital. The eastern two-thirds of Savoie is covered with forested mountains culminating in some of the highest peaks in Europe, capped by perpetual snow. The Isère River, making wide zigzags westward from its source in the high Alps, follows the Tarentaise Valley through Bourg-Saint-Maurice and Albertville, while its tributary, the Arc, flows westward in a sweeping concave bend through the trough of the Maurienne Valley. The area almost encompassed by the two rivers contains the Massif (mountains) de la Vanoise, which has 34 sq mi (88 sq km) of glaciers, and the Mont (range) Pourri, with numerous mountains of over 12,000 ft (3,700 m). Pointe de la Grande Casse, the highest peak in the Vanoise National Park, rises to 12,638 ft (3,852 m).

Chambéry commands an important international highway running southeast along the Arc through Saint-Jean-de-Maurienne and Modane over the Col (pass) du Mont Cenis, 6,834 ft (2,083 m), to Turin, Italy. A railway follows the same route to Modane and passes through the Fréjus tunnel to Italy. Alpine peaks follow the whole length of the border with Italy, reaching 12,293 ft (3,747 m) at the Grande Sassière. The chain dips slightly in the northeast, in which the motor road from Chambéry to Italy through Albertville and Bourg-Saint-Maurice crosses the Little Saint Bernard Pass (Col du Petit-Saint-Bernard) at 7,178 ft (2,188 m). Farther north, the Aiguille (peak) des Glaciers, 12,579 ft (3,834 m), in the Mont Blanc Massif, is the dividing point between the Savoie, Haute-Savoie, and Italy. A spectacular motor road follows the high Alps parallel to the frontier from Mont Cenis to Bourg-Saint-Maurice. The climate is extreme in the high valleys, becoming milder in the Lower Isère Valley and in the Chambéry region.

Cattle are raised in the high valleys; cereals, forage crops, fruit trees, and vines grow in lower areas. Thermal springs are exploited in such health resorts as Aix-les-Bains. Hydroelectric power has been widely developed, feeding aluminum, specialized steel, paper, cement, and electro-mechanical works. Tourism and winter sports at Courchevel, Pralognan-la-Vanoise, Val d'Isère, and many other new resorts make a considerable contribution to the economy. The *département* has three *arrondissements,* Chambéry, Albertville, and Saint-Jean-de-Maurienne, and is in the educational division of Grenoble. Pop. (1982) 323,675.

Savojbolāgh (Iran): *see* Mahābād.

Savoldo, Giovanni Girolamo, also called GIROLAMO DA BRESCIA (b. *c.* 1480, Brescia, Republic of Venice—d. *c.* 1548, Venice?), painter of the Brescian school whose style is marked by a quiet lyricism. Scholars believe, because of his preoccupation with clearly defined shapes in light, that Savoldo was influenced by Cima da Conegliano, who also used light with quiet exactitude, or that he was influenced by Flemish painters. Savoldo was recorded in the guild at Florence in 1508, and little else is known of his personal life except that he may have left Venice, where he spent most of his life, to live in Milan for a few years and that he had a Dutch wife, through whom he may have made Northern contacts.

Savoldo's use of deep, rich colour gives his paintings dramatic tonal values. The influence of Giorgione can be felt in the dreamy, poeticized treatment in such works as "Portrait of a Cavalier" (National Gallery, Washington, D.C.). Savoldo defined his luminous, meticulously detailed figures by setting them against darkened, twilit skies, a technique that culminated in "Saint Matthew" (Metropolitan Museum of Art, New York City) and "St. Mary Magdalene" (National Gallery, London). He liked to depict unusual effects of light, and paid particular attention to reflected or nocturnally lit scenes. His output was small, and he had little influence on the course of Venetian painting, from which he had always stood somewhat aloof.

Savona, Latin SAVO, or VADA SABBATA, city, seaport, and capital of Savona province, Liguria region, northwestern Italy, on the Riviera di Ponente, southwest of Genoa. First recorded as the Gallo-Roman town of Savo, an ally of Carthage against Rome in 205 BC, it was next noted in AD 568–569, when the Ligurians were fighting the barbarians, and was destroyed by the Lombards in 639. The capital of Marca Aleramica, the border territory (march) of the Aleramici (950–1191) and later an autonomous commune, its initial alliance with Genoa was superseded by a long and fierce rivalry until the Genoese destroyed Savona's port in 1528 and built a fortress there in 1542–43. The city was annexed to the Napoleonic Empire in 1805, and Pope Pius VII was interned there by Napoleon in 1809–12. It was joined to the Kingdom of Sardinia in 1815 and to that of Italy in 1861. Savona was heavily bombed in World War II. Although most of the city is modern, the small old quarter has examples of medieval, Renaissance, and Baroque architecture. Notable landmarks include the Renaissance cathedral (1589–1602), which replaced a structure demolished to make way for the Genoese fort; the Capella Sistina, built by Pope Sixtus IV; the Palazzo della Rovere, built by Cardinal Giuliano della Rovere (Pope Julius II); and the Teatro Civico Gabriello Chiabrera (1853), a theatre built in honour of the native poet Gabriello Chiabrera.

A major Italian port and an outlet for Piedmont and part of central Europe, Savona's main imports are coal for distribution to the Bormida Valley and oil for refineries near Trecate and Novara. A main centre of the Italian iron industry, it also has shipbuilding, mechanical and electrical engineering, sulfur and glass works, tanneries, and food processing. Savona is linked by rail with Turin and is on the main rail and road route from Genoa to the French border. Pop. (1981 prelim.) mun., 75,069.

Savona faience, tin-glazed earthenware made in the 17th and 18th centuries at Savona, Liguria, Italy, and at nearby Genoa and Albissola. It is painted in a highly individual and seemingly artless style.

Most 17th-century specimens are decorated in blue on a white ground; the painting of landscapes, ships, animals, birds, and sometimes human figures is sketchy but assured, often with deliberately visible brushstrokes. Similar

compositions are carried out in brownish purple on a turquoise ground and sometimes in other colours. Typical dishes have openwork, scalloped, or otherwise ornamented edges. In



Savona faience dish from Albissola, Italy, *c.* 1660; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London; photograph, EB Inc.

the 18th century a similar style prevailed, sketchy scenes being painted in restrained colours that were sometimes deliberately allowed to smudge and run. Many potters are known by name, such as the Guidobono family, spanning the 17th and first half of the 18th centuries; the Folco, Levantino, and Boselli families in the 18th century; and Girolamo Salomone (flourished 1700–20).

Savonarola, Girolamo (b. Sept. 21, 1452, Ferrara, Duchy of Ferrara—d. May 23, 1498, Florence), Italian Christian preacher, reformer, and martyr, renowned for his clash with tyrannical rulers and a corrupt clergy. After the overthrow of the Medici in 1494, Savonarola was the sole leader of Florence, setting up a democratic republic. His chief enemies were the Duke of Milan and Pope Alexander VI, who issued numerous restraints against him, all of which were ignored.

Early years. Girolamo Savonarola was born at Ferrara, the son of Niccolò Savonarola and of Elena Bonaccorsi. He was educated by his paternal grandfather, Michele, a celebrated doctor and a man of rigid moral and religious principles. From this elderly scholar, whose own education was of the 14th century, Savonarola may have received certain medieval influences. In his early poetry and other adolescent writings the main characteristics of the future reformer are seen. Even at that early date, as he wrote in a letter to his father, he could not suffer "the blind wickedness of the peoples of Italy." He found unbearable the humanistic paganism that corrupted manners, art, poetry, and religion itself. He saw as the cause of this spreading corruption a clergy vicious even in the highest levels of the church hierarchy.

On April 24, 1475, he left his father's house and his medical studies, on which he had embarked after taking a degree in the liberal arts, to enter the Dominican order at Bologna. Returning to Ferrara four years later, he taught Scripture in the Convento degli Angeli. The study of Scripture, together with the works of Thomas Aquinas, had always been his great passion.

Career in Florence. In 1482 Savonarola was sent to Florence to take up the post of lecturer in the convent of San Marco, where he gained a great reputation for his learning and asceticism. As a preacher he was unsuccessful until a sudden revelation inspired him to begin his prophetic sermons. At San Gimignano in Lent 1485 and 1486, he put forward his famous propositions: the church needed reforming; it would be scourged and then renewed.

The following year (1487) he left Florence to become master of studies in the school of general studies at Bologna. After the year of his appointment was over, he was sent to preach in various cities until Lorenzo de' Medici used his influence to have Savonarola sent back to Florence, thus opening the doors there to the bitterest enemy of Medici rule. Having returned to the city of his destiny (1490), Savonarola preached boldly against the tyrannical abuses of the government. Too late Lorenzo tried to dam the dangerous eloquence with threats and flattery, but his own life was drawing to a close, while popular enthusiasm for Savonarola's preaching constantly increased. Soon afterward Savonarola gave his blessing to the dying Lorenzo. The legend that he refused Lorenzo absolution is disproved by documentary evidence.

Medici rule did not long survive Lorenzo and was overthrown by the invasion of Charles VIII (1494). Two years before, Savonarola had predicted his coming and his easy victory. These authenticated prophecies and the part he had played in negotiations with the King and in moderating the hatred of the factions after the change of government enormously increased his authority. Once the Medici had been driven out, Florence had no other master than Savonarola's terrible voice. He introduced a democratic government, the best the city ever had. He has been accused, but unjustly, of interfering in politics. He was not ambitious or an intriguer. He wanted to found his city of God in Florence, the heart of Italy, as a well-organized Christian republic that might initiate the reform of Italy and of the church. This was the object of all his actions. The results he obtained were amazing: the splendid but corrupt Renaissance capital, thus miraculously transformed, seemed to a contemporary to be a foretaste of paradise.

Political intrigues. Savonarola's triumph was too great and too sudden not to give rise to jealousy and suspicion. A Florentine party called the Arrabbiati was formed in opposition to him. These internal enemies formed an alliance with powerful foreign forces, foremost of which were the Duke of Milan and the Pope, who had joined in the Holy League against the King of France and saw in Savonarola the main obstacle to Florence's joining them. It was then, after a firm rejection of the League by Florence, that the Pope sent to Savonarola the brief of July 21, 1495, in which he praised the miraculous fruits of Savonarola's work and called him to Rome to pronounce his prophecies from his own lips. As that pope was the corrupt Alexander VI, the trap was too obvious. Savonarola asked to be allowed to put off his journey, offering illness as his excuse.

The Pope appeared to be satisfied, but on September 8, under pressure from his political friends and Savonarola's enemies, he sent him a second brief in which praises turned into vituperation. He ordered him to go to Bologna under pain of excommunication. Savonarola replied to this strange document with respectful firmness, pointing out no fewer than 18 mistakes in it. The brief was replaced by another of October 16, in which he was forbidden to preach. As the Pope himself frankly confessed, it was the Holy League that insisted. After a few months, as Lent 1496 drew near, Alexander VI, while refusing the Florentine ambassadors a formal revocation of the ban, conceded this verbally. Thus Savonarola was able to give his sermons on Amos, among his finest and most forceful, in which he attacked the Roman Court with renewed vigour. He also appeared to refer to the Pope's scandalous private life, and the latter took offense at this. A college of theologians found nothing to criticize in what the friar had said, so that after Lent he was able to begin, without further remonstrances from Rome, the sermons on Ruth and Micah.

At that time, as Savonarola's authority grew, the Pope tried to win him over by offering him a cardinal's hat. He replied: "A red hat? I want a hat of blood." Then Alexander VI, pressed by the League and Arrabbiati, mounted a fresh attack. In a brief of Nov. 7, 1496, he incorporated the Congregation of San Marco, of which Savonarola was vicar, with another in which he would have lost all his authority. If he obeyed, his reforms would be lost. If he disobeyed, he would be excommunicated. Savonarola, however, while protesting vigorously, did not disobey, because no one came forward to put the brief into force. He therefore went on unperturbed in Advent 1496 and Lent 1497 with his series of sermons on Ezekiel. During the carnival season that year his authority received a symbolic tribute in the "burning of the vanities," when personal ornaments, lewd pictures, cards, and gaming tables were burned. Destruction of books and works of art was negligible.

Events in Italy now turned against Savonarola, however, and even in Florence his power was lessened by unfavourable political and economic developments. A government of Arrabbiati forced him to stop preaching and incited sacrilegious riots against him on Ascension Day. The Arrabbiati obtained from the Roman Court, for a financial consideration, the desired bull of excommunication against their enemy. In effect the excommunication, besides being surreptitious, was full of such obvious errors of form and substance as to render it null and void, and the Pope himself had to disown it. The Florentine government, however, sought in vain to obtain its formal withdrawal; wider political issues



Savonarola, painting by Fra Bartolomeo; in the Museo di S. Marco, Florence

Alinari—Art Resource/EB Inc.

were involved. Absorbed in study and prayer, Savonarola was silent. Only when Rome proposed an unworthy arrangement, which made withdrawal of the censure dependent on Florence's entry into the League, did he again go into the pulpit (Lent 1498) to give those sermons on Exodus that marked his own departure from the pulpit and from life. He was soon silenced by the interdict with which the city was threatened. He had no other way out but an appeal to a church council, and he began a move in this direction but then burned the letters to the princes that he had already written, in order not to cause dissension within the church. Once this road was closed the only remaining one led to martyrdom.

Trial and execution. The imprudence of the most impassioned of his followers, Fra Domenico da Pescia, brought events to a head. Fra Domenico took at his word a Franciscan who had challenged to ordeal by fire anyone who maintained the invalidity of Savonaro-

la's excommunication. The Signoria and the whole population of the most civilized city in Italy greedily encouraged that barbarous experiment, as it alone seemed to promise a solution of an insuperable problem. Only Savonarola was dissatisfied. The decree, which assigned to the ordeal Fra Domenico himself and a Franciscan, declared the loser whichever might withdraw or even vacillate. In fact the Franciscan failed to appear and so the ordeal did not take place. Savonarola, victorious by the terms of the decree, was blamed for not having achieved a miracle. The following day the rabble led by the Arrabbiati rioted, marched to San Marco, and overcame the defenders. Savonarola was taken like a common criminal together with Fra Domenico and another follower. After examination by a commission of his worst enemies and after savage torture, it was yet necessary to falsify the record of the inquiry if he was to be charged with any crimes. But his fate was settled. The papal commissioners came from Rome "with the verdict in their bosom," as one of them said. After the ecclesiastical trial, which was even more perfunctory, he was handed over to the secular arm, with his two companions, to be hanged and burned. The account of his last hours is like a page from the lives of the Church Fathers. Before mounting the scaffold he piously received the Pope's absolution and plenary indulgence.

Assessment. In fact Savonarola's quarrel was with the corruption of the clergy of whom Alexander VI was merely the most scandalous example, not with the Roman pontiff, for whom he always professed obedience and respect. He was a reformer, but Catholic and Thomist to the marrow; his faith is borne out in his many works, the greatest of which is the *Triumphus crucis,* a clear exposition of Christian apologetics. His *Compendium revelationum,* an account of visions and prophecies that came true, went through many editions in several countries. Of his sermons, some exist in a version taken down verbatim.

After Savonarola's death a cult was dedicated to him, which had a long history. Saints canonized by the church, such as Philip Neri and Catherine de' Ricci, venerated him as a saint; an office was said for him, and miracles he had performed were recorded. He was portrayed in paintings and medals with the title of *beatus.* In the *Acta sanctorum* he was included among the *praetermissi.* When the 500th anniversary of his birth came around in 1952, there was again talk of his canonization.

(Ro.Ri.)

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Savonarola chair: *see* scissors chair.

Savonnerie carpet, French pile floor covering, usually large, whether made at the Savonnerie workshop or not. The Savonnerie factory was established in Paris in the 17th century at the Hospice de la Savonnerie at Chaillot by royal order, to provide pile carpets for use in the king's palaces and as royal gifts. Subject to interruptions from time to time, this shop has provided carpets, seat covers, and similar weavings ever since, at first for the French court and then for government buildings. The patterns are floral and architectural Renaissance conceptions, many based upon paintings and cartoons by the same artists who designed the Gobelins tapestries. In 1826, the enterprises having been combined, the Savonnerie production was moved into the Gobelins workshops, near Paris.

The styles of ornamentation have varied with the tastes of the passing reigns and regimes until in recent years the abstract or surrealist creations of modern painters have, in their turn, been reflected in the Savonnerie rugs.



Detail of the centre floral motif of a Savonnerie carpet, French, 17th century; in the Metropolitan Museum of Art, New York City

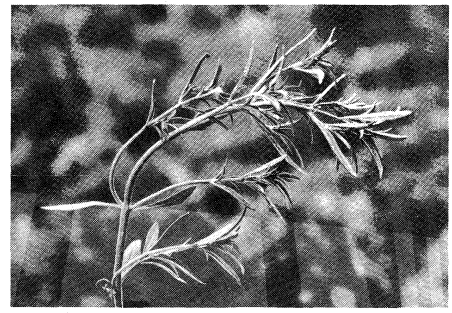
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The various Savonnerie fashions have exercised a powerful influence upon the patterns of other Western carpet workshops.

savora, also spelled SABORA (Aramaic: "reasoner," or "one who reflects"), plural SAVORAIM, or SABORAIM, any of a group of 6th-century-AD Jewish scholars who determined the final internal form of the Babylonian Talmud (*Talmud Bavli*), a collection of authoritative interpretations and explanations of Jewish oral laws and religious customs. Some experts feel that certain (perhaps many) of the critical textual remarks now found in the Talmud represent the work of *savoraim,* though early manuscripts are lacking to confirm this opinion.

Whatever the extent of their role in the history of Jewish sacred literature, the *savoraim* were the successors of the *amoraim,* the scholars who previously had interpreted and explained the codification of Jewish oral law known as the Mishna. The *savoraim* were followed by another group of Talmudic scholars (*geonim*), who developed oral law still further and adjudicated points of legal controversy. *See also* amora; gaon.

savory (species *Satureia hortensis*), aromatic annual herb of the mint family (Lamiaceae, or Labiatae), the dried leaves and flowering



Savory (*Satureia hortensis*)
G.R. Roberts

tops of which are used to flavour many foods, particularly poultry and stuffings. In Germany savory is called the bean herb, but the plant is also used in many other vegetables and salads and is a popular ingredient in herb bouquets. The dried leaves are greenish brown and have a fragrant aroma and a warm, slightly sharp taste. Native to southern Europe, savory is cultivated in many climates, particularly in France and Spain. The ancient Greeks and Romans used it blended with thyme for flavouring game and stuffings. In the time of the Caesars, the Romans brought savory to Britain. The colonists brought it to America, and it is a favourite seasoning in the United States. Savory contains about 1 percent essential oil, the principal component of which is carvacrol.

Winter savory, or dwarf savory, is *Satureia montana,* a smaller subshrub that flowers in winter. It is used for culinary purposes almost interchangeably with the summer species.

Savoy, French SAVOIE, Italian SAVOIA, historic and cultural region encompassing the southeastern French *départements* of Haute-Savoie and Savoie and coextensive with the historic region of Savoy.

The early inhabitants of the area were the Allobroges, members of a Celtic tribe, who fiercely resisted Roman penetration. They were finally conquered by the Romans in 121 BC, and their territory was later included in the province of Gallia Narbonensis. During the period of barbarian invasions, the area of Savoy was assigned to the Burgundians (437) and then passed to the Frankish Kingdom of Burgundy (534). The name Savoy dates from this period and eventually came to apply specifically to the land between Lake Geneva on the north and the Isère River on the south.

After the breakdown of the Carolingian empire in the 9th century, Savoy formed part of a series of kingdoms covering middle Europe and came under the suzerainty of the German Holy Roman emperor in the mid-11th century. By this date a feudal lord, Humbert I the Whitehanded, founder of the house of Savoy, actually controlled much of the area. Humbert and his successors during the European Middle Ages built up a considerable state for themselves with Savoy as its base and extending east across the Alps into Piedmont.

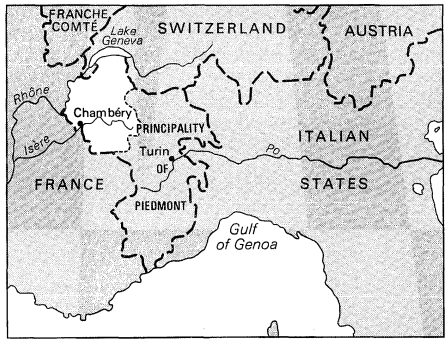
In the early modern period, Savoy became an object of French expansion because of its strategic position commanding the roads into Italy. Although Savoy was occupied a number of times by French troops in the 16th and 17th centuries, the dukes of Savoy were able to recover it. At the same time, however, Savoy, which was predominately French in language, lost its hegemony among the Savoyard lands as the dukes came to favour their Italian territories, a shift reflected in the transfer of the

capital from Chambéry to Turin in Piedmont (1563). Annexed by France in 1792 during the French Revolutionary Wars, Savoy was restored to its traditional rulers in 1815.

Savoy (along with Nice) became part of France permanently in 1860 as the price for the French emperor Napoleon III's consent to the formation of a state covering north-central Italy under the rule of the house of Savoy.

Physiographically, the region represents an almost purely Alpine mountain landscape, situated just south of Switzerland's Lake Geneva. The region's limited farmland is devoted to cattle-raising and the growing of hay and other fodder crops. Forests are an important resource, and cheesemaking and sawmilling are important industries. Traditional chalets in the northwest of Savoy are built of wood, while the chalets in the high Alps are largely built of stone. Farms tend to be highly fragmented. Savoy is overwhelmingly Roman Catholic, and Protestantism has made few inroads.

The regional cuisine relies heavily on cheese, freshwater fish, crayfish, mushrooms, potatoes, and fruit. Cheeses are known as *tommes* and are packaged in tight balls with a tough rind. Gratins are prepared with potatoes, eggs, and bouillon. Saint-Jean-de-Port and Montmélian produce distinctive red wines; the Marc de Savoie is a fine gentian bitters. The patois of

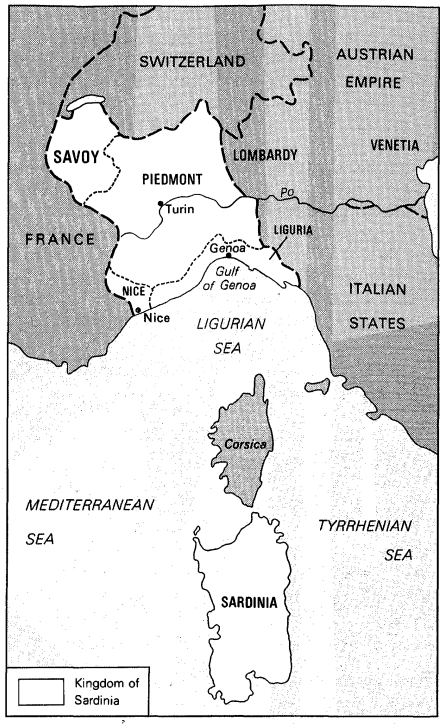


Savoy in the 17th century

Savoy shows Provençal influence, and numerous words end in *oz* or *az*. The *z* is never pronounced.

Savoy, HOUSE OF, Italian SAVOIA, French SAVOIE, historic dynasty of Europe, the ruling house of Italy from 1861 to 1946. During the European Middle Ages the family acquired considerable territory in the western Alps where France, Italy, and Switzerland now converge. In the 15th century, the house was raised to ducal status within the Holy Roman Empire, and in the 18th century it attained the royal title (first of the kingdom of Sicily, then of Sardinia). Having contributed to the movement for Italian unification, the family became the ruling house of Italy in the mid-19th century and remained so until overthrown with the establishment of the Italian Republic in 1946.

The founder of the house of Savoy was Humbert I the Whitehanded (mid-11th century), who held the county of Savoy and other areas east of the Rhône River and south of Lake Geneva and who was probably of Burgundian origin. His successors during the Middle Ages gradually expanded their territory. Amadeus V (reigned 1285–1323) introduced the Salic Law of Succession and the law of primogeniture to avoid any future partition of the family's dominions between various members. Amadeus VI (reigned 1343–83) enlarged and further consolidated their territory, and under Amadeus VII (reigned 1383–91) the port of Nice was acquired. Under Amadeus VIII (reigned 1391–1440), Piedmont, on the Italian side of the Alps, was definitely incorporated



Holdings of the house of Savoy in 1815

(after having belonged for nearly two centuries to a branch of the house). Amadeus VIII was granted the title of duke in 1416.

During the latter 15th and early 16th centuries, the importance of the house declined under a series of weak rulers, culminating in a French occupation of Savoy (1536–59). In 1559, however, Emmanuel Philibert (reigned 1553–80) was able to recover most of Savoy under the terms of the Peace of Cateau-Cambrésis. During the next century, the dukes of Savoy pursued a policy of territorial aggrandizement and, for the most part, maintained an independent role in international affairs by maneuvering between the two major opposing powers, France and the Habsburgs. Although its lands were under French domination during the second half of the 17th century, Savoy emerged from the long period of international wars with major gains. By the Treaty of Utrecht (1713), Victor Amadeus II (reigned 1675–1730) was raised in 1713 from duke to the status of a king as ruler of Sicily; in 1720 he exchanged Sicily for Sardinia. He and his successors also acquired important territory in northeastern Italy. During the French Revolutionary and Napoleonic Wars (1792–1815), only Sardinia remained free of French control, but in 1815, Victor Emmanuel I (reigned 1802–21) added Genoa to the family's holdings.

At the beginning of the Risorgimento, the territory of the house of Savoy, centred on Piedmont, was unique among Italian states for its freedom from foreign influence and for its relative military strength. A liberal revolution in 1821 forced Victor Emmanuel I to abdicate in favour of his brother, Charles Felix. On the death of the latter in 1831, Charles Albert, of the Carignano branch of the family, obtained the throne. He contributed to the cause of unification under Piedmont's leadership by modernizing his government (granting a constitution in 1848) and fighting against Austrian power in Italy in the First War of Independence of 1848–49. Under his son Victor Emmanuel II (reigned 1849–1878, king of Italy from 1861), who supported Piedmont's prime minister, Count Cavour, in the diplomatic maneuvering immediately before unification, the Kingdom of Italy was formed with the house of Savoy at its head.

In the new state the role of the monarch lost its former prominence as a parliamentary system of government evolved. The king was in a pivotal position only in times of crisis. Umberto I succeeded his father as king of Italy in 1878 and reigned until his own death in 1900. Victor Emmanuel III (reigned 1900–46), who remained as figurehead king during the Fascist regime, abdicated in 1946, at the end of World War II, in favour of his son Umberto II in an attempt to save the monarchy, but the Italian people voted in a referendum of June 2, 1946, for a republic, ending the rule of the house of Savoy.

Savoy Alps, French ALPES DE SAVOIE, northwestern spurs of the Graian Alps (*q.v.*) in southeastern France between Lake Geneva (north), the middle Rhône River (west), and the Arc and Isère river valleys (south). The highest peak is Pointe de la Grande Casse (12,631 feet [3,850 m]), a part of the Massif de la Vanoise and located in Vanoise National Park. Other subranges include Beaufortin, Bauges, Bornes, and Chablais. The Mont Blanc group sometimes is considered part of the Savoy Alps. Tourism and outdoor recreation are the main activities of the region.

Savoy Conference, meeting held in 1661 at the Savoy Palace, London, attended by 12 Anglican bishops and 12 Puritan ministers, with nine assistants from each side, in order to decide on revisions for *The Book of Common Prayer;* as a result of the conference, the majority of Puritans defected from the Church of England.

The bishops, led by Gilbert Sheldon, ignored the Reformed liturgy presented by Richard Baxter, a Presbyterian, and refused to consider most of the "Exceptions"—a list of Puritan objections to *The Book of Common Prayer.* The bishops also required the reordination of ministers who had not received orders from a bishop. The following year a revision of *The Book of Common Prayer* incorporated a few minor "Exceptions," but it proved equally unacceptable to the Puritans.

Savoy Declaration, statement of faith prepared in 1658 by a conference of English Congregationalists who met at Savoy Palace, London. The declaration consisted of three parts: a preface, a confession of faith, and a platform of discipline.

In matters of doctrine it was primarily a restatement (with some modifications) of the Presbyterian Westminster Confession (1646), but in the declaration concerning church government it advocated the autonomy of each local church. As with other statements of faith prepared by Congregationalist conventions, it was considered to be a presentation of beliefs shared by the church membership and was not treated as doctrinal law.

Savu (Indonesia): *see* Sawu Island.

Savu Sea, Indonesian LAUT SAWU, Dutch SAVOE-ZEE, portion of the Pacific Ocean surrounded by the Lesser Sunda Islands of Indonesia. It is bounded by the volcanic inner Banda Island arc (Flores, Solor, Lomblen, Pantar, and Alor) on the north and by the nonvolcanic outer arc (Sumba, Roti, Sawu, and Timor) on the south.

The Savu Sea is about 400 miles (650 km) wide. It occupies a total surface area of 41,000 square miles (105,000 square km) and opens to the Banda Sea (northeast), Flores Sea through the Sumba Strait (northwest), Timor Sea (southeast), and the Indian Ocean (southwest). The sea basin is a northward-tilting abyssal plain unmarked by distinctive escarpments or trenches. The deepest point (11,385 feet [3,470 m]) is south of Pantar.

saw, tool for cutting solid materials to prescribed lengths or shapes. Most saws take the form of a thin metal strip with teeth on one edge or a thin metal disk with teeth on the periphery. Usually the teeth are "set" (bent) to

alternate sides so that the kerf (groove) cut by the saw is wider than the thickness of the saw. This prevents binding between the cut surfaces and the sides of the saw. The thin-strip saws are used in a variety of arrangements for both hand and machine operation, while circular, or disk, saws are invariably machine powered.

The hand hacksaw has a U-shaped frame and blades 20 to 30 cm (8 to 12 inches) long, 1.25 cm (0.5 inch) wide, and 0.06 cm (0.025 inch) thick that close the U and are placed under tension by a screw adjustment in the handle. This saw is one of the most common tools in a machine shop and is used for cutting off solid parts held in a vise. Saws of this type are also used by butchers for cutting bones. For cutting curves and other irregular shapes in wood or other materials, the coping, or jeweler's, saw, which is basically a hacksaw with a deeper U-shaped frame and a much narrower blade, is well-suited.

The power jigsaw, or scroll saw, does mechanically the same irregular cutting as the hand coping saw. The straight, narrow blade is mounted vertically between a pulsating lower shaft and a reciprocating upper shaft, which together move the blade rapidly up and down. Power hacksaws, driven by electric motors, are indispensable in any general-purpose machine shop or tool room; they are most often used for cutting metal. The blade is much wider and thicker and the frame much heavier than those of a hand hacksaw. The frame, carrying the blade, moves back and forth, cutting in one direction only, while a slight feeding pressure or weight automatically presses the saw against the work.

The vertical bandsaw blade is an endless narrow metal strip, with teeth along one edge, that runs around two large motorized pulleys or wheels that are mounted on a frame so that one is directly above the other. The blade passes through the table on which the work is laid. Blades are available with various sizes of teeth, and on most machines the blade speed can be varied to suit the material being cut.

Among the saws that are neither loops nor disks are three of the most common hand saws used by the carpenter: the ripsaw, the crosscut saw, and the backsaw. The first two have roughly triangular blades about 50 cm (20 inches) long, 10 cm (4 inches) wide at the handle, and tapering to about 5 cm (2 inches) at the opposite end. Ripsaws are used for cutting wood with the grain, crosscut saws for cutting across the grain. The main difference between the saws is in the way the teeth are ground. The ripsaw teeth have cutting edges that are at 90° to the blade and act like a row of chisels; the crosscut has knifelike teeth that are set to alternate sides and cut two parallel lines on each side of the kerf, so that the wood in between is broken up. The backsaw is a crosscut saw with a rectangular blade and heavy steel backing along the side opposite the teeth; this keeps the blade perfectly straight. It is usually guided by an attachment that keeps it level at all times and maintains it in the proper direction when making angular cuts.

Among the machines utilizing a rotating steel disk with peripheral teeth, the radial-arm saw is one of the most useful. The motor-driven blade is manually drawn along a horizontally set shaft or pipe, called a radial arm, that is itself supported by a vertical column attached to a heavy base. The motor-blade unit is free to move back and forth along the arm and can be adjusted to different heights by movement of the radial arm on its vertical support. The motor-blade unit can also be pivoted to make angular and ripping cuts. The work is laid on a wooden table on top of the base, and the motor-blade unit is manually moved across it, cutting as it goes. The table saw (or stationary circular saw) consists of a circular saw that can be raised and tilted, protruding through a slot in a horizontal metal table on which the work can be laid and pushed into contact with the saw. This saw is one of the basic machines in any woodworking shop; with blades of sufficient hardness, table saws can also be used for cutting metal bars. For heavy cutting-off operations the circular or cold saw is used extensively in steel plants such as cold-drawing mills or where large quantities of bars and shafts are cut. In operation, the saw carriage is fed slowly into the work.

The portable electric circular saw, with the blade attached to a motor shaft, is probably the most commonly used saw, particularly by home handymen. With the proper blade it can cut almost any material—wood, metals, plastics, fibreglass, cement block, slate, and brick. On wood it can rip, crosscut, and make angle cuts. The sabre saw, which is basically a portable jigsaw, moves up and down and may have a stroke of as much as 2.5 cm (1 inch). It can rip, crosscut, and make angle cuts. The portable chain saw has practically replaced the woodman's axe and the two-man hand saw for felling trees. It consists of a thin metal frame supporting a steel roller chain carrying saw teeth attached at intervals along its length; the teeth are slightly wider than the chain to prevent binding of the chain body and the material being cut. An electric motor or a small gasoline engine causes the chain sprocket to rotate, drawing the chain around with it at a high rate of speed.

Saw, U, also called GALON U SAW (b. 1900, Tharrawaddy, Burma—d. May 8, 1948, Rangoon), Burmese political leader who conspired in the assassination of Aung San, the resistance leader who negotiated Burma's independence from the British.

Unlike most other Burmese politicians, U Saw was not university-educated. He held a license to plead some types of legal cases, however, and helped in the defense of Saya San, the leader of the peasant rebellion of 1930–32. U Saw subsequently adopted the honorific title Galon (a fabulous bird in Hindu mythology) from the name of Saya San's rebel "Galon Army." He served for several terms in the Burma legislative council and was owner and editor of a nationalist newspaper in Burma, *Thuriya* ("The Sun").

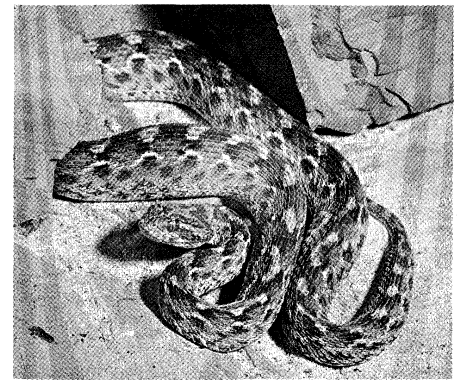
Greatly impressed by Japan, which he visited in 1935, U Saw aspired to rebuild Burma along similar, totalitarian lines. In 1938 he founded the Myochit ("Patriot") Party and organized a private Galon army, modeled on the Nazi storm troopers. U Saw helped engineer the overthrow of prime minister Ba Maw in 1939, and, after serving as minister of forests, he was prime minister from 1940 to 1942.

In 1941, when U Saw failed in London to obtain dominion status for Burma, he went to Lisbon to negotiate secretly with the Japanese. Arrested by the British at Haifa in January 1942, he was interned in Uganda for the duration of the war. In 1945, however, he returned to Burma, reestablished the Myochit Party, and became a major opponent of the Anti-Fascist People's Freedom League (AFPFL), which was led by Aung San. U Saw went with Aung San to London to negotiate with British Prime Minister Clement Attlee, but he refused to sign the agreement for Burma's independence of Jan. 27, 1947, on the grounds that Aung San had made too many concessions to the British. Although he urged a boycott of the April 9 elections, the AFPFL won an overwhelming victory.

On July 19, 1947, U Saw sent gunmen to assassinate Aung San and the ministers of the new government. Convicted of conspiracy to murder, he was executed.

saw-scaled viper (*Echis carinatus*), venomous snake of the family Viperidae, found in deserts and other arid regions from northern Africa to Ceylon. Though probably the most venomous of vipers, with a bite that is often fatal, it is rarely more than 60 cm (2 feet) long.

The saw-scaled viper is irritable and aggressive and commonly hides under stones and in rodent runs. It is sand-coloured or gray,

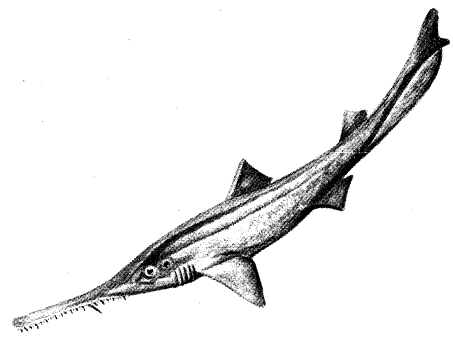


Saw-scaled viper (*Echis carinatus*)
Anton Thau—Bavaria-Verlag

with a row of white spots on the back and a pale zigzag line on each side. The scales are rough and are rubbed together to make a characteristic hissing sound when the snake is disturbed.

saw shark, any of about four species of long-snouted marine sharks of the family Pristiophoridae. Saw sharks are found off South Africa, Australia, and eastern Asia and are characterized by a long, slender, sawlike snout equipped with sharp, toothlike projections on each edge. They resemble the rays known as sawfishes but have a pair of barbels on the underside of the saw and have gill slits on the sides of the head, not underneath.

Saw sharks grow to a maximum of about 1 m (3 feet) long. They feed on fish, striking



Japanese saw shark (*Pristiophorus japonicus*)
Painting by Richard Ellis

and cutting their prey with their saws, but are harmless to humans. There are two genera of saw sharks: *Pliotrema,* with six pairs of gill openings, and *Pristiophorus,* with five.

Sawai Mādhopur, town, eastern Rājasthān state, northwestern India. Sawai Mādhopur, a walled town, was laid out on a plan somewhat similar to that of Jaipur city by Madho Singh, maharaja of Jaipur (1751–68). The town is a major road and rail junction and trades in metalware and agricultural products. It is noted for its handmade copper and brass vessels, lacquered woodwork, papier-mâché objects, round playing cards, and a scented extract of *khas* grass. It also has food-processing and cement factories.

In the region, wheat, corn (maize), rice, barley, gram, sugarcane, and oilseeds are the chief crops; lead, zinc, silver, and bentonite deposits are worked. Pop. (1981) town, 28,-139; metropolitan area, 59,083.

Sawākin, also spelled SUAKIN, town, northeastern Sudan, on the Red Sea coast south of

Port Sudan. Originating in the 12th century as a rival port to 'Aydhāb (Aidhab) to the north, where dues were levied on trade, it grew in importance after 'Aydhāb's destruction (about 1428) to become the chief African Red Sea port and a major pilgrimage crossing point on the route to Mecca.

Sawākin began to decline when it was occupied by the Turks in the 16th century. Leased to Egypt in 1821, it remained in Egyptian hands for much of the 19th century. In the 1920s its port was abandoned in favour of the new one at Port Sudan, 36 miles (58 km) to the north. Since then, encroaching coral reefs have impeded harbour activity, but redevelopment of Sawākin as the country's second port has continued. The inner town lies on an island connected by causeway to the residential section and railhead of El Geif on the mainland. Pop. (latest est.) 3,960.

Sawankhalok, town, north-central Thailand, on the Yom River north of Sukhothai town. A few miles north of the present town are the remains of the ancient walled city of Sawankhalok. The old town was renowned for pottery manufacture. Pop. (1985 est.) 20,720.

Sawara, city, Chiba *ken* (prefecture), Honshu, Japan, on the lower Tone River. From the 17th to the early 20th century, Sawara was a commercial centre and river port whose importance was enhanced by the construction of the Narita Line (railway) to Tokyo (1898). Subsequent changes of the traffic network, however, have brought a decline in the city's function as a market. Major products are rice, soy, and sake (rice wine).

Sawara serves as a gateway to Suigo-Tsukuba Quasi-national Park. The city contains the former residence of its native son Inō Tadataka (1742–1818), who surveyed and mapped Japan's entire coastline. Pop. (1985) 49,784.

Sawatch Range, segment of the southern Rocky Mountains in central Colorado, U.S., extending southeastward for 100 miles (160 km) from the Eagle River to Saguache. Bounded by the Arkansas River (east) and the Elk Mountains (west), its middle portion is usually called the Collegiate Range, with Mounts Yale, Harvard, and Princeton. These and many other summits exceed 14,000 feet (4,300 m), including Mount Elbert (14,433 feet [4,399 m]; highest point in Colorado and the American Rockies), Grizzly Mountain, Shavano and La Plata peaks, and Mounts Antero and Massive. Mount of the Holy Cross (13,986 feet [4,263 m]) is known for a unique formation near its peak, comprising snow-filled crevices shaped like a huge cross more than 1,000 feet (305 m) long with 375-foot (114-metre) arms. Highways traverse Independence (12,093 feet [3,686 m]) and Monarch (11,312 feet [3,448 m]) passes, with the Busk-Ivanhoe (rail and road) and Twin Lakes (water-diversion) tunnels also serving the area.

Discovery of gold (1860) and lead with a high silver content (1877) attracted settlers to the region; ranching, dairying, and the tourist industry (based on year-round outdoor sporting activities) are now the economic mainstays. Embraced by the White River and San Isabel national forests, the mountains are the source of the Arkansas River. The name Sawatch is derived from a Ute Indian word meaning "blue-earth spring."

sawbelly (fish): *see* alewife.

sawbill (duck): *see* merganser.

Sawbridge, Catharine: *see* Macaulay, Catharine.

Sawchuk, Terry, byname of TERRENCE GORDON SAWCHUK (b. Dec. 28, 1929, Winnipeg, Man., Can.—d. May 31, 1970, New York City), professional North American ice hockey goalie, who is considered one of the greatest in the game.

After playing two seasons in the U.S. Hockey League (1947–48) and the American Hockey League (1948–49), Sawchuk began his National Hockey League (NHL) career with the Detroit Red Wings in 1949. With them during his first stay, his goals-against average was less than two. He was traded to the Boston Bruins in 1955 and played with them for two seasons before he was traded back to the Red Wings in 1957. He played with them through the 1963–64 season and later played with the Toronto Maple Leafs (1964–67), the Los Angeles Kings (1967–68), the Red Wings again (1968–69), and the New York Rangers (1969–70), by which time he was a relief goalie. His career record of 103 shutouts persisted into the mid-1980s.

In the 1952 Stanley Cup play-offs and series, Sawchuk allowed only five goals in eight games and had four shutouts. He won the NHL Vezina Trophy for goaltending four times: three times alone (1952, 1953, 1955) and once shared with John Bower (1965). Sawchuk died as a result of injuries that he incurred during horseplay with a teammate.

sawfish, any of several species of sharklike rays forming the genus *Pristis* and the family Pristidae. Sawfishes are found in shallow water in subtropical and tropical regions of the world. They are bottom dwellers, frequenting bays and estuaries and sometimes swimming considerable distances up rivers; some are also known to live and breed in the freshwaters of Lake Nicaragua. Sawfishes have a long, flattened head and body and an elongated snout, much like that of the saw shark, that forms a long, flat blade, edged with strong teeth. The largest sawfishes attain lengths of 7 m (23 feet) or more.



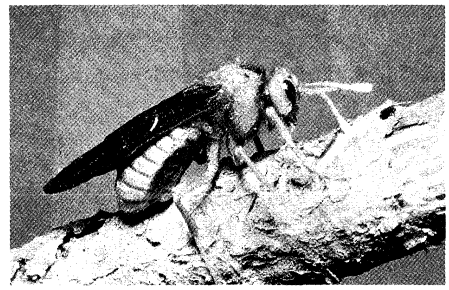
Sawfish (*Pristis*)
Karl H. Maslowski

Sawfishes are not generally considered dangerous, but their saws, constituting as much as one-third the total length, can be formidable. The saws are used in feeding, either in digging out bottom animals or, when lashed about, in killing or maiming schooling fishes. Sawfishes are reportedly good to eat when small; they are fished in some areas for food, oil, skins, and other products.

sawfly, any member of the superfamily Tenthredinoidea (order Hymenoptera), a large and widely distributed group of insects. The superfamily consists of five families: Argidae, argid sawflies; Pergidae, pergid sawflies; Cimbicidae, cimbicid sawflies; Diprionidae, conifer sawflies; and Tenthredinidae, typical sawflies.

Argid sawflies (Argidae) are stout-bodied insects; they number more than 400 species and are distributed worldwide. The larvae of many species feed on rose bushes, willow, oak, and birch trees.

The preferred food plants of pergid sawflies (Pergidae), which occur mainly in South America and Australia, are oak, hickory, and eucalyptus. The family consists of a single genus, *Acordulecera.*



Sawfly (*Cimbex*)
William E. Ferguson

Cimbicid sawflies (Cimbicidae) are large, robust insects easily recognized by their club-shaped antennae. The most common North American species is the elm sawfly (*Cimbex americana*), a dark blue insect about 2.5 cm (1 inch) long. The larvae feed on elm and willow. In Europe the larvae of *Clavellaria amerinae* feed on willow and poplar.

Conifer sawflies (Diprionidae) are medium-sized insects; the family includes several serious pests of coniferous trees. Diprionids are common throughout most of North America except in the Middle West.

The typical sawflies (Tenthredinidae) number about 4,000 species and exhibit considerable diversity in structure and habit. They are often brightly coloured and are commonly found on flowers. Many are poor fliers. The leaves of pear, cherry, and plum trees are eaten by the destructive North American species *Caliroa cerasi,* commonly called the pear slug. The larch sawfly (*Pristiphora erichsonii*) is sometimes highly destructive to larch trees in the United States and Canada. The elm leaf miner (*Fenusa ulmi*) is sometimes a serious pest of elm trees.

Sawhāj, *muḥāfaẓah* (governorate) in Upper Egypt, south of Asyūṭ and north of Qinā governorates. It is a ribbonlike stretch of the fertile Nile River valley about 60 miles (100 km) long, with an area of 597 square miles (1,547 square km). Through it the Nile flows in a roughly 13-mile- (21-kilometre-) wide flat-bottomed valley hemmed in by limestone cliffs rising to nearly 1,000 feet (305 m). Throughout the area the Nile has cut a channel close to the eastern side of the valley; nearly all of the arable land lies west of the river. Sawhāj governorate's habitable area is one of the most densely populated in Egypt.

About three-fourths of the employed population are farmers. The principal crops are cotton, millet, wheat, sugarcane, onions, peanuts (groundnuts), and melons. Local provincial industries include silk weaving at Akhmīm. Perennially irrigated land is watered from as-Sawhājīyah Canal, fed from the Naj' Ḥammādī barrage to the south. At Mount al-Ḥarīdī and al-'Īsāwīyah Sharq east of Akhmīm, there are limestone quarries.

Two notable sites of antiquity are Abydos, with monuments of Old, Middle, and New Kingdom Egypt; and Bayt Khallāf, near Sawhāj town, the site of a mastaba (mud-brick tomb) probably of King Djoser (3rd dynasty; *c.* 2650–*c.* 2575 BC). Nearby is the Coptic White Convent with a late 5th-century basilica church surrounded by a wall of white

calcite incorporating many reused pharaonic stones. The Red Convent, also with a basilica church, is located 4 miles (6.5 km) to the northwest. Both of these centres of early and medieval Coptic learning have been restored.

Apart from Sawhāj (*q.v.*), the capital of the *muḥāfaẓah,* principal towns are Akhmīm, Jirjā, and Ṭahtā. Jirjā has a sugar refinery, which was enlarged in the early 1980s. Pop. (1986 prelim.) 2,455,134.

Sawhāj, also spelled SOHĀG, or SUHAG, town and capital of Sawhāj *muḥāfaẓah* (governorate) in the Nile River valley of Upper Egypt. The town is located on the Nile's western bank between Asyūṭ and Jirjā, immediately across from Akhmīm on the eastern bank. It has cotton-ginning, textile-weaving, and food-processing factories. Automobile parts are distributed, and it is a centre for vehicle repair. The Sawhāj Institute is an affiliate of al-Azhar University, Cairo.

Sawhāj lies along the Cairo-Aswān railway and the main highway through Upper Egypt. A bridge across the Nile links it to Akhmīm. In recent years the two cities have virtually merged, although they are still separately administered. Pop. (1986 prelim.) 132,965.

ṣawm (Arabic: "fasting"), in Islām, any religious fast, but particularly the fast of the month of Ramaḍān (*q.v.*).

sawmill, machine or plant with power-driven machines for sawing logs into rough-squared sections or into planks and boards. A sawmill may be equipped with planing, molding, tenoning, and other machines for finishing processes. The biggest mills are usually situated where timber can be brought by river or rail, and the design of the mill is affected by the mode of transportation. Waterborne logs float into the mill and are dragged out in turn by a winch. More space is necessary for storage in the rail-borne system; an overhead crane serves the stockyard and carries the logs to the machines.

Cutting is performed on various large machines, a preliminary operation often being that of crosscutting to convenient lengths. Reciprocating saws, band saws, or circular saws cut the log into various thicknesses as it moves past the saw on a feeder table. The log frame is a machine with a set of vertically reciprocating blades, suitably spaced; it divides a log into boards at one pass of the table. The number of blades employed may be as few as 4 for cutting thick pieces or as many as 50 for thin boards.

Resawing machines handle material partly broken up, such as flitches (longitudinal sections of log) and deals (boards). The sawdust and chips from the machines formerly were disposed of by pneumatic ducts ending in the boiler house, where they were used as fuel; substantial quantities of these materials are now fabricated into particleboard and chipboard.

Sawu Island, Indonesian PULAU SAWU, Sawu also spelled SAVU, or SAWOE, island and island group in the Savu Sea, Nusa Tenggara Timur *provinsi* ("province"), Indonesia. The island group includes Sawu (160 square miles [414 square km]), Raijua (14 square miles [36 square km]), and several other islets located about 100 miles (160 km) west of the southern tip of Timor. Sawu, 23 miles (37 km) long and 10 miles (16 km) wide, and Raijua, 8 miles (13 km) long and 3 miles (5 km) wide, are generally low and almost flat; elevation ranges from 3 feet to 330 feet (1 m to 100 m). The climate is hot, and rainfall, confined mostly to the wet season, exposes new, fertile volcanic soil each year.

The islands are densely populated, and the principal occupation is agriculture. Corn (maize) and cotton are the main products, and there are extensive coconut plantations along the coasts. Some fruits and vegetables are also grown, and cattle and ponies are raised. Exports are mainly of copra and fish. Islām is the dominant religion. Seba and Baah, the chief towns on Sawu Island, are linked by road. Communication by boat exists with Sumba, one of the Lesser Sunda Islands, to the west, and with Timor to the east.

Sax, Antoine-Joseph, also called ADOLPHE SAX (b. Nov. 6, 1814, Dinant, Belg.—d. Feb. 7, 1894, Paris, Fr.), Belgian-French maker of musical instruments and inventor of the saxophone.

Sax was the son of Charles Joseph Sax (1791–1865), a maker of wind and brass instruments, as well as of pianos, harps, and guitars. Adolphe studied the flute and clarinet at the Brussels Conservatory and in 1842 went to Paris. There he exhibited the saxophone, a single-reed instrument made of metal, with a conical bore, overblowing at the octave, which had resulted from his efforts to improve the tone of the bass clarinet. It was patented in 1846. With his father he evolved the saxhorn (patented 1845), a development on the bugle horn; the saxo-tromba, producing a tone between that of the bugle and the trumpet; and the saxtuba. Sax discovered that it is the proportions given to a column of air vibrating in



Sax, lithograph by Auguste Bry after a portrait by Charles Baugniet, 1844

J.P. Ziolo

a sonorous tube, and these alone, that determine the timbre produced.

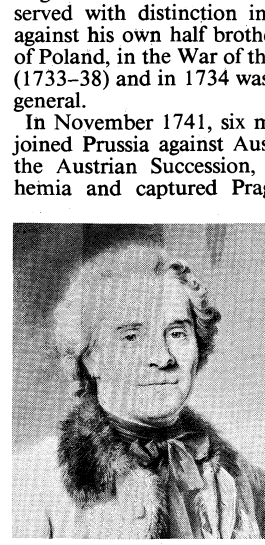
In 1857 Sax was appointed instructor of the saxophone at the Paris Conservatory. Later he improved several instruments and invented others without, however, establishing a basis for their commercial exploitation. Many of his instruments were accepted for the French army bands, and for 10 years Sax was involved in lawsuits with competing instrument makers seeking to have his patents revoked. In his 80th year he was living in abject poverty; Emmanuel Chabrier, Jules Massenet, and Camille Saint-Saëns were obliged to petition the minister of fine arts to come to his aid.

Saxe, (Hermann-) Maurice, comte de (count of) (b. Oct. 28, 1696, Goslar, Saxony [Germany]—d. Nov. 30, 1750, Chambord, Fr.), general and military theorist who successfully led French armies during the War of the Austrian Succession (1740–48).

The illegitimate son of the elector Frederick Augustus I of Saxony (later also King Augustus II of Poland), young Maurice was sent by his father to serve under Prince Eugene of Savoy against the French in Flanders in 1709–10. In 1711 he was made Graf von Sachsen (count of Saxony; in French, comte de Saxe). His father bought him a German regiment in the French service in 1719, and Saxe quickly won recognition for his innovations in military training, especially in musketry.

Anna Ivanovna, duchess of Courland (later empress of Russia), secured Saxe's election as duke of Courland (a Baltic duchy between Prussia and Latvia) in 1726, but the Russians expelled him from the region in 1727 in order to prevent him from marrying the duchess. Returning to France, Saxe in 1732 wrote *Mes Rêveries* (published in 1756–57), a remarkably original treatise on the science of warfare. He served with distinction in the French army against his own half brother, King August III of Poland, in the War of the Polish Succession (1733–38) and in 1734 was made a lieutenant general.

In November 1741, six months after France joined Prussia against Austria in the War of the Austrian Succession, Saxe invaded Bohemia and captured Prague. Although the



Saxe, detail of a portrait by Maurice-Quentin de La Tour; in the Staatliche Museum, Dresden, Ger.

Giraudon—Art Resource/EB Inc.

British had not yet become involved in the conflict, the French king Louis XV in January 1744 made Saxe commander of a force that was to invade Great Britain on behalf of Charles Edward, the Young Pretender, the Stuart claimant to the British throne. The project was dropped after a storm shattered Saxe's invasion fleet at Dunkirk in March. Shortly thereafter, Louis formally declared war on Great Britain and promoted Saxe to the rank of marshal. Saxe and the king then invaded the Austrian Netherlands.

The king wisely allowed Saxe to give the orders in the ensuing campaign. Their forces surrounded Tournai, and, when allied troops advanced from the east to relieve the siege, Saxe decisively defeated them in the Battle of Fontenoy (May 11, 1745). It was France's last great victory before the outbreak of the French Revolution in 1789. Saxe then captured Brussels and Antwerp (February 1746). Turning south, he seized Mons and Namur, and on Oct. 11, 1746, he defeated the allies at Raucoux, near Liège, thereby completing the conquest of the Austrian Netherlands.

In January 1747 Louis appointed Saxe marshal general of France. In 1747 he invaded Holland, defeated an allied army in the Battle of Lauffeld near Maastricht (July 2), and captured the fortress of Bergen-Op-Zoom. Saxe retired to his château at Chambord, where he died. His grandson was the father of the novelist George Sand.

BIBLIOGRAPHY. Jon E.M. White, *Marshal of France* (1962), examines his life and times.

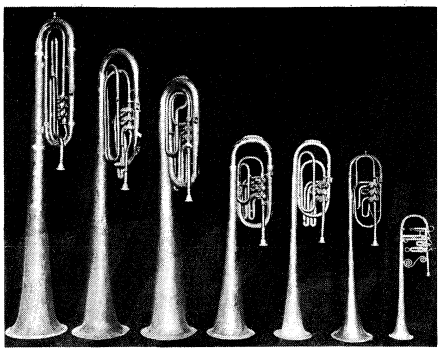
Saxe-Coburg-Gotha, HOUSE OF, also called SAXE-COBURG AND GOTHA (United Kingdom): *see* Windsor, house of.

Saxe-Meiningen, George II, duke of: *see* George II *under* George (Saxe-Meiningen).

saxhorn, any of a family of brass wind instruments patented by the Belgian instrument-maker Antoine-Joseph Sax, known as Adolphe Sax, in Paris in 1845. Saxhorns, one of many 19th-century developments from the valved bugle, provided military bands with a homogeneous series of valved brass in place of the miscellany of valved instruments that had come into use since 1825 (such as flügelhorns, or valved bugles; cornets; euphoniums; and others).

Saxhorns, from sopranino to contrabass, have

a wide, buglelike bore, in contrast to Sax's parallel but short-lived saxo-tromba family, and they are frequently called by the names of other valved brass instruments of similar



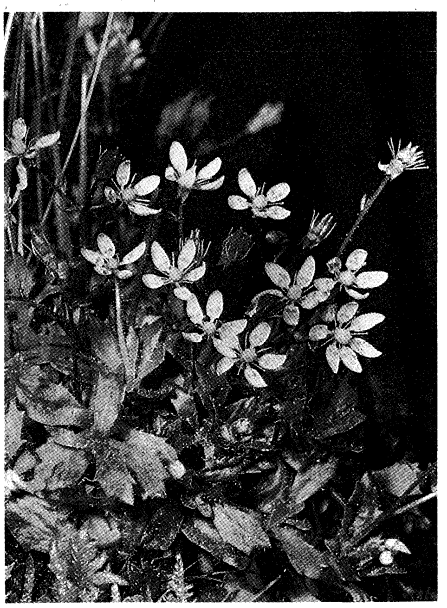
American saxhorns, 19th century; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York City, the Crosby Brown Collection of Musical Instruments, 1889

pitch. The deeper-pitched saxhorns remain regular brass band instruments in France, Great Britain, and the United States, where they are not known as saxhorns but simply as: alto in E♭ (in Britain, tenor horn); tenor in B♭ (baritone); the wider-bore baritone in B♭ (euphonium); and bass in E♭ and contrabass in BB♭ (sometimes called tubas).

Saxifragaceae, the saxifrage family of flowering plants, in the order Saxifragales, comprising 30 genera of mostly perennial herbs, native primarily to northern cold and temperate regions. Members of the family have leaves that usually alternate along the stem and sometimes are deeply lobed or form rosettes. The flowers have both male and female parts and four or five sepals and petals; they are usually borne in branched clusters and range in colour from greenish to white or yellow and from pink or red to purple. The fruit is a capsule with many seeds.

Most of the cultivated species in the family belong to the genus *Saxifraga* (saxifrage, or rockfoil). *Heuchera* (alum root, or coral bells), *Astilbe, Mitella* (bishop's cap, or mitrewort), *Lithophragma, Peltiphyllum peltatum* (umbrella plant), *Tiarella* (false mitrewort), and *Tolmiea menziesii* (pickaback plant) are other well-known members of the family that



Saxifraga stellaris

John Markham—Photo Researchers/EB Inc.

are often planted in rock gardens or as border ornamentals.

Saxifragales, the saxifrage order of flowering plants, consisting of 28 families, 165 genera, and more than 3,000 species and belonging to the class known as dicotyledon (characterized by two seed leaves). It encompasses a wide variety of plant types distributed throughout the world, including ornamental garden shrubs, such as hydrangea, deutzia, and mock orange (Hydrangeaceae); rock-garden plants such as saxifrage (Saxifragaceae); bushes that yield currants and gooseberries; and insect-trapping pitcher plants.

A brief treatment of Saxifragales follows. For full treatment, *see* MACROPAEDIA: Angiosperms.

Members of the order grow on all continents and inhabit nearly the complete range of environmental conditions on Earth. The order includes a group of woody trees, shrubs, and vines and another group of herbaceous (nonwoody) annual and perennial plants.

Among the herbaceous families, the Saxifragaceae are perhaps the most important horticulturally. Members are mainly perennial herbs of cold northern regions. *Saxifraga*—the saxifrage, or rockfoil, genus—contains many species cultivated in rock gardens. The stonecrop, or orpine, family (Crassulaceae) also includes widely grown ornamental perennials. Stonecrop (*Sedum*) is a favourite rock-garden plant; other species are grown as pot plants.

Several trees in Saxifragales furnish timber and other products such as tannins for making leather. Shoots and leaves of some plants are eaten or brewed like tea. People of the Appalachian Mountains make salads with mountain lettuce, or deer-tongue (*Saxifraga erosa*). Many species of *Ribes* (family Grossulariaceae) bear edible fruits of some commercial importance. Chief among them are the European gooseberry (*R. grossularia*), the European currants (*R. nigrum* and *R. rubrum*), and an American currant (*R. vulgare*). Other species of gooseberry and currant produce splendid shrubs, with fragrant flowers and colourful fruits, and are cultivated as garden ornamentals.

Certain *Ribes* species act as alternate hosts to the parasitic fungus that causes white-pine blister rust, an extremely destructive forest disease especially in the United States and Canada. Fungal spores that germinate on *Ribes* plants are blown to the pines, where the disease eventually kills the trees. In North America, eradication and strict controls have severely limited the growth of currant and mulberry bushes in areas containing white pines.

Practically all types of growth forms are seen among the Saxifragales. The order shows wide structural variation, but some common traits unite the group. Flowers are nearly always radially symmetrical, with petals that are free rather than fused together, and are generally bisexual (containing both female and male reproductive organs); seeds typically have abundant endosperm (nutrient tissue).

The Crassulaceae, which are concentrated in dry regions, are characterized by very thick, fleshy leaves and by water-storage tissues in the leaves and stem. Special hairs, aerial roots, and surface cells may enable some species to absorb water directly from the air. Members of the genus *Bryophyllum* produce plantlets from the bases of clustered leaves, or rosettes, on the parent plant. The crowded leaves retain moisture, enabling the plantlets to grow.

The family Saxifragaceae illustrates an entire range of adaptations to different moisture conditions in the environment. Some species are true aquatic plants; others grow in boggy soil; and others store moisture in leaves or stems as a means of coping with a dry habitat. Most species of the family grow in moist woodlands. Members of the genus *Saxifraga* (literally "rock breaker"), with their tenacious ability to thrive on rocky crags in cold, harsh climates, have a tough root system and penetrating taproots.

Plants in two small families are insectivorous. The fly-catcher plant of southwestern Australia (*Cephalotus follicularis*, family Cephalotaceae) produces two types of leaves—foliage leaves, studded with nectar glands, and pitcher leaves that form urnlike cavities. Insects, particularly ants, fall into these pitchers. A glassy inner surface prevents escape, and glands secrete a fluid that digests insect protein. Another Australian genus, *Byblis* (family Byblidaceae), has leaves with glands that produce a glistening mucilage on which insects become stuck.

Pollination in the Saxifragales is usually by insects, principally bees and flies that become dusted with pollen as they gather nectar from the flowers.

saxifrage, also called ROCKFOIL (*Saxifraga*), any of a genus of flowering plants, of the family Saxifragaceae, native in temperate, subarctic, and alpine areas. About 300 species have been identified. Many of them are valued as rock-garden subjects, and some are grown in garden borders. As a group they are notable for their small bright flowers and fine-textured foliage. Alpine species are the earliest to flower in gardens.

Saxifraga virginiensis, S. pennsylvanica, and *S. oregana* are a few of the species found wild in North America. *S. callosa, S. cotyledon,* and *S. granulata,* from Europe, have several varieties prized for their white to rose-pink, much-branched flower clusters. *S. paniculata,* from the north temperate zone, has yielded many fine garden varieties, differing in size, leaf shape, and flower colour. Only one species is widely grown as a window and basket plant, *S. stolonifera,* a trailing plant with cascading runners. Its common names are strawberry begonia, strawberry geranium, and mother-of-thousands.

Saxo Grammaticus (fl. mid-12th century–early 13th century), historian whose *Gesta Danorum* is the first important work on the history of Denmark and the first Danish contribution to world literature.

Little is known of his life except that he was a Zealander belonging to a family of warriors and was probably a clerk in the service of Absalon, archbishop of Lund from 1178 to 1201. Saxo is first mentioned in Svend Aggesen's *Historia Regum Danicae compendiosa* (1185) as writing the history of Svend Estridsen (d. 1076).

The *Gesta Danorum* was written at the suggestion of Archbishop Absalon: its 16 volumes begin with the legendary King Dan and end with the conquest of Pomerania by Canute IV in 1185. The work is written in a brilliant, ornate Latin. It was his Latin eloquence that early in the 14th century caused Saxo to be called "Grammaticus." The first nine books of the *Gesta Danorum* give an account of about 60 legendary Danish kings. For this part Saxo depended on ancient lays, romantic sagas, and the accounts of Icelanders. His legend of *Amleth* is thought to be the source of Shakespeare's *Hamlet,* his Toke, the archer, the prototype of William Tell. Saxo incorporated also myths of national gods whom tradition claimed as Danish kings, and myths of foreign heroes. Three heroic poems are especially noteworthy, translated by Saxo into Latin hexameters. These oldest-known Danish poems are *Bjarkemaalet,* a battle hymn designed to arouse warlike feelings; *Ingjaldskvadet,* a poem stressing the corruptive danger of luxury upon the old Viking spirit; and *Hagbard and Signe,* a tragedy of love and family feuds. The last seven books comprise Saxo's account of the historical period, but he only achieves independent authority when writing of events close to his own time. His work is noteworthy for its sense of patriotic

purpose based on a belief in the unifying influence of the monarchy. By presenting a 2,000-year-long panorama of Danish history, he aimed to show his country's antiquity and traditions. Saxo's work became a source of inspiration to many of the 19th-century Danish Romantic poets.

Saxon, member of a Germanic people who in ancient times lived in the area of modern Schleswig and along the Baltic coast. The period of Roman decline in the West was marked by vigorous Saxon piracy in the North Sea. During the early part of the 5th century AD, the Saxons spread rapidly through north Germany and along the coasts of Gaul and Britain. The coastal stretch from the Elbe to the Scheldt rivers, however, was held by the Frisians, on whom the Saxons had great influence.

The expansion of the Saxons brought collision with the Franks. In 772 the Frankish ruler Charlemagne decided on a campaign of conquest and conversion of the Saxons. With interruptions, the Saxon wars lasted 32 years and ended with the incorporation of the Saxons into the Frankish empire.

The Venerable Bede (in *Historia ecclesiastica*) described the Germanic invaders of Britain as Angles, Saxons, and Jutes and said that the East, West, and South Saxons (of Essex, Wessex, and Sussex) were descended from the Saxons. However, Bede was not always careful to distinguish Angles and Saxons; and, furthermore, all the invaders of Britain were closely related and spoke dialects similar to each other and to the Frisian language. The dialects of the continental Saxons, on the other hand, underwent considerable approximation to High German, and their affinity to those of the English and the Frisians is only to be traced in sporadic spellings in texts now extant, of which none is older than the 9th century. When Procopius (*Gothic Wars, c.* 550) alleged that the inhabitants of Britain were Britons, Angles, and Frisians, he was no doubt confusing Frisians and Saxons, owing to their close relationship and to the extensive Saxon settlements among the Frisians.

Saxon DYNASTY, also called LIUDOLFING DYNASTY, ruling house of German kings (Holy Roman emperors) from 919 to 1024. It came to power when the Liudolfing duke of Saxony was elected German king as Henry I (later called the Fowler), in 919.

Henry I's son and successor, Otto I the Great (king 936–973, western emperor from 962), won a decisive victory over the Magyars at the Battle of Lechfeld near Augsburg in 955 and continued the policy, initiated by Henry I, of German expansion into Slavic territory to the east; he also intervened in Italy and, like several of his successors, established control over the papacy. By investing churchmen in Germany with lands, he laid down a long-lasting framework of support for the crown against the lay nobility. He was crowned emperor by Pope John XII at Rome in 962. He concluded the *Privilegium Ottonianum,* a treaty that regulated relations between emperor and pope, and initiated a Holy Roman Empire of the German nation. His son Otto II (973–83) continued his policy, but his grandson Otto III (983–1002) was interested in Italian affairs to the detriment of Germany.

The last member of the line, Henry II (1002–24), turned his attention back to Germany. When Henry II died childless in 1024, another descendant of Henry I, Conrad II, the Salian, was elected king, thus initiating the Salian dynasty.

Saxon duchies, also called ERNESTINE DUCHIES, German SÄCHSISCHE HERZOGTÜMER, or ERNESTINISCHE HERZOGTÜMER, several states in the Thuringian region of east central Germany, ruled by members of the Ernestine branch of the house of Wettin between 1485 and 1918; today their territory occupies Thuringia *Land* (state) and a small portion of northern Bavaria *Land* in Germany.

From 1826 there were four duchies: the grand duchy of Saxe-Weimar-Eisenach (Sachsen-Weimar-Eisenach); the duchy of Saxe-Meiningen-Hildburghausen (Sachsen-Meiningen-Hildburghausen); the duchy of Saxe-Altenburg (Sachsen-Altenburg); and the duchy of Saxe-Coburg-Gotha (Sachsen-Coburg und Gotha). The territories of the duchies were fragmented, and in the same area there were several exclaves of Prussian and other territories. The Saxe-Coburg-Gotha branch in the 19th and 20th centuries became one of the most prominently connected of the European dynasties: one of its members became the first king of Belgium in 1831 as Leopold I. Another, Albert, became the prince consort of Queen Victoria of Great Britain in 1840, and from them have descended the five British sovereigns of the 20th century. A third, Ferdinand, became the prince consort of Queen Maria II of Portugal in 1836, and from them descended the Portuguese royal dynasty that reigned from 1853 until 1910. A fourth was chosen prince of Bulgaria in 1887 and founded a dynasty that reigned there until 1946. The house of Wettin accumulated possessions in Thuringia from the middle decades of the 13th century onward. It received the Pleissnerland, centred at Altenburg, from the Holy Roman emperor Frederick II in 1243; won the landgraviate of Thuringia, with control over the Eisenach and Gotha areas, in 1264, after the war of 1256–63; obtained Neustadt by marriage to the heiress of Arnshaugk in 1300; acquired Coburg and Hildburghausen from the house of Henneberg, and Weimar from that of Orlamünde, between 1347 and 1374; and purchased Saalfeld from Schwarzburg in 1389 and Weida from the house of the *Vögte* (imperial advocates) in 1410–27. The accession of the Wettins to the electorate of Saxony in 1423 gave rise to the use of the prefix Saxe- (German: Sachsen-) for their dynastic ramifications in Thuringia.

The Ernestine duchies originated in 1485, when the electorate of Saxony was partitioned between Ernest and Albert, the sons of Elector Frederick II. The title of elector (*i.e.,* a prince with the right to participate in choosing the Holy Roman emperor) was kept by Ernest, and by his son Frederick III the Wise (reigned 1486–1525), who was the protector of Martin Luther. The Ernestine line lost the electoral title and much of its territory in 1547 but retained Weimar (with Jena), Gotha, Eisenach, Saalfeld, and Coburg and later recovered Altenburg, Eisenberg (1554), and other lands (including Meiningen) in 1583. From then until the early 19th century, the Ernestine lands underwent successive divisions and regroupings. The most outstanding ruler of Saxe-Weimar-Eisenach was Charles Augustus (duke from 1775 to 1828), patron of the great German writers Goethe, Herder, and Schiller, under whom Weimar was the intellectual heart of Germany. All the Ernestine duchies in 1807 adhered to the Confederation of the Rhine, organized by Napoleon, and in 1815 became sovereign members of the German Confederation. Saxe-Meiningen-Hildburghausen sided with Austria in the Seven Weeks' War (1866); the other duchies with victorious Prussia. All joined the North German Confederation (1867) and the German Empire in 1871. In the German revolution of 1918 all the Ernestine rulers abdicated, and in 1920 their former lands were merged in the new Thuringia, with the exception of Coburg, which joined Bavaria.

Saxon language, Old, also called OLD LOW GERMAN: *see* Old Saxon language.

Saxon Mirror (medieval law code): *see* Sachsenspiegel.

Saxony, German SACHSEN, French SAXE, any of several major territories in German history. It has been applied: (1) before AD 1180, to an extensive far-north German region including Holstein but lying mainly west and southwest of the estuary and lower course of the Elbe River; (2) between 1180 and 1423, to two much smaller and widely separated areas, one on the right bank of the lower Elbe southeast of Holstein, the other on the middle Elbe; and (3) between 1423 and 1952, to a large central German region with its principal axis even farther up the Elbe and including, in the widest sense, all the country from Thuringia to Lusatia, bordering Bohemia (Czechoslovakia).

Before 1180 the name Saxony was applied to the territory conquered and otherwise united between about AD 200 and 700 by the Germanic Saxon *Stamm* (tribe). This territory included Holstein and the area west of the lower Elbe River, in what is now the German *Land* (state) of Niedersachsen (Lower Saxony). From there the Saxons expanded westward by sea to Britain in the 5th century. In the late 8th century the Saxons were conquered and Christianized by the Frankish ruler Charlemagne. In 843 Saxony became part of the East Frankish, or German, kingdom.

By the early 10th century Saxony had emerged as a hereditary duchy under the Liudolfing dynasty, and in 919 Duke Henry of Saxony was elected German king. He founded the Saxon, or Ottonian, dynasty, which held the German crown until 1024. (*See* Saxon dynasty.) Under the Ottonians, the Germans advanced eastward into Slavic territory.

In 961 the Saxon ducal title was transferred to the Billung family, which held it until 1106. The duchy thereafter passed to Henry III the Lion of the house of Welf in 1142. When Henry the Lion was outlawed by the Holy Roman emperor Frederick I Barbarossa in 1180, the duchy was broken up, and only two small and widely separated territories retained the Saxon name: Saxe-Lauenburg, southeast of Holstein, and Saxe-Wittenberg, along the middle Elbe (now north of Leipzig). Both territories were united under the Ascanian family until 1260, when two separate Ascanian dynasties emerged. From the mid-13th century, the duke of Saxony was recognized as an imperial elector (a prince with the right to participate in choosing the Holy Roman emperor); a dispute over this right between the two branches was settled in favour of the Wittenberg branch in 1356. The Lauenburg line survived until 1689, after which its lands were absorbed by Hanover.

When the Wittenberg line became extinct in 1422, the duchy and electorate of Saxony was bestowed on Frederick I the Warlike, margrave of Meissen and a member of the house of Wettin, and the name Saxony was then applied to all of the Wettin possessions, including Osterland (the area around Leipzig) and large portions of Lusatia and Thuringia. Following Frederick's death (1428) the Wettins disputed the division of the inheritance; in 1485 Albert and Ernest, the sons of Frederick II (d. 1464), by the Treaty of Leipzig, arranged what came to be a permanent division between the Albertine (eastern) and Ernestine (western) Saxon lands. Albert's lands comprised the margravate of Meissen (with Dresden as his capital) and northern Thuringia. (For information about the western lands, *see* Saxon duchies.)

In the 16th century the Albertine line acquired the electorate and won territory from the Ernestines in Thuringia and Wittenberg. The electors Henry (d. 1541) and Maurice (d. 1553) adopted Lutheranism. Augustus (reigned 1553–86) codified Albertine Saxony's laws and made the capital, Leipzig, a centre of commerce and the arts. John George I (reigned 1611–56) headed the organization of

German Protestant princes during the Thirty Years' War (1618–48), but from this period Albertine Saxony was increasingly overshadowed by Brandenburg-Prussia as the leading state of Protestant Germany. In 1697 Elector Frederick Augustus I (reigned 1694–1733) became king of Poland, initiating an economically draining bond between Saxony and the declining Polish kingdom that lasted until 1768.

Napoleon conquered Saxony in 1806 and made it a kingdom. It was thereafter one of his most loyal allies, and, after his overthrow, its territory was greatly reduced by the victorious powers at the Congress of Vienna (1814–15). Prussia acquired Wittenberg, Torgau, northern Thuringia, and most of Lusatia, which became the Prussian province of Saxony; the truncated kingdom of Saxony became a member of the German Confederation.

As a result of uprisings in 1830, a constitution was granted in the kingdom in 1831. King Frederick Augustus II (reigned 1836–54) was deposed by a revolutionary uprising in 1848 but was restored to power by Prussian troops a week later. In 1871 the kingdom became part of the new German Empire. The Social Democrats became a potent political force in Saxony as industrialization increased in the following decades. Saxony's monarchy was abolished after Germany's defeat in World War I (1918), and Saxony adopted a republican constitution as a free state under the Weimar Republic (1919–33). The territory continued to exist as a *Land* (state) under Adolf Hitler's Third Reich (1933–45) and the German Democratic Republic until 1952, when it was abolished as a formal territory. Saxony *Land* was re-created in 1990 in the process of the unification of East with West Germany.

Saxony, German SACHSEN, *Land* (state), eastern Germany. Saxony *Land* was re-created in the process of the reunification of East with West Germany in 1990 from the former East German *Bezirke* (districts) of Dresden, Chemnitz (formerly Karl-Marx-Stadt), and most of Leipzig, along with a small part of Cottbus *Bezirk.* The East German *Bezirke* had themselves been created in 1952 from historic Saxony. The current territory of Saxony *Land* occupies the southeastern portion of what was formerly East Germany and covers an area of 7,080 square miles (18,337 square km). The capital is Dresden.

Present-day Saxony *Land* belongs almost entirely to the east-central mountain region of Germany, with only its northernmost portions and the area around Leipzig descending into the great North European Plain. The chief mountain range is the Ore Mountains (Erzgebirge), which stretch for 100 miles (160 km) along the *Land*'s southern border and reach elevations of more than 4,000 feet (1,200 m). The west and southwest are occupied by subsidiary groups of this range, while the southeastern angle of the *Land* is occupied by the mountains of Upper Lusatia. Northwest of this group, and along both banks of the Elbe River, extends a picturesque region of hills and deep gorges known as the Saxon Switzerland. The upper course of the Elbe River flows from northwest to southeast through the *Land.* The Mulde, a tributary of the Elbe, is the second largest river in Saxony.

Saxony occupies one of the most fertile parts of eastern Germany and is highly developed agriculturally, though fertility diminishes as one ascends toward the Ore Mountains of the south. Wheat and other grains are the principal crops, while cattle raising is important on the extensive pastures of the Ore Mountains. Forestry is also important, and lead, tin, and coal are among the state's mineral products.

The chief industry in Saxony is textile manufacturing, which is carried on in Chemnitz and Zwickau as well as many smaller urban centres. Leipzig, the largest city in the *Land,* is a centre of printing and publishing as well as of heavy engineering. The making of machinery used in mining, textile weaving, papermaking, and printing is a general feature of Saxony's industrial base. Dresden, the second largest city in the *Land,* has little heavy industry but makes many types of precision optical and electrical equipment. Miessen and Chemnitz are centres for the production of porcelain and other ceramics. Saxony is densely populated. The principal urban centres are Leipzig, Dresden, Chemnitz, Plauen, Zwickau, and Meissen. Pop. (1989 est.) 5,014,435.

Saxony-Anhalt, German SACHSEN-ANHALT, *Land* (state), east-central Germany. Saxony-Anhalt had its origins in the principality of Anhalt (*q.v.*), which was a duchy from 1863 to 1918 and a *Land* of Germany from 1918 until 1945, when it became part of Saxony-Anhalt. The latter was a newly created *Land* of the German Democratic Republic (East Germany) from 1949 until 1952, at which time it was broken up into the *Bezirke* (districts) of Magdeburg and Halle. Upon the reunification of East with West Germany in 1990, the post-World War II *Land* of Saxony-Anhalt was reconstituted to include former Magdeburg and most of Halle *Bezirke,* as well as a small part of Cottbus *Bezirk.* It has an area of 7,894 square miles (20,445 square km). The capital is Magdeburg.

The Elbe River flows through the eastern and northern portions of Saxony-Anhalt, while the *Land*'s southern portion is drained by two of the Elbe's tributaries, the Saale and Mulde rivers. The sandy plains of the valley of the Elbe are interspersed with farmlands, pastures, pine forests, and bog lands. The southwest portion of the *Land* merges with the foothills of the Harz Mountains. The central portion of Saxony-Anhalt is occupied by the Fläming Heide (heath) and the fertile Börde region, which extends from the Harz foothills in the southwest to the Elbe at Magdeburg. Apart from the valley of the northward-flowing Elbe, the northernmost segment of the *Land* mostly consists of the Altmark heathland.

The fertile lowlands of the Börde region and of the Saale and Mulde river valleys support the cultivation of wheat, alfalfa, and sugar beets. This productive agriculture has given rise to important local food-processing industries, especially sugar-refining and flour-milling. Cattle are also raised. The heathlands are only thinly populated by comparison, producing some rye, potatoes, and cattle. Significant quantities of lignite (brown coal), rock salt, iron ore, and potash are mined in the *Land.*

The densely populated Börde region has an excellent rail and road network, and commerce in the *Land* in general is furthered by its navigable rivers. The city of Magdeburg, along the Elbe, is an important inland port that is connected to western Germany's inland navigation system by the Mittelland Canal. Magdeburg has food-processing and metalworking industries. The city of Halle, in the south, is an important rail junction and has varied food-processing industries, as well as chemical and metallurgical plants. Among the other cities in Saxony-Anhalt are Dessau, Halberstadt, Wittenberg, Stendal, and Merseburg. Pop. (1989 est.) 3,004,456.

saxophone, any of a family of single-reed wind instruments ranging from soprano to bass and characterized by a conical metal tube and finger keys. The first saxophone was patented by Antoine-Joseph Sax in Paris in 1846.

A saxophone has a conical metal (originally brass) tube with about 24 openings controlled by padded keys; the mouthpiece is similar to that of a clarinet. Two octave key vents allow the instrument to overblow to a higher register at the octave. Except for the sopranino and one form of the B♭ soprano saxophone, built straight like a clarinet, saxophones have an upturned lower end and a detachable crook, or neck, at the upper end.

The normal compass originally extended from B (B below middle C) to f‴ (the third F above middle C), but it soon was expanded downward one half step to include B♭. The compass of the most commonly used members of the saxophone family has been further increased: the alto and tenor can sound one half step above f‴, and the baritone can sound one half step below B♭. The compass is pitched differently for each member of the family: the B♭ soprano, a tone lower than written; the E♭ alto, a sixth lower; the B♭ tenor (made with an undulating crook), a ninth lower; the E♭ baritone (with a looped crook), an octave below the alto; and the B♭ bass (similar in shape to the baritone), an octave below the tenor. Rare forms, representing the extreme ranges of the instrument, include the sopranino, contrabass, and subcontrabass saxophones. All of the common forms were originally pitched in C or in F; the C melody saxophone, a tenor in C, is occasionally used for playing vocal music without transposition.

Sax left no historical account of his invention, which was intended for both military bands and orchestras and which may have



Alto saxophone
By courtesy of Henri Selmer & Cie., Paris

stemmed from experiments with reed mouthpieces on brass instruments. He quickly procured its official adoption by the French army, and it soon spread to other countries. The saxophone was a popular solo instrument in the United States about World War I and was subsequently adopted in dance bands, becoming one of the most important solo instruments in the development of swing and other forms of jazz. Its use in big bands brought changes in mouthpiece design to produce a brighter, more penetrating sound. Modern instruments are also wider in bore than early ones.

The saxophone has great flexibility, blending well with both brasses and woodwinds. It is not widely used as a concert instrument but is quite prominent in jazz, in which it is a principal vehicle for melodic improvisation. Among the greatest jazz saxophonists have been Lester Young, Coleman Hawkins, Charlie Parker, Sonny Rollins, Ornette Coleman, and John Coltrane.

Say, J(ean-)B(aptiste) (b. Jan. 5, 1767, Lyon, Fr.—d. Nov. 15, 1832, Paris), French economist, best known for his law of markets, which postulates that supply creates its own demand.

After completing his education, Say worked briefly for an insurance company and then as a journalist. In 1794 he became an editor of a new magazine dedicated to the ideas of the French Revolution; he later became editor in chief of the magazine. He was appointed to the Tribunate under the consulate in 1799 but was later dismissed by Napoleon. He started a cotton-spinning mill in 1807 but sold out in 1813. He held a chair in industrial economy at the Conservatory of Arts and Crafts from 1817 to 1830 and was professor of political economy at the Collège de France from 1830 until his death. His major publication was *Traité d'économie solitique* (1803; *A Treatise on Political Economy*).

Say attributed economic depression not to a general deficiency in demand but rather to



J.-B. Say, lithograph by Gottfried Englemann after a portrait by Achille-Jacques-Jean-Marie Devéria

H. Roger-Viollet

temporary overproduction for some markets and underproduction for others. This imbalance must automatically adjust itself, he believed, because overproducers have to redirect their production to conform with consumers' preferences or be forced out of business.

Say's law remained a central tenet of orthodox economics until the Great Depression of the 1930s. An obvious implication of Say's law is that the capitalist system is self-regulating; thus there is no need for government intervention in economic affairs.

Say, Léon (b. June 6, 1826, Paris, Fr.—d. April 22, 1896, Paris), economist who served as finance minister in the Third Republic of France.

Say was born into a prominent Protestant family and was the grandson of another well-known economist, Jean-Baptiste Say. Early in his career, Say worked for the *Journal des Débats,* later becoming its editor. He became known for his opposition to the Second Empire in general and the policies of Baron Haussmann in particular. He refused to support the monarchy in 1875 and voted instead for a constitutional republic. In addition to his terms as deputy (1871–76, 1889–96) and senator (1876–89), Say served as finance minister in the cabinets of seven administrations (1872–73, 1875–76, 1876–79, and 1882). During his first term as finance minister he demonstrated his financial genius by paying off the massive debt that France had incurred in the course of the Franco-German War (1870–71). In his later terms as finance minister, Say voiced his disapproval of the constant state of indebtedness of the Third Republic and tried to maintain free trade.

Along with his ministerial duties, Say was ambassador to London in 1880 and served as president of the Senate (1880–82). His politics in the legislature became increasingly antisocialist, but, after 1883, Say finally recognized the need for government to support public works. He wrote extensively on economics, his works including the classic *Les finances de la France sous la troisième République* (1898–1901), and directed publication of *Nouveau dictionnaire d'économie politique* (1891–92).

Say, Thomas (b. June 27, 1787, Philadelphia, Pa., U.S.—d. Oct. 10, 1834, New Harmony, Ind.), naturalist often considered to be the founder of descriptive entomology in the



Thomas Say, watercolour by Joseph Wood; in the Yale University Art Gallery

By courtesy of the Yale University Art Gallery, gift of Mrs. Francis P. Garvan for the Mabel Brady Garvan collection

United States. His work, which was almost entirely taxonomic, was quickly recognized by European zoologists.

Say accompanied various expeditions in North American territory, including an exploration of the Rocky Mountains led by Stephen Long in 1820. He served as curator of the American Philosophical Society, Philadelphia (1821–27), and was professor of natural history at the University of Pennsylvania, Philadelphia (1822–28). He was invited to join the experimental ideal community at New Harmony, Ind., in 1826; the community was disbanded in 1827, but Say remained in the town, which grew as a cultural centre.

Volumes of Say's *American Entomology,* on which he began work in 1817, were published in 1824, 1825, and 1828. His *American Conchology,* 6 vol. (1830–34), was illustrated by Charles A. Le Sueur, a colleague in the New Harmony experiment. Collections of Say's extensive writings in entomology, conchology, and paleontology were published after his death.

Saya San (Burmese leader): *see* San, Saya.

Sayaboury (Laos): *see* Xaignabouri, Muang.

Sayan Mountains, also spelled SAJAN, or SAIAN, Russian SAYANSKY KHREBET, large upland region lying along the frontiers of the east-central Russian S.F.S.R. and Mongolia. Within the Soviet Union the mountains occupy the southern parts of the Krasnoyarsk *kray* (region) and Irkutsk *oblast* (province), the northern part of the Tuvinian A.S.S.R., and the west of the Buryat A.S.S.R.

The Sayans form a rough arc, convex to the north, and stretch from the Altai Mountains in the west to Lake Baikal in the east, south of which they connect with the Khamar-Daban mountain system of the Transbaikalia. The Sayans can be divided into western and eastern ranges, each with a different geologic history, meeting at the centre in a mountain knot in which elevations exceed 10,000 feet (3,000 m). The eastern ranges are higher than the western and have several glaciers. Mount Munku-Sardyk, a peak in the eastern Sayons, reaches an elevation of 11,453 feet (3,491 m).

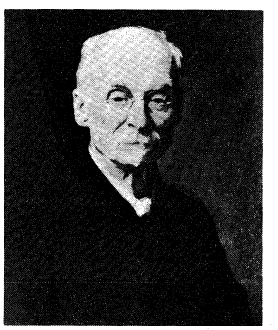
Sayat-Nova, pseudonym of ARUTHIN SAYADIAN (b. 1712, Tiflis, Georgia [now Georgian S.S.R.]—d. 1795, Tiflis), Armenian troubadour known for his love songs.

Sayat-Nova worked first as a weaver and later (1750–65) became the court minstrel of Irakli II of Georgia. In 1770 he entered a monastery in Haghbat, and he was martyred by the Persian invaders of Georgia. Most of his extant songs are in Azeri Turkish; the rest are in Armenian and Georgian.

Sayce, Archibald H(enry) (b. Sept. 25, 1845, Gloucester, Gloucestershire, Eng.—d. Feb. 4, 1933, Bath, Somerset), British language scholar whose many valuable contributions to ancient Middle Eastern linguistic research included the first grammar in English of Assyrian.

During his lifetime Sayce learned to write in about 20 ancient and modern languages. Appointed a fellow of Queen's College, Oxford (1869), and shortly afterward a tutor (1870–90), he began writing the first of a long stream of works of wide-ranging scholarship. The appearance of his *Assyrian Grammar, for Comparative Purposes* (1872) and *Elementary Grammar with Full Syllabary and Progressive Reading Book, of the Assyrian Language* (1875) and a syllabary (1877) was interspersed with a number of Assyrian translations. He also wrote general linguistic works, including the *Introduction to the Science of Language,* 2 vol. (1879).

In 1890 he traveled in Egypt and was instrumental in securing two important ancient Greek manuscripts for the British Museum, including Aristotle's *Constitution of Athens,* long thought to be lost. From 1891 to 1919 he



Sayce, detail of an oil painting by an unknown artist, *c.* 1920; in the Ashmolean Museum, Oxford

By courtesy of the Ashmolean Museum, Oxford

was professor of Assyriology at Oxford. Major works of the later years of his career include *The Early History of the Hebrews* (1897), *Early Israel and the Surrounding Nations* (1898), and *The Archaeology of the Cuneiform Inscriptions* (1907). Sayce's *Reminiscences* appeared in 1923.

Saye and Sele, William Fiennes, 1st Viscount, 8TH LORD SAYE AND SELE (b. May 28, 1582, Broughton Castle, near Banbury, Oxfordshire, Eng.—d. April 14, 1662, Broughton Castle), English statesman, a leading opponent of James I and Charles I in the House of Lords and a supporter of Parliament in the English Civil Wars.

The only son of Richard Fiennes, 7th Lord Saye and Sele, he was educated at New College, Oxford, and succeeded to his father's lordship (barony) in 1613. He opposed the policy of James I in Parliament and in 1622 was imprisoned for six months for objecting to the imposition of a benevolence by the King. Created a viscount in 1624 through the friendship of George Villiers, 1st Duke of Buckingham, he nevertheless continued his opposition to the crown in the early Parliaments of Charles I.

From 1630 Saye became actively engaged in colonization schemes. He was a member of the company formed to colonize Providence Island (now Providencia) in the Caribbean Sea and in 1635 was responsible with Robert Greville, Baron Brooke, for the establishment of a settlement on the Connecticut River which was named Saybrook after them.

Saye reluctantly accompanied Charles I against the Scots in the first Bishops' War in

1639, but together with Brooke he refused to take the oath binding peers to fight for the King. In 1642 Parliament appointed him a member of the Committee of Safety and after the outbreak of the Civil War in August, Saye raised a regiment for the Paliamentary forces. He was mainly responsible for the passage through the House of Lords of the Self-Denying Ordinance (April 1645) which discharged members of Parliament from holding civil or military commands. A supporter of the army in its struggle with Parliament in 1647, he soon became eager for Parliament to reach an agreement with the King and was one of the Parliamentary commissioners who negotiated with Charles at Newport, Isle of Wight (April–November 1648). After the King's execution (Jan. 30, 1649) Saye retired from public life. He took his seat in the Convention Parliament in April 1660 and, in June, after the restoration of Charles II, was appointed a privy councillor.

Sayers, Dorothy L(eigh) (b. June 13, 1893, Oxford—d. Dec. 17, 1957, Witham, Essex, Eng.), scholar and writer whose numerous mystery stories featuring the witty and charming Lord Peter Wimsey combine the attractions of scholarly erudition and cultural small talk with the puzzle of detection.

Sayers received a degree in medieval literature from the University of Oxford in 1915; she was one of the first women to graduate from that university. Her first major published work was *Whose Body?* (1923), a detective novel in which Lord Peter first appeared as a dashing gentleman-scholar. The book was



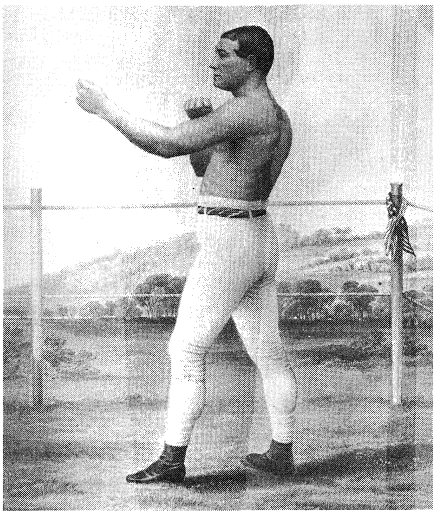
Dorothy L. Sayers
Keystone

followed by one or two novels a year for about 15 years. Sayers wrote short stories that featured not only Lord Peter but also another detective creation, Montague Egg. She also published an anthology of the detective story, *The Omnibus of Crime* (1929).

In her later years Sayers turned from detective fiction to writing theological plays and books such as *Creed or Chaos?* (1947). She made scholarly translations of Dante's *Inferno* (1949) and *Purgatorio* (1955); her translation of the third book, the *Paradiso,* was incomplete at her death.

A biography by James Brabazon, based on the cooperation of her son and access to her papers, was published in 1980. Earlier biographies included those by Janet Hitchman (1975) and Ralph E. Hone (1979).

Sayers, Tom (b. May 25, 1826, Brighton, Sussex, Eng.—d. Nov. 8, 1865, London?), boxer who participated in the first international heavyweight championship match and was one of England's best known 19th-century pugilists. Standing 5 feet 8½ inches and weighing 155 pounds, he was known as the Little Wonder and the Napoleon of the Prize Ring. He often fought much bigger opponents, yet lost only one bout in his career—to Nat Langham in 61 rounds, on Oct. 18, 1853. His



Tom Sayers, portrait by W.L.W. (identity unknown), 1860
BBC Hulton Picture Library

most important victory was scored against the 185-pound Bill Perry (the Tipton Slasher) in 10 rounds, on June 16, 1857.

For the international championship, Sayers fought John C. Heenan of the United States at Farnborough, Hampshire, Eng., on April 17, 1860. Although seven years older than Heenan and 40 pounds lighter, Sayers was made a 2 to 1 betting favourite. After 42 rounds (more than two hours), when Sayers had injured his right arm and Heenan seemed to be winning, the crowd broke into the ring. The fight was declared a draw, and both men were given championship belts. Sayers then retired from the ring, and the British raised £3,000 (about $15,000) by public subscription for him.

Sayf ad-Dawlah (Abū al-Ḥasan ibn Ḥamdān) (b. 916—d. 967, Aleppo, Syria), ruler of northern Syria who was the founder and the most prominent prince of the Arab Ḥamdānid dynasty of Aleppo. He was famous for his patronage of scholars and for his military struggles against the Greeks.

Sayf ad-Dawlah began his career as lord of the city of Wāsiṭ in Iraq and became involved in the struggles of the 'Abbāsid caliph (the titular leader of the Islāmic community), who ruled from nearby Baghdad. Sayf ad-Dawlah realized that greater potential lay to the west, in Syria, then under the dominion of the Ikhshīdid dynasty, which ruled Egypt. In 946 he captured Aleppo, and in the following year, after two unsuccessful attempts, he took Damascus. He then marched his army toward Egypt and captured Ramla, but he was unable to make further progress. A peace treaty was negotiated between him and the Ikshīdids, and thereafter his most important concern was with the Byzantine Empire. Every year from 950 to the time of his death he saw some kind of armed conflict with the Byzantines. He won a number of the engagements but could effect no permanent acquisition of territory. His worst defeat came in 962, when a Byzantine army of 200,000 advanced on Aleppo, defeated Sayf ad-Dawlah, and captured the city. The countryside was plundered, but the Greeks retired after one week. Two years later they returned but were defeated.

Sayf ad-Dawlah surrounded himself with prominent intellectual figures, notably the great poet al-Mutanabbī and the noted philosopher al-Fārābī. Sayf ad-Dawlah himself was a poet; his delicate little poem on the rainbow shows high artistic ability.

Sayida (Lebanon): *see* Sidon.

Saynshand, also spelled SAIN SHANDA, or SAYN-SHENDA, town, administrative headquarters of Dornogovĭ *aymag* (East Gobi province), southeastern Mongolian People's Republic. Located on the main rail line 260 mi (420 km) southeast of Ulaanbaatar, the Mongolian capital, it is the industrial, transportation, and cultural centre of the province.

Food processing and mining are basic to the regional economy. Coal and alabaster are mined in the vicinity, and in 1956 oil deposits, with high sulfur and paraffin content, began to be exploited in Dzüübayan, to the south. Pop. (1979) 11,300.

sayyid (Arabic: "master," or "lord"), Arabic title of respect, sometimes restricted, as is the title *sharīf,* to the Banū Hāshim, members of Muḥammad's clan; in particular, the descendants of Muḥammad's uncles al-'Abbās and Abū Ṭālib, and of 'Alī ibn Abī Ṭālib by Muḥammad's daughter Fāṭimah. In the Hejaz, sayyid is further restricted to the descendants of Ḥusayn, the younger son of 'Alī and Fāṭimah.

In Pakistan and India sayyids are numerous, being one of the four main groups of Muslims. They also constitute an influential extratribal class in Yemen (Ṣan'ā'), claiming descent from the Prophet through an ancestor who came south from Iraq over a millennium ago. Many dynasties have also claimed to be sayyids in the restricted sense.

Sayyid DYNASTY, rulers of India's Delhi sultanate (*c.* 1414–51) as successors of the Tughluq dynasty until displaced by the Afghan Lodīs; this family claimed to be Sayyids, or descendants of the Prophet Muḥammad. The central authority of the Delhi sultanate had been fatally weakened by the invasion of Timur (Tamerlane) and his sack of Delhi in 1398. For the next 50 years, North India was virtually divided among a number of military chiefs, the strongest of whom were the Sharqī sultans of Jaunpur.

The first Sayyid ruler of Delhi was Khizr Khān (reigned 1414–21), who had been governor of the Punjab. He and his three successors occupied themselves in raids to collect revenue, barely maintaining themselves against the Sharqī sultans to the east and the Khokars to the northwest. Khizr's successor, Mubārak Shāh, had some success, but, after his assassination in 1434, his two successors, Muḥammad Shāh and 'Ālam Shāh, proved incapable. 'Ālam Shāh abandoned Delhi for Badaun in 1448, and three years later Bahlūl Lodī, already ruler of the Punjab, seized Delhi and inaugurated the Lodī, the last dynasty of the Delhi sultanate.

Sayyid ash-Sharīf, as- (Iranian theologian): *see* Jurjānī, al-.

Sazonov, Sergey Dmitriyevich (b. Aug. 10 [July 29, old style], 1860, Ryazan province, Russia—d. Dec. 25, 1927, Nice, Fr.), statesman and diplomat, Russia's minister of foreign affairs (1910–16) during the period immediately preceding and following the outbreak of World War I.

Having entered the foreign ministry in 1883, Sazonov, whose brother-in-law Pyotr Stolypin was Russia's prime minister from 1906 to 1911, obtained posts in the Russian embassies in London, Washington, D.C., and the Vatican (1904–09) before becoming deputy foreign minister in May 1909 and minister of foreign affairs on Oct. 11 (Sept. 28, O.S.), 1910. Directing his policy primarily toward maintaining close relations with France and Great Britain, Sazonov also eased Russia's relations with Germany (November 1910) and worked to uphold the status quo in the Balkans. His associates and particularly his agents in the Balkans, however, promoted the formation of the Balkan League, an alliance among Serbia, Bulgaria, Greece, and Montenegro; although it was intended by the Russians to be directed against Austria, the Balkan states transformed it into a coalition against the Ottoman Empire; and Sazonov was compelled to abandon

his attempts to maintain relatively friendly relations with the Turks and to give diplomatic support to the Balkan League.

When the Austrian archduke Francis Ferdinand was assassinated (June 28, 1914) and Austria issued an ultimatum to Serbia (July 23), Sazonov made it clear that Russia would not allow Austria to annihilate Serbia. Urged on by Russia's military leaders and the assurance of French aid, he also insisted that Emperor Nicholas II order the complete mobilization of the Russian Army (July 30). On Aug. 1, 1914, four days after Austria had declared war on Serbia, Germany declared war on Russia.

During the early years of World War I, Sazonov concentrated on defining Russia's war aims; after Turkey entered the war against Russia (November 1914), he obtained the consent of Russia's allies, Great Britain and France, to claim the annexation of Constantinople and the straits area as one of his country's primary objectives. But when he urged Nicholas to promise to grant Poland autonomy and allow it to enter into a free union with Russia after the war, he was dismissed (Aug. 5 [July 23, O.S.], 1916).

Shortly before the February Revolution (1917) overthrew the imperial government, Sazonov was appointed ambassador to London but was dismissed by Russia's Provisional Government in May 1917. He then went to Paris, where, after the October Revolution, he acted as foreign minister for the anti-Bolshevik government of Adm. Aleksandr Kolchak.

Sbeitla (Tunisia): *see* Sufetula.

scab, widespread plant disease, often serious on apple, crab apple, cereals, cucumber, peach, pecan, *Photinis,* potato, and pyracantha, caused by a few bacteria and numerous fungi. Roughened, crustlike, and often raised areas develop on the surface of leaf, fruit, stem, or root. Leaves may wither and drop early. Scab can be controlled by growing resistant varieties; planting disease-free seeds, tubers, and corms; destroying diseased parts; removing weeds; rotating vegetables and flowers; and regularly spraying plants with fungicides during extended wet periods most favourable to the disease agents.

Powdery scab is a minor disease of potato caused by the fungus *Spongospora subterranea.* Affected tubers develop wartlike pustules that rupture to release a dust of brown spores. It may be avoided by planting disease-free seed potatoes in well-drained soil.

scabious, any of about 100 species of annual and perennial herbs constituting the genus *Scabiosa,* of the teasel family (Dipsacaceae). They are native to temperate Eurasia, the Mediterranean region, and the mountains



Perennial scabious (*Scabiosa caucasica*)
Valerie Finnis

of East Africa. Some are important garden plants. All species have basal leaf rosettes and leafy stems. The flower heads have many crowded, small, five-lobed, mostly bisexual blooms. There are larger female flowers in the outer ring, and a circle of leaflike bracts occurs below each flower head.

Pincushion flower, sweet scabious, mourning bride, or garden scabiosa (*S. atropurpurea*), a southern European annual with deeply cut basal leaves and feathery stem leaves, produces fragrant, 5-centimetre (2-inch) flower heads in white, rose, crimson, blue, or deep mahogany purple. It is about 1 metre (3 feet) tall. Small scabious (*S. columbaria*), from Eurasia and Africa, reaches 60 cm. It is a perennial, with toothed, elongate, oval basal leaves and cut stem leaves. The light-blue flowers are 3½ cm across. Perennial scabiosa (*S. caucasica*), of southeastern Europe, grows to 75 cm. It has narrow, smooth-margined basal leaves and cut stem leaves and produces light-blue flowers up to 8 cm across. Devil's bit scabious belongs to the genus *Succisa* of the teasel family. *See* Dipsacaceae.

scad, any of several species of fishes in the family Carangidae (order Perciformes), which also includes the jacks, amberjacks, and pompanos. The name scad is usually restricted to certain species in the genera *Decapterus, Selar,* and *Trachurus.* The half dozen species are marine and occur along the Atlantic coast of the Americas, except for the Mexican scad (*D. scombrinus*), which is found in the Pacific.

Scad generally reach lengths of about 25–30 centimetres (10–12 inches). They have deeply forked tails, and some are mackerel-shaped with narrow, streamlined bodies. Scad eat other fishes and invertebrates. They are bluish or blue-gray on the top half of the body and silvery below.

Scaevola, Gaius Mucius, legendary Roman hero who is said to have saved Rome (*c.* 509 BC) from conquest by the Etruscan king Lars Porsena. According to the legend, Mucius volunteered to assassinate Porsena, who was besieging Rome, but killed his victim's attendant by mistake. Brought before the Etruscan royal tribunal, he declared that he was one of 300 noble youths who had sworn to take the King's life. He demonstrated his courage to his captors by thrusting his right hand into a blazing altar fire and holding it there until it was consumed. Deeply impressed and fearing another attempt on his life, Porsena ordered Mucius to be freed; he made peace with the Romans and withdrew his forces.

According to the story, Mucius was rewarded with a grant of land beyond the Tiber and given the name Scaevola, meaning "left-handed." The tale is presumably an attempt to explain the origin of Rome's famed Scaevola family.

Scaevola, Publius Mucius (d. *c.* 115 BC), one of the foremost Roman jurists of his time and a prominent figure in the events surrounding the downfall of Tiberius Gracchus.

The son of Publius Mucius Scaevola, consul in 175 BC, Mucius held the office of people's tribune in 141. He was praetor in 136. When Tiberius Gracchus, as tribune, was formulating his laws for agrarian reform, he is reported to have consulted Mucius.

In 133, Scaevola was consul with Lucius Calpurnius Piso. Tiberius announced for an unprecedented second term as tribune. Scipio Nasica, as pontifex maximus, demanded that Scaevola condemn Tiberius as a tyrant. Scaevola refused, saying he would not be the one to resort to violence or jeopardize Tiberius' rights without a trial.

When Tiberius was murdered, Scaevola did not publicly condemn those responsible and thus escaped the bloody proscription that followed. He did, however, subsequently lead the political opposition to the oligarchic party of Scipio, which had triumphed. Scaevola was one of the founders of the *Jus civile* ("civil law") and the author of legal works, none of which has survived.

Scaevola, Quintus Mucius, also called AUGUR (d. 88 BC), prominent Roman jurist. He was the cousin of Quintus Mucius Scaevola Pontifex, who founded the scientific study of Roman law.

Instructed in law by his father and in philosophy by the Stoic Panaetius of Rhodes, Scaevola became governor of the province of Asia about 120. Although accused of extortion on his return to Rome, he defended himself successfully and was elected consul in 117. He developed a high regard for the powerful general Gaius Marius and voted against Sulla's motion to declare Marius a public enemy (88). In his last years Scaevola taught law to Cicero, who became one of Rome's greatest orators. Scaevola is one of the interlocutors in Cicero's *De oratore* ("On Oratory"), *De amicitia* ("On Friendship"), and *De republica* ("On the Republic").

Scaevola, Quintus Mucius, also called PONTIFEX (d. 82 BC), founder of the scientific study of Roman law.

As consul in 95 he and his colleague obtained the passage of the Lex Licinia Mucia, which removed certain groups not amalgamated into the Roman Republic (the so-called Latin and Italian allies) from the citizen rolls. The unrest created by this measure exploded in the Social (Italic) War of 90–88. After his consulship Scaevola was governor of the province of Asia. In this position he punished farmers who defaulted on their tax payments and issued an edict on provincial administration that became a model for later governors. About 89 he was appointed *pontifex maximus.* Though not himself religious, he regulated the priestly colleges and insisted on observance of the traditional rituals.

Scaevola was the author of an 80-volume systematic treatise on civil law, a compilation of legislative enactments, judicial precedents, and passages from older collections that was frequently quoted and followed by subsequent writers. In addition, he wrote a small handbook called *Horoi* ("Definitions"), consisting of short rules of law and explanations of legal terms; it was to be the oldest work excerpted in the Byzantine emperor Justinian I's Digest. He was killed in the massacres directed by Lucius Cornelius Sulla in his struggle against Gaius Marius for imperial power.

scaffold, in building construction, temporary platform used to elevate and support workmen and materials during the construction, repair, or cleaning of a structure or machine; it consists of one or more planks of convenient size and length, with various methods of support, depending on the form and use.

In timber scaffolding, support for the planks is provided by a timber frame fabricated and erected at the site. The frame may consist of vertical posts, horizontal longitudinal members, called ledgers, transverse members supported by the ledgers, and longitudinal and transverse cross-bracing. The planks rest on the transverse members.

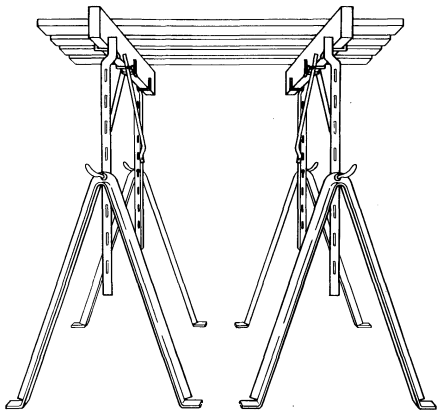
Trestle supports are used for work on a large area if little or no adjustment of height is required (*e.g.,* for plastering the ceiling of a room). The trestles may be of special design or simply wooden sawhorses of the type used by carpenters. Specially designed trestles may be adjusted to provide for working heights of from 7 to 18 feet (2 to 5 metres).

Tubular scaffolding of steel or aluminum has largely replaced timber scaffolding on most construction projects. Tubular scaffolding can easily be erected in any shape, length, or height. Sections may be mounted on casters to provide a highly mobile staging. The scaf-

folding may be enclosed with canvas or plastic sheeting for protection against the weather.

Tubular hoisting towers may be quickly assembled from steel tubes or pipes about 3 inches (8 cm) in diameter with standard connections.

A suspended scaffold consists of two horizontal putlogs, short timbers that support the flooring of the scaffold, each attached to a



Steel trestle scaffold

drum mechanism. Cables extend from each drum to an outrigger beam attached overhead to the structure frame. Ratchet devices on the drums provide for raising or lowering the putlogs between which spanning planks form the working surface. Power scaffolding may be raised or lowered by means of an electric motor operated by the worker on the scaffold.

Scala, della, FAMILY: *see* della Scala family.

scalare, any of several popular aquarium fishes of the angelfish (*q.v.*) group.

scalawag, in U.S. history, any Southerner who supported the federal plan of Reconstruction after the Civil War or who joined with the black freedman and the carpetbagger (*q.v.*) in support of Republican Party policies. The term is pejorative.

Scalawags came from various segments of Southern society. In the Deep South many were apt to be former Whigs of the planter–merchant aristocracy. In the upper South they were often hill-country farmers whose sympathies during the war had been Unionist. Altogether, during the Reconstruction era, scalawags constituted perhaps 20 percent of the white electorate, a sizable force in any election or constitutional convention.

The origin of the term is unclear, but it was known in the United States from at least the 1840s, at first denoting a worthless farm animal and then denoting a worthless person.

scaldic poetry: *see* skaldic poetry.

scale, in zoology, small plate that forms part of the skin of certain animals. Scales provide protection from the environment and from predators. Fish scales are formed of bone from the deeper, or dermal, skin layer. The elasmobranchs (*e.g.,* sharks) have placoid scales; these are bony, spiny projections with an enamel-like covering. Ganoid scales, which are found on such fishes as gars and the bowfin, are similar to placoid scales but are covered with a peculiar enamel-like substance called ganoin. It is thought that true teeth developed from placoid scales. The advanced fish have either cycloid scales (*e.g.,* carp) or ctenoid scales (*e.g.,* perch; sunfish). These are typical overlapping fish scales; cycloid scales are large, thin, and round or oval in shape, and exhibit growth rings along their free edges. Ctenoid scales resemble cycloid scales but have comblike teeth on their overlapping edge.

Horny scutes, or corneoscutes, derived from the upper, or epidermal, skin layer, appear in reptiles and on the legs of birds; in some lizards, bony dermal scales underlie these. Modified epidermal tissue, mostly consisting of keratin, forms the scaly surface found on some mammals (*e.g.,* rats; pangolins).

The term scale is also applied to modified body coverings on certain insects, *e.g.,* moths.

scale, in music, any graduated sequence of notes, tones, or intervals dividing what is called an octave.

A brief treatment of scales follows. For full treatment, *see* MACROPAEDIA: Music, The Art of.

The division of the octave into seven notes appears early in Western music. Medieval musicians employed a variety of seven-note scales known as modes. Two modes, the Ionian and the Aeolian (in a slightly modified form), remain in general use as the diatonic major and minor scales. In each major and each minor scale the semitone intervals occur in the same relation to the key note (or tonic). In the major scale the semitones occur between notes 3–4 and 7–8.

The minor scale has two forms, the melodic minor and the harmonic minor. In the melodic minor the semitones occur between notes 2–3 and 7–8 ascending and between notes 6–5 and 3–2 descending. In the harmonic minor the semitones occur between 2–3, 5–6, and 7–8, with the interval of an augmented second (a tone plus a semitone) between notes 6–7.

The chromatic scale is a scale that is composed of all the 12 semitones in the octave and can be considered as a colouring of the diatonic scale. The medieval musician regarded the notes C and C-sharp, for example, not as separate notes but as two aspects of one note. This could be written as C and altered in performance "by reason of necessity or of beauty." At a later date, because of the tuning system called equal temperament, diatonic scales were built on any of the 12 notes of the octave. In the late 19th century the extreme use of chromaticism caused the partial destruction of diatonic tonality.

The scale of 12-tone, or dodecaphonic, music uses the notes of the chromatic scale but does not permit the establishment of any tonal centre. Such 20th-century composers as Arnold Schoenberg, Anton Webern, and Alban Berg used it in their technique of composition known as serialism.

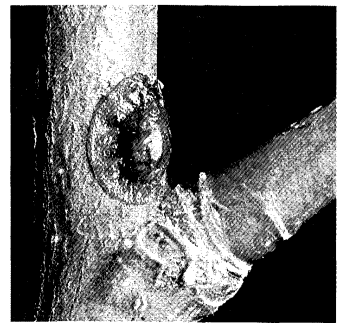
The whole-tone scale is often associated with Claude Debussy, although it had been used as early as the 18th century by Wolfgang Amadeus Mozart (in a sextet called "A Musical Joke"). As its name implies, it is a scale without semitones and therefore consists of only six notes. Various 19th- and 20th-century composers created other experimental scales.

Many historical and some existing traditions of music make use of five notes only (with their octave transpositions), and such a practice yields a pentatonic scale. This is a gapped scale—*i.e.,* a scale containing intervals of more than a tone. One of the more familiar pentatonic scales is the equivalent of the black notes of the keyboard.

See also diatonic; heptatonic scale; major scale; pentatonic scale; whole-tone scale.

scale insect, any member of several families of the insect order Homoptera. The females are wingless, with reduced legs and antennae; the males have one pair of delicate wings, well-developed legs and antennae, and no mouthparts. The body is covered by a protective waxy shell, often resembling scales or cottony cushions, that gives these insects their common name. The eggs are always protected; they are either embedded in a mass of waxy filaments or sheltered beneath the female's body or the scale she secretes.

Each species of scale insect is restricted in its range of host plants. Scale insects may attack



A soft scale (*Lecanium conic*)
Fran Hall—Photo Researchers/EB Inc.

roots, bark, leaves, twigs, or fruits of plants. Serious plant pests are the San Jose scale, the oystershell scale, the scurfy scale, and the purple and red scale of citrus. Other species—including the cochineal insect, the lac insect, and the ground pearls—have some commercial value. *See* Chinese wax; cottony-cushion scale; ground pearl; oystershell scale; San Jose scale; scurfy scale.

scale worm, any member of the order Aphroditamorpha (class Polychaeta, phylum Annelida), a group of widely distributed free-moving, segmented marine worms. Scale worms range in size from 0.5 to 25 cm (about 0.2 to 10 inches). The order includes the sea mouse (*q.v.*) and the common scale worm (*Arctonoe*).

The somewhat arched back of the scale worm is covered with flattened pairs of overlapping scales. A proboscis, or snout, which can be extended, has soft, fingerlike projections and four horny jaws.

scaleless dragonfish, any of the more than 90 species of marine fishes constituting the family Melanostomiatidae (order Salmoniformes), with representatives inhabiting tropical regions of the major oceans. The name refers to the total absence of scales and the fierce appearance resulting from the numerous fanglike teeth of these fish.

The dorsal and anal fins of the scaleless dragonfish are located at the extreme posterior, and the pectoral fins are frequently absent; thus most of the body appears to be without fins. Long barbels extend from the lower jaw, and luminescent organs run the length of the body along the sides. Most species are about 10–15 cm (4–6 inches) long. Scaleless dragonfish inhabit waters ranging from the surface to depths of 1,500 m (5,000 feet), their preferred habitat usually being waters of great depth.

scaletail, any of several species of African rodents of the family Anomaluridae. *See* flying squirrel.

Scalia, Antonin (b. March 11, 1936, Trenton, N.J., U.S.), associate justice of the U.S. Supreme Court from 1986, well-known for his strong legal conservatism.

The son of a Sicilian immigrant father and an Italian-American mother, he received a Roman Catholic parochial education in New York City and graduated at the top of his class from Georgetown University (A.B., 1957), Washington, D.C. He went to Harvard Law School, editing the prestigious *Law Review* and graduating in 1960. He worked for a Cleveland law firm from 1961 to 1967, taught law at the University of Virginia Law School from 1967 to 1974, and served as assistant attorney general in the Office of Legal Counsel of the U.S. Department of Justice from 1974 to 1977.

Returning to academia full-time, Scalia taught at the law school of the University of Chicago from 1977 until President Ronald W. Reagan appointed him to the U.S. Court of Appeals, District of Columbia Circuit, in 1982. He served there until chosen by Rea-

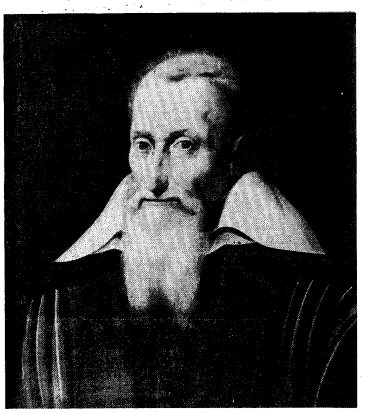
gan to be an associate justice of the Supreme Court in 1986.

Scalia tended to oppose "judicial activism" and to favour "judicial restraint" and also tended to interpret narrowly the laws of Congress and to interpret more leniently state and local laws (unless they were in irreconcilable conflict with federal law or with conservative constitutional principles).

Scaliger FAMILY: *see* della Scala family.

Scaliger, Joseph Justus (b. Aug. 5, 1540, Agen, Fr.—d. Jan. 21, 1609, Leiden, Holland [now in Neth.]), Dutch philologist and historian whose works on chronology were among the greatest contributions of Renaissance scholars to revisions in historical and classical studies.

The son of an Italian physician and philosopher, Julius Caesar Scaliger, who immigrated to Agen in 1525, the young Joseph entered school at Bordeaux and quickly proved himself an extraordinarily precocious student. In 1559 he went to Paris to study Greek and Latin and then began to teach himself Hebrew, Arabic, Syrian, Persian, and the principal modern languages. He converted to Protestantism in 1562 and set out on travels to French and German universities and to Italy to study its antiqui-



Joseph Justus Scaliger, oil painting by an unknown French artist, 17th century; in the Musée de Versailles

Cliche Musees Nationaux

ties. After the Massacre of St. Bartholomew's Day (August 1572) and the persecution of French Protestants, he went to Geneva, where he taught at an academy, returning to France in 1574. He was called to the University of Leiden (1593), where he became known as the most erudite scholar of his time. He remained there until his death.

Scaliger's greatest work is the *Opus de emendatione tempore* (1583; "Study on the Improvement of Time"), a study of previous calendars. In it he compared the computations of time made by the various civilizations of antiquity, corrected their errors, and for the first time placed chronology on a solidly scientific basis. His other major work is *Thesaurus temporum, complectens Eusebi Pamphili Chronicon* (1609; "The Thesaurus of Time, Including the Chronicle of Eusebius Pamphilus"), a reconstruction of the *Chronicle* of the early Christian historian Eusebius Pamphilus and a collection of Greek and Latin remnants placed in chronological order. Two other treatises (published in 1604 and 1616) established numismatics, the study of coins, as a new and reliable tool in historical research. A prolific writer, his works were collected and published posthumously in 1610, and two collections of his correspondence appeared in 1624 and 1627.

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Scaliger, Julius Caesar, Scaliger also spelled SCALIGERI (b. April 23, 1484, Riva, Republic of Venice [Italy]—d. Oct. 21, 1558, Agen, Fr.), French classical scholar of Italian descent who worked in botany, zoology, grammar, and literary criticism. He claimed to be a descendant of the Della Scala family, whose Latinized name was Scaligerus and who had ruled the Italian city of Verona during the two preceding centuries.

Scaliger became known as a scholar through two virulent orations in 1531 and 1536 against the *Ciceronianus* of Erasmus, written in vigorous and trenchant Latin. The views on Ciceronianism with which Scaliger countered Erasmus, however, are considered narrow and shortsighted; Scaliger largely misunderstood the purpose of Erasmus' ridicule of the stylistic excesses of contemporary Ciceronians.

Little is known of Scaliger's early life. In 1525 he left Italy to become physician to the bishop of Agen at Quienne, where he spent the rest of his life, becoming a French citizen. Except for a tract on Hippocrates' *De insomniis* (1539; "Concerning Bad Dreams"), his scholarly work was published late in his life and consisted largely of discussions of standard authors.

His dialogue *De plantis* (1556) is a commentary on the book on plants wrongly ascribed to Aristotle, and his *Exercitationes exotericae de subtilitate* (1557; "Esoteric Exercises in Subtlety") discusses scientific and metaphysical problems raised in *De subtilitate rerum* ("On the Subtlety of Things") by the eminent naturalist Geronimo Cardano. An unfinished commentary on Aristotle was published in 1619 and one on Theophrastus in 1644.

His *De causis linguae latinae* (1540; "On the Subject of the Latin Language") was an interesting early attempt to discuss the principles of Latin grammar. His *Poetice* (1561; "Poetics") became his most widely read book. In it Greco-Roman rhetoric and poetics are used as a foundation for literary criticism, and his exposition of Aristotelian criteria for tragedy did much to turn his contemporaries toward Classicism. Thoroughly conversant with Latin and Greek writers, a competent textual critic, and a prolific composer of Latin verse, Scaliger was chiefly interested in developing an understanding and critical evaluation of the ancients. His teaching impressed a whole generation of savants in the great age of French classical scholarship.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

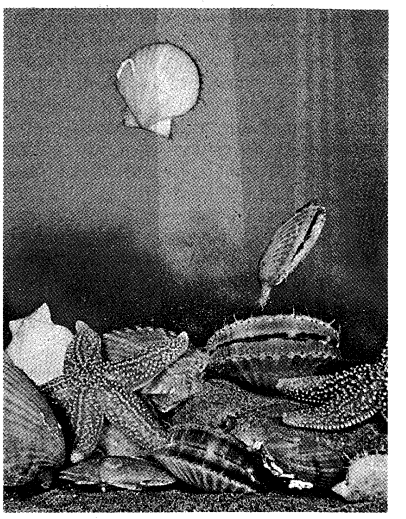
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scallop, also called ESCALLOP, FAN SHELL, or COMB SHELL, any of the marine bivalve mollusks of the family Pectinidae, particularly the species of the genus *Pecten.* The family, which includes about 50 genera and subgenera and more than 400 species, is worldwide in distribution and ranges from the intertidal zone to considerable ocean depths.

The two valves of the shell are usually fan-shaped, except for the straight hinge line with winglike projections at either side of the hinge; the valves range in size from about 2.5 cm (1 inch) to more than 15 cm (6 inches). The shell may be smooth or sculptured with radial ribs, which may be smooth, scaly, or knobbed. Scallops range in colour from brilliant red, purple, orange, or yellow to white. The lower valve is usually lighter in colour and less sculptured than the upper.

Scallops have a single large adductor muscle for closing the valves. At the edge of the mantle (*i.e.,* the soft tissues in contact with most of the valve surface) are short tentacles that hang like a curtain between the valves when they are open. The tentacles detect changes in the composition of the watery medium. Also at the edge of the mantle are eyes.

Scallops are most commonly found in sand or fine gravel in relatively clear water. They feed on microscopic plants and animals. Cilia (tiny hairlike structures) and mucus aid in



Scallop (*Chlamys opercularis*) swimming to escape capture by starfish (*Asterias rubens*)

Douglas P. Wilson

the collection and movement of food particles toward the mouth. Scallops are unusual as bivalves in their ability to swim, which they do by spasmodic clapping movements of the valves; the water, ejected in jetlike spurts, propels the animal forward.

During reproduction eggs and sperm are shed into the water, where fertilization occurs. The eggs develop into free-swimming larvae. In the next developmental stage they settle on the bottom; some have the ability to crawl. A byssal gland develops and is used to attach the animal firmly to the bottom or to some other solid surface. Some scallops remain attached throughout life; others break free and become spasmodic swimmers.

The most important predator of scallops is the starfish, which attacks by wrapping its arms about the valves and, by the sucking action of its tube feet, pulls the valves apart; it then inserts its stomach between the valves of the scallop and digests the soft parts.

Primitive man ate scallops and used their shells as utensils. During the European Middle Ages the shell design of the pilgrim's scallop (*Pecten jacobaeus*) became a religious emblem (the badge of St. James).

Scallops are a popular and commercially important food item; the large adductor muscle is the part normally eaten. The most productive scallop-bearing grounds are in the northeastern part of Georges Bank, off the coast of Massachusetts, and the Bay of Fundy (New Brunswick–Nova Scotia).

The sea scallop, also known as the giant, or deep-sea, scallop (*Placopecten magellanicus*), is the species commonly taken off New England and eastern Canada. The bay scallop (*Aequipecten irradians*) is also commonly found there. In the British Isles *A. opercularis* is the species most commonly sought, for food and as bait for commercial fishing lines.

scalping, removal of all or part of the scalp, with hair attached, from an enemy's head. Although best known as a practice of North American Indian warfare, scalping was not exclusive to the Indians. The Greek historian Herodotus attributed the practice to the Scythians, and some western Siberian peoples and possibly the ancient Persians may also have scalped enemies.

Scalping was not common to all American

Indian tribes, and some authors question its presence in North America before the arrival of whites. The custom was probably confined originally to a limited area in what is now the eastern United States and around the lower St. Lawrence, as well as an area in the Gran Chaco country of South America. The practice spread over much of central and western North America as a result of bounties offered by the French, English, Dutch, and Spanish colonial authorities for the scalps of enemy Indians and sometimes of enemy whites. Many American frontiersmen and soldiers adopted the custom.

The importance of scalping varied. For Southeastern Indians it was necessary to take scalps to become a warrior and to placate the spirits of the dead. Most Northeastern Indians valued captives more than scalps. Among Plains Indians scalps were taken for war honours, although such practices as touching a live enemy accrued more honour to a warrior.

Scalps were usually taken from dead enemies, although some Plains Indians preferred a live victim. The operation was not necessarily fatal, and some victims were released alive. The scalp was sometimes offered as a ritual sacrifice or preserved and carried by women in a triumphal scalp dance, later to be retained as a pendant by the warrior, used as tribal medicine, or discarded.

scaly anteater: *see* pangolin.

Scamozzi, Vincenzo (b. 1552, Vicenza, Venice—d. 1616, Venice), Venetian architect and architectural theorist of the Late Renaissance who is often regarded as the intellectual father of Neoclassicism. Trained by his father, Bertotti Scamozzi, in the atmosphere of the Accademia Olimpico, Vicenza, he provided designs for Salzburg cathedral but worked mostly at Venice and Padua. He designed palaces, villas, churches, theatres, and the Italian fortress town of Palmanova.

Although Scamozzi's theories differ in certain respects from those of Andrea Palladio, his writings (*L'idea dell'architettura universale,* 1615) caused Palladianism to influence English Neoclassic architecture from Inigo Jones onward. An important theatre architect, he completed, in 1585, Palladio's Teatro Olimpico, adding to it the model streets behind the doorways of the *frons scaenae.* These streets were constructed of timber and plaster on a raking stage beneath a domed plaster sky and arranged so that each member of the audience could see into at least one of them. The form of theatre developed for contemporary needs is found in his court theatre at Sabbioneta, 1588–90, where the scenery was extended forward on the actors' stage to provide entry doors for the performers, who also used the floor of the hall (orchestra).

scampi, plural SCAMPI, also called DUBLIN BAY PRAWN, or NORWAY LOBSTER (*Nephrops norvegicus*), edible lobster of the order Decapoda (class Crustacea). It is widespread in the Mediterranean and Northeastern Atlantic, from North Africa to Norway and Iceland, and as a gastronomic delicacy it is commercially exploited over much of its range, particularly by Great Britain, France, Denmark, and Italy.

The scampi lives in burrows on soft sea bottoms at depths between 10 and 250 metres (about 33 to 820 feet). It grows to about 200 millimetres (8 inches) in length and weighs about 200 grams (0.44 pounds). It is easily identified by its long slender claws, which can be almost as long as the body. Most scampi are fished using a small trawl, but a few are caught in baited lobster pots. They are marketed in a variety of ways, whole or as tails, shelled or unshelled, fresh, frozen, or cooked. *See also* lobster.

Scandinavia, historically SCANDIA, part of northern Europe, generally held to consist of the two countries of the Scandinavian Peninsula, Norway and Sweden, with the addition of Denmark. Some authorities argue for the inclusion of Finland on geological and economic grounds and of Iceland and the Faeroe Islands on an anthropological, cultural, and linguistic basis.

The term Norden has recently come into use in addition to the word Scandinavia and includes Denmark, Finland, Iceland, Norway, and Sweden, a group of countries having affinities with one another and a distinctness from the rest of continental Europe.

Scandinavian Airlines System (SAS), major international airline, formed by three national Scandinavian air carriers. Headquarters are in Stockholm.

The airline was established in 1951 through a consortium agreement among three Scandinavian airlines: Det Danske Luftfartselskab A/S (DDL), the Danish airline; Den Norske Luftfartselskap A/S (DNL), the Norwegian air carrier; and AB Aerotransport (ABA), the Swedish airline. Each of the national carriers is owned 50 percent by its national government, and 50 percent by private individuals.

SAS operates scheduled passenger, freight, and mail flights between nearly 100 cities in about 50 countries. The company also offers tour and catering services, and operates hotels in Scandinavia and Greenland.

Scandinavian Ice Sheet, one of the largest Pleistocene glacial masses, covering most of northern Europe (the Pleistocene Epoch began about 2,500,000 years ago and ended about 10,000 years ago). At its maximum extent, the Scandinavian Ice Sheet nearly reached latitude 48° N. It is estimated to have covered about 6,600,000 square kilometres (2,500,000 square miles) and attained a thickness of up to 3,000 metres (9,800 feet).

The ice sheet originated from the Jostedalsbreen area in Norway and spread to Great Britain on the west and nearly to Moscow on the east. It retreated to the Jostedalsbreen area at the end of the Pleistocene.

Scandinavian languages, languages forming the North Germanic group of the Germanic languages. The modern standard languages are Danish, Swedish, Norwegian (Dano-Norwegian and New Norwegian varieties), Icelandic, and Faeroese. These languages are usually divided into East Scandinavian (Danish and Swedish) and West Scandinavian (Norwegian, Icelandic, and Faeroese) groups. They developed from the dialects that arose within Common Scandinavian toward the end of the Viking period (*c.* 11th century). Earliest written records consist of runic inscriptions, dating from *c.* AD 200 to 800.

Icelandic and Faeroese, which preserve many of the words and grammatical forms of Old Norse, are the most conservative of the modern Scandinavian languages and are largely unintelligible to other Scandinavians. Norwegians, Swedes, and Danes, on the other hand, are usually able to communicate with each other by speaking or writing their own languages, which have many words in common, many similar grammatical features, and numerous changes in common from Common Scandinavian times (600–1050). One characteristic shared by all Scandinavian languages is that definite articles are enclitic (*i.e.,* "the" is attached to the end of the noun rather than preceding it—Norwegian *boken* "the book," formed from *bok* "book" and *-en* "the"). *See also* Danish language; Faeroese language; Icelandic language; Norwegian language; Norse, Old, language; Swedish language.

Scandinavian law, in medieval times, a separate and independent branch of early Germanic law. It originated within the territories of present-day Norway, Denmark, and Sweden and was extended between the 9th and 13th centuries to the settled or conquered territories of Iceland, Greenland, the Faeroe Islands, parts of Great Britain and Ireland, Normandy, Finland, and other territories along the Baltic shore.

Before the Scandinavian states emerged as unified kingdoms in the 9th century, the several districts and provinces were virtually independent legally and administratively. Although legal developments followed similar lines everywhere, a number of separate legal systems or laws came into existence. Originally there were no written laws, the legal system consisting of customary law that was conserved, developed, and approved by the people themselves at the *things; i.e.,* popular meetings of all freemen. The meetings were conducted by one or more prominent men conversant with the law, who made statements of law, gave directions concerning rules of law applicable in particular cases, and with the assent of the *thing* created new law when traditional law was insufficient. A trend toward greater legal unity gradually asserted itself, the result being the formation of more comprehensive regions with common *things* and identical laws.

Between the 11th and 13th centuries the provincial laws were recorded in writing, most often as private compilations but occasionally by instructions from the king and invariably in the vernacular. In Norway, King Magnus V (1263–80) provided a common code of law for the rural districts as early as 1274 and for the towns two years later. Similar developments took place in Sweden in the 14th century, but Denmark remained subject to three different provincial laws until the promulgation of Christian V's Danish Law (1683).

In addition to the principal subjects of private law (matrimony, inheritance, property, and contract), the codes contained constitutional and administrative law, criminal law, and law of procedure. Ecclesiastical law was usually excluded and treated separately. The codes were chiefly a codification of the customary law; influences from abroad were negligible except for some traces of canon law.

The codes did, nonetheless, depart from customary law in some respects. Whereas the provincial laws had tolerated and regulated blood feuds, King Magnus' code abolished private vengeance, declaring that the king's officials should initiate criminal proceedings and provide for the punishment of those who committed crimes. Further, presumably under the influence of Christianity, legal provisions were introduced for assistance to paupers and the helpless. Rules concerning property in land were markedly original, for example, in giving the right of redemption to the family rather than to the king or clan.

During the early modern period, supplementary laws were issued, and in some cases the original codes were revised. Finally, during the reign of Christian V, a comprehensive codification was accomplished, and the earlier and often obsolete law was replaced by codes known as Danish Law (1683) and Norwegian Law (1688). The new codes were based mainly on the existing national laws of the two countries, and foreign influence was comparatively slight. There was a strong emphasis—for the times—on individual rights, and provisions of criminal law were relatively humane as compared with other European legislation.

In Sweden a revised edition of the original code was issued in the 15th century. The need for more modern legislation, however, made itself increasingly felt, and, following the Danish–Norwegian example, in 1734 a royal commission drafted a new code, which was also applicable to Sweden's possession, Finland. These old codes have been almost completely displaced by modern parliamentary statutes.

Scandinavian literature, the body of written works produced in the group of languages

spoken by the inhabitants of Denmark, the Faeroe Islands, Iceland, Norway, and Sweden.

A brief treatment of Scandinavian literature follows. For full treatment, *see* MACROPAEDIA: Scandinavian Literature.

Scandinavian literature may be said to have originated in the Middle Ages, when the most distinguished works were Icelandic and Norwegian, consisting of heroic and mythological lays, skaldic poetry, and sagas. Other notable medieval writings included the late 12th- and early 13th-century Danish writer Saxo Grammaticus' *Gesta Danorum* (written between 1185 and 1222; "The Deeds of the Danes"); a wealth of ballads common to Scandinavia but particularly well-represented in Denmark; and *Eufemiavisorna* ("The Songs of Euphemia"), a work of chivalric poetry written in Swedish between 1303 and 1312. Norway and Denmark entered into a political union in 1397, and the Danish language served as the literary medium for both countries during the next few centuries.

The Lutheran Reformation had a major impact on the various Scandinavian literatures. The Bible was translated into the Swedish, Danish, and Icelandic vernaculars in the mid-16th century and was supplemented by a wealth of scholarly polemics supporting or attacking the Reformation, as well as by early Lutheran hymns and sermons. The 17th-century lyrics and hymns of the Dane Thomas Kingo and the poetic works of the Swede Georg Stiernhielm, particularly his allegorical epic *Hercules* (1658), reflect the delayed influence of continental Neoclassicism on Scandinavian letters.

The Enlightenment flowered in 18th-century Denmark with the comedies of the Norwegian-born Ludvig Holberg and in Sweden with Olof von Dalin's journal, *Then swänska Argus* (1732–34; "The Swedish Argus"), which played a major role in popularizing French and English ideas and literary forms.

The Scandinavian Romantic movement of the late 18th and early 19th centuries derived its inspiration partly from 18th-century British sources—such as the verses that James Macpherson attributed to Ossian, and the poems of Thomas Gray and Edward Young—but mostly from German ones, particularly Goethe, Schiller, the folkloristic school of Heidelberg (the Brothers Grimm), and the philosophical school of Jena (Friedrich Schelling and the brothers August and Friedrich von Schlegel). Humiliating political events (the bombardment of Copenhagen in 1807 and Sweden's loss of Finland to the Russians) led both Denmark and Sweden to cultivate national romanticism (the celebration of a nebulous past of legendary greatness). The Danes Johannes Ewald and Adam Oehlenschläger both chose legendary-mythological themes. In Sweden this tendency found exponents in Esaias Tegnér and Erik Gustaf Geijer, while the leading metaphysical Romantics were Per Daniel Atterbom and Erik Johan Stagnelius. Swedish for a long time continued to be the literary language of Finland after the country was ceded to Russia in 1809; two outstanding Finno-Swedish writers of the age were the poet Johan Ludvig Runeberg and the writer-scholar Zacharias Topelius.

The Romantic movement was central to the literary and linguistic revival that occurred in Iceland during the early 1800s. Its leading representative was Bjarni Thorarensen, who produced a nationalistic poetry that became a model for much of the lyrical verse written during the rest of the century.

After Denmark ceded Norway to Sweden in 1814, Henrik Wergeland and other prominent Norwegian men of letters saw an opportunity to develop an independent culture and insisted on the complete rejection of all existing Danish elements in Norwegian literature. During the ascendancy of national Romanticism in Norway, Ivar Aasen led a movement to establish a literary language based on rural dialects linked with Old Norse, and many writers of the time turned to Norway's heroic past and to contemporary life for inspiration.

Toward the end of the 19th century the Danish critic Georg Brandes encouraged the emergence of a modern school of literature that would deal with social realities instead of romantic ideals. His compatriot, the novelist and poet Jens Peter Jacobsen, responded, as did such Norwegian writers as Bjørnstjerne Bjørnson and Henrik Ibsen, as well as the Swedish playwright August Strindberg, who had originally been drawn to national-historical themes but whose subsequent works spearheaded the modern breakthrough that Brandes had urged. Ibsen's most famous plays unmask the hypocrisy of conventional morality, while his late ones have strong Symbolist elements. Strindberg's work followed a similar development, moving from Realism to a mode anticipating Symbolism and Expressionism. Both Ibsen and Strindberg met with opposition in their native countries and lived abroad before finally gaining recognition at home. The 1890s saw a reaction against Social Realism. The Dane Johannes Jørgensen was typical of the Neoromantic poetic revival and return to religious faith; the Norwegian Knut Hamsun explored the individual's subjective experiences; and their Swedish contemporaries Verner von Heidenstam and Selma Lagerlöf exploited myth and fantasy once more.

Outstanding writers of the first half of the 20th century were the Danes Henrik Pontoppidan and Isak Dinesen (pseudonym of Karen Christence Dinesen, Baroness Blixen-Finecke), the Swede Hjalmar Bergman, and the Norwegian Sigrid Undset. The period also saw the emergence of many powerful talents from working-class backgrounds: the Dane Martin Andersen Nexø; the Swedes Eyvind Johnson and Harry Martinson (joint recipients of the Nobel Prize for Literature for 1974) and Vilhelm Moberg; and the Norwegians Aksel Sandemose, Kristofer Uppdal, and Oskar Braaten, who were deeply marked by their early experience of life's struggles. Modernism in poetry was pioneered by Finno-Swedish writers such as Edith Södergran and Gunnar Björling; by the Swedes Gunnar Ekelöf, Birger Sjöberg, and Pär Lagerkvist (also a novelist and dramatist); the Danes Emil Bønnelycke and Gustaf Munch-Petersen; and the Norwegian Rolf Jacobsen.

World Wars I and II focussed the attention of dramatists on moral and existential issues, as in the plays of Kaj Munk and Kjeld Abell of Denmark and of Nordahl Grieg of Norway. These issues were also explored in the novels of the Swede Stig Dagerman, the Faeroese Heðin Brú (pseudonym of Hans Jakob Jacobsen), and the Icelander Halldór Laxness, who won the 1955 Nobel Prize for Literature.

Much of the literature produced in Scandinavia from the mid-1960s through the late 1970s was that of social and political protest. Dissatisfaction with the capitalist system, concern for Third World poverty, and revulsion against the Vietnam War led to a belief in the need to heighten the public's awareness by means of documentaries and politically committed works. By the 1980s, however, imaginative literature had begun to reemerge. Present-day Scandinavian literature, as exemplified by some of its leading authors (*e.g.*, Sven Lindqvist, Klaus Rifbjerg, Tove Jansson, and Steinbjørn B. Jacobsen), shows a more philosophical approach to the problems of contemporary society, an upsurge of interest in myth and fantasy, and an increased experimentation with technique and style.

Scandinavian Peninsula, large promontory of northern Europe, occupied by Norway and Sweden. It is about 1,150 mi (1,850 km) long and extends southward from the Barents Sea of the Arctic Ocean between the Gulf of Bothnia and the Baltic Sea (east), Kattegat and Skagerrak (south), and the Norwegian and North seas (west). The peninsula (area 289,500 sq mi [750,000 sq km]) essentially consists of a mountainous mass, much of which is part of the ancient Baltic Shield, parts of which were affected by glaciation during the Pleistocene Epoch. Norway and Sweden share the western and eastern sides, respectively, of this mountain mass. Sweden, however, has extensive slopes of gentle gradient down to the Baltic Sea, while Norway's mountains reach to the actual coastline and are deeply dissected by fjords.

Scandinavianism: *see* Pan-Scandinavianism.

scandium (Sc), chemical element, rare-earth metal of transition Group IIIb of the periodic table. Scandium is a silvery-white, rather soft metal. After Dmitry Ivanovich Mendeleyev predicted (1871) its existence, tentatively calling it ekaboron, Lars Fredrik Nilson discovered (1879) its oxide, scandia, in the rare-earth minerals gadolinite and euxenite, and Per Teodor Cleve (later in 1879) identified scandium with the hypothetical ekaboron.

Scandium is found in small proportions in many of the heavy rare-earth ores of Scandinavia and elsewhere and in many tin and tungsten ores; it also occurs in the products of nuclear fission. The cosmic abundance of scandium is relatively high. Although it is only about the 50th most abundant element on Earth, it is about the 23rd most abundant element in the Sun.

Scandium is easily separated from the other rare earths by precipitation of the very insoluble potassium scandium sulfate or by extraction of scandium thiocyanate by diethyl ether. The metal itself was first prepared (1938) by the electrolysis of potassium, lithium, and scandium chlorides in a eutectic mixture (*i.e.*, a mixture having the lowest melting point possible with those components). Scandium is now produced on a small scale mostly as a by-product of uranium extraction from the mineral davidite, which contains about 0.02 percent scandium oxide. Very few uses of this unusual metal have been developed. Its low density and high melting point suggest applications as an alloying agent for devices requiring lightweight metals. After irradiation in an atomic pile, scandium emits strong gamma radiation with an 85-day half-life, for which it could be used in radiotherapy.

The chemistry of scandium bears a closer resemblance to that of the other trivalent rare-earth elements than to that of aluminum or titanium. Some of its behaviour, however, is atypical of the rare earths because of its significantly smaller ionic radius (0.73 angstrom [Å]) as compared with the rare-earth average (0.96 Å). For this reason the Sc^{3+} ion is a relatively strong acid and has a much greater tendency to form complex ions. The Sc^{3+} ion is paramagnetic. Natural scandium is wholly composed of the stable isotope scandium-45.

atomic number	21
atomic weight	44.956
melting point	1,539° C
boiling point	2,832° C
specific gravity	2.989 (25° C)
valence	3
electronic config.	2-8-9-2 or $(Ar)3d^14s^2$

Scania (Sweden): *see* Skåne.

Scania question: (Scandinavian history) *see* Skåne question.

scansion, the analysis and visual representation of a poem's metrical pattern. Adapted from the classical method of analyzing ancient Greek and Roman quantitative verse, scansion in English prosody employs a system of symbols to reveal the mechanics of a poem—

i.e., the predominant type of foot (the smallest metrical unit of stressed and unstressed syllables); the number of feet per line; and the rhyme scheme. The purpose of scansion is to enhance the reader's sensitivity to the ways in which rhythmic elements in a poem convey meaning. Deviations in a poem's metrical pattern are often significant to its meaning.

There are three major types of English scansion: the graphic, the musical, and the acoustic. The primary symbols used in graphic scansion, the most common type of scansion, are: (— or ′) to represent a syllable that is stressed in context; (˘) to represent a syllable that is unstressed in context; a vertical line (|) to indicate a division between feet; and a double vertical line (‖) to show a caesura, a pause within a line of verse. Using these symbols, graphic scansion begins by marking the accented, then the unaccented syllables according to the natural rhythm of speech. It cannot, however, record the subtle variations of language, and is, therefore, a highly simplified analysis.

Because few poems are absolutely regular, metre is usually determined by the type of foot that appears most frequently, as iambic pentameter or trochaic tetrameter. Following are the last two lines from Tennyson's "Ulysses," which are written in iambic pentameter; the lines are scanned in the graphic method. The spondaic foot (two stressed syllables) in the first line is a common variation in iambic rhythm.

˘ ′ ˘ ′ ˘ ′ ˘ ′ ˘ ′
Made weak | by time | and fate, | but strong | in will
˘ ′ ˘ ′ ˘ ′ ˘ ′ ˘ ′
To strive, | to seek, | to find, | and not | to yield.

Both musical and acoustic scansion, highly complex systems, are more sensitive than graphic scansion to the tonal and accentual variety of speech. Musical symbols (*e.g.,* eighth notes for unstressed syllables, quarter or half notes for stressed syllables, and musical rests for pauses) record accentual differences. Machines such as the oscillograph are used by modern acoustic linguists to catch even slightly varying degrees of stress.

Scapa Flow, extensive landlocked anchorage in the Orkney Islands, which lie off the northern tip of Scotland. The anchorage is approximately 15 mi (24 km) from north to south and 8 mi wide and is bounded by the islands of Mainland (Pomona) to the north, South Ronaldsay to the east, and Hoy to the west. The main entrance is in the south, from Pentland Firth, the strait separating the Orkneys from the mainland of Scotland; Sound of Hoy on the west leads to the Atlantic, and three intricate channels on the east give access to the North Sea. Scapa Flow's extensive sheltered waters were selected as a suitable base from which the British fleet could patrol the North Sea. Little defensive work had been done by the outbreak of World War I, as the strong tides and the navigational hazards were considered sufficient defense. The Grand Fleet was based there from 1914 for much of the war. After the surrender of the German fleet in 1918 and its internment in Scapa Flow, the ships were scuttled by the German crews.

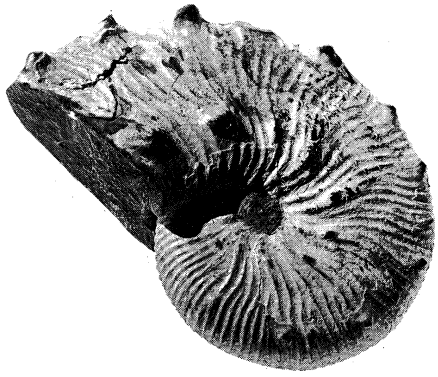
During World War II, the British fleet was again stationed at Scapa Flow, where it was subjected to considerable attack by both submarines and aircraft early in the war. In 1939 the battleship "Royal Oak" was sunk, with a loss of 833 lives, by a German submarine. This attack was quickly followed by air raids, and the fleet was forced to put to sea. New defensive measures were rapidly installed. Airfields were also constructed, and the islands on the east were joined to Mainland by concrete emplacements known as the Churchill Barriers. The German air attacks continued only until April 1940. The base was finally closed in 1956.

scapegoat, Hebrew SA'IR LA-'AZA'ZEL ("goat for Azazel"), in the Old Testament ritual of Yom Kippur (Lev. 16:8–10), a goat symbolically burdened with the sins of the Jewish people. Some scholars believe that the animal was chosen by lot to placate Azazel, a wilderness demon, then thrown over a precipice outside Jerusalem to rid the nation of its iniquities. By extension, a scapegoat has come to mean any group or individual that innocently bears the blame of others.

The use of scapegoats has a long and varied history involving many kinds of animals, as well as human beings. In ancient Greece, human scapegoats (*pharmakos*) were used to mitigate a plague or other calamity or even to prevent such ills. The Athenians chose a man and woman for the festival of Thargelia. After being feasted, the couple was led around the town, beaten with green twigs, driven out of the city, and possibly even stoned. In this way the city was supposedly protected from ill fortune for another year.

During the Roman feast of Lupercalia, priests (Luperci) cut thongs from the sacrificial animals (goats and a dog), then raced around the walls of the old Palatine city, striking women (especially) as they passed with the thongs. A blow from the hide of the scapegoat was said to cure sterility. In early Roman law an innocent person was allowed to take upon himself the penalty of another who had confessed his own guilt. Christianity reflects this notion in its doctrine of justification and in its belief that Jesus Christ was the God-man who died to atone for the sins of all mankind.

Scaphites, extinct genus of cephalopods (animals related to the modern octopus, squid, and nautilus) found as fossils in marine deposits. Because *Scaphites* is restricted to certain divisions of Cretaceous time (the Cretaceous Period began 136,000,000 years ago and lasted 71,000,000 years) it is a useful index, or guide, fossil. Its shell form and manner of growth are quite unusual. At first, the shell in *Scaphites* is tightly coiled; later, it grows in a straight fashion but then coils again at its terminus, and the mature shell takes the form of a double loop linked by a straight segment.



Scaphites, Middle to Upper Cretaceous in age; from Cheyenne River, Wasta, S.D.
By courtesy of the Buffalo Museum of Science, Buffalo, N.Y.

scapigliatura (Italian: "bohemianism"), a mid-19th-century avant-garde movement found mostly in Milan; influenced by Baudelaire, the French Symbolist poets, Edgar Allan Poe, and German Romantic writers, it sought to replace the classical, Arcadian, and moralistic traditions of Italian literature with works that featured bizarre and pathological elements and direct, realistic narrative description. One of the founding members, Cletto Arrighi (pseudonym for Carlo Righetti), coined the name for the group in his novel *Scapigliatura e il 6 febbraio* (1862). The chief spokesmen were the novelists Giuseppe Rovani and Emilio Praga. Other members included the poet and musician Arrigo Boito (chiefly remembered today as Verdi's librettist), the poet and literary professor Arturo Graf, and Iginio Ugo Tarchetti.

Although some members of the group produced important literary work, they were more important as catalysts. Both of the major writers of *verismo* (Realism), Luigi Capuana and Giovanni Verga, drew part of their inspiration from the *scapigliati.* As iconoclasts, the group also served as an example to 20th-century groups such as the Futurists and the Hermetic poets.

Scapin, Italian SCAPINO (from Italian *scappare,* "to flee"), stock character of the Italian commedia dell'arte; one of the comic servants,



Scapin, etching by Jacques Callot, 17th century; in the Victoria and Albert Museum, London
By courtesy of the Victoria and Albert Museum, London

or *zanni,* who was especially noted for his cowardice, taking flight at the first sign of a conflict. Usually cast as an unreliable valet and general handyman, Scapin, wearing a bearded mask with a large hooked nose, was costumed in a loose-fitting green-and-white-striped tunic, pantaloons, and a rakish hat with two long feathers; he carried a wooden sword. Molière's *Les Fourberies de Scapin* (1671; *The Cheats of Scapin,* 1677) made this character a part of French comedy.

scapolite, any of a group of feldspathoid minerals found in calcium-rich metamorphic rocks, particularly marble, gneiss, granulite, greenschist, and skarns. Principal occurrences are Quebec and Ontario, Canada; Kiruna, Swed.; Pennsylvania, United States; and Queensland, Australia. These minerals form a solid-solution (chemical-replacement) series in which sodium and calcium replace each other in the molecular structure. Marialite, a sodium aluminosilicate, and meionite, a calcium aluminosilicate, are the theoretical end-members (pure compounds); they have been synthesized but occur in nature only with at least 20 percent substitution of one for the other. Several names have been given to naturally occurring scapolite, including wernerite (the former group name), dipyre (now used for the marialite-rich variety), and mizzonite (now used for the meionite-rich variety). For chemical formulae and detailed physical properties, *see* feldspathoid (table).

scapula, also called SHOULDER BLADE, large bone of the shoulder girdle in vertebrates. In humans it is triangular and lies on the upper back between the levels of the second and eighth ribs. Its posterior surface is crossed obliquely by a prominent ridge, the spine, which divides the bone into two concave areas, the supraspinous and infraspinous fossae. The spine and fossae give attachment to muscles that act in rotating the arm. The spine ends in the acromion, a process that articulates with the clavicle, or collarbone, in front and helps form the upper part of the shoulder socket. The lateral apex of the triangle is broadened and presents a shallow cavity, the glenoid cavity, which articulates with the head of the bone of the upper arm, the humerus, to form the shoulder joint. Overhanging the glenoid cavity is a beaklike projection, the coracoid process, which completes the shoulder socket. To the margins of the scapula are attached muscles that aid in moving or fixing the shoulder as demanded by movements of the upper limb.

scar, mark left on the skin after healing of a sore or wound; it lacks the oil glands and elastic tissue that normally protect the skin against irritation. Often, scars are slightly painful or itchy. Most of them gradually contract and may inhibit motion of joints. Sometimes a scar becomes an excessively fibrous growth called a keloid (*q.v.*), which extends beyond the wound's original limits. All scars, but especially those resulting from unaided healing of third-degree burns, are prone to malignant change. Treatment of scars is considered by plastic surgeons to be among their most important problems.

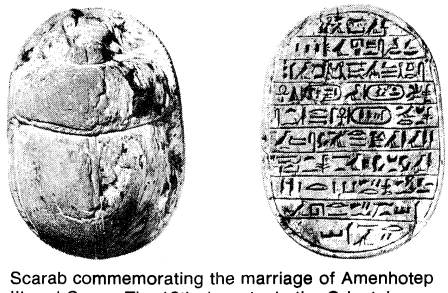
scarab, Latin SCARABAEUS, in ancient Egyptian religion, important symbol in the form of a dung beetle. The Egyptians apparently believed that the beetle laid its egg in the ball of dung, which it rolled to its burrow and consumed; they saw in the life cycle of the beetle a microcosm of the cyclical processes in nature, and particularly of the daily rebirth of the sun. The scarab became a symbol of the enduring human soul as well, and quantities of dead beetles have been discovered in burials of the earliest period.

Scarabs of various materials, glazed steatite being most common, form an important class of Egyptian antiquities. Such objects usually have the bases inscribed or decorated with designs and are simultaneously amulets and seals. First appearing in the late Old Kingdom (*c.* 2575–*c.* 2130 BC), when they evolved from the so-called button seals, they remained rare until Middle Kingdom times (1938–*c.*1600? BC). Some were used simply as ornaments, while others were purely amuletic in purpose, as the large basalt "heart scarabs" of the New Kingdom (1539–1075 BC) and later times, which were placed in the mummy bandages. A winged scarab might also be placed on the breast, and later a number of amuletic scarabs were placed about the body.

The seal type of scarab was, however, the most common, and numerous clay sealings have been found. Spiral motifs and titles of officials were characteristic of Middle Kingdom examples, while on later scarabs a wide variety of designs and inscriptions was found. The inscriptions were sometimes mottoes referring to places, deities, and so on or containing words of good omen or friendly wishes.

Historically, the most valuable class included scarabs that bore royal names; they ranged in date from the 11th dynasty to the Late Period. Although some great kings were commemorated on scarabs of periods long subsequent to them, distinctions of style and pattern often make it possible to recognize contemporary royal scarabs.

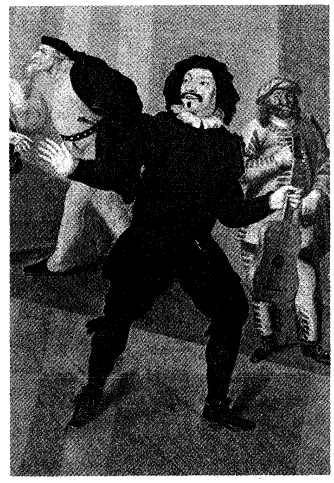
A related type of seal amulet, called by Egyptologists the scaraboid, was similar in shape but lacked the details of the beetle's anatomy. Egyptian scarabs were carried by trade over all the eastern Mediterranean and to Mesopotamia. Numerous examples of Greek and Etruscan imitations have also been found.



Scarab commemorating the marriage of Amenhotep III and Queen Tiy, 18th dynasty; in the Oriental Institute, Chicago

By courtesy of the Oriental Institute, the University of Chicago

Scaramouche, Italian SCARAMUCCIA, stock character of the Italian theatrical form known as the commedia dell'arte; an unscrupulous and unreliable servant. His affinity for intrigue often landed him in difficult situations, yet he always managed to extricate himself, usually leaving an innocent bystander as his victim. Scaramouche was originally a variation of the commedia character Capitano (*q.v.*), a braggart soldier. The role was closely associated with the Italian actor Tiberio Fiorillo (1608–94), who played without a mask. He transformed the military role to that of a comic servant, usually an indigent gentleman's valet. His costume was black breeches, jacket, cloak, and beret.



Scaramouche, detail from "French and Italian Farceurs," oil painting by an unknown artist, 1670; in the collection of the Comédie-Française, Paris

LAUROS—Giraudon from Art Resource/EB Inc.

Scarborough, city, one of the boroughs that, with the borough of East York and the cities of Etobicoke, York, North York, and Toronto, constitute the Municipality of Metropolitan Toronto, southeastern Ontario, Can. Scarborough has an area of 70 square miles (181 square km) and is bounded north by Markham township, east by Pickering township, south by Lake Ontario, and west by the cities of Toronto and North York and the borough of East York. Scarborough township (incorporated 1850) was reconstituted as a borough on Jan. 1, 1967. First called Glasgow, it was renamed in 1793 at the suggestion of Mrs. John Graves Simcoe, wife of the lieutenant governor, because its coastal bluffs resembled the cliffs at Scarborough, Eng. Originally a farming community, it has rapidly developed since World War II into a well-planned industrial and residential urban complex with a commercial stretch known as the "Golden Mile" and more than 2,500 acres (1,000 hectares) of park land. Scarborough College (1964) is affiliated with the University of Toronto, and Centennial College (1967) offers courses in applied arts and technology. St. Augustine's Seminary is located in the borough. Pop. (1986) 484,676.

Scarborough, district (borough) on the North Sea coast, county of North Yorkshire, England. Scarborough town originated from a 10th-century Viking fishing settlement in the shelter of a craggy sandstone headland, where there had earlier been a Roman signal station. In the 12th century a Norman castle was built on the headland. After 1626, spa development and later sea bathing caused Scarborough to burgeon as a fashionable 18th-century resort. From 1845 the railways further stimulated its growth and extended the social range of its clientele. Scarborough remains the most popular seaside resort town in northeastern England. It is also a significant conference centre and retirement town.

Modern Scarborough district (315 square miles [817 square km]) extends far beyond old Scarborough town. It lies almost entirely within North York Moors National Park. Eskdale in the north and the Derwent Valley in the south cut through heather-clad moorlands with scattered sheep farms and some recently planted forest. Coastal cliffs shelter small picturesque fishing villages. Most of the population lives in the coastal resorts of Scarborough, Whitby, and Filey. Pop. (1986 est.) 103,700.

Scarborough, chief town and deepwater harbour of Tobago island in the Trinidad and Tobago group in the southern Caribbean Sea. Formerly called Port Louis, it overlooks Scarborough Harbour, formerly Rockly Bay, and is steeply laid out on the bottom slopes of a 425-foot (129-metre) hill, 8 miles (13 km) from Tobago's southwestern tip. It succeeded Georgetown, now Mount Saint George, as capital of Tobago in 1796, though it had been destroyed by fire only six years earlier. On top of the hill is Fort King George (1770s), with a ruined barracks and hospital, and a rebuilt Anglican church. The town is in a coconut-growing area; industries include sawmilling and lime-oil production. Pop. (1980) 6,089.

Scarborough, also spelled SCARBORO, town, Cumberland county, southwestern Maine, U.S., at the mouth of the Nonesuch River on the Atlantic coast. It is mainly a residential suburb for Greater Portland and the Biddeford–Saco urbanized area. Black Point, an early settlement made by Thomas Cammock, combined in 1658 with Blue Point and Stratton's Islands to form one incorporated community, which was named for Scarborough, Eng. Rufus King, the Federalist Party leader, was born at Dunstan Landing. After 1883 Winslow Homer, the marine painter, made his home at Prouts Neck, a peninsula at the river mouth, and many of his canvases were inspired by the wild, rockbound Atlantic coast; his studio is now a national landmark. The seafood industry, tourism, and Scarborough Downs Race Track are economic assets. Pop. (1987 est.) 12,471.

scarecrow, device posted on cultivated ground to deter birds or other animals from eating or otherwise disturbing seeds, shoots, and fruit; its name derives from its use against the crow. The scarecrow of popular tradition is a mannequin stuffed with straw; free-hanging, often reflective parts movable by the wind are commonly attached to increase effectiveness. A scarecrow outfitted in clothes previously worn by a hunter who has fired on the flock is regarded by some as especially efficacious. A common variant is the effigy of a predator (*e.g.*, an owl or a snake).

The function of the scarecrow is sometimes filled by various audio devices, including recordings of the calls or sounds of predators or noisome insects. Recorded sounds of deerflies in flight, for example, are used to deter deer from young tree plantations. Automatically fired carbide cannons and other simulated gunfire are used to keep migrating geese out of cornfields.

Scarfe, Gerald (b. June 1, 1936, London), caricaturist best known for his savagely grotesque portraits of politicians and other public figures. For most of his first 19 years Scarfe was bedridden with chronic asthma, and he began to draw during these long periods of confinement. After a brief, uncongenial period with an advertising agency, he became a free-lance artist, and his early work was accepted by the *Evening Standard, Punch,* and, particularly, *Private Eye.*

In 1966 Scarfe was appointed a regular contributor to the London *Daily Mail.* During the same year, publication of a collection of his drawings, *Gerald Scarfe's People,* revealed a wide range of subject matter and technique. Of the portraits, some were quite realistic; others, such as those of the novelist Somerset Maugham and of the Duke and Duchess of Windsor, were wildly distorted. Some had full shading; others were in line drawings. Commenting on his use of distortion, he said, "I like to see how far I can stretch a face and still leave it recognizable." In 1967 he began to do animation and film directing for the British Broadcasting Corporation.

Articles are alphabetized word by word, not letter by letter

scarification, also called CICATRIZATION, practice of producing raised scars (keloids) on the human body in decorative patterns. *See* body modifications and mutilations.

scarlatina: *see* scarlet fever.

Scarlatti, (Pietro) Alessandro (Gaspare) (b. May 2, 1660, Palermo—d. Oct. 24, 1725, Naples), Italian composer of operas and religious works and one of the most important figures in the development of classical harmony.



Alessandro Scarlatti, detail of a portrait by an unknown artist, 1692; in the Palacio del Duque de Hijar, Epila, Spain

Archivo Mas, Barcelona

Scarlatti was sent to Rome at about the age of 12; there he met Bernardo Pasquini, by whom he was greatly influenced. The first of his 115 operas, *Gli equivoci nel sembiante* (1679), written for a religious fraternity in Rome, won him the protection of Queen Christina of Sweden, for whom he wrote *L'honestà negli amori* (1680) and in whose service he remained until 1683. These works brought him commissions for operas from Naples, where in 1684 he became *maestro di cappella* in the royal service. He remained there until 1702, writing more than 40 operas and musical entertainments for the court and its circle. *Gli equivoci in amore* (1690) is a typical example of his work during that period.

In 1702 Scarlatti went to Florence, where, over the next two years, he wrote four operas for the theatre of Prince Ferdinando III de' Medici; the scores of these works have disappeared. In 1707 he was appointed *maestro di cappella* to Cardinal Pietro Ottoboni in Rome and was also elected to the Arcadian Academy there. The following year he held a like post at Sta. Maria Maggiore in Rome and also wrote two operas on a larger scale, *Il trionfo della libertà* and *Il Mitridate Eupatore,* for production during the carnival in Venice. The latter is considered one of his finest works. Scarlatti travelled to Venice to supervise the performances; in 1709 he returned to his old post at Naples. There followed a period of intense activity during which he wrote serenades and masses as well as operas. *La principessa fedele* (1710), *Scipione nelle Spagne* (1714), and *Il Tigrane* (1715) are among his principal operatic successes of this period. The ternary aria form is developed in these works, which are also noted for a bolder use of the orchestral stringed instruments. In 1716 he wrote a mass for Pope Clement XI and in the same year completed his first opera buffa, *Il trionfo dell'onore* (Naples, 1718). Between 1718 and 1721 he wrote more operas and religious works. On his return to Naples in 1723 he seems to have gone into retirement.

Scarlatti is noted for his thematic development and chromatic harmony, which he used with great mastery and in a way that anticipates the work of much later composers, among them Mozart and Schubert. He is chiefly remembered for his operas, in which he established the form of the Italian overture (*i.e.*, the opera overture in three sections, allegro–adagio–allegro), which was a forerunner of the classical symphony. His chamber music is equally characteristic and shows him to have had a commanding conception of form. More than 600 chamber cantatas from all periods of his life are extant. He wrote little orchestral music, but he contributed to the development of the opera orchestra. Whereas in his youth the strings were used mainly to play introductions and ritornelli (instrumental interludes), Scarlatti placed more emphasis on the orchestral accompaniment to the voices. His use of wind instruments was similarly novel: trumpets, flutes, oboes, and bassoons were used for particular effects, and horns were introduced into the orchestra.

Scarlatti, (Giuseppe) Domenico (b. Oct. 26, 1685, Naples—d. July 23, 1757, Madrid), Italian composer noted particularly for his 555 keyboard sonatas, which substantially expanded the technical and musical possibilities of the harpsichord.

Early life and vocal works: Italy. Domenico, the son of the famous composer of vocal music Alessandro Scarlatti, was born in the same year as Bach and Handel. He began the first half of his career at the age of 16 with the production in Naples in 1703 of his first operas, *Ottavia restituita al trono* and *Il Giustino.* The librettos and part of the music still survive. In 1705 his father sent him away from Naples, reputedly to study with the then famous pedagogue and composer of opera Francesco Gasparini, musical director at the Ospedale della Pietà in Venice, where the composer Antonio Vivaldi also served.

While in Venice, Domenico met a young Irishman, Thomas Roseingrave, who later became the founder of an English Scarlatti cult that lasted throughout the century. Many years later he described Domenico's harpsichord playing to the English musicologist Charles Burney as sounding as if "ten hundred d. . . .s had been at the instrument; he had never heard such passages of execution and effect before." At about the same time, Domenico formed a friendship with Handel, who was only a few months older than himself. Although they never again met after Domenico's establishment in Rome and Handel's departure from Italy in 1709, they spoke of each other for the rest of their lives with affection and admiration.

By the spring of 1709 Domenico had taken over his father's position in Rome as musical director and composer to the exiled queen Maria Casimira of Poland. Until her departure in 1714, he composed a series of operas and occasional pieces, all of them on texts by the Queen's secretary, Carlo Sigismondo Capeci. Many of these had set designs by



Domenico Scarlatti, engraving

By courtesy of the Bibliotheque Nationale, Paris; photograph, J.P. Ziolo

the young Filippo Juvarra, one of the last of the great Italian Baroque architects. Their grandiose perspectives, as shown in surviving drawings, quite belied the size of the Queen's tiny theatre in the Palazzo Zuccari. Some of the music has survived, but, were it not for the reflected glory cast upon it by the later harpsichord sonatas, this music would inspire little interest today.

By 1713 at least, Domenico had established relations with the Vatican, and from 1714 to 1719 he held the position of musical director at St. Peter's. Of the surviving church music that appears to date from this time, only the 10-voice *Stabat Mater* gives a hint of the genius that was to find its long-delayed flowering in the harpsichord sonatas.

During these years Domenico brought to an end his apparently never-too-successful career as an opera composer with *Ambleto* (1715); it had an intermezzo, *La Dirindina,* which, because of the liberties of its text, was withdrawn from performance in Rome. His endeavours also produced *Berenice, regina di Egitto* (1718), with music by both Scarlatti and Nicola Porpora. More promising for the future were his relations with the Portuguese embassy, for which in 1714 he composed a cantata in honour of the birth of a crown prince of Portugal.

In September 1719 Domenico abandoned his post at the Vatican, and the records indicate a departure for England, but no substantiating evidence of a visit to the British Isles has ever been discovered. By the end of 1720, if not earlier, he was in Lisbon, and his serenata the *Contesa delle Stagione* (of which half the music survives) was performed at the royal palace in Lisbon on September 6. He had become musical director to that flamboyant and extravagant monarch John V of Portugal, as well as music master to the King's younger brother Don Antonio and to Princess Maria Bârbara de Bragança, who was to remain his patroness and for whom most of the harpsichord sonatas were later written. The production of serenades and church music continued, most of it adequate but hardly distinguished, if judged by surviving pieces. But a major change was taking place in Scarlatti's life. In 1725 his father died; in 1728 he made his last

visit to Italy to marry at the unusually late age of 43 a young Roman, Maria Catalina Gentili, who, before her death in 1739 bore him five children (four more were born to his second marriage, with the Spanish Anastasia Maxarti Ximenes); and in 1729 his pupil Maria Bárbara married the Spanish crown prince, the future Ferdinand VI, and Scarlatti followed the royal pair to Spain.

Later life and keyboard works: Spain. There he was to spend his remaining years, first in Seville, perhaps already listening to Spanish popular music and imitating, as Burney tells us, "the melody of tunes sung by carriers, muleteers, and common people," and after 1733 in the royal residences of Madrid and at the nearby palaces of La Granja, El Escorial, and Aranjuez. Many links with the past seem to have been cut, and an emancipation seems to have taken place that permitted the extraordinary stylistic development of the harpsichord sonatas. Scarlatti virtually disappears as a composer of vocal music, and there is no evidence of his participation in the extravagant opera productions directed by his friend the castrato singer Farinelli, whose singing in 1737 had so charmed the half-mad Philip V that he rose to a position of unparalleled eminence and power at the Spanish court.

Scarlatti is seldom mentioned, and the fullest surviving record of his life and character is to be found in the series of harpsichord sonatas that begins with the sumptuous publication of the *Essercizi per gravicembalo* (*Exercises*) in 1738, preceded by a dedication to his former patron John V of Portugal, doubtless in acknowledgment of the knighthood in the Order of Santiago that he had received from him earlier that year. The series of harpsichord sonatas continues brilliantly with manuscript volumes copied out for Maria Bárbara in 1742 and 1749. She became queen of Spain in 1746, and the musical activities of the Spanish court became more lavish than ever, always under the direction of Farinelli. But the principal evidence of Scarlatti's own activity continues to reside in the final great series of harpsichord sonatas copied out for the Queen from 1752 to 1757, the year of Scarlatti's death.

> This music ranges from the courtly to the savage, from an almost saccharine urbanity to an acrid violence. Its gaiety is all the more intense for an undertone of tragedy. Its moments of meditative melancholy are at times overwhelmed by a surge of extrovert operatic passion. Most particularly he has expressed that part of his life which was lived in Spain. There is hardly an aspect of Spanish life, of Spanish popular music and dance, that has not found itself a place in the microcosm that Scarlatti created with his sonatas. No Spanish composer, not even Manuel de Falla in the 20th century, has expressed the essence of his native land as completely as did the foreigner Scarlatti. He has captured the click of castanets, the strumming of guitars, the thud of muffled drums, the harsh bitter wail of gypsy lament, the overwhelming gaiety of the village band, and above all the wiry tension of the Spanish dance.
>
> (R. K.: *Domenico Scarlatti*)

There are also abundant echoes of the festivities of the Spanish court, of the wind instruments and drums of state processions, of the horns and oboes of the royal hunt, of fireworks and artillery salvos, and of the music from the royal barges that floated over the waters of the Tagus during the summer embarkations at Aranjuez.

> All of this does not find expression merely in loosely knit impressionistic program music, but is assimilated and distilled with all the rigour that Scarlatti had learned from his 16th century ecclesiastical masters, and is given forth again in a pure musical language that extends far beyond the domain of mere harpsichord virtuosity. All is assimilated into an unfailing sense of the larger context. In those last five years as he wrote sonata after sonata Scarlatti was reliving his entire life, living it more intensely than ever before, bringing it to fruition. (*Ibid.*)

A consistent development is perceptible in Scarlatti's harpsichord music, essentially characterized by an expansion of simple binary dance form through elaborations of thematic organization and extensions of tonal range. Spectacular innovations in keyboard virtuosity are often accompanied by audacious dissonances, unconventional voice leading, and far-flung modulations. The predominance of fast movements in the earlier sonatas gives way to a greater frequency of slow movements in the middle period, to a wider range of lyricism, and in the later sonatas to a leaner, more concentrated style.

Beginning with the Queen's volume of 1749, an increasing number of sonatas are arranged in pairs, contrasting slow movements with fast, coupling complementary fast movements, or extending the total tonal range of a pair conceived as a unit. Nearly 400 of the later sonatas appear arranged in pairs, and there are at least a dozen sonatas arranged in triptychs. A general absence of recognition of this organization of Scarlatti sonatas into a larger context has provided a serious obstacle to the appreciation of their true stature.

The instrument for which most of the late sonatas were composed appears to have been a one-manual harpsichord of the traditional Mediterranean kind, in cedar and cypress, with an extended compass of five octaves and with two eight-foot registers. Queen Maria Bárbara was supplied with such instruments in each of the three principal royal residences, Buen Retiro (in Madrid), Aranjuez, and El Escorial. On a background of such simplicity and seeming limitation of resources, Scarlatti imposed the variety and contrasts of sonorities and textures that elevate his writing for the harpsichord to a level comparable to that of Chopin and Liszt for the piano.

Shortly before his death, Scarlatti returned at least once more to vocal music, with a *Salve Regina* for soprano and strings, perhaps the most beautiful of his vocal compositions and one of the few meriting survival.

Assessment. Scarlatti's career demonstrates aspects both of precocity and of delayed maturity. More than the entire first half of his life was devoted to the composition of vocal music that seldom shows any independence from the all-pervading influence of his father. But nearly all those keyboard works in which he developed his own almost totally unprecedented style appear to date from the period subsequent to his father's death and to his own departure from his native Italy. In fact, the majority of them appear to date from the last years of his life.

Personal verbal utterances of Scarlatti have survived only in his preface and dedication of the *Essercizi,* in a letter to the Duke of Alba (1752), and indirectly in a few legal documents. Known samples of his handwriting are fewer than a dozen, and no autographs of the harpsichord sonatas have been found. A handsome portrait by Domingo Antonio de Velasco was in the possession of Scarlatti descendants until 1912 and is now in the municipal museum of Alpiarça, Port.

Except for 18th-century English publications, mainly of his earlier sonatas, and for a few continental reprints, the bulk of Scarlatti's keyboard music was hardly known beyond his immediate circle and can have exercised little direct influence on his Italian successors (with the exception of one of his editors, the composer Muzio Clementi), or on those German and Austrian composers such as C.P.E. Bach, Haydn, Mozart, and Beethoven, many of whose stylistic features it anticipates.

It was not until the edition prepared by the Italian pianist Alessandro Longo (began in 1906) that virtually all the harpsichord sonatas became available, and, even then, serious flaws in this and other editions prior to 1953 severely hampered any serious understanding of their stylistic development and coherence. Only with the respective complete editions of Ralph Kirkpatrick and Kenneth Gilbert, which maintain the chronological order and pairwise arrangement of sources, can an unobstructed view of Scarlatti's keyboard work at last generally be obtained, revealing one of the most strikingly original styles of the 18th century. (R.Ki.)

MAJOR WORKS. *Harpsichord music.* The main body of Scarlatti's work consists for the most part of one-movement sonatas for the harpischord. There are 555, of which the majority are grouped in pairs.

Operas. Scarlatti wrote more than a dozen operas. These include: *Tolomeo et Alessandro, overo La corona disprezzata* (1711); *Tetide in Sciro* (1712); *Amor d'un ombra, e gelosia d'un aura* (1714, produced in London in 1720, under the title *Narciso*); and *Ambleto* (1715).

Other works. The rest of his output comprises cantatas and church music, including a mass, two settings of Salve Regina, and a Stabat Mater.

BIBLIOGRAPHY. The definitive biographical and critical study, including the most complete existing catalog of compositions, a comprehensive bibliography, and an account of sources, is Ralph Kirkpatrick, *Domenico Scarlatti* (1953; paperback, 1968). It is supplemented by Domenico Scarlatti, *Sixty Sonatas . . .*, ed. with a preface by Ralph Kirkpatrick, 2 vol. (1953) and also recorded by him. Superseding all previous editions are Domenico Scarlatti, *Complete Keyboard Works in Facsimile from the Manuscript and Printed Sources,* ed. by Ralph Kirkpatrick, 18 vol. (1971); and *Complete Keyboard Works,* ed. by Kenneth Gilbert, 9 vol. 1971–). Also see Sir Sacheverell Sitwell, *A Background for Domenico Scarlatti, 1685–1757,* written for his 250th anniversary (1935, reprinted 1970).

scarlet fever, also called SCARLATINA, acute infectious disease caused by certain types of hemolytic (hemoglobin-liberating) streptococcal bacteria, typically *Streptococcus pyogenes.* The English physician Thomas Sydenham in 1676 gave a clear differentiation of scarlet fever, as follows: "The skin is marked with small, red spots, more frequent, more diffuse, and more red than in measles. These last two or three days. They then disappear, leaving the skin covered with brawny squamulae [scales], as if powdered with meal."

The onset of the disease begins from two to seven days after exposure. The first symptoms are fever, sore throat, headache, and, in children, vomiting. From two to three days later the rash appears as a reddening of the skin that begins on the neck, in the armpits and groin, and upon the chest. The face is flushed, with a ring of pallor around the lips. The throat is inflamed, and red spots appear upon the palate. The tongue is coated, but the edges are deeply inflamed. After four days the coating on the tongue disappears, leaving a swollen, deeply injected surface with prominent papillae (strawberry tongue).

The eruption and fever last for a week or more and in about one-third of the cases are followed by desquamation, or peeling off of portions of the skin. The glands of the body are usually swollen; those of the neck may be tender and painful to touch.

Complications are frequent. The sinuses probably are always secondarily involved, frequently remain infected during convalescence, and constitute an important focus in which the organism remains to make the patient a carrier. Abscesses of the ear and mastoiditis occur. Infection of the glands of the neck frequently results in abscess formation. In certain instances the streptococcus enters the bloodstream and is carried to various parts of the body, where localized areas of infection develop. Among the late complications are nephritis (inflammation of the collecting tubules in the kidney, occurring in 0.5 to 1

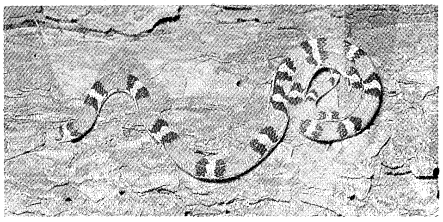
percent of all cases), arthritis, and rheumatic fever.

Penicillin, to which the streptococcus is highly sensitive, is the treatment of choice. Gamma globulin, prepared from human serum, is also effective. Treatment includes bed rest and consumption of adequate fluids.

Since the mid-20th century, scarlet fever has become uncommon and very much milder than previously, especially in the United States and Great Britain. This decline may be the result of a change in the virulence of the streptococcus, or possibly of a change in host resistance; it has, in any case, occurred independently of the use of penicillin and sulfonamides. Diseases tend to rise and fall in incidence and severity over the centuries, and it may be that scarlet fever is dying out.

scarlet maple: *see* red maple.

scarlet snake (*Cemophora coccinea*), small, burrowing, nocturnal member of the family Colubridae. It occurs in the United States from New Jersey to Florida and as far west as Texas.



Scarlet snake (*Cemophora coccinea*)
Hal H. Harrison from Grant Heilman—EB Inc.

Because of its red, black, white, and yellow rings, this harmless species is sometimes referred to as a false coral snake. It also somewhat resembles the scarlet king snake.

Scarpanto (Greece): *see* Kárpathos.

Scarron, Françoise: *see* Maintenon, Françoise d'Aubigné, marquise de.

Scarron, Paul (baptized July 4, 1610, Paris—d. Oct. 7, 1660, Paris), French writer who contributed significantly to the development of three literary genres: the drama, the burlesque epic, and the novel. He is remembered today for a single work, *Le Roman comique* ("The Comic Novel").



Scarron, engraving by Georg Friedrich Schmidt after a drawing by Antoine Boizot
By courtesy of the Bibliotheque Nationale, Paris

Scarron's origins were bourgeois, and it was originally intended that he should enter the church. After a period in Brittany and a visit to Rome, however, Scarron settled in Paris and devoted himself to writing. His first works were burlesques. The poet Saint-Amant had already started the vogue for parodies of the classics, but Scarron is mainly responsible for making the burlesque one of the characteristic literary forms of the mid-17th century. His seven-volume *Virgile travesty* (1648–53) had a tremendous success. Modern readers, perhaps because they are less impressed than Scarron's contemporaries by the daring of parodying the *Aeneid,* find the humour facile and too drawn out.

Scarron was also a considerable figure in the theatrical life of Paris in the years immediately preceding Molière's arrival in the capital. He often wrote with particular actors in mind; for example, *Le Jodelet* (produced 1645) was written to include a starring role for the popular comedian of the same name. Scarron's plots are usually based upon Spanish originals, and even his most successful comedy, *Dom Japhet d'Arménie* (produced 1647), owes a good deal to a play by Castillo Solórzano. Though no longer performed, Scarron's plays are of real historical importance, and Molière took many hints from them. Scarron's profound practical experience of the theatre is reflected in *Le Roman comique* (3 vol.; 1651–59). This novel, composed in the style of a Spanish picaresque romance, recounts with gusto the comical adventures of a company of strolling players. The humour of *Le Roman comique* has lasted better than that of the parodies because it is more human and less literary. The realism of the novel makes it an invaluable source of information about conditions in the French provinces in the 17th century. In 1652 Scarron married Françoise d'Aubigné, who later became Madame de Maintenon, the influential mistress and later the secret wife of King Louis XIV.

scat, any of the fishes in the family Scatophagidae (order Perciformes). The few species are placed into two genera, *Prenes* and *Scatophagus.* They are found in marine waters or estuaries of the Indo-Pacific from the western coasts of India to New Guinea and northern Australia. Occasionally they may enter freshwater habitats. Scats are scavengers, eating decaying plant and animal remains and fecal matter.

The best known species, the scat, or argus fish (*S. argus*), is a popular freshwater aquarium fish when small. Although they can reach a length of 30 centimetres (1 foot), the young can be kept for several months before outgrowing a small aquarium. They are colourful little fish with black spots and orangish fins. A characteristic of the family is the presence of four stiff spines on the front of the anal fin.

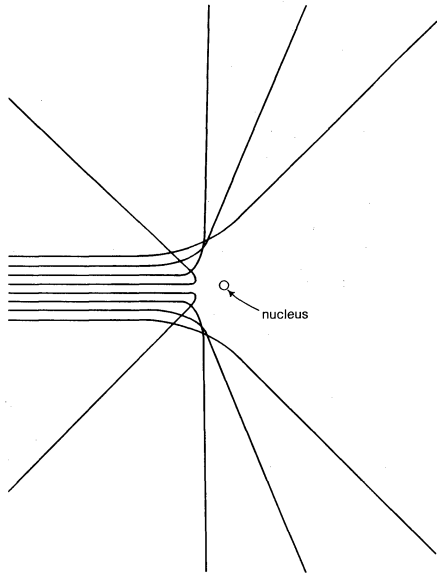
The threadfin scat (*Rhinoprenes pentanemus*) in the family Rhinoprenidae is a brackish water species of New Guinea.

scat, also called SCAT SINGING, jazz vocal style using emotive, onomatopoeic, and nonsense syllables instead of words in solo improvisations on a melody. Scat has dim antecedents in the West African practice of assigning fixed syllables to percussion patterns, but the style was made popular by trumpeter and singer Louis Armstrong from 1927 on. The popular theory that scat singing began when a vocalist forgot the lyrics may be true, but this origin does not explain the persistence of the style. Earlier, as an accompanist to singers, notably the blues singer Bessie Smith, Armstrong played riffs that took on vocalization qualities. His scat reversed the process. Later scat singers fitted their styles, all individualized, to the music of their times. Ella Fitzgerald phrased her scat with the fluidity of a saxophone. Earlier, Cab Calloway became known as the "hi-de-ho man" for his wordless choruses. Sarah Vaughan's improvisations included be-bop harmonic advances of the 1940s. By the mid-1960s Betty Carter was exploiting extremes of range and flexibility of time similar to those of saxophonist John Coltrane. The vocal trio Lamber, Hendricks, and Ross also phonetically imitated horn solos. In the 1960s the Swingle Singers recorded classical numbers using scat syllables but without improvisation.

scatologia, also called COPROLALIA, deviant sexual practice in which sexual pleasure is obtained through the compulsive use of obscene language. The affected person commonly satisfies his desires through obscene telephone calls, usually to strangers. Such telephone encounters may be extremely frightening to the recipients, and this reaction may play a part in the arousal of the scatologist, who often masturbates during the call. Some sexual graffiti also may be related to this deviation.

Compulsive use of foul language is also a characteristic of Gilles de la Tourette syndrome, a psychiatric disorder chiefly of children, but it is not accompanied by sexual arousal.

scattering, in physics, a change in the direction of motion of a particle because of a collision with another particle. As defined in physics, a collision can occur between particles that repel one another, such as two positive (or negative) ions, and need not involve direct physical contact of the particles. Experiments with subatomic particles indicate that the electric repulsive force between the particles satisfies Coulomb's law, which states that the force varies as the inverse square of the distance between the particles; *i.e.,* if the distance is halved, the force is quadrupled. Experiments show, as in the Figure, that the trajectory of the scattered particle, whatever the angle of deflection, is a hyperbola and that as the bombarding particle is aimed more closely toward the scattering centre the angle of deflection increases.



Scattering

In probing the interior of the atom, the physicist Ernest Rutherford passed a stream of alpha particles through a thin sheet of gold foil. The alpha particles were emitted by a radioactive material and had enough energy to penetrate an atom; although most passed right through the gold foil, some were deflected in a way that indicated that the scattering was produced by a Coulomb force. Because the alpha particles are positively charged and the electrons in the atom are negatively charged, it followed that there must be a large positive charge inside the atom to create the Coulomb force by interacting with the alpha particles. In this way the nucleus of the atom was discovered.

scaup, also called BLUEBILL, any of three species of diving ducks in the genus *Aythya* (family Anatidae). The greater scaup (*A. marila*), also called the big bluebill, breeds across Eurasia and most of the Nearctic region. The lesser scaup (*A. affinis*), a New World species

also known as the little bluebill, breeds across the northwest quadrant of North America. In the New World both species winter along the coasts of the United States; the lesser scaup reaches central Mexico. Both popular game birds, the two species are very hard to differentiate in the field. Both are about 38–51 centimetres (15–20 inches) long. Males have dark breasts and grayish backs; the head of the greater scaup is dark green, that of the lesser scaup is glossed with purple but may have tinges of green. Females are brown with white patches around their blue bills. The diet is composed mainly of clams. The third species is the New Zealand scaup (*A. novaeseelandiae*). In flight, the white stripe on the rear of the wing extends almost to the wingtip in the greater scaup and only halfway in the lesser scaup.

Scaurus, Marcus Aemilius (b. *c.* 162 BC—d. *c.* 89), a leader of the Optimates (conservative senatorial aristocrats) and one of the most influential men in the Roman government *c.* 100 BC. Cicero wrote that the world was almost ruled by a nod of his head.

Scaurus was born into an impoverished patrician family and acquired wealth in business before entering public life. With the backing of the family of the Metelli, Scaurus obtained the consulship in 115; in that year he defeated several Alpine tribes and was awarded a triumph. He was then chosen *princeps senatus* ("senior senator"), a position he held until his death. In 112 Scaurus headed an embassy to the Numidian king Jugurtha. According to his political opponents, he was one of the nobles bribed by Jugurtha in 111 to accept a peace unfavourable to Rome, and in order to avoid exposure, Scaurus had himself appointed (109) to the commission established to inquire into such allegations. As censor in 109 he directed construction of a highway, the Via Aemilia, through Pisa to Dertona (modern Tortona, Italy). When L. Appuleius Saturninus was removed from the post of grain commissioner at Ostia some time before 104, Scaurus took charge of the grain supply. In 91 he supported an attempt by the tribune Livius Drusus to extend the franchise to Rome's Italian allies. With the outbreak of the Social War his enemies brought him to trial (90) on a charge of intriguing with the allies, but he was acquitted. Scaurus married Caecilia Metella, who later married the dictator L. Cornelius Sulla; Scaurus' daughter, Aemilia, married Gnaeus Pompey.

Ancient evaluations of Scaurus' character were coloured by political prejudice: Cicero praised him highly, while Sallust, an opponent of the Optimates, presented a far less flattering portrait. His autobiography is now lost.

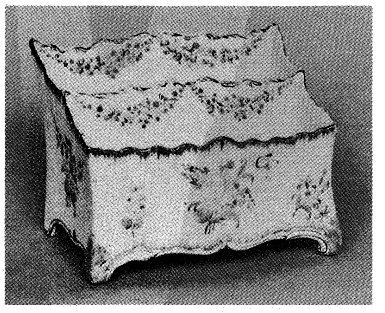
Scaurus, Marcus Aemilius (d. after 52 BC), quaestor and proquaestor to Gnaeus Pompey in the third war (74–63) between Rome and King Mithradates of Pontus (in northeastern Anatolia).

Scaurus was the son of a powerful politician of the same name. In 64, Scaurus marched to Judaea, where he—perhaps after being bribed—installed as sovereign Aristobulus over the rival claimant, John Hyrcanus. Pompey later reversed the judgment. In 55 Scaurus served as a provincial governor in Sardinia, and the following year he was accused of having practiced extortion while in this office. Cicero and Quintus Hortensius pleaded his case and obtained an acquittal. Subsequently charged with electoral fraud, Scaurus went into exile in 52.

scavenger, also called CARRION-FEEDER, animal that feeds partly or wholly on the bodies of dead animals. Many invertebrates, such as carrion beetles, live almost entirely on decomposing animal matter. The burying beetles actually enter the dead bodies of small animals before feeding on them underground.

Among vertebrates there are species such as the vultures that exist solely on carrion. Most vertebrates show more flexibility. The bald eagle will scavenge dead fish whenever possible, but it hunts when necessary and will rob the kill of an osprey. Most large mammalian predators, *e.g.*, the lion and the wolf, will opportunistically eat of a carcass killed by another animal. The spotted hyena, widely known as a scavenger, has heavy jaws equipped for crushing bones. Lone hyenas live mostly on carrion, but where large populations exist they form packs and hunt by night. A clan of 30 hyenas may drive off a small group of lions and steal their kill.

Sceaux ware, tin-glazed earthenware and porcelain made at a factory in Sceaux, Fr., from 1748 to 1794. Both were skillfully painted in a large range of enamel colours with landscape and figure subjects and with



Sceaux faience letter rack, *c.* 1770; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London, photograph, EB Inc.

minutely exact flowers and birds. Cupids in pink outline derived from the paintings of François Boucher were typical of the period of Louis XV. Pieces decorated with naturalistic flowers, fruit, and the like in relief may have been modelled by Richard Glot, who purchased the factory in 1772.

scél (Old Irish: "story"; pl. *scéla*), in the Gaelic literature of Ireland, early prose and verse legends of gods and folk heroes, most of which originated during or before the 11th century. *Scéla* were divided into primary and secondary types. The primary, or most important, were classified according to the actions they celebrated: destructions, cattle raids, navigations, elopements, violent deaths, conflagrations, and others. In modern times these tales have been grouped into cycles according to the characters and periods with which they deal. They comprise (1) the mythological cycle, dealing with immortal beings; (2) the Ulster (Ulaid) cycle, dealing with the Ulster heroes during the reign of King Conor (Conchobar mac Nessa) in the 1st century BC; and (3) the Fenian cycle, dealing mainly with the deeds of Finn MacCumhaill's war band during the reign of Cormac mac Art in the 3rd century.

Scelba, Mario (b. Sept. 5, 1901, Caltagirone, Sicily), Italian lawyer and Christian Democrat politician who was premier, 1954–55.

A graduate of the University of Rome, Scelba began his political career in the Popular Party. When this party was suppressed in 1923 for opposing the Fascists, Scelba retired to private life. In 1943 the party was reborn as the Christian Democrats. Scelba was their chief counsellor beginning in 1944.

Elected to the Constitutional Assembly (1946), Scelba held a succession of cabinet posts. As prime minister (1954–55) Scelba tried to steer a middle course between left and right. He was one of the last influential Christian Democrats to oppose the inclusion of the leftist Socialists in government coalitions and was eventually dropped from Amintore Fanfani's cabinet for that reason (1962).

An Italian statute defining and banning Fascism in any of its phases is known as the Scelba Law.

scenario, in film making, original idea for a film translated into a visually oriented text. The scenario plan gives the mood of each image and its relationship with the other shots in the sequence. The writer of the shooting script sets up each individual camera shot according to the camera directions in the scenario.

A detailed scenario—indicating the exact length of each shot, giving every word of dialogue, and describing all sound effects and the music to be used in each scene—is rarely used any more. It is generally written in master shots that include all the dialogue and visual action, permitting the director to stage it. A director may dispense with the scenario and direct the action according to his own concept of what best brings out the theme. Usually the director works with the scenario's basic instructions and, as the filming progresses, adapts them to the evolving action.

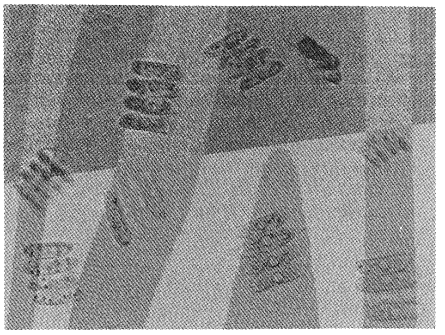
scene shifting, in theatre, method of indicating a change of locale during the course of a play. In Greek and Roman theatre the action was performed in front of a conventional backdrop—representing a temple in Greek theatre and houses or a temple in Roman theatre. Changes of scene were indicated by the movement of actors to a different area of the backdrop. *Periaktoi*, triangular prisms with a different scene painted on each side, were also used by both the Greeks and the Romans. These were revolved during the play to indicate the change of scene. In medieval theatre, mansions, or small booths, each representing a different locale, were arranged around the playing area. The actors indicated a change of scene by moving from one mansion to another. The use of mansions and *periaktoi* persisted until the development of angled wings (painted sidepanels) and perspective scenery in 16th-century Italy. Scene changes were effected either by moving new wings around those that were already in place or by quickly pulling a painted canvas around the angled wing.

The principles of perspective drawing that had been established by 1600 allowed the use of sets of flat wings, placed parallel to the front of the stage. They were probably first used by Aleotti in Ferrara, Italy, in 1606. A series of flats, set in grooves on the stage floor, was set up at each wing position; at the scene change, those visible in the last scene (*i.e.*, those in front) were simultaneously pulled out of sight backstage. Between 1641 and 1645 Giacomo Torelli developed the chariot-and-pole, or carriage-and-frame, method of scene shifting. This was a mechanization of the groove system that allowed one man to change all of the wings simultaneously. The flat wings were connected by means of a pole, which ran through slots in the stage floor, to "chariots" that moved on rails parallel to the front of the stage. When the chariots ran to the centre of the stage, the flats were pulled onstage; a reverse movement pulled them off. The mechanics allowed all the wings to be changed by pulling a single winch. The chariot-and-pole system was quickly adopted throughout Europe and remained the standard method of changing scenes until the late 19th century. Only England, The Netherlands, and the United States continued to use the groove method.

As the demand grew for more scenic realism, the use of three-dimensional furnishings and box sets forced scene changes to take place behind the drop curtain between acts. For shifting heavy three-dimensional settings a revolving stage was developed in 1896 at the Residenz Theatre in Munich and was soon

widely adopted. Other mechanical devices for shifting three-dimensional settings were developed during the early 1900s. Modern preferences for simplified staging generally reduced their use in the second half of the 20th century.

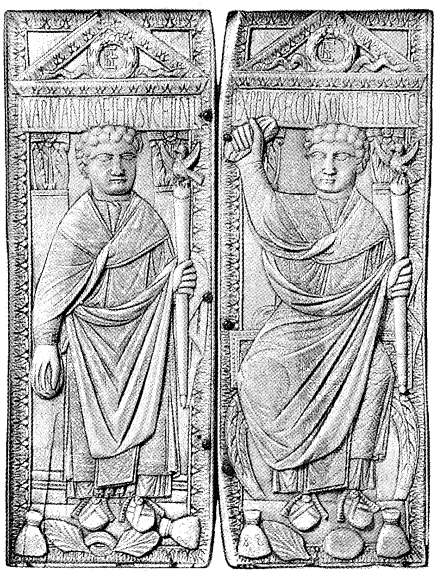
Scenedesmus, genus of colonial green algae with 4, 8, or 16 cells arranged in a row. A common component of freshwater plankton, *Scenedesmus* is used in experimental work on photosynthesis. In sewage purification processes, it provides oxygen for the bacterial breakdown of organic matter and destroys other harmful substances. Reproduction is by nonmotile spores called autospores.



Scenedesmus (highly magnified)
Robert W. Hoshaw—EB Inc.

Scepticism (philosophy): *see* Skepticism.

sceptre, also spelled SCEPTER, ornamented rod or staff borne by rulers on ceremonial occasions as an emblem of authority and sovereignty. The primeval symbol of the staff was familiar to the Greeks and Romans and to the Germanic tribes in various forms (*baculus*, "long staff"; *sceptrum*, "short staff") and had various significances. The staff of command belonged to God as well as to the earthly ruler; there were the old man's staff, the messenger's wand, the shepherd's crook, and, derived from it, the bishop's; and so on.



The consul Boethius holding sceptres in his left hand, ivory diptych, Byzantine, 5th–6th century; in the Museo Civico Cristiano, Brescia, Italy
SCALA—Art Resource/EB Inc.

The Carolingians first used a long staff but also imitated the short Roman one. Consequently, from the 10th century, two staffs were used in the consecration of a European king. In most countries the second was replaced by the orb, a sphere that in ancient times represented the cosmos. The only country to retain two staffs was England, where the two became alike in length but were distinguished in being surmounted respectively by a cross and by a dove.

Scève, Maurice (b. *c.* 1501, Lyon, Fr.—d. 1560/64?, Lyon), French poet who was considered great in his own day, then long neglected. Reinstated by 20th-century critics and poets, chiefly for his poem cycle, *Délie*, Scève has often been described as the leader of the Lyonese school of writers (including Pernette du Guillet and Louise Labé), although there is no evidence of an organized school. Lyon, on the trade route between northern and southern Europe, was a centre of Humanism, and Scève first achieved fame in 1533 by his "discovery" of the tomb of Petrarch's Laura at Avignon and again in 1536 with his *Blason du sourcil* ("Description of an Eyebrow"), adjudged the best entry in a poetic competition held at Ferrara. This poem was later published in the anthology *Les Blasons du corps féminin* ("Descriptions of the Feminine Body"), often reprinted between 1537 and 1550.

His *Délie, objet de plus haute vertu* (1544; "Délie, Object of Highest Virtue") is a poetic cycle of 449 highly organized decasyllabic 10-line stanzas (*dizains*), rich in imagery and Platonic and Petrarchan in theme and style. "Délie" (an anagram of "L'Idée," "The Idea"), long thought to be an imaginary ideal, may have been Pernette du Guillet, whose death seems to have partly inspired Scève's *Saulsaye, églogue de la vie solitaire* (1547; "Willow Row, an Eclogue on the Solitary Life"), written in retirement in the country.

Schaarbeek (Belgium): *see* Schaerbeek.

Schacht, (Horace Greely) Hjalmar (b. Jan. 22, 1877, Tinglev, Ger.—d. June 4, 1970, Munich), German financial expert who achieved international renown by halting the ruinous inflation that threatened the existence of the Weimar Republic in 1922–23. He also served as minister of economics (1934–37) in the National Socialist government of Adolf Hitler.

Appointed vice director of the Dresdner Bank in 1908, Schacht served during the early part of World War I as financial consultant for the German occupation government at Brussels (1914–15) and in 1916 was named director of the German National Bank—subsequently the amalgamated Darmstädter and National Bank. In 1923, as special currency commissioner in the finance ministry, he developed a rigorous monetary program for halting rampant inflation and stabilizing the mark, and in December of the same year he was appointed president of Germany's leading financial institution, the Reichsbank. Later (1929) he headed the German delegation at Paris during the negotiation of a new plan of reparations payments for Germany but subsequently rejected the conference's major handiwork—the Young Plan.

Resigning his Reichsbank presidency in 1930, Schacht cultivated an alliance with the German right-wing parties. After Hitler's accession to power (January 1933), he was reappointed president of the Reichsbank, a position he retained through his subsequent tenure as German minister of economics (1934–37). As economics minister he was responsible for the National Socialist unemployment and rearmament programs; but his rivalry with Hermann Göring, who in 1936 had become virtual dictator of the German economy, led to Schacht's resignation. Opposing Hitler's rearmament expenditure, he was in 1939 dismissed as Reichsbank president. Arraigned before the International Military Tribunal at Nürnberg after World War II, he was ultimately acquitted. He subsequently founded his own bank in Düsseldorf and served as financial consultant for several countries.

Schadow, (Johann) Gottfried (b. May 20, 1764, Berlin—d. Jan. 27, 1850, Berlin), German sculptor.

He was trained under the court sculptor Jean-Pierre-Antoine Tassaert and in Rome, where he studied under A. Trippel and A. Canova (1785–87). In 1788 he succeeded Tassaert as director of the royal school of sculpture in Berlin. His first monumental work was the tombstone for Count Alexander von der Mark (1790; Berlin) in which he portrayed the nine-year-old Count as a sleeping shepherd boy. His best known work is the "Quadriga of Victory," (1793), a statue of a chariot drawn by four horses, which stands atop the Brandenburg Gate. Among his finest works is the group of the princesses Luise and Friederike of Prussia (1797).



"The Princesses Luise and Friederike," marble sculpture by Gottfried Schadow, 1797; in the National-Galerie, Berlin
By courtesy of the Staatliche Museen zu Berlin, Germany

In later years Schadow's sight was affected and he turned more and more to writing on art theory. Two of his sons, Rudolf Schadow (1786–1822) and Wilhelm von Schadow-Godenhaus (1788–1862), became well known as painters.

Consult the INDEX *first*

Schaefer, Vincent Joseph (b. July 4, 1906, Schenectady, N.Y., U.S.), U.S. research chemist and meteorologist, who in 1946 carried out the first systematic series of experiments to investigate the physics of precipitation. From an aircraft over Massachusetts he seeded clouds with pellets of Dry Ice (solid carbon dioxide) and succeeded in producing snow, initiating the science of experimental meteorology and weather control.

Schaefer was educated at Union College in New York and graduated in 1928 from the Davey Institute of Tree Surgery. From 1933 to 1954 he worked in research at General Electric Laboratories, where his efforts during the war were directed specifically toward aircraft icing, then a serious problem for military aircraft. Studies showed that when sufficient numbers of ice particles were present in clouds to eliminate the hazardous supercooled water conditions, ice ceased to form on airplane bodies. Using Dry Ice, Schaefer discovered by chance how to produce this condition artificially.

In 1959 Schaefer joined the faculty of the

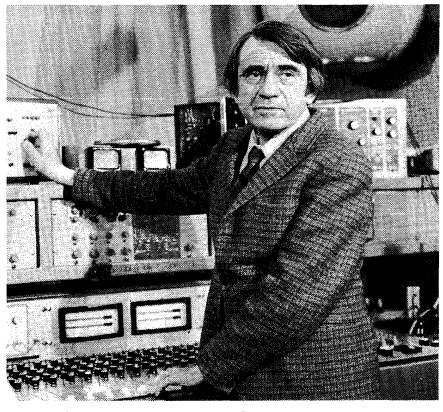
State University of New York at Albany, and was professor of atmospheric science there from 1964 to 1976. He was appointed fellow of the American Academy of Arts and Sciences, and received an award in 1957 and a special citation in 1976 from the American Meteorological Society.

Schaeffer, Claude-Frédéric-Armand (b. March 6, 1898, Strassburg, Ger.—death reported Oct. 5, 1982), French archaeologist whose excavation of the ancient city of Ugarit at Ras Shamra, Syria, disclosed a succession of cultures from about 1195 BC to the 7th to 6th millennia BC. Moreover, the resulting knowledge of northern Canaanite civilization helped to clarify difficult passages in the Old Testament.

Schaeffer was curator of the Prehistoric and Gallo-Roman Museum, Strasbourg (1924–33), and of the Museum of National Antiquities, Saint-Germain-en-Laye (1933–56). He conducted research at Ugarit from 1929 to 1939. He discovered the ancient port city to have been quite cosmopolitan; in various periods it showed evidence of cultural influence from the Egyptian, Mesopotamian, Hittite, and Mediterranean civilizations. In addition to excavating many architectural remains and artifacts valuable in helping delineate the city's history, Schaeffer found hundreds of clay tablets bearing cuneiform inscriptions. Later identified as representing a Semitic language related to biblical Hebrew, the inscriptions included text of literary works of considerable sophistication and originality that also helped to establish the Canaanite origin of the stories of the patriarchs in the Bible. Schaeffer discussed the tablets in *The Cuneiform Texts of Ras Shamra-Ugarit* (1939) and *Ugaritica I-VI* (1939–69).

Following World War II, Schaeffer continued excavations and research in Turkey, Cyprus, and Syria. In 1948 he made a valuable contribution to the science of archaeology with the publication of *Stratigraphie comparée et chronologie de l'Asie occidentale* ("Comparative Stratigraphy and Chronology of the Near East").

Schaeffer, Pierre (b. Aug. 14, 1910, Nancy, Fr.), French composer, acoustician, and electronics engineer who in 1948, with his staff at Radio-diffusion et Télévision Française, introduced *musique concrète* (*q.v.*), in which sounds



Pierre Schaeffer
O.R.T.F.

of natural origin, animate and inanimate, are recorded and manipulated so that the original sounds are distorted and combined in a musical fashion. The means of manipulation include changing the speed of the playback to alter pitch, playing the tape backward, cutting the tape so as to exercise precise control over duration, filtering out or reinforcing certain sound-wave frequencies, and other more complex manipulation. Schaeffer's 10-movement *Symphonie pour un homme seul* (1950; *Symphony for One Man Only*), produced in collaboration with Pierre Henry, was the first major concrete piece. This and other works of *musique concrète* reflect an approach to sound that had an important influence on composers of aleatoric, or "chance," music.

Schaeffer's book *À la recherche d'une musique concrète* (1952; "Toward a Concrete Music") gives an account of his work.

Schaepman, Hermanus Johannes Aloysius Maria (b. March 2, 1844, Tubbergen, Neth.—d. Jan. 21, 1903, Rome), Dutch statesman, Roman Catholic priest, and author who founded Catholic political clubs (forerunners of the Roman Catholic State Party) and established a Catholic–Calvinist legislative coalition that lasted from 1888 to 1905.

Ordained a priest in 1867, Schaepman received a doctorate in church history (1869) and taught at a seminary for many years. He published poems and articles on religious and political subjects and became editor of *De Tijd* ("The Times") newspaper in 1872 and *De Katholiek* newspaper in 1895. He founded Catholic political clubs to protect the rights of his co-religionists, who, however, resisted his efforts to form a true political party until 1905.

Schaepman was elected to the Dutch Second Chamber (house of representatives) in 1880 and became the leader of the Catholic legislators. In 1888 he established a coalition with Calvinist members of the Anti-Revolutionary Party to obtain state aid for parochial (Catholic and Calvinist) schools on the same basis as public schools. The coalition, which participated in all Dutch cabinets until 1905, won some state aid for parochial schools in 1889, though parity with state schools was not obtained until 1917. Schaepman served in Abraham Kuyper's coalition Cabinet from 1901. His poems include "De Paus" (1866; "The Pope") and "Aya Sofia" (1886); a collection of his articles, *Menschen en Boeken* ("Men and Books"), was published between 1893 and 1902.

Schaerbeek, Flemish SCHAARBEEK, municipality, Brabant province, central Belgium. A village until 1795, it is an industrial suburb northeast of Brussels and one of the 19 communes that make up Greater Brussels. A rail junction with switch and freight yards, it has an electric power station and manufactures clothing, chemicals, and machinery. The conspicuous domed church of Sainte-Marie (1845–53) is built in the Romanesque-Byzantine style, and the town hall (1885–87) is of an old Flemish design. Pop. (1982) mun., 105,965.

Schäfer, Edward Albert: *see* Sharpey-Schafer, Sir Edward Albert.

Schaff, Philip (b. Jan. 1, 1819, Chur, Switz.—d. Oct. 20, 1893, New York City), Swiss-born U.S. ecumenical leader and theologian whose works, especially the *Creeds of Christendom* (1877), helped set standards in the United States for scholarship in church history.

Schaff was educated at the universities of Tübingen, Halle, and Berlin and was made a lecturer in 1842 at Berlin, where his interest in church history was aroused by the famed church historian Johann Neander. Schaff emigrated to the United States in 1844, and in the same year became professor of church history and biblical literature at the Theological Seminary of the German Reformed Church at Mercersburg, Pa. On his installation he delivered a controversial address, published as *The Principle of Protestantism*, in which he expressed his view that the positive values of both Roman Catholicism and Protestantism would eventually be blended in an ecumenical, evangelical Catholicism. The address provoked criticism and charges of heresy, but Schaff was exonerated by the Eastern Synod of his church in 1845.

The so-called Mercersburg Theology, formulated by Schaff and his theological colleague John W. Nevin (1803–86), implemented some of the themes and principles elucidated in his speech at Mercersburg and generated equal controversy. It resisted revivalist theology, which stressed the life of the individual, in favour of an affirmation of the institutional church. In 1864 Schaff was made secretary of the New York Sabbath Committee, which opposed the commercialization of Sunday. The following year he resigned his position at



Schaff, engraving by J.J. Cade
By courtesy of the Library of Congress, Washington, D.C.

Mercersburg and moved to New York City, where in 1870 he became a professor at Union Theological Seminary and changed his church affiliation to the Presbyterian denomination.

In addition to his seven-volume *History of the Christian Church* (1858–92), Schaff's works include his edition of the translation and revision of Johann Peter Lange's *Commentary* (1864–80) and a revised, condensed version of Johann Jakob Herzog's 22-volume religious encyclopaedia (published in English as *The Schaff-Herzog Encyclopaedia of Religious Knowledge,* 1884). Schaff participated in the preparation of the Revised Version of the Bible and in 1888 founded the American Society of Church History, which he served as its first president.

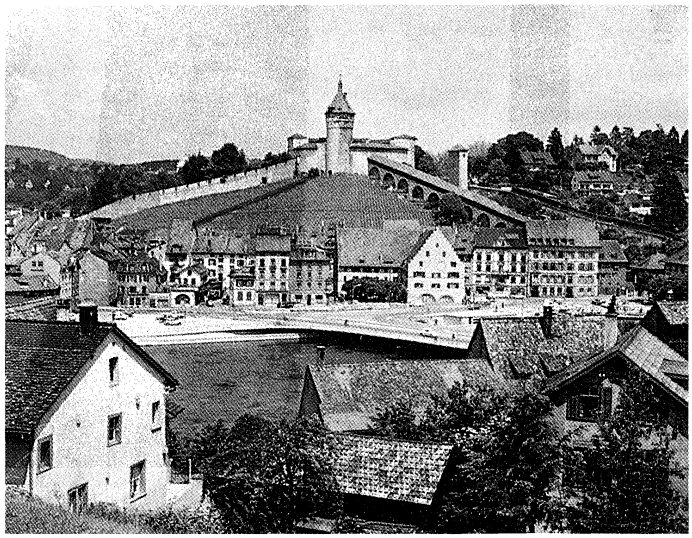
Schaffhausen (German), French SCHAFFHOUSE, most northerly canton of Switzerland, north of the Rhine and west of Lake Constance (Bodensee); it has an area of 115 sq mi (298 sq km), of which about 90 percent is classed as productive. It is virtually surrounded on the north, east, and west by Germany, portions of which divide the canton into three detached parts: a large region including the capital city of Schaffhausen (*q.v.*), the small isolated district of Rüdlingen-Buchberg to the southwest, and an area extending northward from Stein am Rhein. The canton contains two small German enclaves. The dominant relief feature is the plateau of Randen (reaching 2,992 ft [912 m] at the summit, Hoher Randen), which slopes gently southward to the Rhine and is intersected by short, narrow valleys such as the Klettgau. On the Rhine just below Schaffhausen is the celebrated Rhine Falls.

Historically, the canton represents acquisitions made at various times by the city of Schaffhausen, which was admitted to the Swiss Confederation in 1501. The cantonal constitution dates from 1876, with revisions made in 1895.

The major industries include the production of machinery and metal goods, watches, jewelry, textiles, canned foods, leather goods, cement, glass, paper, and chemicals. Woodworking and brewing are also important. Hydroelectricity produced at Rheinau supplies power for the chemical industry at Rhein-

felden, the aluminum plant at Neuhausen am Rheinfall, and engineering works at Schaffhausen. Vine cultivation is the predominant agricultural activity, and forestry is significant. The majority of the population is German speaking and Protestant. Pop. (1983 est.) 69,759.

Schaffhausen (German), French SCHAFFHOUSE, capital of Schaffhausen canton, northern Switzerland, on the right bank of the Rhine, west of Lake Constance (Bodensee). The site was first mentioned in 1045 as Villa Scafhusun. About 1049 Count Eberhard III of Nellenburg founded there the Benedictine monastery of All Saints, around which the community developed. The town became a free imperial city between 1190 and 1218 but fell under Habsburg domination from 1330, until it bought its independence in 1415. It allied with the Swiss Confederation against the Habsburgs in 1454 and was admitted as a full member in 1501.



Munot Fort, Schaffhausen, Switz.
Josef Muench

The Protestant Münster, or cathedral (consecrated 1103), formerly the church of the All Saints monastery, has a bell (cast in 1486) inscribed "vivos voco, mortuos plango, fulgura frango" ("I call the living, I toll the dead, I break lightning bolts"), which is said to have inspired Friedrich Schiller's famous poem "Das Lied von der Glocke" ("The Lay of the Bell"). The former monastery now houses the municipal museum. Other notable landmarks are the round, massive Munot Fort (1564–85), the parish church (1460–1517), the old (1382–1412) and new (1617) town halls, and the Haus zum Ritter, or the Knight's House (1485), with frescoes by Tobias Stimmer.

A busy rail junction and tourist centre, it manufactures metal products, textiles, and watches. Important hydroelectric plants are nearby on the Rhine, there noted for its magnificent Rhine Falls, 2 mi (3 km) southwest. There is an aluminum plant in the industrial suburb of Neuhausen am Rheinfall. The population is German speaking and largely Protestant. Pop. (1983 est.) 34,396.

Schäffle, Albert (b. Feb. 24, 1831, Nürtingen, Württemberg—d. Dec. 25, 1903, Stuttgart), economist and sociologist who served briefly as Austrian minister of commerce and agriculture (1871); he was responsible for a major plan of imperial federalization for the Bohemian crownland.

Schäffle became a professor of political economy at Tübingen (1860) and later Vienna (1868). He was a member of the Württemberg Landtag (assembly) from 1862 to 1865, and in 1868 a delegate to the new German federal customs parliament (Zollparlament). Despite his reputation for radicalism, he was appointed to the Cabinet of the Austrian prime minister Karl, Graf von Hohenwart, in February 1871. The most forceful member of the Cabinet, he devised a scheme for redefining the position of Bohemia within the empire—the so-called Fundamental Articles (Fundamentalartikeln). The plan, vigorously denounced by Germans and Magyars alike, was shelved and the Cabinet was forced from office (October 1871).

Outside the government, Schäffle's ideas nonetheless continued to exert influence in matters of political and social welfare legislation, not only in Austria but also in Germany. He left a considerable written corpus in the fields of economics and sociology and also two volumes of posthumously published memoirs.

Schaffner, Jakob (b. Nov. 14, 1875, Basel, Switz.—d. Sept. 23, 1944, Strasbourg, Fr.), Swiss writer who lived in Germany from 1913. He belonged to a new generation of Swiss writers who, searching for uncompromising greatness and believing in life as a boundless adventure, broke away from the saturated tradition of middle-class society.

Schaffner was orphaned at an early age. He described his life in four autobiographical novels: *Johannes* (1922), *Die Jünglingszeit des Johannes Schattenhold* (1930; "The Youth of Johann Schattenhold"), *Eine deutsche Wanderschaft* (1931; "A German Journey"), and *Kampf und Reife* (1939; "Struggle and Resolution"). These works depict his experiences as a child, a charity schoolboy, a shoemaker, and a roving and self-taught writer. Schaffner's writing is colourful, spirited, and imaginative; his convictions were those of Nietzsche and, to some extent, of Dostoyevsky and finally led him to follow the lure of Nazism. He went on to write more novels—*Konrad Pilater* (1910), *Der Dechant von Gottesbüren* (1917; "The Dean of Gottesbüren"), and *Die Glücksfischer* (1925; "The Fisher for Happiness"); a volume of poetry entitled *Bekenntnis* (1940; "Confessions"); and essays—*Die Predigt der Marienburg* (1931; "The Sermon of Marienburg") and *Berge, Ströme und Städte, eine schweizerische Heimatschau* (1938; "Mountains, Streams and Towns, a View of my Swiss Homeland").

Schall von Bell, Adam, Chinese name T'ANG JO-WANG (b. May 1, 1591, Cologne—d. Aug. 15, 1666, Peking), Jesuit missionary and astronomer who became an important adviser to the first emperor of the Ch'ing dynasty (1644–1911/12).

Schall arrived in China in 1622, having been trained in Rome in the astronomical system of Galileo. He soon impressed the Chinese with the superiority of Western astronomy and was given an important official post translating Western astronomical books and reforming the old Chinese calendar.

When the Ming dynasty (1368–1644) fell and the Manchu forces of Manchuria established the Ch'ing dynasty, Schall was appointed head of the Imperial Board of Astronomy. After curing the Empress Dowager of a strange illness, Schall became the trusted adviser of the young emperor Shun-chih (reigned 1644–61), who called Schall *mafa* ("grandfather"). The Emperor permitted Schall to build a church in Peking in 1650 and several times attended services himself.

In 1664, three years after Emperor Shun-chih's early death, an anti-Christian official, aided by disgruntled Chinese astronomers, charged Schall with plotting against the state, citing Jesuit writings that depicted the Chinese as minor descendants of the ancient Hebrews. Schall was also accused of having cast a spell that caused the premature death of the Emperor Shun-chih. At his trial, Schall, having suffered a stroke, was unable to speak. He was defended by his newly arrived young assistant, Ferdinand Verbiest (1623–88), whose Chinese was inadequate for the occasion. Schall and several of his Chinese Christian colleagues were sentenced to death by dismemberment. But the following day an earthquake occurred; as a result of this inauspicious sign, the sentences were commuted, although five Chinese Christian astronomers were executed. Two years after his death, Schall was vindicated of all charges.

Schally, Andrew Victor (b. Nov. 30, 1926, Wilno, Pol.), Polish-born U.S. endocrinologist whose work in isolating and synthesizing hormones that are produced by the hypothalamus and control the activities of other hormone-producing glands led to his being awarded a share (with Roger Guillemin and Rosalyn Yalow) of the 1977 Nobel Prize for Physiology or Medicine.

Schally fled Poland with his family in 1939. He attended the University of London and worked for three years at the National Institute for Medical Research in London before travelling to Montreal to enter McGill University. He graduated in 1955 and two years later took a Ph.D. in biochemistry. From 1957 to 1962 he was associated with Baylor University in Houston, Texas, and in the latter year he became chief of endocrine and polypeptide laboratories at the Veterans Administration (VA) Medical Center in New Orleans. At the same time he joined the medical faculty of the Tulane University School of Medicine, becoming professor in 1967. He became senior medical investigator with the VA in 1973. Schally became a U.S. citizen in 1962.

Among Schally's chief accomplishments were the synthesis of TRH (thyrotropin-releasing hormone), the isolation and synthesis of LH-RH (luteinizing hormone-releasing hormone), and studies of the action of somatostatin.

Schāmil, also spelled SCHĀMYL (Caucasian leader): *see* Shāmil.

Schapera, Isaac (b. June 23, 1905, Garies, S.Af.), South African social anthropologist known for his detailed ethnographic and typological work on the tribal peoples of South Africa and Botswana.

Schapera's numerous field trips to Bechuanaland (now Botswana) during 20 years allowed him to record oral history accounts in the native tongue as well as to make minute observations of the effects of exposure to other cultures. His analysis of cross-racial influences between the Boers and Hottentots (or Khoi)

in South Africa, and between the Tswana and native Bushmen (or San) and whites in Bechuanaland led to his recommendation that "applied anthropology" be used as a tool in resolving other racial problems in South Africa. Schapera worked with both British and native political structures in his studies of land tenure and migration and was able to analyze the effects of government colonial policy in several areas.

Schapera received his M.A. from the University of Cape Town and his Ph.D. from the London School of Economics and Political Science. His work was influenced by his instructors A.R. Radcliffe-Brown and Bronisław Malinowski, from whom he learned structural and functional analysis. His work tended to document the dynamic acculturation theories of Radcliffe-Brown over Malinowski's then-prevailing ahistorical model. In his own work, Schapera emphasized the empirical and historical perspective. Schapera taught at the University of Cape Town until 1950 and at the University of London between 1950 and 1969. His published works include *A Handbook of Tswana Law and Custom* (1938), *Praise Poems of Tswana Chiefs* (1965), *Rainmaking Rites of Tswana Tribes* (1971), and *Kinship Terminology in Jane Austen's Novels* (1977).

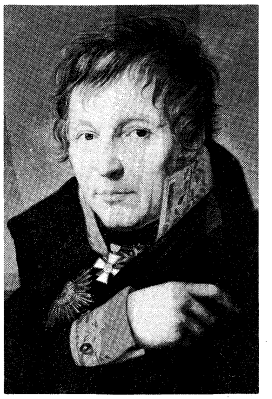
Scharnhorst, German battle cruiser completed in 1939. It did great damage to Allied shipping in northern waters during World War II before it was sunk by the British battleship "Duke of York" on Dec. 26, 1943. The "Scharnhorst" was a heavily armed ship of 26,000 tons standard displacement, carrying a 1,400 man crew and four aircraft and armed with nine 11-inch, twelve 5.9-inch, and fourteen 4.1-inch guns and sixteen 37-millimetre anti-aircraft guns. The "Gneisenau" was its sister ship.

Scharnhorst, Gerhard Johann David von (b. Nov. 12, 1755, Bordenau, Hanover—d. June 28, 1813, Prague), Prussian general who developed the modern general staff system. With another reformer of army procedures, August von Gneisenau, he devised the "shrinkage system" (*Krümpersystem*), in which army recruits were quickly trained and sent into the reserves so that more men could be trained. This system increased the actual number of trained soldiers and officers while keeping the size of the standing army at the 42,000 limit imposed by Napoleon on Prussia in the Peace of Tilsit (1807). Germany pursued a similar policy later in response to the military restrictions imposed after World War I.

As a soldier in the Hanoverian Army (commissioned in 1778), Scharnhorst distinguished himself in Belgium in the campaigns against the French Revolutionary forces in the 1790s. In 1801 Scharnhorst applied for service in the Prussian Army in an extraordinary way. He asked the King of Prussia to make him a lieutenant colonel, to raise him to the nobility, and to permit him to reorganize the Prussian Army. To show his qualifications, he enclosed three military essays with his application. Surprisingly, his request was approved. By 1804, when he was ennobled, all his conditions had been granted. He began his Prussian service at the war academy in Berlin, where one of his pupils was Karl von Clausewitz, later a noted writer on strategy.

In the Napoleonic campaign of 1806, Scharnhorst, along with Gebhard von Blücher, was taken prisoner after the Battle of Jena but was soon released in an exchange of prisoners. Although brought up in the military tradition of Frederick the Great, he was one of the first to realize the necessity for conscripted citizen armies rather than small, long-service, professional mercenary forces. He also realized that national service must be accompanied by political reform.

His appointment as head of the Army Re-

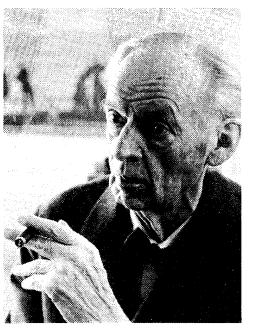


Scharnhorst, detail from a portrait by Friedrich Bury; in the Niedersächsisches Landesmuseum, Hannover, Ger.

By courtesy of the Niedersachsisches Landesmuseum, Hannover, Ger.

form Commission after the Peace of Tilsit gave him access to the King, but Napoleon soon became suspicious of Scharnhorst's activities and forced the King to cancel many of the proposed reforms. When Prussia was forced into an alliance (1811–12) with France against Russia, Scharnhorst went on indefinite leave. He later returned to service and in 1813 was made chief of staff to Blücher. In the Battle of Lützen (May 2), he received a wound from which he never recovered. He died in Prague, where he had gone to negotiate for Austria's entry into the war.

Scharoun, Hans (Bernhard) (b. Sept. 20, 1893, Bremen, Ger.—d. Nov. 25, 1972, West Berlin), German architect who was closely associated with modern architectural movements of the 1920s, much later producing his best known work, the hall for the Berlin Philharmonic Orchestra (1963).



Scharoun, 1972

Archiv fur Kunst und Geschichte, West Berlin

Scharoun received his training at the Technische Hochschule in Berlin from 1912 to 1914. After World War I he became a follower of the Berlin architect Bruno Taut, and in 1925 he joined the group known as Der Ring, formed to defend the modern movement in architecture. For the Deutscher Werkbund exhibition at Stuttgart (1927), featuring the work of prominent contemporary architects, Scharoun built a private residence. Among his outstanding projects before World War II were an institution for the aged at Breslau (1929), houses of the Siemensstadt Housing Estate in Berlin (1930), and the Schminke House at Löbau, in Saxony (1932).

When the Nazis came to power, his architectural activities were severely curtailed, but after World War II he served in a number of government and academic posts related to town planning. Among his best known postwar works are the Geschwister Scholl Schule at Lünen, Westphalia (1955–62), and the multi-facetted Romeo and Juliet apartment buildings at Stuttgart (1963).

Schary, Dore, byname of ISIDORE SCHARY (b. Aug. 31, 1905, Newark, N.J., U.S.—d. July 7, 1980, New York City), U.S. motion-picture producer, screenwriter, playwright, and director whose career included work on more than 300 motion pictures.

Between 1926 and 1932 Schary worked in the New York City area as a director of amateur theatricals, a publicist, and a newspaper writer and at summer hotels where he was associated with playwright Moss Hart. He made his stage debut as an actor in 1930 but went to Hollywood in 1932 to become a screenwriter. By 1940 he had written 46 screenplays and became an executive producer. In 1948 he was made vice-president of production for Metro-Goldwyn-Mayer studios, a position he held until 1956, when he was dismissed and became an independent producer.

Schary co-produced and directed for the stage the hit musical *The Unsinkable Molly Brown* (1960) and wrote, produced, and directed several of his own plays, including the celebrated *Sunrise at Campobello* (1957). He received an Oscar from the Academy of Motion Picture Arts and Sciences for the screenplay of *Boy's Town* (1938), and in 1970 he was appointed New York City's first commissioner of cultural affairs.

Schattschneider, Elmer Eric (b. Aug. 11, 1892, Bethany, Minn., U.S.—d. March 4, 1971, Old Saybrook, Conn.), U.S. political scientist and educator known for the study and advocacy of the political party system of government.

Schattschneider earned an A.B. at the University of Wisconsin (1915), an M.A. at the University of Pittsburgh (1927), and a Ph.D. at Columbia University (1935). He taught at Columbia (1927–30); Rutgers University in New Brunswick, N.J. (1929–30); and Wesleyan University in Middletown, Conn. (1930–60). In his work he argued for the importance of government shaped by political party competition. Conflict, he maintained, provided the energy for political life and was socialized through the workings of democracy. He also examined the distinctions between public and private interests, finding that vigorous party government contributed to public interest.

His major writings include *Politics, Pressures and the Tariff* (1953), *Party Government* (1942), *The Semi-Sovereign People* (1960), and *Two Hundred Million Americans in Search of a Government* (1969).

Schaudinn, Fritz (b. Sept. 19, 1871, Rösenigken, East Prussia—d. June 22, 1906, Hamburg), German zoologist who, with the dermatologist Erich Hoffmann, in 1905 discovered the causal organism of syphilis, *Spirochaeta pallida,* later called *Treponema pallidum.* He is known for his work in the development of protozoology as an experimental science.

He earned his doctorate in zoology at the University of Berlin (1894), became a lecturer there in 1898, and in 1904 headed the protozoological laboratory in the Imperial Health Office, Berlin.

Schaudinn was the first to differentiate between *Entamoeba histolytica,* cause of amebic dysentery, and its harmless counterpart, *Entamoeba coli.* He confirmed (1904) an earlier discovery that hookworm infection occurs through the skin. His studies of human and bird malaria provided clues that facilitated later work on the malarial parasite.

Schäuffelein, Hans Leonhard, also spelled LÉONARD SCHÄUFFELIN, SCHAUFFELE, SCHEIFELIN, SCHENFELEIN, SCHENFLEIN, or SCHOYFFELIN (b. *c.* 1480, Nürnberg—d. *c.* 1539, Nördlingen, Holy Roman Empire), German painter and designer of woodcuts whose work bears the strong influence of Al-

brecht Dürer. An altarpiece for the Church of Ober-Sankt-Veit, near Vienna, believed to be his first work, was drawn by Dürer.

In 1509 Schäuffelein worked in the Tirol and later in Bavaria. There he painted the altarpiece for the Benedictine abbey in Auhausen and was one of a group of artists in the service of Maximilian I. An accomplished graphic designer, Schäuffelein executed copperplate engravings and illustrated the *Theuerdank* (*c.* 1514) with woodcuts for Maximilian. He opened a workshop in Nördlingen in 1514 and thereafter devoted most of his time to painting. Though never viewed by critics as an outstanding draftsman, Schäuffelein showed in his later works his talent as a portraitist. His major work during this period includes the mural cycle depicting the "Story of Judith" for the town hall of Nördlingen.

Schaulen (Lithuanian S.S.R.): *see* Siauliai.

Schaumburg-Lippe, one of the smallest of member states of the German Reich prior to the end of World War II. It lay east of the middle bend of the Weser River and was bounded on all sides by Prussian territory from 1866 to 1946. Bückeburg was its capital.

Schaumburg, or Schauenburg, northeast of Rinteln, was the ancestral seat of a line of counts recorded from the early 12th century. Lutheran from 1559, this line died out in 1640, and the lands were partitioned. One of the survivors, Schaumburg-Lippe, was admitted to the Confederation of the Rhine as a sovereign principality in 1807. It joined the German Confederation in 1815, the North German Confederation in 1866, and the German Empire in 1871. The revolution of 1918 made it a "free state" with a republican and democratic constitution from 1922. In 1946 it was merged in Niedersachsen.

Schawlow, Arthur Leonard (b. May 5, 1921, Mount Vernon, N.Y., U.S.), U.S. physicist and co-recipient, with Nicolaas Bloembergen of the United States and Kai Manne Börje Siegbahn of Sweden, of the 1981 Nobel Prize for Physics for their revolutionary work in spectroscopy, particularly the spectroscopic analysis of the interaction of electromagnetic radiation with matter. Schawlow and Bloembergen earned their share of the award by investigating phenomena that are detectable only with the use of lasers.

As a child, Schawlow moved with his family to Canada. He attended the University of Toronto, receiving his Ph.D. in 1949. In that year he joined Charles Townes at Columbia University in the maser-laser project that led to Townes's share of the Nobel Prize for Physics in 1964. Townes and Schawlow wrote *Microwave Spectroscopy,* a monograph published in 1955. In 1951 Schawlow joined the staff of the Bell Telephone Laboratories; after returning to Columbia as a visiting professor in 1960, he moved to Stanford.

Schechina (Judaism): *see* Shekhina.

Schechter, Solomon (b. Dec. 7, 1847, Focşani, Rom.—d. Nov. 19, 1915, New York City), outstanding authority on the Talmud, researcher who discovered important ancient documents, and leader of U.S. Conservative Judaism.

Schechter studied the Talmud, the authoritative rabbinical compendium of law, lore, and commentary, in Vienna, Berlin, and London. In 1890 he became lecturer in Talmudic studies at the University of Cambridge. His book, *Some Aspects of Rabbinic Theology* (1909), which led to a sympathetic reappraisal of the teachings of the Pharisees, is an outgrowth of his lectures at Cambridge.

In 1896 Schechter went to Cairo to examine a cache of ancient writings, known only from the manuscript fragments that had been brought back by travellers to Egypt. In the old synagogue at Cairo, he found hidden within the *geniza* (a repository for sacred documents and objects) a priceless hoard of ancient manuscripts, among them a fragment of the Hebrew text of Ecclesiasticus and a document relating to the pre-Christian Jewish sect the Essenes.

In 1902 Schechter went to New York City to serve as president of the Jewish Theological Seminary of America. He developed the institution into a major centre for research in Judaica and for the training of rabbis in Conservative Judaism. In his approach to Judaism, Schechter emphasized the study of Jewish history, through which, he believed, a true picture of the workings of God would emerge. He originated the idea of "catholic Israel," a concept emphasizing the continuity of past and present Judaism. In 1913 he founded the United Synagogue of America, which eventually grew from 23 to more than 800 Conservative congregations. He considered this organization his greatest legacy, because he believed deeply in a strong congregational base for Conservative Judaism.

Scheele, Carl Wilhelm, Carl also spelled KARL (b. Dec. 9, 1742, Stralsund, Pomerania—d. May 21, 1786, Köping, Swed.), Swedish chemist who anticipated Joseph Priestley's discovery of oxygen and made many other important investigations. His record as a discoverer of new substances is probably unequalled, in spite of his poverty and lack of ordinary laboratory conveniences.

Scheele was first apprenticed for eight years to an apothecary in Göteborg before taking similar positions in Malmö (1765) and Stockholm (1768). In 1770 he settled at Uppsala and in 1775, when he was elected to the Stockholm Royal Academy of Sciences, he moved to Köping, where he became proprietor of a pharmacy.

In his only book, *Abhandlung von der Luft und dem Feuer* (1777; *Chemical Observations and Experiments on Air and Fire,* 1780), Scheele records that the atmosphere is composed of two gases—one that supports combustion and the other that prevents it. The former, "fire-air," or oxygen, he prepared from nitric acid, saltpetre (potassium nitrate), manganese dioxide, mercuric oxide, and other substances, and there is little doubt that he obtained the gas in about 1772, two years before Priestley.

Among his other discoveries were chlorine; baryta (barium oxide); glycerine; hydrogen sulfide; arsine (hydrogen arsenide); the pigment Scheele's green (copper arsenite); and citric, gallic, lactic, malic, molybdic, oxalic, prussic (hydrocyanic), and tartaric acids.

scheelite, calcium tungstate mineral, $CaWO_4$, that is an important ore of tungsten. Since the development of high-speed tool steels around 1900, the ore has had commercial value. Scheelite commonly occurs as compact or granular masses in contact metasomatic deposits, high-temperature veins, and granite pegmatites. In the United States it has been mined extensively in North Carolina, California, and Nevada. It also occurs in Cornwall and Cumberland in England, and in Bolivia, New South Wales, New Zealand, Siberia, Switzerland, and France.

It is white, yellow, brown, or green and has a vitreous to adamantine lustre. Most scheelite fluoresces, the colour ranging from blue white or white to yellow, depending upon the amount of molybdenum present. The Mohs hardness is $4\frac{1}{2}$–5; specific gravity, 5.9–6.1; and crystal system, tetragonal. Scheelite is one end-member of a continuous series of solid solutions in which the second component is the similar mineral powellite, $CaMoO_4$.

Scheer, Reinhard (b. Sept. 30, 1863, Obernkirchen, Hanover—d. Nov. 26, 1928, Marktredwitz, Ger.), admiral who commanded the German High Seas Fleet at the Battle of Jutland (1916).

Scheer became chief of staff of the High Seas Fleet under Henning von Holtzendorff in 1910 and commander of a battle squadron in 1913. After the outbreak of World War I, he advocated the use of submarines and gained fame as a submarine strategist. He planned sub-surface raids off the English coast, using surface units as bait with submarines lying in ambush for any British ships lured into the open sea. Scheer received command of the fleet in January 1916; he hoped to precipitate a strategic division of the British Grand Fleet and catch it at a disadvantage. A combination of both planning and chance resulted in the two fleets converging at the Battle of Jutland (May 31–June 1, 1916), the only major fleet action of World War I. Although the Grand Fleet was not successfully divided and the British outnumbered the Germans, Scheer's brilliant manoeuvring saved the High Seas Fleet. The battle itself proved indecisive.

On Aug. 8, 1918, Scheer succeeded Holtzendorff as chief of the admiralty staff, serving for five months until his retirement.

Scheer's account of the Battle of Jutland appears in his book *Deutschlands Hochseeflotte im Weltkrieg* (1919; *Germany's High Seas Fleet in the World War,* 1920).

Scheffel, Joseph Victor von (b. Feb. 16, 1826, Karlsruhe, Baden—d. April 9, 1886, Karlsruhe, Ger.), poet and novelist whose immensely popular humorous verse romance, *Der Trompeter von Säkkingen* (1854) and historical novel, *Ekkehard* (1855) appealed to sentimental popular taste and made him one of the most widely read German authors.

Scheffel's father was a Baden army engineer, and his mother was a poet. At his father's insistence Scheffel was trained in law at the universities of Munich, Heidelberg, and Berlin and began a career in the Baden civil service in 1848. He soon obtained a leave of absence to travel and study painting in Italy, and in 1853 he resigned his legal post and turned to literature. He served as librarian to Prince Fürstenberg at Donaueschingen from 1857 to 1859. In 1865 he was given the title Sachsen-Weimarischer Hofrat (privy councillor), and in 1876, on his jubilee, he was given a patent of nobility.

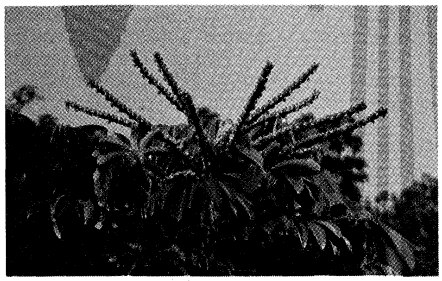
Scheffel's popularity was based on genuine talent as a fluent poet and on his romantic, nationalistic stance that rejected the strictures of contemporary realism and steadfast adherence to historical fact in favour of a rosy view of Germany's ancient glories. *Ekkehard,* probably the most historical novel in all German literature, is set at the 10th-century monastery of St. Gall; *Hugideo* (1884) is a story from the 5th century. A book of Scheffel's verse, *Frau Aventiure* (1863; "Lady Adventure" [the medieval muse of narrative poetry]), and a collection of student songs, *Gaudeamus!* (1868; Eng. trans. 1872), were very popular; *Gaudeamus!* and *Ekkehard* were being reprinted in the second half of the 20th century. Scheffel's writings fell out of favour with the critics, who viewed them as cloying and trivial.

Schefferville, town, Nouveau-Québec (New Quebec) region, northeastern Quebec province, Canada, on the Quebec–Labrador (Newfoundland) border. The town, first known as Knob Lake, was developed on the site in the early 1950s along with the exploitation of the immense iron-ore reserves in the area. Production and shipment began in 1954 with the completion of a hydroelectric plant on the Churchill River and a railway 360 mi (580 km) long to the ports of Sept-Îles, Port-Cartier, and Pointe-Noir on the St. Lawrence River. An important regional centre, Schefferville is

now one of the largest producers of iron ore in Canada. The town has an airport. Inc. 1955. Pop. (1981) 1,997.

Scheffler, Johann (Christian mystic): *see* Angelus Silesius.

schefflera, also called UMBRELLA TREE, any of several tropical evergreen trees or shrubs, in the ginseng family (Araliaceae), widely cultivated as indoor foliage plants because of their tolerance to low light conditions. The genus



Schefflera
Phil Clark

Schefflera includes the New Zealand seven fingers (*S. digitata*), which may reach a height of 7.5 metres (25 feet), and the Asian *S. octophylla*, similar in size.

The most common schefflera is the Australian umbrella tree (*S. actinophylla*, or *Brassaia actinophylla*), up to 12 m, which is widely used as a landscape tree in Hawaii and other warm areas and is also one of the most popular indoor plants around the world. A cultivated dwarf species, called Hawaiian schefflera (*B. arboricola*), is more compact in habit and has smaller leaves.

Scheidemann, Philipp (b. July 26, 1865, Kassel, Hesse-Kassel—d. Nov. 29, 1939, Copenhagen), German Social Democratic politician who, without party or government authorization, on Nov. 9, 1918, made the Weimar Republic a fact by proclaiming it from the balcony of the Reichstag. He became the republic's first chancellor.

A journalist and (from 1903) member of the Reichstag for the Social Democrats, Scheidemann joined the majority of his party in supporting Germany's participation in World War I. Toward the war's end, he was appointed minister without portfolio in the last imperial Cabinet (October 1918). From November 1918 to February 1919 he served on the six-member ruling council of the interim republican government. After serving as first chancellor (February–June 1919) of the Weimar Republic, he resigned rather than give his assent to the Versailles Treaty. Serving subsequently as mayor of Kassel (1920–25), Scheidemann maintained an outspoken opposition to all government attempts at accommodation with the military and with reactionary parties. In 1922 an attempt to assassinate him miscarried. He emigrated from Germany at the beginning of the National Socialist era (1933).

Scheidt, Samuel (b. 1587, Halle, Saxony—d. March 30, 1654, Halle), organist and composer who, with Jan Pieterszoon Sweelinck, influenced the Baroque organ style of northern Germany.

Scheidt studied with Sweelinck in Amsterdam and in 1609 became organist at the Moritzkirche in Halle. About 1619 he became organist, and later chapelmaster, to the Margrave of Brandenburg. He was esteemed as a teacher, and his pupils included the composer Adam Krieger.

Scheidt's first published works include sacred vocal music, notably *Cantiones sacrae* (1620) for eight voices, and four books of *Geistliche Concerten* (1631–40) for two to four voices and continuo. The publication of his *Tabulatura nova* (three parts, 1624) was an important event in the history of organ music. The title refers to the musical notation used: keyboard tablature in the Italian sense; *i.e.*, staff notation, rather than the alphabetical tablature used in earlier German organ music. The collection contains fantasias, toccatas, "echo pieces," organ responses for liturgical use, and, most important, variations on chorale melodies.

Scheidt's subjection of the chorale melody to musical variations and his use of different combinations of voices and instruments in the different stanzas foreshadowed the later Lutheran cantatas based on chorales. Scheidt's work, though influenced by Sweelinck, shows his own skill in counterpoint. His *Tablatur-Buch* (1650) contains harmonized accompaniments for 100 sacred songs and psalms, pointing to the growing practice of congregational singing in Lutheran churches.

Scheie's syndrome, also called MUCOPOLYSACCHARIDOSIS I S, or MPS I S, uncommon hereditary metabolic disease characterized by clawing of the hands, corneal clouding, incompetence of the aortic valve of the heart, and painful nerve compression in the wrist (Carpal tunnel syndrome). The disease was described by Harold Scheie of the United States in 1962 and is a mild variant of Hurler's syndrome (MPS I H), a disorder associated with subnormal intelligence and dwarfism. Patients with Scheie's syndrome, in contrast, usually attain normal height and intelligence and can expect a normal lifespan, rare in Hurler's disease. Both syndromes are caused by a recessively inherited defect in the enzyme alpha-L-iduronidase, important in the development of connective tissues. A related condition is Hurler-Scheie syndrome (MPS I H S), which causes dwarfism, progressive blindness, deafness, and heart failure.

Scheifelin, Hans Leonhard: *see* Schäuffelein, Hans Leonhard.

Schein, Johann Hermann (b. Jan. 20, 1586, Grünhain, Saxony—d. Nov. 19, 1630, Leipzig), German composer of sacred and secular music; one of the earliest (with Michael Praetorius and Heinrich Schütz) to introduce the Italian Baroque style into German music.

Schein's father, a teacher and pastor, died when the boy was seven, and the family moved from rural Grunhain back to Dresden, its former home. At 13, he was a soprano in the chapel choir of the court at Dresden and studied under the kappellmeister there. He was an apt scholar. In 1603 he studied briefly at the University of Leipzig and then was accepted into the Schupforta near Naumburg, where he studied music and the humanities for four years. Schein returned to the University of Leipzig for another four years, studying law and the liberal arts. His musical abilities were evident throughout his studies, and by 1615 he was kappellmeister at Weimar. The following year he won the valued position of Thomaskantor, cantor at the Thomaskirche in Leipzig, a post that Johann Sebastian Bach occupied more than a century later. Schein was required to direct choral music at two churches and to teach Latin and music for some 14 hours a week.

Meanwhile, Schein's reputation as a composer of vocal music, both sacred and secular, was growing. He is considered, along with his acquaintance Samuel Scheidt and his close friend Heinrich Schütz, one of the three finest German composers of his time. His *Cantional oder Gesangbuch Augburgischer Konfession* (1627) contains about 200 harmonized chorales, in which about 80 of the melodies are his. The *Cymbalum Sionium sive Cantiones Sacrae* (1615) contains 30 instrumental motets in the rich Venetian style. Italian influence also appears in the *Opella nova ander Theil, geistliche Concerten* (1618) and in the secular *Diletti pastorali* (1624), which contain early examples of chromaticism (use of nonharmonic tones or of harmonies based on them) in German secular music. Schein's *Banchetto musicale* (1617), one of his few instrumental compositions, is an outstanding collection of variation suites, created long before the term was coined.

Scheldt River, French ESCAUT, Flemish and Dutch SCHELDE, river, 270 mi (435 km) long, rising in northern France and flowing across Belgium to its North Sea outlet in Dutch territory. Along with the Lower Rhine and the Meuse rivers, it drains one of the world's most densely populated areas; as a waterway, with its numerous branch canals and navigable tributaries, it serves an area including the agriculturally important Flanders Plain, the Belgian textile centres, the coalfields of northern France, and the industrial complex of Lille-Roubaix-Tourcoing. The chief tributaries of the Scheldt are the Scarpe and Lys on the left and the Dender (or Dendre) and Rupel on the right. The estuary formerly had two channels, the East and the West Scheldt (Oosterand Westerschelde) divided by the islands of Noord, Zuidbeveland and Walcheren; but in 1866 the East Scheldt was sealed off by a dike carrying the railway to Vlissingen in The Netherlands. The outlet between Zuidbeveland and Walcheren is closed by a dike, and the only connection is via Kanaal door Zuidbeveland. A channel in the West Scheldt, with a minimum depth of 24 ft (7 m), allows vessels drawing up to 33 ft to reach Antwerp at full tide. With its upper course canalized, the river is navigable for about 125 mi in Belgium and 39 mi in France. Among well-known towns on its banks are Cambrai and Valenciennes in France and Tournai, Oudenaarde, Ghent, and Antwerp in Belgium.

The busiest section of the Scheldt River lies between Antwerp and Ghent, along which are many industrial sites. Above Cambrai the river is unnavigable, but from this point the Canal de Saint-Quentin connects it with the Somme-Seine system. The Scheldt waterway is also connected with the Sambre-Meuse river system by the Mons-Condé Canal. From Ghent the Ghent-Terneuzen Canal gives direct access to the West Scheldt, and the small Ghent–Ostende Canal is a link to the North Sea.

Use of the Scheldt as a shipping outlet was long a subject of bitter contention between the Flemish and the Dutch because the latter controlled most of the estuary. Seeking to cripple the trade of Antwerp, the Dutch in 1648 secured the right to close the estuary to navigation. In 1863, Belgium finally bought out this right, with assistance from other maritime countries, and declared the Scheldt free, thereby giving impetus to the development of Antwerp (*q.v.*) as a great international port.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Scheler, Max (b. Aug. 22, 1874, Munich—d. May 19, 1928, Frankfurt am Main), German social and ethical philosopher, remembered for his Phenomenological approach, after the philosophical method of the founder of Phenomenology, Edmund Husserl.

In 1901 Scheler became a lecturer at the University of Jena; by that time he had already been influenced by Husserl. Scheler later met several of Husserl's disciples during his years (1907–10) as a professor at Munich. Retiring to Berlin in 1910, he wrote his major works before 1917, when he joined the German Foreign Office as a diplomat in Geneva and at The Hague. In 1919 he became professor of philosophy at Cologne. By 1920 he had

become a pacifist and a convert to Roman Catholicism but about 1924 turned toward a more pantheistic view of man and the world.

As a Phenomenologist, Scheler sought to discover the essence of mental attitudes and their relation to their objects. He differed from Husserl in his readiness to assign an independently real status to the objects. Scheler's major ethical work, *Der Formalismus in der Ethik und die materiale Wertethik* (1921; "Formalism in Ethics and the Material Value Ethics"), severely criticizes the formalistic ethics of Kant and pleads for an ethics based on human purpose and intention. Arranging all values in a hierarchy presented a priori through men's feelings, Scheler built largely on the "order" or "logic of the heart" of Pascal. Feeling, in contrast to pure intellection, is also central to Scheler's most significant psychological work, *Wesen und Formen der Sympathie* (1923; *The Nature of Sympathy,* 1954). His *Vom Ewigen im Menschen* (1921; "On the Eternal in Man") analyzes man's religious consciousness and the object to which it is directed, described variously as the holy, the self-sufficient, or the all-performing. The theistic tenor of this work yields to a more pantheistic attitude in the later *Die Stellung des Menschen im Kosmos* (1928; "The Place of Man in the Universe"). His principal contribution to philosophical sociology is *Die Wissensformen und die Gesellschaft* (1926; "Forms of Knowledge and Society"), a critique of Marxist accounts of the relation of ideas and beliefs to social structure and development. M.S. Frings's *Max Scheler* (1965) was followed by E.W. Ranly's *Scheler's Phenomenology of Community* (1966) and J.R. Staude's *Max Scheler* (1967).

Schellendorf, Paul Bronsart von: *see* Bronsart von Schellendorf, Paul.

Schelling, Friedrich Wilhelm Joseph von (b. Jan. 27, 1775, Leonberg, near Stuttgart, Württemberg—d. Aug. 20, 1854, Bad Ragaz, Switz.), German philosopher and educator, a major figure of German Idealism, in the post-Kantian development in German philosophy. He was ennobled (with the addition of *von*) in 1806.

Early life and career. Schelling's father was a Lutheran minister, who in 1777 became a professor of Oriental languages at the theological seminary in Bebenhausen, near Tübingen. It was there that Schelling received his elementary education. He was a highly gifted child, and he had already learned the classical languages at the age of eight. On the basis of his rapid intellectual development, he was admitted, at the age of 15, to the theological seminary in Tübingen, a famous finishing school for ministers of the Württemberg area, where he lived from 1790 to 1795. The youths at Tübingen were inspired by the ideas of the French Revolution and, spurning tradition, turned away from doctrinal theology to philosophy. The young Schelling was inspired, however, by the thought of Immanuel Kant, who had raised philosophy to a higher critical level, and by the Idealist system of Johann Fichte, as well as by the pantheism of Benedict de Spinoza, a 17th-century Rationalist. When he was 19 years old Schelling wrote his first philosophical work, *Über die Möglichkeit einer Form der Philosophie überhaupt* (1795; "On the Possibility and Form of Philosophy in General"), which he sent to Fichte, who expressed strong approval. It was followed by *Vom Ich als Prinzip der Philosophie* ("Of the Ego as Principle of Philosophy"). One basic theme governs both of these works—the Absolute. This Absolute cannot be defined, however, as God; each person is himself the Absolute as the Absolute ego. This ego, eternal and timeless, is apprehended in a direct intuition, which, in contrast to sensory intuition, can be characterized as intellectual.



Schelling, detail of an oil painting by Joseph Karl Stieler; in the Bayerische Staatsgemäldesammlungen, Munich

By courtesy of the Bayerisches Nationalmuseum, Munich

From 1795 to 1797 Schelling acted as a private tutor for a noble family, who had placed its sons under his care during their studies in Leipzig. The time spent in Leipzig marked a decisive turning point in the thought of Schelling. He attended lectures in physics, chemistry, and medicine. He acknowledged that Fichte, whom he had previously revered as his philosophical model, had not taken adequate notice of nature in his philosophical system, inasmuch as Fichte had always viewed nature only as an object in its subordination to man. Schelling, in contrast, wanted to show that nature, seen in itself, shows an active development toward the spirit. This philosophy of nature, the first independent philosophical accomplishment of Schelling, made him known in the circles of the Romanticists.

Period of intense productivity. In 1798 Schelling was called to a professorship at the University of Jena, the academic centre of Germany at the time, where many of the foremost intellects of the time were gathered. During this period Schelling was extremely productive, publishing a rapid succession of works on the philosophy of nature. It was Schelling's desire, as attested by his famous work *System des transzendentalen Idealismus* (1800; "System of Transcendental Idealism"), to unite his concept of nature with Fichte's philosophy, which took the ego as the point of departure. Schelling saw that art mediates between the natural and physical spheres insofar as, in artistic creation, the natural (or unconscious) and the spiritual (or conscious) productions are united. Naturalness and spirituality are explained as emerging from an original state of indifference, in which they were submerged in the yet-undeveloped Absolute, and as rising through a succession of steps of ever-higher order. Fichte did not acknowledge this concept, however, and the two writers attacked each other most sharply in an intensive correspondence.

The time spent in Jena was important for Schelling also in a personal respect: there he became acquainted with Caroline Schlegel, among the most gifted women in German Romanticism, and married her in 1803. The unpleasant intrigues that accompanied this marriage and the dispute with Fichte caused Schelling to leave Jena, and he accepted an appointment at the University of Würzburg.

At first, Schelling lectured there on the philosophy of identity, conceived in his last years in Jena, in which he tried to show that, in all beings, the Absolute expresses itself directly as the unity of the subjective and the objective. It was just on this point that G.W.F. Hegel initiated his criticism of Schelling. Hegel had at first taken Schelling's side in the disagreement between Schelling and Fichte, and complete unanimity seemed to exist between them in 1802 when they co-edited the *Kritisches Journal der Philosophie* ("Critical Journal of Philosophy"). In the following years, however, Hegel's philosophical thought began to move significantly away from Schelling's, and his *Phänomenologie des Geistes* (1807; *The Phenomenology of Mind,* 1910) contained strong charges against Schelling's system. To Schelling's definition of the Absolute as an indiscriminate unity of the subjective and the objective, Hegel replied that such an Absolute is comparable to the night, "in which all cows are black." Besides, Schelling had never explicitly shown how one could ascend to the Absolute; he had begun with this Absolute as though it were "shot out of a pistol."

This criticism struck Schelling a heavy blow. The friendship with Hegel that had existed since their time together at the seminary in Tübingen broke up. Schelling, who had been regarded as the leading philosopher of the time until the publication of Hegel's *Phänomenologie,* was pushed into the background.

This situation caused Schelling to retreat from public life. From 1806 to 1841 he lived in Munich, where, in 1806, he was appointed as general secretary of the Academy of Plastic Arts. He lectured from 1820 to 1827 in Erlangen. Caroline's death on Sept. 7, 1809, led him to write a philosophical work on immortality. In 1812 Schelling married Pauline Gotter, a friend of Caroline. The marriage was harmonious, but the great passion that Schelling had felt for Caroline was unrepeatable.

During the years in Munich, Schelling tried to consolidate his philosophical work in a new way, producing a revision that was instigated by Hegel's criticism. Schelling questioned all Idealistic speculations built on the assumption that the world presents itself as a rational cosmos. Were there not also irrational things, he asked, and was not evil the predominant power in the world? In his *Philosophische Untersuchungen über das Wesener menschlichen Freiheit* (1809; *Of Human Freedom,* 1936), Schelling declared that the freedom of man is a real freedom only if it is freedom for good and evil. The possibility of this freedom is founded on two principles that are active in every living thing: one, a dark primal foundation that manifests itself in carnal desire and impulse; the other, a clearheaded sensibleness that governs as a formative power. Man, however, has placed the dark stratum of impulse, which was meant only to serve the intellect as a source of power, above the intellect and has thus subordinated the intellect to the impulses, which now rule over him. This reversal of the right order is the occurrence known in the Bible as the Fall from grace, through which evil came into the world. But this perversion of man is revoked by God, who becomes man in Christ and thus reestablishes the original order.

Period of the later, unpublished philosophy. The position developed in the work on freedom forms the basis of Schelling's later philosophy, covering the time from 1810 until his death, which is known only through a draft of the unpublished work *Die Weltalter* (written in 1811; *The Ages of the World,* 1942) and through the manuscripts of his later lectures. In *Die Weltalter* Schelling wanted to relate the history of God. God, who originally is absorbed in a quiet longing, comes to himself by glimpsing in himself ideas through which he becomes conscious of himself. This self-consciousness, which is identical to freedom, enables God to project these ideas from himself—*i.e.,* to create the world.

Schelling's appointment to the University of Berlin in 1841 gave him an opportunity once again to develop public interest in his conceptions. The Prussian king of that time, Frederick William IV, hoped that Schelling would combat the so-called dragon's seed of Hegelianism in Berlin, where Hegel had been

working until his death in 1831. Schelling's first lecture in Berlin manifested his self-consciousness. Schelling declared that in his youth he had opened a new page in the history of philosophy and that now in his maturity he wanted to turn this page and start yet a newer one. Such notables as Friedrich Engels, Søren Kierkegaard, Jakob Burckhardt, and Mikhail Bakunin were in his audience. Schelling, however, had no great success in Berlin. Moreover, he was embittered when his lectures were plagiarized by an opponent who wanted to submit the positive philosophy of Schelling, now finally disclosed in these lectures, to the public for examination. Schelling initiated a legal suit but lost the case. He resigned and discontinued lecturing.

The content of these final lectures, however, represented the climax of Schelling's creative activity. Schelling divided philosophy into a *negative* philosophy, which developed the idea of God by means of reason alone, and, in contrast, a *positive* philosophy, which showed the reality of this idea by reasoning a posteriori from the fact of the world to God as its creator. Schelling then explained (referring to his work on freedom) that man, who wanted to be equal to God, stood up against God in his Fall into sin. God, however, was soon elevated again as the principle. During the era of mythology, God appeared as a dark power. During the era of revelation, however, God emerged in history as manifestly real in the figure of Christ. Thus, the complete history of religion should be conveyed through philosophical thought.

Personality and significance. Schelling is described as a man of thickset build, and, according to favourable reports, his high forehead and sparkling eyes were impressive. Opponents of his philosophy, however, such as Karl Rosenkranz, a disciple of Hegel, spoke of a sharp and piercing look. His character was unbalanced. Schelling has been described as nervous, unpredictable, and deeply sensitive in his proud fashion. Particularly striking was his unwavering consciousness that it was his mission to bring philosophy to a definite completion.

Great philosophical influence was denied to Schelling. The philosophical situation at the time was determined not by the few disciples of Schelling but by the Hegelians. The right-wing Hegelians occupied all of the philosophical professorial chairs and handed down the tradition of Hegel's system. The left-wing Hegelians explained that, even to suspend Hegel's system, an analysis of Hegel's philosophy was necessary. Thus, in tracing the development of German Idealism, the early and middle Schelling—that is, the Schelling who drew up the philosophy of nature and the philosophy of identity—has been placed between the Idealism of Fichte, who started from the ego, and Hegel's system of the Absolute spirit.

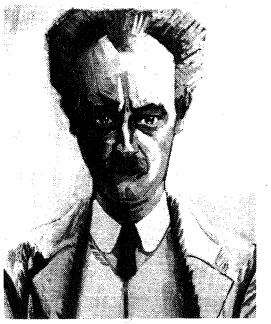
The independence of Schelling and his importance for philosophy are only now being recognized, and that in connection with Existential philosophy and philosophical anthropology, which conceive themselves as counteracting the philosophy of absolute reason. The later Schelling now turns out to have been the first thinker to illuminate Hegel's philosophy critically. In particular, Schelling's insight that man is determined not only by reason but also by dark natural impulses is now valued as a positive attempt to understand the reality of man on a level more profound than that attained by Hegel. (W.Sc./Ed.)

BIBLIOGRAPHY. Schelling's works have been published by his son, K.F.A. Schelling (ed.), *Sämtliche Werke,* 14 vol. (1856–61), and reprinted unchanged as the "Münchner Jubiläumsdruck," entitled *Werke,* ed. by Manfred Schroeter, 12 vol. (1927–54). The Schelling-Kommission, which existed for a time at the Bayerische Akademie der Wissenschaften in Munich, prepared a critical new edition of his works that includes the unpublished manuscripts. His instructive and often intimate correspondence with influential persons was edited by Gustav L. Plitt, *Aus Schellings Leben: In Briefen,* 3 vol. (1869–70). Important for the change in Schelling's thought is his correspondence with Fichte: Walter Schulz (ed.), *Fichte-Schelling: Briefwechsel* (1968), which presents the philosophical development that characterized his position in German Idealism. An older classical work, Kuno Fischer, *Geschichte der neuern Philosophie,* 4th ed., vol. 7 (1923), details Schelling's life and interprets his individual writings. Joseph L. Esposito, *Schelling's Idealism and Philosophy of Nature* (1978), examines his thoughts on nature and his influence on 19th-century American thought. Karl Jaspers, *Schelling: Grösse und Verhängnis* (1955), is an important work that achieves a critical understanding of Schelling from the standpoint of Existentialism. See also Horst Fuhrmans, *Schelling: Briefe und Dokumente* (1962), and two other works, *Schellings letzte Philosophie* (1940), and *Schellings Philosophie der Weltalter* (1954), which provide guidance on the salient problem of whether Schelling changed from the building of a system of Idealism to espousing a philosophy of freedom that also recognizes the irrational.

schemochrome, any one of many colourless, submicroscopic structures in organisms that serve as a source of colour by the manner in which they reflect light. Among those physical structures in organisms that fractionate light into its component colours are ridges, striations, facets, successive layers, and multiple fine, randomly dispersed light-scattering bodies.

Schendel, Arthur (-François-Émile) van (b. March 5, 1874, Batavia, Java—d. Sept. 11, 1946, Amsterdam), Dutch novelist and short-story writer, whose basically Romantic temperament, combined with a concentrated, restrained, almost classical style, produced some of the greatest novels of his period.

His first important novels *Een zwerver verliefd* (1904; "A Wanderer in Love") and *Een zwerver verdwaald* (1907; "A Lost Wanderer") are set in medieval Italy, but the historical

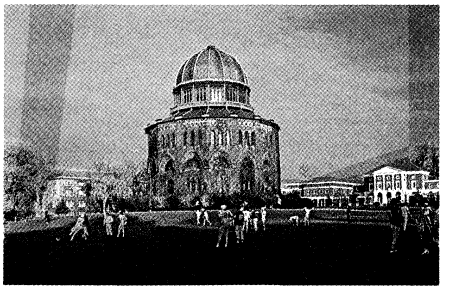


Schendel, detail of an oil painting by Jan Toorop, 1912
Iconographisch Bureau

aspect is subordinated to the inner life and imagination of the hero, Tamalone. The force of destiny is felt throughout, and Schendel's muted, sober use of language intensifies the tragic note.

The theme of fate and humanity's inevitable succumbing to it is prevalent in all his later works, in which he turns to a more Realistic style. Notable examples are *Het fregatschip Johanna Maria* (1930; *The Johanna Maria,* 1935), the history of one of the vanishing sailing ships and its sailmaker, and his popular *Een hollandsch drama* (1935; *The House in Haarlem,* 1940). His Romanticism reasserted itself in his last works, among which *De wereld een dansfeest* (1938) and *De grauwe vogels* (1937; *Grey Birds,* 1939) are perhaps the best known.

Schenectady, city, seat (1809) of Schenectady County, east central New York, U.S., on the Mohawk River and Barge Canal. With Albany and Troy, it forms an urban-industrial complex. Founded as a Dutch settlement in 1661, it took its name from the nearby Mohawk village of Schaunactada, probably meaning "the other side of the pinelands." In 1690 the village was virtually destroyed in the Schenectady Massacre by French and Indians. With an influx of English settlers in the early 1700s, the site (above a series of waterfalls) was fortified and developed as the terminus of the portage between Albany, on the Hudson,



Playing fields and library of Union College, Schenectady, N.Y.
Milt and Joan Mann from CameraMann

and the Mohawk. The prosperous transshipment business declined after 1825 with the opening of the Erie Canal. Economic recovery for the city was stimulated by the arrival of the Mohawk and Hudson Railroad in 1831 and the establishment of a locomotive works in 1848.

In 1886 the Edison Machine Works were moved from New York to Schenectady, and by a series of mergers in 1892 the General Electric Company was created with its main administrative offices in the city. Later, plants manufacturing a wide range of electrical equipment and experimental laboratories, including nuclear research centres, were established. Sporting goods, wire and cable equipment, and chemicals are also manufactured. Union College and University was founded (1795) in Schenectady and includes Jackson Botanical Gardens on its 100-ac (40-ha) campus. Schenectady County Community College opened in 1968. The city's colonial past survives in its downtown Historic Stockade Area. Inc. borough, 1765; city, 1798. Pop. (1980) 67,972; (1982 est.) Albany–Schenectady–Troy metropolitan area (SMSA), 832,800.

Schenfelein, Hans Leonhard, also spelled SCHENFLEIN: *see* Schäuffelein, Hans Leonhard.

Schenk, Ard (b. Sept. 16, 1944, Anna Pavlowna, The Netherlands), Dutch speed skater, who in 1972 won three gold medals in the Winter Olympic Games and became the first skater to win the 500-, 1,500-, 5,000- and 10,000-metre races at the world championships. He received his Olympic gold medals that year for the latter three distances.

He was the son of a former national skating coach and began international competition in 1964, won his first European championship in 1966, was world 1,500-metre champion (1967; 1970–72), world 5,000-metre champion (1971–72), and world 10,000-metre champion (1971–72). As a professional from 1973, he won many European and world championships.

Schenk von Stauffenberg, Claus, Graf von (count of): *see* Stauffenberg, Claus, Graf (Schenk) von.

Schenker, Heinrich (b. June 19, 1868, Wisniowczyki, Russia—d. Jan. 14, 1935, Vienna), Austrian music theorist whose insights into the structural hierarchies underlying much of 18th- and 19th-century music led to a new understanding of the laws of melodic and har-

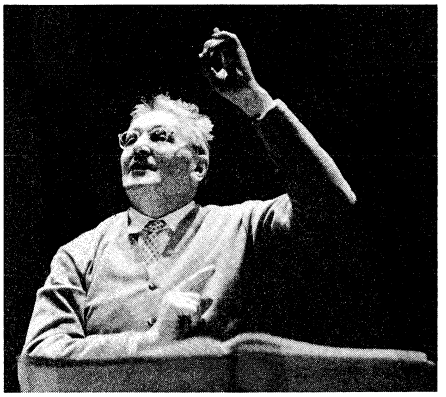
monic construction and form. Schenker was not well known in his time; he worked as a private teacher in Austria. He studied composition with Anton Bruckner and was an accompanist before turning his energies to the exploration of the fundamental principles of musical organization and coherence.

Taking works of the 18th and 19th centuries as models of musical perfection, he based his analyses on the compositions of the masters of tonal harmony (prevalent *c.* 1650–*c.* 1900). In this connection he edited works of J.S. Bach and G.F. Handel and the piano sonatas of Ludwig van Beethoven. His theoretical writings include essays on particular works, among them "Beethovens neunte Sinfonie" (1912; "Beethoven's Ninth Symphony") and the monumental *Neue musikalische Theorien und Phantasien* (three sections, 1906–35; "New Musical Theories and Phantasies"). Schenker's most important theory, expounded in *Das Meisterwerk in der Musik* ("The Masterpiece in Music"), was that great musical compositions grow from a single idea and that their contrasting themes represent only a different aspect of this one basic thought. His hypotheses greatly influenced 20th-century theoreticians.

Schenoudi (Coptic abbot): *see* Shenute.

schenti: *see* loincloth.

Scherchen, Hermann (b. June 21, 1891, Berlin, Ger.—d. June 12, 1966, Florence, Italy), German conductor and champion of 20th-century music. He was influential in the careers of many contemporary composers.



Scherchen, 1954–55 season
BBC Hulton Picture Library

Scherchen was musically self-taught. Early in his career he played the viola, and for a time he toured with the Austrian composer Arnold Schoenberg. Interned in Russia during World War I, he returned to Berlin after the war and there in 1918 founded the Neue Musikgesellschaft ("Society for New Music"). He edited the music journal *Melos* in 1920–21. In 1933 he fled Germany to Brussels, where he edited the journal *Musica viva* (1933–36). He conducted also in Spain, France, and elsewhere in Europe during and after World War II; he made his American debut with the Philadelphia Orchestra in 1964.

Scherchen collaborated with avant-garde composers in introducing their works in recordings and live performances. He recorded with the orchestras of Vienna, London, and Paris and devoted particular attention to the works of Baroque masters and of Ludwig van Beethoven. Serving as an important link between Schoenberg and his school and the younger composers, Scherchen influenced the careers of Luigi Nono and other leading mid-century composers, especially in Italy.

Scherchen wrote several books, including the *Lehrbuch des Dirigierens* (1929; *Handbook of Conducting*), *Vom Wesen der Musik* (1946; *The Nature of Music*), and *Musik für Jedermann* (1950; "Music for Everyman").

Scherrer, Paul (b. Feb. 3, 1890, Sankt Gallen, Switz.—d. Sept. 25, 1969, Zürich), Swiss physicist who collaborated with Peter Debye in the development of a method of X-ray diffraction analysis. The Debye–Scherrer method is widely used to identify materials that do not readily form large, perfect crystals.

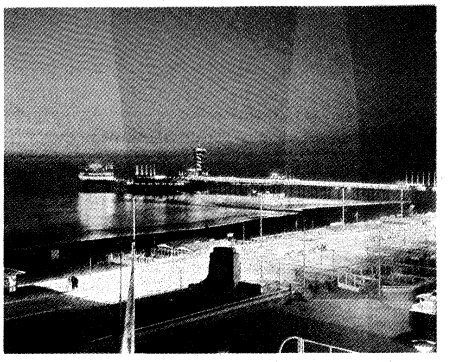
Scherrer spent most of his life in Zürich, where he was professor of physics (1916–60) and director (1920–60) of the Physics Institute of the University of Zürich. In recognition of his contributions to solid-state, quantum, and nuclear physics, he was appointed president of the Swiss Atomic Energy Commission in 1946.

scherzo, plural SCHERZOS, or SCHERZI, in music, frequently the third movement of a symphony, sonata, or string quartet; also, in the Baroque era (*c.* 1600–*c.* 1750), a light vocal or instrumental piece (*e.g.,* the *Scherzi musicali* of Claudio Monteverdi, 1607), and, in the 19th century, an independent orchestral composition. In symphonies, sonatas, and string quartets of the 19th century, the scherzo replaced the 18th-century minuet. Unlike the rather stately minuet, originally a dance of the aristocracy, the scherzo in rapid $\frac{3}{4}$ time was replete with elements of surprise in dynamics and orchestration.

Both the minuet and scherzo contained a contrasting section, the trio, following which the minuet or scherzo returned according to the format ABA. Occasionally, as in Ludwig van Beethoven's *Seventh Symphony,* another trio and scherzo followed. The reiterated or abrupt rhythms in some of Joseph Haydn's minuets clearly anticipate the scherzo as developed by Beethoven; in his six quartets, Opus 33 (*Russian Quartets, or Gli scherzi*), Haydn actually used the term.

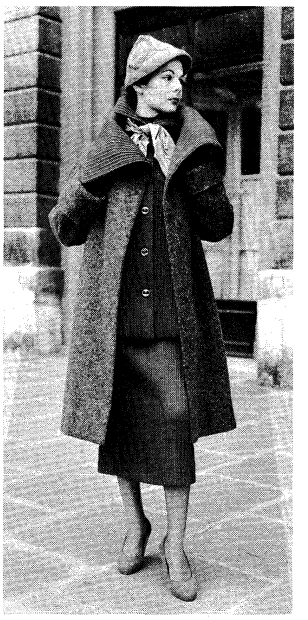
In the 19th century the scherzo was not necessarily bound to larger works, but it was still a characteristically swift-moving piece of music. Brilliant effects of orchestration and exhilarating rhythms in a swift tempo characterize Felix Mendelssohn's scherzo from his *Midsummer Night's Dream,* while in the four piano scherzos of Frédéric Chopin dramatic, somewhat dark moods alternate with more lyrical trios. A later Romantic example is Paul Dukas's *L'Apprenti Sorcier* (*The Sorcerer's Apprentice*), a "scherzo based on a ballad of Goethe."

Scheveningen, seaside resort and fishing port, Zuidholland *provincie,* western Netherlands, on the North Sea. Fishing has been an occupation there since the 14th century. Charles II embarked from Scheveningen to return to England at the Restoration (1660), and King William I landed nearby in 1813. Scheveningen's wide sandy beaches have made it the most popular of the Dutch coastal resorts since the first bathing establishment opened there in 1818. Its harbours, recently enlarged with the addition of a freight and container terminal, shelter much of the Dutch herring fleet, and its industries include fish-freezing plants and canneries. Notable landmarks are the domed Kurhaus, or Casino (1887), and the Fish Auction Hall, the leading one in Europe. Scheveningen is administratively a part of The Hague.



The pier at night, Scheveningen, Neth.
J. Allan Cash—EB Inc.

Schiaparelli, Elsa (b. Sept. 10, 1890, Rome, Italy—d. Nov. 13, 1973, Paris, Fr.), Italian-born French dress designer whose use of accessories and dramatic colours enlivened the fashion scene for 40 years. She introduced the padded shoulder in 1932; designed fur bed jackets and rhinestone-trimmed lingerie in the 1940s; and in the 1950s popularized "shortie" coats in vivid reds, golds, and chartreuses.



"Shortie" coat design by Elsa Schiaparelli, 1953
AP/Wide World Photos

Elsa Schiaparelli worked in the United States as a film-script writer and translator for an importing firm. In the late 1920s she settled in Paris, dabbled in free-lance writing and sculpture, and soon opened her first small couturier shop. By 1935 she was a leader in haute couture and was quickly expanding into jewelry, perfume, cosmetics, lingerie, and swimsuits. Her designs were noted for combining eccentricity with simplicity and a trim neatness with flamboyant colour. In 1947 Schiaparelli's new colour, "shocking pink," was the sensation of the fashion world. Her "ice blue" achieved almost the same popularity, as did her furs dyed in unusual shades of colour.

She opened a branch in New York City in 1949 to mass-produce suits, dresses, and coats of her design. Along with designer Christian Dior, she was instrumental in the worldwide commercialization of Parisian fashion.

Schiaparelli, Giovanni Virginio (b. March 14, 1835, Savigliano, Italy—d. July 4, 1910, Milan), Italian astronomer and senator whose reports of groups of straight lines on Mars touched off much controversy on the possible existence of life on that planet.

Schiaparelli went to Berlin in 1854 to study astronomy under Johann F. Encke. Two years later he was appointed assistant observer at the Pulkovo Observatory, Russia, a post he resigned in 1860 for a similar one at the Brera Observatory, Milan, where he remained until his retirement in 1900; he became director in 1862.

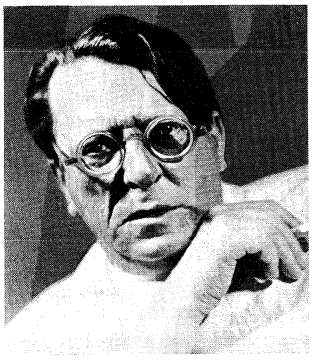
In 1861 Schiaparelli discovered the asteroid

Hesperia. Five years later he demonstrated that meteor swarms have orbits similar to certain comets and concluded that the swarms are the remnants of comets. In particular, he calculated that the Perseid meteors are remnants of Comet 1862 III and the Leonids of Comet 1866 I. He also observed double stars and made extensive studies of Mercury, Venus, and Mars.

Schiaparelli called the peculiar markings he observed on Mars in 1877 *canali*. The word, erroneously translated into English as "canals" instead of "channels," led to widespread speculation over whether the "canals" were constructed by intelligent beings. From his observations of Mercury and Venus, Schiaparelli concluded that those planets rotate on their axes at the same rate at which they revolve about the Sun, thus always keeping one side facing the Sun. This view was generally accepted until the late 1960s, when advanced radar techniques and space probes gave different values. On his retirement Schiaparelli studied the astronomy of the ancient Hebrews and Babylonians and wrote *L'astronomia nell'antico testamento* (1903; *Astronomy in the Old Testament*, 1905).

Schickele, René (b. Aug. 4, 1883, Oberehnheim, Alsace—d. Jan. 31, 1940, Vence, Fr.), German journalist, poet, novelist, and dramatist, whose personal experience of conflict between nations made his work an intense plea for peace and understanding.

Schickele was active as a foreign correspondent, editor, and, from 1915 to 1919, as the publisher of the *Weissen Blätter* ("The White Papers"), which he had transferred from Berlin to Zürich and which he made the most effective mouthpiece of European anti-war sentiment during World War I.



Schickele
Archiv fur Kunst und Geschichte, West Berlin

Peace and the resolution of cultural and political conflicts between France and Germany, which as an Alsatian he felt keenly, were the goals Schickele pursued throughout his life. Divided loyalty between Germany and France was already manifest in the theme and style of his first collection of poetry, *Der Ritt ins Leben* (1905; "The Ride into Life"), and in his first novel, *Der Fremde* (1907; "The Stranger"). This conflict was powerfully dramatized in *Hans im Schnakenloch* (1916; "Hans in the Gnat Hole"), in which the protagonist, Hans, must choose between Germany and France in time of war; torn within himself, he seeks death in the French Army, which he expects to be defeated. After having a considerable popular success, the drama was banned in Germany and condemned in France.

In his best known work, the novel trilogy *Das Erbe am Rhein* ("The Inheritance on the Rhine")—comprising *Maria Capponi* (1925), *Blick auf die Vogesen* (1927; *Heart of Alsace*), and *Der Wolf in der Hürde* (1931; "The Wolf in the Pen")—Schickele suggests that the ideal meeting ground for the creation of the supernational European is the area between the Schwarzwald and the Vosges mountains, where French and German cultures meet and fuse. Schickele fled Germany in 1933 and became a French citizen.

Schiedam, *gemeente* (municipality) and river port, Zuidholland *provincie* (province), western Netherlands, at the confluence of the Schie and Nieuwe Maas (New Meuse) rivers, just west of Rotterdam. Named for an early dam on the Schie, it was chartered in 1273 and conducted a flourishing medieval trade in fish and grain until it was superseded by Rotterdam. Historic landmarks are the 15th-century church of St. John, the 17th-century town hall, the exchange (1792), and the ruins of Mathenesse Castle (1260). Schiedam is famous for its gin and liquor distilleries; other industries include shipbuilding and iron founding and the manufacture of machinery, glass, chemicals, and lumber products. There is a municipal museum and the De Jongh Liqueur Museum. Pop. (1983 est.) 71,280.

Schiele, Egon (b. June 12, 1890, Tulln, near Vienna—d. Oct. 31, 1918, Vienna), Austrian Expressionist painter, draftsman, and printmaker noted for the eroticism of his figurative works.

As a student at the Vienna Academy of Fine Arts (1907–09), Schiele was strongly influenced by the Jugendstil movement, the German Art Nouveau. He met Gustav Klimt, leader of the Vienna Sezession group, and the linearity and subtlety of Schiele's work owe much to Klimt's decorative elegance. Schiele, however, emphasized expression over decoration, heightening the emotive power of line with a feverish tension. He concentrated from the beginning on the human figure, and his candid, agitated treatment of erotic themes caused a sensation.

In 1909 he helped found the Neukunstgruppe (New Art Group) in Vienna. From 1911 onward he exhibited throughout Europe, and a special room was devoted to his work at a 1918 Sezessionist exhibit in Vienna, shortly before his death from Spanish influenza. Important works include "The Self Seer" (1911), "The Cardinal and Nun" (1912), and "Embrace" (1917). His landscapes exhibit the same febrile quality of colour and line.

Schiff, Jacob H(enry) (b. Jan. 10, 1847, Frankfurt am Main—d. Sept. 25, 1920, New York City), American financier and philanthropist. As head of the investment banking firm of Kuhn, Loeb & Co. he became one of the leading railroad bankers in the United States, playing a pivotal role in the reorganization of several transcontinental lines around the turn of the 20th century.

Schiff was educated in Germany and emigrated to the United States in 1865, settling in New York and becoming a U.S. citizen in 1870. In 1875 he married the daughter of Solomon Loeb, then head of Kuhn, Loeb & Co., and joined the firm promptly thereafter. Schiff took charge of the company in 1885 upon Loeb's death.

In 1897 Schiff attained considerable prestige in banking circles when he provided the financial backing that enabled railroad magnate Edward H. Harriman to purchase control of the bankrupt Union Pacific Railroad. Later he was a major figure in the protracted but ultimately inconclusive struggle for control of the Northern Pacific, backing Harriman against James J. Hill and his banker, J.P. Morgan. Schiff's firm also arranged numerous other transactions involving major railroads throughout the country. Through Kuhn, Loeb & Co. he played a central role in the sale of Japanese bonds in the United States in 1904–05 during the Russo-Japanese War, for which he was subsequently decorated by the emperor of Japan.

In his later years Schiff increasingly turned his attention to charity. He founded the Montefiore Home for Chronic Invalids, gave well over $1,000,000 to Barnard College, and was a major contributor to the founding of the Jewish Theological Seminary (New York City). He was said to have contributed to nearly every Jewish and many nonsectarian charities in New York, as well as to Harvard and Cornell universities and Tuskegee Institute.

Schiff, Moritz (b. Jan. 28, 1823, Frankfurt am Main—d. Oct. 6, 1896, Geneva), German physiologist who investigated the effects produced by removal of the thyroid gland.

A graduate of the University of Göttingen (M.D., 1844) and a student of the French physiologist François Magendie in Paris, Schiff became director of the ornithology section of the Frankfurt Zoological Museum in 1846. Because of his medical assistance to revolutionaries during the 1848 insurrection, he lost a prospective post at Göttingen, but six years later he was appointed the University of Bern's first professor of comparative anatomy.

At Bern, Schiff demonstrated (1856) that excision of the thyroid gland from dogs and guinea pigs is fatal, and in 1884 he showed that adverse effects produced by the excision could be avoided by thyroid grafts or injections of thyroid extracts. This proved to be effective treatment for exophthalmos (protrusion of the eyeballs) and myxedema (swelling characterized by excess deposits of mucin, the primary component of mucus, and fluid in the tissues).

As professor of physiology at the Instituto di Studi Superiori, Florence (1863–76), and the University of Geneva (1876–96), Schiff was the first to notice the excitatory influence of the cerebral cortex on blood circulation, and he conducted pioneering studies of the physiological effects produced by removal of the cerebellum and partial section of the spinal cord. Schiff also recognized the role of the vagus nerve in regulating heart function—although he believed vagus action to be motor, rather than inhibitory—and he discovered the restoration to the liver of bile salts passing through the intestine (Schiff's biliary cycle). His major work is *Gesammelte Beiträge zur Physiologie*, 4 vol. (1894–96; "Collected Contributions to Physiology").

Schikaneder, Emanuel, pseudonym of JOHANN JOSEPH SCHIKANEDER (b. Sept. 1, 1751, Straubing, Bavaria—d. Sept. 21, 1812, Vienna), prominent German actor, singer, playwright, and theatre manager now chiefly remembered as the librettist of Mozart's opera *The Magic Flute*.

Schikaneder began his career as an actor with a small travelling company doing the improvised farce and song then popular, but by 22 years of age he had written and starred in his first operetta. Five years later he was the manager of his own company. His repertoire included plays by Lessing, Goethe, and Pedro Calderon. His Shakespearean roles, especially, were widely admired; he was particularly notable as Hamlet. The company also performed farces and *Singspiele* (operettas), and Schikaneder's growing interest in the musical theatre led in 1780 to his acquaintance with the Mozart family.

By 1784 the Schikaneder company had received the favourable notice of the Emperor, Joseph II, and settled in Vienna. In Vienna he turned his attention to opera, and he commissioned scores from contemporary composers, using his own libretti. His libretto for *The Magic Flute*, set to music by his friend Wolfgang Amadeus Mozart, and his superb performance in the role of Papageno at the premiere in 1791 raised him to the peak of his popularity. His productions grew increasingly sumptuous, and by the time he opened the Theater an der Wien (1801), built especially for him, the costs were becoming

ruinous. Schikaneder retained management of the theatre for less than four years, a period marked by an abortive attempt at collaboration on an opera with Ludwig van Beethoven. Schikaneder left Vienna to manage theatres in Brno and Pest but returned to the Austrian capital, where he died insane and in poverty.

Schildkraut, Joseph (b. March 22, 1895, Vienna—d. Jan. 21, 1964, New York City), Austrian-born U.S. stage, television, and motion-picture actor.

Schildkraut joined his father, the actor Rudolf Schildkraut, on his first American tour in 1910 and remained to study at the American Academy of Dramatic Arts (1912–13). He made his professional debut in Berlin in 1913 under Max Reinhardt and acted in Vienna from 1917 until he moved to New York City in 1920. His U.S. stage appearances included *Liliom* (1921; with Eva Le Gallienne) and *Peer Gynt* (1923) and continued through the 1950s.

Schildkraut acted in more than 50 films, beginning with *Orphans of the Storm* (1922) and including Cecil B. de Mille's *King of Kings* (1927), in which he appeared with his father. *The Man in the Iron Mask* (1939), *The Cheaters* (1945), and *The Greatest Story Ever Told* (1965) are among his other films. His best roles were as Dreyfus in the 1937 film *The Life of Emile Zola* (for which he won an Academy Award) and as Otto Frank in both the stage version (1955) and the motion picture (1959) of *The Diary of Anne Frank.*

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Schiller, (Johann Christoph) Friedrich von (b. Nov. 10, 1759, Marbach, Württemberg—d. May 9, 1805, Weimar, Saxe-Weimar), leading German dramatist, poet, and literary theorist, best remembered for such dramas as *Die Räuber* (1781; *The Robbers*), the *Wallenstein* trilogy (1800–01), *Maria Stuart* (1801), and *Wilhelm Tell* (1804). He was ennobled (with the addition of the *von*) in 1802.

Early years and plays. Friedrich Schiller was the second child of Lieut. Johann Kaspar Schiller and his wife, Dorothea. After Johann Kaspar retired from military service, he devoted himself to horticulture and was appointed superintendent of the gardens and plantations at Ludwigsburg, the residence of Duke Karl Eugen of Württemberg. Johann Kaspar gave his son Friedrich a sound grammar school education until the age of 13 when, in deference to what amounted to a command from his despotic sovereign, he reluctantly agreed to send his boy to the Military Academy (the Karlsschule), an institution founded and personally supervised by the Duke. Against the wishes of the parents, who had hoped to have their son trained for the ministry, the Duke decreed that young Friedrich was to prepare for the study of law; later, however, he was allowed to transfer to medicine. Having endured the irksome regimentation at the academy for eight years, Schiller left to take up an appointment as an assistant medical officer to a Stuttgart regiment.

His adolescence under the rule of a petty tyrant confronted Schiller with the problem of the use and abuse of power, a theme that recurs in most of his plays. His resentment found expression in some of his early poems and especially in his first play, *Die Räuber,* a stirring protest against stifling convention and corruption in high places. The hero of the play, Karl Moor, a young man of fiery spirit and abundant vitality, has led a somewhat disorderly life at the university. His villainous younger brother Franz poisons their aged



Friedrich Schiller, chalk drawing by F.G. Weitsch, 1804; in the Staatliche Museen, Berlin

By courtesy of the Staatliche Museen, Berlin

father's mind against the prodigal elder son. When the old Count Moor disowns Karl, the young man turns brigand and defies all established authority at the head of a band of outlaws, until, before long, he discovers that however corrupt the existing order may be, violence and anarchy do not offer a workable alternative and society cannot be reformed by terrorism and crime. He decides to give himself up to justice, thus submitting to the law that he had flouted. Schiller could therefore claim to have written in defense of law and morality. At the same time, Karl Moor is represented as a "sublime criminal," and the play is a scathing indictment of a society that could drive so fundamentally noble a character to a career of crime.

In order to have the play accepted, Schiller had to prepare a stage version in which the rebellious ardour of his original text was toned down. Nevertheless, the first performance (Jan. 13, 1782) at the National Theatre at Mannheim created a sensation; it was a milestone in the history of the German theatre. Schiller travelled to Mannheim without the Duke's permission in order to be present on the first night. When the Duke heard of this visit, he sentenced the poet to a fortnight's detention and forbade him to write any more plays. To escape from this intolerable situation, Schiller fled from Stuttgart at night and set out for Mannheim in the hope of receiving help from Heribert Baron von Dalberg, the director of the theatre that had launched his first play. He brought with him the manuscript of a new work, *Die Verschwörung des Fiesko zu Genua* (1783; *Fiesco; or, the Genoese Conspiracy*), subtitled "a republican tragedy": the drama of the rise and fall of a would-be dictator, set in 16th-century Genoa, picturing, in Schiller's own phrase, "ambition in action, and ultimately defeated."

The new play was rejected, however, and when Schiller prepared a revised version with a different ending, this was rejected, too. Dalberg, not anxious to provoke a diplomatic incident by sheltering a deserter, kept him at arm's length. For some tense weeks Schiller led the hand-to-mouth life of a refugee, until he found a temporary home with Henriette von Wolzogen, whose sons had been fellow students of his and who invited him to stay at her house at Bauerbach in Thuringia. There he finished his third tragedy, *Kabale und Liebe* (1784; *Cabal and Love*). In this work about the love of a young aristocrat for a girl of humble origin, Schiller's innate sense of drama comes to the fore. The appeal of its theme (the revolt of elemental human feeling against the artificialities of convention), the vigour of its social criticism, and the vitality of its dialogue and characters combine to make *Kabale und Liebe* great theatre.

Dalberg eventually offered Schiller an appointment as resident playwright with the Mannheim theatre. Schiller accepted and had the satisfaction of seeing *Kabale und Liebe* score a resounding success, but his hopes of clearing his debts and gaining a measure of financial security were doomed. When his contract expired after a year, it was not renewed; and once again Schiller needed the help of friends to extricate him, from both his financial predicament and from an emotional crisis caused by his attachment to a married woman, the charming but unstable Charlotte von Kalb. Schiller moved to Leipzig, where he was befriended by Christian Gottfried Körner. A man of some means, Körner was able to support Schiller during his two years' stay in Saxony, toward the end of which *Don Carlos,* his first major poetic drama, was published in book form (1787).

Don Carlos marks a turning point in Schiller's development as a dramatist. On one level, the work is a domestic drama concerned with the relations between the aging King Philip II of Spain, his third consort, Elizabeth of Valois, and his son by his first marriage, Don Carlos, who is in love with his stepmother. The conflict between father and son is not confined to their private lives, however; it has broad political implications as well. The change of focus from the domestic to the political sphere produced a play of inordinate length and a tortuous plot. But there are positive qualities to compensate for these faults: a wealth of exciting and moving scenes and a wide range of sharply individualized characters, the most memorable being the complex, brooding, and tragic figure of King Philip. The characteristically resonant note of Schiller's blank verse is heard here for the first time. Blank verse had been used by German playwrights before, but it was Schiller's *Don Carlos,* together with Goethe's *Iphigenie auf Tauris* (1787), that definitely established it as the recognized medium of German poetic drama.

Classical drama and historical studies. Schiller had accepted Körner's generous offer of hospitality and financial help in the spirit in which it was made. He gave jubilant expression to his new mood of contentment in his hymn "An die Freude" ("Ode to Joy"), which Beethoven was to use for the choral movement of his *Ninth Symphony.* He could not stay with Körner indefinitely, however, and in July 1787 he set out for Weimar, in the hope of meeting some of the men who had made Weimar the literary capital of Germany. Goethe, who was in Italy at the time, returned to Weimar in the following year. A chance meeting between Schiller and Goethe in 1794 and the ensuing exchange of letters mark the beginning of their friendship, a union of opposites that forms an inspiring chapter in the history of German letters.

In spite of his initial antipathy, Goethe had recommended Schiller for appointment to a professorship of history at the University of Jena, Schiller having presented the requisite credentials in his *Geschichte des Abfalls der vereinigten Niederlande von der spanischen Regierung* (1788; "History of the Revolt of the United Netherlands against the Spanish Government"). His *Geschichte des dreissigjährigen Krieges* (1791–93; "History of the Thirty Years' War") further enhanced his prestige as a historian; it also provided him with the material for his greatest drama, *Wallenstein,* published in 1800.

In 1790 Schiller married Charlotte von Lengefeld, a cultured young woman of good family, who bore him two sons and two daughters. In the second year of their married life, Schiller's health gave way under the strain of perpetual overwork. For a time he lay critically ill, and, although he rallied after several relapses, he never fully recovered from a combination of chest trouble and digestive disorder that proved intractable. The rest of his life was a losing battle, fought with superb fortitude, against the inexorable advance of disease.

Philosophical studies and historical drama. Calamitous as Schiller's illness was, it produced a piece of great good luck. To give him time to recuperate at leisure, two Danish patrons granted him a generous pension for three years. Schiller decided to devote part of this time to studying the philosophy of Immanuel Kant. As he proceeded to assimilate Kant's views, he soon felt the urge to formulate his own. The encounter with Kant's philosophy thus produced between 1793 and 1801 a series of essays in which Schiller sought to define the character of aesthetic activity, its function in society, and its relation to moral experience: the essays on moral grace and dignity, "Über Anmut und Würde," and on the sublime, "Über das Erhabene," as well as the celebrated essay on the distinction between two types of poetic creativity, "Über naive und sentimentalische Dichtung." The latter, like his letters on the aesthetic education of man, "Briefe über die ästhetische Erziehung des Menschen," first appeared in *Die Horen,* an ambitious but short-lived literary periodical edited by Schiller and published by Johann Friedrich Cotta, one of Germany's leading publishers, whom Schiller had met during a visit to his native Swabia in 1793–94.

This period of critical stocktaking also produced some exquisite reflective poems: "Das Ideal und das Leben" ("Life and the Ideal"), "Der Spaziergang" ("The Walk"), "Die Macht des Gesanges" ("The Power of Song"). These are "philosophical lyrics" in the true sense: not versified philosophy, but poetic utterance inspired by an intellectual experience. They contain the quintessence of Schiller's philosophical and critical thinking, and they are among his best poems, but they are poems for the few. On the other hand, the ballads written in 1797 (including "Der Handschuh" ["The Glove"], "Der Taucher" ["The Diver"], and "Die Kraniche des Ibykus" ["The Cranes of Ibycus"]) are among his most popular productions. In these poems and in the famous "Lied von der Glocke" ("The Song of the Bell") Schiller shows how to make poetry accessible to the man in the street without debasing it.

In the *Wallenstein* cycle—a work on the grand scale, consisting of a prefatory poem, a dramatic prologue, and two five-act plays—Schiller reached the height of his powers as a dramatist. The play portrays Albrecht Wenzel Eusebius von Wallenstein, the commander-in-chief of the armies of the Holy Roman Empire during the Thirty Years' War. Against the sombre background of the war there rises the sinister figure of Wallenstein, who in his secret heart is meditating high treason: by joining forces with the enemy, he hopes to make himself the arbiter of the empire. Wallenstein sees himself as a privileged being, a superman beyond good and evil, the man of destiny. While these traits repel, his bearing in the hour of crisis compels admiration and even wins a measure of sympathy. His portrayal is a profound study of the lure and the perils of power.

Working against time, Schiller produced four more plays in quick succession: *Maria Stuart* (first performed in 1800), a psychological drama concerned with the moral rebirth of Mary, Queen of Scots; *Die Jungfrau von Orleans* (1801; *The Maid of Orleans*), a "romantic tragedy" on the subject of Joan of Arc, in which the heroine dies in a blaze of glory after a victorious battle, rather than at the stake like her historical prototype; *Die Braut von Messina* (1803; *The Bride of Messina*), written in emulation of Greek drama, with its important preface, Schiller's last critical pronouncement); and *Wilhelm Tell* (1804; *William Tell*), which depicts the revolt of the Swiss forest cantons against Habsburg rule and the assassination of a tyrannous Austrian governor by the hero, with the underlying question of the play being the justifiability of violence in political action.

Each of these plays of Schiller's classical period has its own distinctive merit, but as a piece of dramatic craftsmanship *Maria Stuart* surpasses the rest. The action of the play is compressed into the last three days in Mary's life, before her execution at Fotheringhay; all the antecedents—her French marriage, her brief and troubled Scottish reign, her long imprisonment in England—emerge by means of retrospective analysis. Although Schiller repeatedly diverged from the recorded facts in his treatment of the subject, he displays in his play a profound grasp of the historical situation. Schiller offers a disturbing analysis of the problems that arise whenever political expediency masquerades as justice and judges are subjected to the pressures of power politics or ideological conflict. Mary turns outward disaster into inward triumph by accepting the verdict of the English tribunal—which she regards as unjust—in expiation of her sins committed in former days. By giving to the decree of her judges a meaning that they had not intended, she rises superior to their jurisdiction, a sinner redeemed and transfigured. This conforms to Schiller's theory of tragedy, which turns on the hero's moral rebirth through an act of voluntary self-abnegation.

Death overtook Schiller in 1805 while he was working at a new play on a Russian theme, *Demetrius* (1805). Judging by the noble fragments that remain, it might well have developed into a masterpiece.

Assessment. "The idea of freedom," Goethe said, "assumed a different form as Schiller advanced in his own development and became a different man. In his youth it was physical freedom that preoccupied him and found its way into his works; in later life it was spiritual freedom." Schiller's early tragedies are attacks upon political oppression and the tyranny of social convention; his later plays are concerned with the inward freedom of the soul that enables a man to rise superior to the frailties of the flesh and to the pressure of material conditions; they show the hero torn between the claims of this world and the demands of an eternal moral order, striving to keep his integrity in the conflict. In his reflective poems and in his treatises, Schiller sets out to show how art can help man to attain this inner harmony and how, through the "aesthetic education" of the individual citizen, a happier, more humane social order may develop. His reflections on aesthetics thus link up with his political and historical thinking.

One of the most striking features of Schiller's *oeuvre* is its modernity, its startling relevance to the life of the 20th century. Although for a time he fell out of favour with the German intelligentsia, the enduring value of his work is not likely to be obscured by fashions in criticism. (W.Wi./Ed.)

MAJOR WORKS. *Plays. Die Räuber* (1781; *The Robbers,* trans. by A.F. Tytler, Lord Woodhouselee, 1792; and the Rev. W. Render, 1799); *Die Verschwörung des Fiesko zu Genua* (1783; *Fiesco; or The Genoese Conspiracy,* trans. by G.H. Noehden and J. Stoddart, 1796); *Kabale und Liebe* (1784; first trans. as *Cabal and Love,* 1795; *The Minister,* trans. by M.G. Lewis, 1798); *Don Carlos, Infant von Spanien* (1787; first trans. 1798; also trans. by J. Kirkup in *The Classic Theatre,* vol. 2, 1959); *Wallenstein, ein dramatisches Gedicht* (1800; trans. by C.E. Passage, and in *Schiller's Tragedies: The Piccolomini and the Death of Wallenstein,* trans. by S.T. Coleridge, 1840); *Maria Stuart* (1801; first trans. 1801; also by L.A. Rhoades, 1894; and *Mary Stuart,* trans. by S. Spender, 1959); *Die Jungfrau von Orleans* (1801; *The Maid of Orleans,* first trans. 1835; also trans. by L. Filmore, 1882); *Die Braut von Messina oder die feindlichen Brüder* (1803; *The Bride of Messina,* first trans. 1837; also trans. by A. Lodge, 1841, and, in English verse, by E. Allfrey, 1876); *Wilhelm Tell* (1804; first trans. 1829; rev. trans. by W. Peter, 1968); *Demetrius* (unfinished) (1805; trans., together with part of *The Bride of Messina* by C. Hodges, 1836).

Verse. Anthologie auf das Jahr 1782 (1782); *Xenien,* with Goethe (1796; both trans. in the *Complete Works,* trans. by S.T. Coleridge *et al.,* with careful revision and new translation, C.J. Hempel, 2 vol., 1870); *Gedichte,* 2 vol. (1800–03). Many of Schiller's poems are collected in *The Poems of Schiller,* trans. by E.P. Arnold Forster (1901), and *The Ballads and Shorter Poems of Frederick v. Schiller,* trans. by G. Clarke (1901), as well as in the *Complete Works.*

Novels. Der Verbrecher aus Infamie (1786, later pub. as *Der Verbrecher aus verlorener Ehre,* 1802; *The Criminal from Lost Honour,* trans. by J. Oxenford and C.A. Feiling, 1844); *Der Geisterseher* (1789; *The Apparitionist,* trans. by T. Roscoe in *The German Novelists,* vol. 3, 1826).

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Of the many biographies, see Thomas Carlyle, *Life of Friedrich Schiller* (1825), the earliest monograph on Schiller of any lasting value; Jakob Minor, *Schiller,* 2 vol. (1890); Karl Berger, *Schiller,* 2 vol. (1905–09); Herbert Cysarz, *Schiller* (1934); William Witte, *Schiller* (1949); Melitta Gerhard, *Schiller* (1950); Reinhard Buchwald, *Schiller,* 2 vol., rev. ed. (1953–54); Bernhard Zeller, *Schiller, eine Bildbiographie* (1958), richly illustrated; Gerhard Storz, *Der Dichter Friedrich Schiller* (1959); Benno von Wiese, *Schiller* (1959); Emil Staiger, *Friedrich Schiller* (1967); and Charles E. Passage, *Friedrich Schiller* (1975). The biographies by Carlyle, Witte, and Passage are in English; all others are in German.

Schiltberger, Johann, also called HANS SCHILTBERGER (b. 1380, near Lohhof, Bavaria—d. *c.* 1440), German nobleman whose *Reisebuch* ("Travel Book"), describing his journeys through areas now chiefly within the Soviet Union, offers an important record of medieval history and topography.

While serving in the crusade of King Sigismund of Hungary against the Turks, the young Schiltberger was taken prisoner by the Turks in the decisive battle at Nicopolis (now Nikopol, Bulg.), on Sept. 28, 1396, and then enslaved. It was thus that he came to see Asia Minor and Egypt. After the Turkish defeat at Ankara on July 20, 1402, he passed into the possession of the Mongol khan Timur (Tamerlane), with whom he enjoyed a favoured position comparable to that of Marco Polo in Cathay. Hence, he became familiar with Samarkand and saw Armenia, Georgia, Siberia, the middle Volga, and southeastern Russia. Escaping from his semibondage, he returned to Bavaria (1427) by way of Constantinople and via a route through east central Europe north of the Carpathian Mountains. The *Reisebuch,* one of the first German contributions to geography, was first printed about 1460. An English edition appeared in 1879.

Schimmelpenninck, Rutger Jan (b. Oct. 31, 1761, Deventer, Neth.—d. Feb. 15, 1825, Amsterdam), Dutch statesman and leader of the Patriot Party who as councillor pen-

sionary (*raadpensionaris*) ruled the Batavian Commonwealth (now The Netherlands) under Napoleon I from 1805 to 1806 and instituted sweeping fiscal and educational reforms.

A lawyer in Amsterdam from 1784, Schimmelpenninck became active in the Patriot Party's committee of revolution in 1794 and headed the committee when it deposed the Dutch Republic's hereditary stadholder, Prince William V of Orange, in January 1795. President of the city government in 1796, Schimmelpenninck also sat as an elected delegate to the first and second National Assemblies (1796–98) of the Batavian (formerly the Dutch) Republic. He led a group of moderate delegates who wrote a compromise constitution aimed at satisfying unitarian (those favouring a unitary government) and federalist (those favouring a federal government) delegates.

After the two extremist factions rejected the constitution, a coup d'etat (June 1798) established a unitary government, and Schimmelpenninck was appointed ambassador to France (1798–1802), where he gained the confidence of Napoleon. He then served as ambassador to Great Britain until the outbreak of war between Britain and France in 1803, and his efforts to maintain the republic's neutrality failed. As a man esteemed by Napoleon, he was sent back to France as ambassador the same year. When Napoleon imposed a change of government on the republic (1805) and it became the Batavian Commonwealth, he appointed Schimmelpenninck head of government as councillor pensionary. In one year Schimmelpenninck reformed the tax system, as well as the educational system, by granting recognition and aid to all parochial schools (Catholic, Protestant, and Jewish). In 1806, however, Napoleon removed him from office and transformed the Commonwealth into the Kingdom of Holland with his brother, Louis Bonaparte, as king. Schimmelpenninck retired from government (1806) but returned to public life when Napoleon made him a baron of the French Empire and appointed him to the French Senate (1811). After returning home in 1813, he served in the Dutch First Chamber (senate) from 1815 to 1821.

Schimper, Andreas Franz Wilhelm (b. May 12, 1856, Strasbourg, Fr.—d. Sept 9, 1901, Basel, Switz.), German botanist, one of the first to successfully divide the continents into floral regions.



Schimper
Archiv fur Kunst und Geschichte, West Berlin

Schimper received the Ph.D. from the University of Strasbourg in 1878. After a year (1880–81) as a fellow at Johns Hopkins University, in Baltimore, he returned to Europe and joined the staff of Bonn University, where he remained until 1898. From 1898 to 1901 he was a professor at the University of Basel. He travelled extensively in Brazil, Java, East Africa, and the Canary Islands, investigating the tropical plants he found there. In 1898 the results of his work and that of other botanists were published in *Pflanzen-Geographie auf physiologischer Grundlage* (1898; *Plant-Geography upon a Physiological Basis,* 1903), a climatological and physiological study of the world's vegetation. The first section of the book treats factors that affect plant life, the second gives his classification of world vegetation, and the third contains a systematic account of this vegetation. The book also described the way in which plants spread to new areas and the unexpected stability of plant territories.

In 1880 Schimper established the fact that starch is both a source of stored energy for plants and a product of photosynthesis. In 1881 he showed that starch grains are formed within certain bodies of the cells of plants; in 1883 he named these bodies chloroplasts. That year he also concluded that new chloroplasts arise only from the division of preexisting ones.

Schindewolf, Otto Heinrich (b. June 7, 1896, Hanover, Ger.—d. June 10, 1971, Tübingen, W.Ger.), German paleontologist, known for his research on corals and cephalopods. Schindewolf was a faculty member of the University of Marburg from 1919 until 1927, when he became director of the Geological Survey of Berlin; in 1948 he became a professor at the University of Tübingen, where he retired as professor emeritus in 1964.

Schindewolf's research on invertebrate fossils led him to question whether the modern theory of evolution, which includes the study of how population genetics may account for change within a given species, could always be applied to the origin of types; he doubted in particular whether the theory could explain the origin of the higher taxonomic categories, such as families, orders, and classes. Studying different fossil species of coral and ammonites obtained from sequential geological strata, he concluded that the most recent taxonomic categories could not have arisen by slow, intermediate steps, generally thought to characterize evolution, but rather by large, single transformations. He drew attention, for example, to the ammonites, in which the anatomical chambers that were successively occupied by the animal preserve the details of both its development and its evolution. The genetic changes responsible for these structural characteristics would have occurred in a single generation and at an early stage of the embryo, he argued; in the following generations the structure would persist through successively later stages of the individual until it became firmly established even in the adult form. Though his views are not accepted by many biologists, particularly the population geneticists, who consider them too controversial, he has drawn attention to fundamental problems in evolution.

Schindewolf wrote *Grundfragen der Paläontologie* (1950; "Basic Questions of Paleontology"), *Grundlagen und Methoden der paläontologischen Chronologie* (3rd ed., 1950; "Foundations and Methods of Paleontological Chronology"), and *Studien zur Stammesgeschichte der Ammoniten* (1961–68; "Studies on the Phylogeny of Ammonites").

Schiner, Matthäus, also spelled MATHIAS SCHINNER (b. *c.* 1465, Mühlebach, Switz.—d. Oct. 1, 1522, Rome), Swiss prelate, papal diplomat, and intimate counsellor of the Holy Roman emperor Charles V; he worked to preserve the freedom of the Papal States from French domination.

Consecrated bishop of Sion in 1499, Schiner soon established himself as a master of diplomacy. He helped secure Bellinzona and the Blenio Valley for the cantons of Uri, Schwyz, and Nidwalden (Treaty of Arona, 1503) and acted on behalf of Pope Julius II to obtain the support of Swiss mercenaries against King Louis XII of France. Created cardinal in March 1511, he was installed at the see of Novara shortly thereafter. Schiner was largely responsible for the accession of Massimiliano Sforza to the ducal throne at Milan (1513) and played an important role in the elevation of Leo X to the papacy (1513). After the victory of the new French king, Francis I, against the Swiss at the Battle of Marignano (1515), he worked for an alliance embracing the papacy, the Habsburg dominions, and England. A supporter of the election of Charles I of Spain to the imperial title (as Charles V) in 1519, he subsequently became the new Emperor's confidant and encouraged the issuance of the imperial ban against the Reformer Martin Luther (1521). In August 1521, as imperial envoy to the Swiss confederation, Schiner once again secured Swiss mercenaries on behalf of the emperor and the pope. Throughout his diplomatic career, he was amply rewarded for his services with clerical endowments. He died during an outbreak of plague.

Schinkel, Karl Friedrich (b. March 13, 1781, near Brandenburg, Brandenburg—d. Oct. 9, 1841, Berlin), German architect and painter whose Romantic–Classical creations in other related arts made him the leading arbiter of national aesthetic taste in his lifetime.

The son of an archdeacon, Schinkel studied architecture with the brilliant Friedrich Gilly (1798–1800) and at Berlin's Academy of Architecture (1800–02), followed by several years in Italy. Returning to Berlin via Paris (1805), he became a painter. He designed furniture for Queen Louise in 1809 that, with its rich, light-coloured pearwood, play of matched grains, and romantic simplification of form in a classical milieu, anticipated the forthcoming Biedermeier period.

Becoming state architect of Prussia in 1815, Schinkel executed many commissions for King Frederick William III and other members of the royal family. His designs were based on the revival of various historical styles of architecture; *e.g.,* Greek Revival buildings such as the Königschauspelhaus, Berlin (1818), and the Altes Museum, Berlin (1822–30). His designs for a mausoleum for Louise (1810) and the brick and terra-cotta Werdersche Kirche, Berlin (1821–30), are among the earliest Gothic Revival designs in Europe.

In 1824 Schinkel visited Italy again and in 1826 travelled through Scotland and England. Appointed director (1830) of the Prussian Office of Public Works, he decorated apartments for Crown Prince Friedrich Wilhelm and Prince August. His work as a city planner resulted in new boulevards and squares in Berlin. Also remembered for his stage and ironwork designs, he designed scenery for Goethe's plays, bathing the whole stage in an atmosphere of picturesque illusion.

Schio, town, Vicenza province, Veneto region, northern Italy, northwest of Vicenza, on the Leogra River. A manufacturing centre with wool, machinery, lumber, and cutlery enterprises, Schio's ancient wool trade declined with the fall of the Venetian Republic in 1797 but was restored through the efforts of Alessandro Rossi, a farsighted 19th-century industrialist. There are lead mines and china-clay quarries nearby. Historic monuments include the cathedral of S. Pietro (partly 16th century) and the church of S. Francesco (1442). Near the town is a World War I cemetery and memorial site. Pop. (1981 prelim.) mun., 35,596.

schipperke, Belgian dog breed that originated in Flanders several centuries ago and was used for many years as a guard on barges. The schipperke ("little captain") is descended from



Schipperke
Sally Anne Thompson—EB Inc.

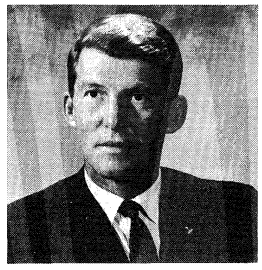
a black sheep dog, the Leauvenaar, which also gave rise to the Belgian sheep dog. A short, thickset, tailless dog with a dense black coat and a foxlike head, the schipperke stands 12 to 13 inches (30.5 to 33 centimetres) and weighs up to 18 pounds (8 kilograms). It has a characteristic lively and inquisitive expression and is generally hardy and energetic, an able vermin hunter, and a good watchdog.

Schirach, Baldur von (b. May 9, 1907, Berlin—d. Aug. 8, 1974, Kröv, W.Ger.), Nazi politician and head of the Nazi youth movement.

The son of a former German theatre director and a U.S. mother, he studied at the University of Munich. He joined the National Socialist Party in 1925 and was elected to the Reichstag in 1932. He was appointed Reichsleiter (Reich leader) in June 1933 and entered Hitler's inner circle. On June 18, 1933, Schirach was made youth leader of the German Reich (Jugendführer des Deutsches Reich), a post he held until 1945, directing all Nazi youth organizations, including the Hitler Youth (Hitler Jugend). In August 1940 he was also appointed Gauleiter ("district leader") of Vienna.

Taken prisoner in 1945, he was indicted Aug. 29, 1945, by the International Military Tribunal to stand trial as one of the major Nazi war criminals. During the trials, Von Schirach admitted (May 23, 1946) that Hitler had given him the post of Gauleiter for the express purpose of driving the Jews and Czechoslovaks out of Vienna. He also acknowledged that he had taken part in plans to ship Vienna's Jews to eastern areas. Von Schirach was found guilty of crimes against humanity and was sentenced, Oct. 1, 1946, to 20 years' imprisonment. He was released from Spandau fortress in 1966.

Schirra, Walter M(arty), Jr. (b. March 12, 1923, Hackensack, N.J., U.S.), U.S. astronaut who manned the Mercury "Sigma 7" (1962) and was command pilot of Gemini 6 (1965), which made the first rendezvous in space. Schirra began flying at 13 and became a naval aviator after graduating from the U.S. Naval Academy, Annapolis, Md., in 1945. He flew 90 missions in the Korean War. A test pilot, he was one of the original seven astronauts named in 1959.



Schirra
By courtesy of the National Aeronautics and Space Administration

On Oct. 3, 1962, Schirra orbited the Earth six times in "Sigma 7." His scheduled flight with Thomas P. Stafford in Gemini 6 was postponed twice because of technical problems. Gemini 6 was finally launched on Dec. 15, 1965, 11 days after Gemini 7. Schirra successfully rendezvoused with Gemini 7, manoeuvring to within one foot of the craft.

Schirra commanded the Apollo 7 flight (Oct. 11–22, 1968), accompanied by Donn Eisele and R. Walter Cunningham, on the first manned Apollo mission. They tested the guidance and control systems and the restarting capability of the rocket engines for future lunar flights.

After retiring from the Navy and the space program in 1969, Schirra held executive positions in private firms in Colorado.

schism, in Christianity, a break in the unity of the church.

In the early church, "schism" was used to describe those groups that broke with the church and established rival churches. The term originally referred to those divisions that were caused by disagreement over something other than basic doctrine. Thus, the schismatic group was not necessarily heretical. Eventually, however, the distinctions between schism and heresy gradually became less clear, and disruptions in the church caused by disagreements over doctrine as well as disruptions caused by other disagreements were eventually all referred to as schismatic.

The most significant medieval schism was the East-West schism that divided Christendom into Western (Roman Catholic) and Eastern (Orthodox) branches. It began in 1054 because of various disputes and actions, and it has never been healed, although in 1965 Pope Paul VI and the ecumenical patriarch Athenagoras I abolished the mutual excommunications of 1054 of the pope and the patriarch of Constantinople (*see* 1054, Schism of). Another important medieval schism was the Western Schism (*q.v.*) between the rival popes of Rome and Avignon and, later, even a third pope. The greatest of the Christian schisms was that involving the Protestant Reformation and the division from Rome.

Opinions concerning the nature and consequences of schism vary with the different conceptions of the nature of the church. According to Roman Catholic canon law, a schismatic is a baptized person who, though continuing to call himself a Christian, refuses submission to the pope or fellowship with members of the church. Other churches have similarly defined schism juridically in terms of separation from their own communion.

In the 20th century the ecumenical movement has worked for cooperation among and reunion of churches, and the greater cooperation between Roman Catholics and Protestants after the second Vatican Council (1962–65) has resulted in more flexible attitudes within the churches concerning the problems of schism.

Schism of 1054: *see* 1054, Schism of.

schist, megascopically crystalline rock that has a highly developed schistosity, or tendency to split into layers. Banding (foliation) is typically poorly developed or absent. Most schists are composed largely of platy minerals such as muscovite, chlorite, talc, sericite, biotite, and graphite; feldspar and quartz are much less abundant in schist than in gneiss. The green colour of many schists and their formation under a certain range of temperature and pressure has led to a distinction of the greenschist facies in the mineral facies classification of metamorphic rocks. The parallel orientation of the platy minerals and well-developed folding of many schists indicate formation under stresses that are not the same in all directions. The mineralogy and high water content of the minerals indicate that they were formed under conditions of relatively low temperature and pressure.

Schists are usually classified on the basis of their mineralogy, with varietal names that indicate the characteristic mineral present. Talc schist contains abundant talc; it has a greasy feel, a well-developed schistosity, and a grayish-green colour. Mica schist often contains muscovite mica rather than biotite, although both minerals are common. It represents a somewhat higher grade of metamorphism than talc schist and is more coarse-grained; individual flakes of mica can be seen.

Schisteux, Massif (Europe): *see* Middle Rhine Highlands.

Schistosoma, fluke genus, three members of which are well known for causing the disease schistosomiasis (*q.v.*). *See also* fluke.

schistosomiasis, also called BILHARZIASIS, group of chronic disorders caused by small, parasitic flatworms, species of trematodes of the family Schistosomatidae, which are commonly called blood flukes (*see* fluke). They live in the blood vessels of man and other mammals, releasing eggs that produce tissue damage.

There are three main types of schistosomiasis, caused by closely related organisms: (1) Japonica, or Eastern, schistosomiasis is caused by *Schistosoma japonicum*, found in Japan, Central and South China, the Philippines, Thailand, and Indonesia. (2) Manson's, or intestinal, schistosomiasis is caused by *S. mansoni*, found in Africa, Arabia, Puerto Rico, the West Indies, and northern South America. (3) Vesical, or urinary, schistosomiasis is caused by *S. haematobium*, found throughout Africa and the Middle East and in southern Europe.

Depending on the species of worm, the female fluke, 10 to 25 millimetres (0.4 to 1 inch) long, releases 300 to 3,500 eggs daily into the blood. The eggs find their way into the intestine or bladder and are evacuated in the feces or urine. On contact with fresh water, the eggs hatch, releasing ciliated larvae that swim about until they find an appropriate snail host, in which they develop further. Fork-tailed larvae, the cercariae, subsequently emerge from the snail into the water and, upon contact with the skin of a mammal, drop their tails and penetrate the tissues, getting into the blood circulation, where they feed.

The clinical course of schistosomiasis usually begins with an allergic reaction to the parasites and their by-products, and symptoms may include inflammation, cough, late-afternoon fever, skin eruption (giant urticaria), and swelling and tenderness of the liver. There may then be blood in the stools and urine in the more acute stage.

The chronic stage of the disease is characterized by the gradual impactment of eggs into the walls of the body organs, leading to fibrous thickening and loss of elasticity. In the intestinal types there may be serious liver damage, and in urinary schistosomiasis the eggs in the bladder may become focuses of stone formation, fibrosis may extend to the pelvic organs, and there may be secondary bacterial infection of the urinary tract. Occasionally, eggs may also cause lesions of such organs as the brain and lungs. During autopsy, fluke eggs have been detected in almost all body structures. Unless exposure is overwhelming, however, early diagnosis and persistent treatment usually ensure recovery.

Chemotherapy is aimed at killing the adult worms, which, if undisturbed, can live for

20 years and continue to cause damage. The drugs that are used are usually antimony compounds.

Schistosomiasis is ordinarily contracted by working, bathing, or swimming in water populated by snails that carry the worms. The disease is more prevalent in rural communities in which standards of hygiene are low. Irrigation projects, aimed at improving the welfare of the people, have actually been known to introduce the carrier snails and the disease, as happened in Egypt. The World Health Organization has estimated the number of infected persons to number between 180 million and 200 million. Next to malaria, it is probably humanity's most serious parasitic infection. Snail control with such molluscicides as sodium pentachlorophenate, dinitro-*o*-cyclohexylphenol, and copper sulfate has been used extensively but with uneven success.

Schizaeaceae, only family of the fern order Schizaeales (or one of about 12 families in the order Polypodiales of other classifications). It contains four genera and about 160 species



Lygodium
A to Z Botanical Collection—EB Inc.

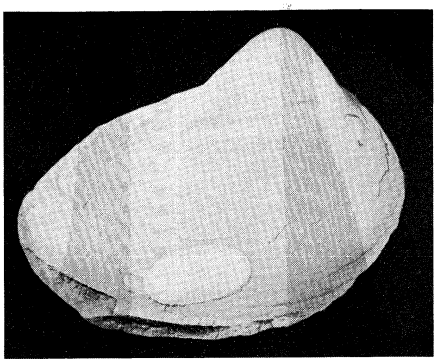
and is called the curly grass or climbing fern family. Four related but extinct families date from the Jurassic period (208 million to 144 million years ago). The family is characterized by large, individually produced spore-bearing structures (sporangia) with a ring of thickened cells (annulus) around the apex; the sporangia are usually borne on special leaflets (pinnae) and lack a covering membrane (indusium).

The genera are strikingly different in growth habit. The curly grass fern (*Schizaea pusilla,* one of about 30 species in the genus *Schizaea*) is a small plant with leaves of two kinds, grasslike and lobed. The climbing fern genus (*Lygodium*), represented by the North American climbing fern, or Hartford fern (*L. palmatum*), contains about 40 species that produce vinelike leaves in rows on the upper surface of a creeping stem. *Anemia,* with 90 species found mainly in the tropics and subtropics of the Americas, is distinguished by its basal pair of pinnae, which are branched and bear sporangia but lack a green photosynthetic blade.

The genera *Lophidium* and *Actinostachys,* sometimes recognized as distinct in this family, are sometimes considered to be synonymous with *Schizaea.*

schizocoelomate, any invertebrate animal that possesses a schizocoel, a coelom (body cavity) formed through the splitting of the mesodermal mass, the middle germ layer in embryonic development. This type of coelom is found in mollusks and annelid worms. Schizocoelomates are thus embryologically distinct from enterocoelomates, in which the coelom arises as an outpouching of the enteron, or embryonic gut.

Schizodus, extinct genus of small mollusks found as fossils in rocks from the Devonian period, which began about 408 million years ago, to the Permian period, which ended about



Schizodus
By courtesy of the trustees of the British Museum (Natural History); photograph, Imitor

245 million years ago. *Schizodus* is representative of a group of clams, the schizodonts, with a distinctive method of shell articulation. The shell of *Schizodus* is relatively smooth and unornamented except for fine growth lines.

Schizomycetes, at one time, class that encompassed all the bacteria in the traditional sense. The name is now obsolete. A current scheme, interim and tentative, consigns the bacteria in the strict sense to Class I of Division II of the Kingdom Procaryotae.

schizophrenia, any of a group of severe mental disorders that have in common such symptoms as hallucinations, delusions, blunted emotions, disordered thinking, and a withdrawal from reality. Schizophrenics display a wide array of symptoms, but four main types of schizophrenia, differing in their specific symptomatology as follows, are recognized by some authorities.

1. The simple or undifferentiated type of schizophrenic manifests an insidious and gradual reduction in his external relations and interests. His emotions lack depth, his ideation is simple and refers to concrete things, and there is a relative absence of mental activity, a progressive lessening in the use of inner resources, and a retreat to simpler or stereotyped forms of behaviour.
2. The hebephrenic or disorganized type of schizophrenic displays shallow and inappropriate emotional responses, foolish or bizarre behaviour, false beliefs (delusions), and false perceptions (hallucinations).
3. The catatonic type is characterized by striking motor behaviour. The patient may remain in a state of almost complete immobility, often assuming statuesque positions. Mutism (inability to talk), extreme compliance, and absence of almost all voluntary actions are also common. This state of inactivity is at times preceded or interrupted by episodes of excessive motor activity and excitement, generally of an impulsive, unpredictable kind.
4. The paranoid type, which usually arises later in life than the other types, is characterized primarily by delusions of persecution and grandeur combined with unrealistic, illogical thinking, often accompanied by hallucinations.

These different types of schizophrenia are not mutually exclusive, and schizophrenics may display a mixture of symptoms that defy convenient classification. There may also be a mixture of schizophrenic symptoms with those of other psychoses, notably those of the manic-depressive group.

Hallucinations and delusions, although not invariably present, are often a conspicuous symptom in schizophrenia. The most common hallucinations are auditory: the patient hears (nonexistent) voices and believes in their reality. Schizophrenics are subject to a wide variety of delusions, including many that are characteristically bizarre or absurd. One symptom common to most schizophrenics is a loosening in their thought processes; this syndrome manifests itself as disorganized or incoherent thinking, illogical trains of mental association, and unclear or incomprehensible speech.

Schizophrenia crosses all socioeconomic, cultural, and racial boundaries. The lifetime risk of developing the illness has been estimated at about 8 per 1,000. Schizophrenia is the single largest cause of admissions to mental hospitals and accounts for an even larger proportion of the permanent populations of such institutions. The illness usually first manifests itself in the teen years or in early adult life, and its subsequent course is extremely variable.

Various theories of the origin of schizophrenia have centred on anatomical, biochemical, psychological, social, genetic, and environmental causes. Despite much research, no single cause of schizophrenia has been established, or even identified. There is strong evidence that genetic inheritance often plays a role in the disease, and researchers continue to search for the presence of biochemical abnormalities in the brains of people suffering from schizophrenia. Stressful life experiences may trigger the disease's initial onset. There is no cure for most patients with chronic schizophrenia, but the disease's symptoms can in many cases be effectively treated by antipsychotic drugs given in conjunction with psychotherapy and supportive therapy. *See also* psychosis.

Schlegel, August Wilhelm von (b. Sept. 8, 1767, Hannover, Hanover [now in Germany]—d. May 12, 1845, Bonn [now in Germany]), German scholar and critic, one of the most influential disseminators of the ideas of the German Romantic movement, and the finest German translator of William Shakespeare. He was also an Orientalist and a poet.

Schlegel, the son of a Protestant pastor, began his studies in 1787 at Göttingen, where he studied classical philology and aesthetics. In Jena, in 1796, he wrote for Friedrich Schiller's short-lived periodical *Die Horen.* Thereafter, Schlegel, with his philosopher–critic brother Friedrich, started the periodical *Athenäum* (1798–1800), which became the organ of German Romanticism. In 1798 he became extraordinary professor at Jena University, where he began his long-planned translation of Shakespeare (1797–1810). He himself translated 17 plays; the remaining works were translated by Ludwig Tieck's daughter Dorothea and by Wolf Heinrich von Baudissin under Tieck's supervision (1825–33). Schlegel's translations of Shakespeare became the standard German translation of that author and are among the finest of all German literary translations. Schlegel's incomplete translations of five plays by Calderón de la Barca (*Spanisches Theater,* 2 vol., 1803–09) and his other translations from Romance literatures (*Blumensträuse italiänischer, spanischer und portugiesischer Poesie,* 1804) also show his gift for carrying the spirit of a foreign work over into German.

In 1796 Schlegel had married the brilliant Caroline Michaelis, but in 1803 she left him for the philosopher Friedrich W.J. Schelling. After his divorce, Schlegel accompanied Mme de Staël on travels in Germany, Italy, France, and Sweden, where he became (1813–14) press secretary to the crown prince Bernadotte.

In 1818 he went to Bonn, where he remained the rest of his life as professor of literature. There he published the scholarly *Indische Bibliothek,* 3 vol. (1820–30), set up a Sanskrit printing press, and founded Sanskrit studies in Germany.

Critics of Schlegel's poetry (*Gedichte,* 1800; *Ion,* a tragedy based on Euripides, 1803; *Poetische Werke,* 1811) concede that it shows mastery of form but that it amounts to only cultivated verse. As a critic of poetry he has been described as more empirical and systematic and less speculative than his brother Friedrich. Schlegel's view of world literature as an organic whole influenced Coleridge. His collected works were edited by E. Böcking and published in 12 volumes in 1846–47; his letters were edited by J. Körner and published in 1930.

Schlegel, Friedrich von (b. March 10, 1772, Hannover, Hanover—d. Jan. 12, 1829, Dresden, Saxony), German writer and critic, originator of many of the philosophical ideas that inspired the early German Romantic movement. Open to every new idea, he reveals a rich store of projects and theories in his provocative *Aperçus* and *Fragmente* (contributed to the *Athenäum* and other journals); his conception of a universal, historical, and comparative literary scholarship has had profound influence.



Friedrich von Schlegel, drawing by Philipp Veit, 1811; in the Goethemuseum, Frankfurt am Main, Ger.

By courtesy of the Goethemuseum, Frankfurt am Main

After studying at Göttingen and Leipzig, Schlegel became closely associated with his elder brother August William at Jena in the quarterly *Athenäum.* He believed that Greek philosophy and culture were essential to complete education. Influenced also by J.G. Fichte's transcendental philosophy, he developed his conception of the Romantic—that poetry should be at once philosophical and mythological, ironic and religious. But his imaginative work, a semi-autobiographical novel fragment *Lucinde* (1799; Eng. trans., 1913–15), and a tragedy *Alarcos* (1802) were less successful.

In 1801 Schlegel was briefly Privatdozent at Jena University, but in 1802 he went to Paris with Dorothea Veit, the eldest daughter of Moses Mendelssohn and the divorced wife of Simon Veit. He married her in 1804. In Paris he studied Sanskrit, publishing *Über die Sprache und Weisheit der Indier* (1808), the first attempt at comparative Indo-Germanic linguistics and the starting point of the study of Indian languages and comparative philology. In 1808 he and his wife became Roman Catholics, and he united his concept of Romanticism with ideas of medieval Christendom. He became the ideological spokesman of the anti-Napoleonic movement for German liberation, serving in the Vienna chancellery (1809) and helping to write the appeal to the German people issued by the archduke Charles. He had already edited two periodicals on the arts, *Europa* and *Deutsche Museum;* in 1820 he became editor of the right-wing Catholic paper *Concordia,* and his attack in it on the beliefs that he had earlier cherished led to a breach with his brother.

Two series of lectures Schlegel gave in Vienna between 1810 and 1812 (*Über die neuere Geschichte,* 1811; *A Course of Lectures on Modern History,* 1849 and *Geschichte der alten und neueren Literatur,* 1815; *Lectures on the History of Literature,* 1818) developed his concept of a "new Middle Ages." His collected works were first issued in 10 volumes in 1822–25, augmented to 15 volumes in 1846. His correspondence with his brother was published in 1890 and that with Dorothea was edited (1926) by J. Körner, who wrote major studies of the brothers.

Schlegel, Johann Elias (b. Jan. 17, 1719, Meissen, Saxony—d. Aug. 13, 1749, Sorø, Den.), German author and critic (uncle of August Wilhelm and Friedrich von Schlegel), whose plays and criticism helped give the German theatre a much-needed new impetus. He was educated at the famous classical-humanist boarding school Schulpforte. After studying law in Leipzig, he became private secretary to the Saxon ambassador in Copenhagen in 1743 and from 1748 taught at the Sorø Academy.

At a time when Shakespeare was virtually unknown to the German public, he showed his awareness of Shakespeare's genius in *Vergleichung Shakespears und Andreas Gryphs* (1741), a discussion of the relative merits of Shakespeare and the leading 17th-century German dramatist and poet. Schlegel developed a theory of literary appreciation that anticipated later developments in the field of aesthetics; he insisted that art aims at providing pleasure rather than instruction or moral uplift. His comedies *Die Stumme Schönheit* (1747) and *Der Triumph der guten Frauen* (1748) were praised later by G.E. Lessing.

Schleicher, August (b. Feb. 19, 1821, Meiningen, Saxe-Meiningen—d. Dec. 6, 1868, Jena, Prussia), German linguist whose work in comparative linguistics was a summation of the achievements up to his time and whose methodology provided the direction for much subsequent research. He was influenced by the philosophy of G.W.F. Hegel, which he espoused during his student days at the University of Tübingen, and, later, by the views of Charles Darwin. Ultimately, he aimed to devise a logical and scientific theory of language based on a combination of the Hegelian theory of history and Darwinian natural selection.



August Schleicher, engraving

By courtesy Bildarchiv Preussischer Kulturbesitz BPK, Berlin

From 1850 to 1857 Schleicher taught classical philology and the comparative study of Greek and Latin at the University of Prague. During this period he turned to the study of Slavic languages. In 1852 he began research on Lithuanian while living among the peasantry of Prussian Lithuania. This was the first attempt to study an Indo-European language directly from speech rather than from texts. His results appeared in the remarkable *Handbuch der litauischen Sprache* (1856–57; "Handbook of the Lithuanian Language"), the first scientific description and analysis of Lithuanian, complete with a grammar, reader, and glossary.

In the course of his professorship at the University of Jena (1857–68), he published many works, including the one on which his fame rests, *Compendium der vergleichenden Grammatik der indogermanischen Sprachen* (1861–62; *A Compendium of the Comparative Grammar of the Indo-European, Sanskrit, Greek and Latin Languages,* 1874–77), in which he studied the common characteristics of the languages and attempted to reconstruct the proto-Indo-European parent language, or Ursprache. Schleicher believed that language is an organism exhibiting periods of development, maturity, and decline. As such, it could be studied by the methods of natural science. Developing a system of language classification resembling a botanical taxonomy, he traced groups of related languages and arranged them into a genealogical tree. His model came to be known as the *Stammbaumtheorie,* or family-tree theory, and was a major development in the history of Indo-European studies or, more generally, in historical linguistic theory.

Schleicher, Kurt von (b. April 7, 1882, Brandenburg, Ger.—d. June 30, 1934, Berlin), German army officer, last chancellor of the Weimar Republic, an opponent of Adolf Hitler in 1932–33.

Joining the German military in 1900, Schleicher attached himself to the newly created Reichswehr in 1919 and by 1929 was a major general in charge of an office in the Reichswehr ministry. For the next three years, Schleicher—with Wilhelm Groener, minister of defense, Chancellor Heinrich Brüning, and Pres. Paul von Hindenburg—was one of the determining forces in the Weimar Republic. Schleicher came into sharp conflict with Brüning and Hindenburg; his intrigues contributed to Brüning's downfall (May 1932) and helped bring about the appointment of Franz von Papen as chancellor in June 1932. Schleicher was appointed defense minister, and when Papen was forced to resign (Dec. 1, 1932), Schleicher became chancellor as well. He sought to prevent Nazi violation of the laws and constitution by keeping the Nazis under Reichswehr control. To this end, he intrigued with Adolf Hitler, offering to participate in a government with Hitler as chancellor provided that he, Schleicher, remained in charge of the Reichswehr. Hitler refused. From that time on, he regarded Schleicher as his chief enemy. In January 1933 Hindenburg dismissed Schleicher and made Hitler chancellor. A year and a half later, on the "night of the long knives," Schleicher was murdered by Hitler's SS (Schutzstaffel) in his Berlin flat.



Kurt von Schleicher, 1932

Archiv fur Kunst und Geschichte, Berlin

Schleiden, Matthias Jakob (b. April 5, 1804, Hamburg—d. June 23, 1881, Frankfurt am Main), German botanist, cofounder (with Theodor Schwann) of the cell theory.

Schleiden was educated at Heidelberg (1824–27) and practiced law in Hamburg but soon developed his hobby of botany into a full-time pursuit. Repelled by contemporary botanists'

emphasis on classification, Schleiden preferred to study plant structure under the microscope. While professor of botany at the University of Jena, he wrote "Contributions to Phytogenesis" (1838), in which he stated that the different parts of the plant organism are composed of cells or derivatives of cells. Thus, Schleiden became the first to formulate what was then an informal belief as a principle of biology



Schleiden

By courtesy Bildarchiv Preussischer Kulturbesitz BPK, West Berlin

equal in importance to the atomic theory of chemistry. He also recognized the importance of the cell nucleus, discovered in 1831 by the Scottish botanist Robert Brown, and sensed its connection with cell division. Schleiden was one of the first German biologists to accept Darwin's theory of evolution. He became professor of botany at Dorpat, Russia, in 1863.

Schleiermacher, Friedrich (Ernst Daniel) (b. Nov. 21, 1768, Breslau, Silesia, Prussia—d. Feb. 12, 1834, Berlin), German theologian, preacher, and classical philologist, generally recognized as the founder of modern Protestant theology. His major work, *Der christliche Glaube* (1821–22; 2nd ed. 1831; *The Christian Faith*), is a systematic interpretation of Christian dogmatics.



Schleiermacher, detail of an engraving by F. Lehmann, mid-19th century

By courtesy of Bildarchiv Preussischer Kulturbesitz BPK, West Berlin

Childhood and education. Schleiermacher was the son of Gottlieb and Katharina-Maria (*née* Stubenrauch) Schleiermacher. His father, a Reformed (Calvinist) military chaplain, and his mother both came from families of clergymen. He had an older sister, Charlotte, and a younger brother, Carl.

From 1783 to 1785 he attended a school of the Moravian Brethren (Herrnhuters), an influential Pietistic group, at Niesky. In this milieu, individualized study was combined with a piety based on the joy of salvation and a vividly imaginative relation with Jesus as Saviour, rather than (as in the Pietism centred in Halle) on a struggle to feel sorrow and repentance. Here Schleiermacher developed his lifelong interest in the Greek and Latin classics and his distinctive sense of the religious life. Later he called himself a Herrnhuter "of a higher order."

Yet the lifeless and dogmatic narrowness of the Moravian seminary at Barby, which he attended from 1785 to 1787, conflicted with his increasingly critical and inquiring spirit. He left in 1787 with the reluctant permission of his father, who had at first harshly rebuked him for his worldliness and accused him of hypocrisy, and at Easter he matriculated at the University of Halle. There he lived with his maternal uncle, Samuel Stubenrauch, a professor of theology, who could understand his restlessness and skepticism.

A diligent and independent student, Schleiermacher began, along with his theological studies, an intensive study of Immanuel Kant's philosophy. In his epistemology (theory of knowledge), though not in his ethics and religion, he remained a Kantian throughout his life. After two years he moved to Drossen (Ośno), near Frankfurt an der Oder, where his uncle had assumed a pastorate, and began preparing for his first theological examinations. Though he read more in ethics than in theology, he took his examinations in Reformed theology in 1790, achieving marks of "very good" or "excellent" in all fields except dogmatics, the one in which he was later to make his most original contribution.

Early career. Schleiermacher then took a position as tutor for the family of the Graf (Count) zu Dohna in Schlobitten, East Prussia. Besides tutoring, he preached regularly, chiefly on ethical themes, and continued his philosophical study, particularly of the question of human freedom. After taking his second theological examinations in 1794, the same year in which his father died, Schleiermacher became assistant pastor in Landsberg and then, in 1796, pastor of the Charité, a hospital and home for the aged just outside Berlin. In that city he found his way into the circle of the German Romantic writers through the creator of early Romanticism, Friedrich von Schlegel, with whom he shared an apartment for a time, began a translation of Plato's works, and became acquainted with the new Berlin society.

In *Über die Religion. Reden an die Gebilden unter ihren Verächtern* (*On Religion: Speeches to Its Cultured Despisers*), written in 1799 as a kind of literary confession, Schleiermacher addressed the Romantics with the message that they were not as far from religion as they thought; for religion is the "feeling and intuition of the universe" or "the sense of the Infinite in the finite," and Christianity is one individual shaping of that feeling. This work, perennially attractive for its view of a living union of religion and culture, greatly impressed the young theologians of the time. The *Monologen* (1800; *Soliloquies*), written in a somewhat artificial rhythmic prose, presented a parallel to religion in the view of ethics as the intuition and action of the self in its individuality. The individuality of each human being is here seen as a unique "organ and symbol" of the Infinite itself.

A six-year courtship of Eleonore Grunow, unhappily married to a pastor in Berlin, ended in 1802, when Schleiermacher accepted a call to a small Reformed congregation in Stolp, Pomerania (now Słupsk, Pol.), and she decided to remain with her husband, but until 1805 he continued to hope she might still consent to become his wife. In this pastorate he became aware of the deep cleavage between a church preacher and a modern man, but at the same time he came to acquire a great fondness for preaching.

Halle and Berlin. In 1804 he accepted a call to be university preacher and extraordinary professor of theology at the University of Halle. As the first Reformed theologian on that Lutheran theological faculty and as a spokesman for Romantic Idealism, he met a cool reception. But the situation changed, and after a year he was made ordinary professor of theology.

In *Die Weihnachtsfeier* (1805; *Christmas Celebration*), written in the style of a Platonic dialogue, Schleiermacher adopted the definition of religion he later incorporated into *Der christliche Glaube.* Instead of speaking of religion as "feeling and intuition," he now called it simply "feeling"—namely, the immediate feeling that God lives and works in us as finite human beings.

Napoleon's invasion of Prussia forced Schleiermacher to leave Halle in 1807. He moved to Berlin, giving lectures on his own and travelling about to encourage national resistance; he also assisted Wilhelm von Humboldt in laying plans for the new university to be founded in Berlin. He married Henriette von Willich, the widow of a close friend of his, in 1809. In that same year he became pastor of Dreifaltigkeitskirche (Trinity Church) in Berlin and, in 1810, professor of theology at the new university, this latter position one that he retained to the end of his life.

His activities in the years following were many and varied. He lectured on theology and philosophy; he preached in Dreifaltigkeitskirche almost every Sunday until the end of his life; he was a member (from 1800) and permanent secretary of the Berlin Academy of Sciences; he carried on an extensive correspondence; and he was active in promoting the Prussian Union, which brought Lutheran and Calvinist churches into one body. His major publications during this period were the *Kurze Darstellung des theologischen Studiums* (1811; *Brief Outline of the Study of Theology*), presenting a curriculum in which the function of theology is to shape and direct the church as a religious community, and *Der christliche Glaube.*

His relations with the Prussian king were tense until 1831, partly because of differences of view concerning the Prussian constitution and the relation between church and state, and partly because of machinations of his personal rivals. At one stage, an edict of banishment was issued against him, but it was not carried out.

He preached his last sermon on February 2 and gave his last lecture on Feb. 6, 1834. He died a few days later from inflammation of the lungs. His death stirred the populace of the whole city; Leopold von Ranke, a renowned historian, estimated that there were from 20,000 to 30,000 people in the long funeral procession through the streets of Berlin. He was buried in the cemetery of Dreifaltigkeitskirche.

Influence. Schleiermacher's thought continued to influence theology throughout the 19th century and the early part of the 20th. Between about 1925 and 1955 it was under severe attack by followers of the "kerygmatic" theology of the Word of God (founded by Karl Barth and Emil Brunner) as leading away from the gospel toward a religion based on human culture. Since then, however, there has been a renewed study and appreciation of Schleiermacher's contributions, partly because the critique was one-sided, and partly because of a new interest in 19th-century theology.

(R.P.S.)

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100 (1937), contains a critical study of Schleiermacher's thought ("The Theology of Feeling") from the point of view of a "kerygmatic" theology of the Word. Terence Tice, *Schleiermacher Bibliography* (1966), includes more than 1,900 items with introductions and annotations.

Schlesinger, Arthur M(eier) (b. Feb. 27, 1888, Xenia, Ohio, U.S.—d. Oct. 30, 1965, Boston), American historian whose emphasis on social and urban developments greatly broadened approaches to U.S. history.

Schlesinger graduated from Ohio State University in 1910. When he entered Columbia University, New York City, to continue graduate study in history, he came under the influence of the progressive scholarship of James H. Robinson, James Thomson Shotwell, and Charles A. Beard. In New York City he also witnessed the pressures of early 20th-century immigration, urban growth, and progressivist politics.

In 1912 Schlesinger began teaching at Ohio State University, Columbus, and in 1919 moved to the University of Iowa, Iowa City, where he introduced his innovative course, *New Viewpoints in American History* (published in book form in 1922). He also offered the first formal course on American social and cultural history, in 1922. Two years later, he began his three decades of teaching at Harvard University. His influence at Harvard extended both to the creation of a new Ph.D. program in the history of American civilization and to the establishment of the Schlesinger Library on the History of Women in America at Radcliffe College, Cambridge, Mass.

Schlesinger's first book, *The Colonial Merchants and the American Revolution, 1763–1776* (1917), was one of the most important and creative works on the economic interpretation of the Revolutionary era. One of the first works on the neglected role of urban growth as a major factor in the United States' national development was his *Rise of the City, 1878–1898* (1933). His greatest production was the editing, with Dixon Ryan Fox, of *A History of American Life,* 13 vol. (1928–43), a comprehensive survey of the United States' cultural, social, and economic development, of which *The Rise of the City* was Schlesinger's own original contribution.

Schlesinger, Arthur M(eier), Jr. (b. Oct. 15, 1917, Columbus, Ohio, U.S.), American historian, educator, and public official.

Schlesinger graduated from Harvard University in 1938 and achieved initial notice with his biography *Orestes A. Brownson: A Pilgrim's Progress* (1939). After serving in the Office of War Information and the Office of Strategic Services during World War II, he became a professor of history at Harvard in 1946, teaching there until 1961. In 1946 his Pulitzer Prize-winning *The Age of Jackson* was published to widespread acclaim. In this book Schlesinger reinterpreted the American era of Jacksonian democracy in terms of its cultural, social, and economic aspects as well as its strictly political dimensions. Schlesinger's major historical work was *The Age of Roosevelt,* whose three separate volumes were entitled *The Crisis of the Old Order, 1919–1933* (1957), *The Coming of the New Deal* (1958), and *The Politics of Upheaval* (1960). In these books he described and narrated President Franklin D. Roosevelt's New Deal from a sympathetic standpoint.

Throughout his life Schlesinger was active in liberal politics. He was an adviser to Adlai Stevenson and subsequently to John F. Kennedy during their presidential campaigns, and the latter appointed Schlesinger a special assistant for Latin-American affairs. Schlesinger's study of the Kennedy administration, *A Thousand Days: John F. Kennedy in the White House* (1965), also won a Pulitzer Prize. From 1966 he taught history at the City University of New York. Among his other books are *The Bitter Heritage* (1967) and *The Imperial Presidency* (1973).

Schlesinger, Frank (b. May 11, 1871, New York City—d. July 10, 1943, Lyme, Conn., U.S.), American astronomer who pioneered in the use of photography to map stellar positions and to measure stellar parallaxes, from which the most direct determinations of distance can be made.

From 1899 to 1903 Schlesinger was in charge of the International Latitude Observatory at Ukiah, Calif. He then was appointed astronomer at the Yerkes Observatory, Williams Bay, Wis., where he began developing a photographic method of determining parallaxes. With great care he worked to eliminate or compensate for all significant sources of error, with such success that his photographic parallax measurement techniques remain largely unchanged to the present day.

While serving as director (1905–20) of the Allegheny Observatory, Pittsburgh, Schlesinger obtained a long-focus refracting telescope especially designed for parallax determinations. He published the parallaxes of 7,534 stars in his *General Catalogue of Parallaxes* (2nd ed., 1935).

In addition to his parallax work at Allegheny, Schlesinger also pioneered in the use of wide-angle cameras for determining photographically stellar positions and proper motions (the apparent rates of change of position across an observer's line of sight), formerly measured by laborious visual methods. Fifteen volumes of the *Yale Zone Catalogues,* which were prepared under his direction, give results for about 150,000 stars.

Schlesinger became director (1920–41) of the Yale University Observatory and continued his parallax work. He also had a prominent role in the establishment of the International Astronomical Union (1919) and served as that organization's vice president (1925–32) and president (1932–35).

Schlesinger, John (Richard) (b. Feb. 16, 1926, London), British film and theatre director.

After graduating from Balliol College, Oxford, Schlesinger pursued an acting career in television and film. One of his first directorial efforts, the documentary *Terminus* (1960), won an award at the Venice International Film Festival. Schlesinger's first three feature films, *A Kind of Loving* (1962), *Billy Liar* (1963), and *Darling* (1965), were caustic depictions of contemporary English urban life. His next film, *Far from the Madding Crowd* (1967), was a romantic drama of the Victorian period, adapted from the Thomas Hardy novel. Schlesinger then won the Academy Award for best director for *Midnight Cowboy* (1969), which won the Academy Award for best picture for its portrayal of the relationship between two social misfits in New York City. Schlesinger's later films include *Sunday Bloody Sunday* (1971), *The Day of the Locust* (1975), *Marathon Man* (1976), *Yanks* (1979), and *Honky Tonk Freeway* (1981).

For the Royal Shakespeare Company he directed *Timon of Athens* (1964), and in London's West End he directed the musical *I and Albert* (1972). In 1973 Schlesinger was appointed a director of the National Theatre, London.

Schleswig, historic and cultural region occupying the southern Jutland Peninsula north of the Eider River and now encompassing the northern half of Schleswig-Holstein *Land* (state) in northern Germany and Sønderjylland *amtskommune* (county commune) in southern Denmark. Schleswig became a Danish duchy in the 12th century and remained a fief associated with Denmark until it was forcibly annexed by Prussia and incorporated with Holstein as a single Prussian province in 1866. Following World War I the Danish majority living in North Schleswig (north of Flensburg) voted for incorporation with Denmark in a plebiscite (1920) held in accordance with the Treaty of Versailles.

Evidence of the struggle between the Danes and Germans from the 9th to the 12th century lies west of the town of Schleswig. Here the Danish kings built an impressive fortification wall known as the Danewerk. Nearby are the ruins of Haithabu, a historic Viking trading settlement. Evidence of both German and Danish cultural influences abound throughout Schleswig. Scandinavian place-names are mixed with German names throughout the lands north of the Eider, where dispersed farms and small hamlets are predominant. Danish farms, however, do not extend south of the city of Schleswig. The area from Schleswig north to Flensburg has a mixture of Saxon and Danish farmhouses, while north of Flensburg the Jutish rectangular enclosed farmstead is most common. The majority of the people in the German portion of Schleswig speak a Low German dialect, while the majority in the Danish portion of the region speak Danish. More than 85 percent of the region's total population are Protestants.

Schleswig, city, Schleswig-Holstein *Land* (state), northern Germany. The city forms a semicircle around the head of the Schlei, a narrow inlet of the Baltic that affords access to small vessels. First mentioned in 804–808 as Sliesthorp (and later as Sliaswich), the town was in the area of Haddeby (ancient Norse Haithabu), an important Baltic–North Sea trade centre in the 9th–11th century. St. Ansgar built the first church there in 850, and the town became a bishopric in 947. Schleswig's oldest surviving charter, from 1250, refers to an earlier one. Its Gottorp Castle was the residence of the dukes of Schleswig and later (until 1713) of the dukes of Schleswig-Holstein-Gottorp, but its trade dwindled because of the rivalry of the Hanseatic town of Lübeck, local wars, and the silting up of the Schlei. Schleswig was the seat of the Danish governor of the duchies of Schleswig and Holstein (1721–1848) and was the capital of the Prussian province of Schleswig-Holstein from 1867 to 1918.

Since World War II Schleswig has been the seat of the high courts of law and the *Land* museums (in Gottorp Castle); the most famous exhibit is the Nydamboot (Nydam boat), a 4th-century Viking ship discovered in 1863 in the Nydam marsh. St. Peter's Cathedral (mainly 13th century) has a magnificent altarpiece, known as the Bordesholm Altar, carved by Hans Brüggeman in 1514–21. When Kiel was made capital of Schleswig-Holstein *Land* after World War II, Schleswig received as compensation the Supreme Courts of Schleswig-Holstein and the Landesmuseum and archives. There is much work in the service sector, and industries include manufacturing, agriculture, and forestry. Pop. (1989 est.) 26,648.

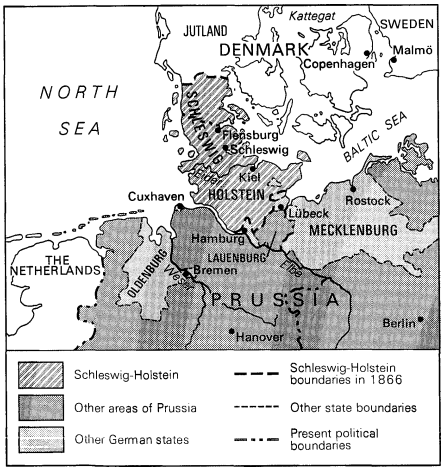
Schleswig-Holstein, the most northwesterly *Land* (state) of Germany, with an area of 6,073 square miles (15,729 square km). Schleswig-Holstein extends from the lower course of the Elbe River and the *Land* of Hamburg northward to Denmark, and thus occupies the southern half of the Jutland Peninsula. Along its eastern coast is the Baltic Sea, and along its western coast is the North Sea. It has a southeastern land boundary with Mecklenburg-West Pomerania *Land.* The *Land* also includes Fehmarn Island in the Baltic, and Helgoland (Heligoland), Sylt, Fohr, Amrum, and other German islands in the North Frisian group. The capital is Kiel.

History. Schleswig lies directly north of Holstein. Both Schleswig and Holstein have

at times been subject to the claims and counterclaims of Denmark, Sweden, the Holy Roman Empire, Prussia, and Austria. The region has had Danish minorities in predominantly German areas and German minorities surrounded by Danes, and consequently its history has been one of border and sovereignty disputes and, more recently, accommodations. A prolonged controversy between Denmark and Prussia over Schleswig-Holstein in the 19th century became known as the Schleswig-Holstein question. The historical region of Schleswig-Holstein was long a part of Denmark, and the northernmost portion of Schleswig in fact still belongs to Denmark.

In the 12th century Schleswig became a dukedom, and it remained a fief associated (but not without dispute) with Denmark until 1864. Holstein developed somewhat more independently; it was ruled for centuries as a duchy by the kings of Denmark, but, at the same time, remained a fief of the Holy Roman Empire. After 1815 Holstein was incorporated in the newly formed German Federation.

During the 1840s, issues relating to the rights of Schleswig's and Holstein's respective German- and Danish-speaking minorities, to the succession rights of the Danish royal family, and to Denmark's interests in the two duchies resulted in the duchies' becoming a bone of contention between Denmark and Prussia and then among Denmark, Prussia, and Austria. At this time the population of Schleswig was Danish in its northern portion, German in the south, and mixed in the northern towns and centre. The population of Holstein was almost entirely German.



Schleswig-Holstein after the Seven Weeks' War, 1866

The Napoleonic Wars had awakened German national feeling, and the political bonds that had historically existed between Schleswig and Holstein suggested that the two regions should form a single country within a united Germany. A countermovement developed among the Danish population in northern, or North, Schleswig and from 1838 in Denmark itself, where the Liberals insisted that Schleswig had belonged to Denmark for centuries and that the frontier between Germany and Denmark must be the Eider River (which had historically marked the border between Schleswig and Holstein). The Danish nationalists thus aspired to incorporate Schlweswig into Denmark, in the process detaching it from Holstein. German nationalists conversely sought to confirm Schleswig's association with Holstein, in the process detaching the former from Denmark. These differences led in March 1848 to an open uprising by Schleswig-Holstein's German majority in support of independence from Denmark and close association with the German Confederation. The rising was helped by the military intervention of Prussia, whose army drove Denmark's troops from Schleswig-Holstein. This war between Denmark and Prussia lasted three years (1848–50) and only ended when the Great Powers pressured Prussia into accepting the London Convention of 1852. Under the terms of this peace agreement, the German Confederation returned Schleswig-Holstein to Denmark. In an agreement with Prussia under the London Protocol of 1852, the Danish government in return undertook not to tie Schleswig more closely to Denmark than to its sister duchy of Holstein.

In 1863, nevertheless, the Liberal government prevailed on the new Danish king, Christian IX, to sign a new joint constitution for Denmark and Schleswig. Prussia and Austria were thus freed to intervene as the upholders of the 1852 protocol. In the ensuing Danish War (1864), Danish military resistance was crushed by Prussia and Austria in two brief campaigns, and, by the Treaty of Vienna in October, Christian IX ceded Schleswig and Holstein to Prussia and Austria. Prussia and Austria then quarreled with each other over the newly won territories, and, as a result of Prussia's victory over Austria in the Seven Weeks' (or Austro-Prussian) War of 1866, both Schleswig and Holstein became part of Prussia. This arrangement left the Danish-speaking majority of North Schleswig discontent under Prussian rule.

After the formation of the German empire in 1871, the Schleswig-Holstein question narrowed to a contest between Germany and Denmark over North Schleswig. The Treaty of Prague (1866), which had concluded the Austro-Prussian War, provided that North Schleswig should be reunited with Denmark should the majority of that area's population by a free vote so choose, but in 1878 Prussia and Austria agreed to cancel this provision. Following Germany's defeat in World War I, separate plebiscites were held in 1920 in the northern and southern portions of North Schleswig so that their respective inhabitants could choose between Denmark and Germany. The northern part of North Schleswig voted 70 percent to join Denmark, while the southern part voted 80 percent to remain within Germany. The northern part of North Schleswig thus became part of Denmark, and the southern portion became part of Germany. The resulting Danish-German boundary in Schleswig has lasted to the present day and is no longer a matter of contention. After World War II the German part of Schleswig-Holstein was organized as a constituent *Land* of the Federal Republic of Germany. *See also* Eider Program.

The land. Topographically, Schleswig-Holstein can be roughly divided into eastern, central, and western regions. The hilly eastern countryside is rich in lakes. The loamy soil in this area brings one of the best wheat harvests in Germany. Along the Baltic coast are sheer cliffs, indented by fjords. In the middle of the state lie the uplands, an old moraine area. The soil is so poor in this area that only in the last two centuries has it been cultivated. The western region consists of flat, marshy, treeless land that can be only partly cultivated. It is known for its numerous ditches, dikes, and ponds. West of the marshes are shallows and flats that are exposed to the tides. Some tidal flats and marshes have been reclaimed, planted to grass, and used for livestock grazing. The east coast, however, is always losing land through exposure to wind, tide, surf, and storm.

Climatically, Schleswig-Holstein lies in an area affected by the Gulf Stream. It has mild winters and temperate summers. A high degree of humidity and much rainfall (yearly average 30 inches [760 mm]) make for strong vegetation growth.

The people. A substantial portion of the population is urbanized, being concentrated in Kiel (the main town and the administrative and industrial centre) and also in Lübeck, Neumünster, and Flensburg. The end of World War II brought difficult social problems as retreating German army units and more than 1 million German evacuees and refugees (most of whom had been driven from the east by the Soviet Red Army) raised Schleswig-Holstein's population about 50 percent above the prewar level. More recently, young workers have tended to migrate away from the state, particularly to Hamburg.

The composition of the population has been greatly altered since World War II through the residual effects of the influx of people from Mecklenburg, East Prussia, and similar areas. This has led to a decline of dialects, although Holsteiner Platt (or Plattdeutsch [Low German]) is still spoken. In the north of the state, there is a small Danish-speaking minority with its own schools. Schleswig-Holstein contains a high proportion of Protestants.

The economy. Agriculture accounts for less than one-tenth of the state's net economic output, but Schleswig-Holstein still uses most of its total area for agricultural purposes. The farms of the area have been forced to rationalize their structure, partly as a result of foreign competition, and much land reform and crop specialization has taken place since 1945. The integration of farms, food-processing plants, and marketing concerns in one organization is increasingly characteristic of the agricultural system. Wheat, sugar beets, and potatoes are among the more common arable crops. Livestock provides a far higher proportion of farm incomes, however, than field crops. Milk and milk products, pigs, and cattle breeding are major sources of farm income. Although the state is low in forest reserves, its importance as a supplier of nursery plants for the forests of other regions has caused it to be called "the cradle of German forests."

Industries are increasingly important to the *Land's* economy. Major branches include shipbuilding, machine construction, and electrical engineering—all important in Kiel—as well as paper, textile, and clothing industries. There has also been a large increase in tourism.

Its long coastline and strategic location have, for centuries, made the area a focus of sea traffic. The Baltic fjords contain the large harbours of Lübeck, Kiel, and Flensburg, and the Kiel Canal, traversing Schleswig-Holstein to connect the North Sea and the Baltic, is heavily used.

Cultural life. The *Land* is noted for a high standard of education. The centre of the system is the historic University of Kiel, founded in 1665; a Medical Academy, in Lübeck, was added in 1964. There are also teacher-training colleges and a number of other specialized institutions of higher learning. At a lower level, cooperative secondary schools have been built to serve the needs of families that live in scattered villages.

There are about 50 significant museums primarily concerned with local and state history. Adult education and libraries enjoy a special tradition and promotion. The Institute for World Economies at Kiel is one of the oldest economic-research institutes in Europe and has a very large special library for political economy. Pop. (1989 est.) 2,564,565.

Schlick, Moritz (b. April 14, 1882, Berlin—d. June 22, 1936, Vienna), German logical empiricist philosopher and a leader of the European school of positivist philosophers known as the Vienna Circle.

After studies in physics at Heidelberg, Lausanne, Switz., and Berlin, where he studied with the German physicist Max Planck, Schlick earned his Ph.D. with a thesis on physics. His treatise, "Das Wesen der Wahrheit nach der modernen Logik" (1910; "The Na-



Schlick

By courtesy of the Osterreichische Nationalbibliothek, Vienna

ture of Truth According to Modern Logic"), reflected his scientific training and helped him obtain a teaching post at the University of Rostock in 1911. In 1922, after a year of teaching at Kiel, he became professor of the philosophy of inductive sciences at Vienna. There his disenchantment with earlier philosophies of knowledge crystallized, and he sought to establish new ways of ascertaining the nature of "how men know what they know," by referring to the methods of the sciences.

The group of philosophers that gathered around Schlick at Vienna included Rudolf Carnap and Otto Neurath and the mathematicians and scientists Kurt Gödel, Philipp Frank, and Hans Hahn. Influenced by Schlick's predecessors in the chair of philosophy in Vienna, Ernst Mach and Ludwig Boltzmann, the Circle also drew on the work of philosophers Bertrand Russell and Ludwig Wittgenstein. The members of the Circle were united by their hostility to the abstractions of metaphysics, by the grounding of philosophical statements on empirical evidence, by faith in the techniques of modern symbolic logic, and by belief that the future of philosophy lay in its becoming the handmaiden of science.

As the reputation of the Circle grew through its books, journals, and manifestos, philosophers in other countries who were similarly inclined became familiar with one another's work. In 1929, as the movement for Logical Positivism began to expand, Schlick went to California briefly as a visiting professor at Stanford University. He continued to direct the Circle's activities and to write for its new review, *Erkenntnis* (Knowledge), from the time of his return to Europe until his death, which resulted from gunshot wounds inflicted by a deranged student.

Schlick was a prolific essayist and was the author of such books as *Raum und Zeit in der gegenwärtigen Physik* (2nd ed. 1919; *Space and Time in Contemporary Physics,* 1920); *Allgemeine Erkenntnislehre* (1918; "General Theory of Knowledge"); *Fragen der Ethik* (1930; *Problems of Ethics,* 1939); and the posthumous *Grundzüge der Naturphilosophie* (1948; *Philosophy of Nature,* 1949) and *Natur und Kultur* (1952).

Schlieffen, Alfred, Graf von (count of) (b. Feb. 28, 1833, Berlin—d. Jan. 4, 1913, Berlin), German officer and head of the general staff who developed the plan of attack (Schlieffen Plan) that the German armies used, with significant modifications, at the outbreak of World War I.

Schlieffen, the son of a Prussian general, entered the army in 1854. He soon moved to the general staff and participated in the Seven Weeks' War against Austria (1866) and the Franco-Prussian War (1870–71). By 1884 he had become head of the military-history section of the general staff and in 1891 replaced Alfred, Graf von Waldersee, as chief of the Great General Staff.

Germany, by this time, had to face the possibility of a two-front war—against France in the west and Russia in the east. In attempting to solve this problem, Schlieffen differed from his predecessors, Waldersee and Field Marshal Helmuth, Graf von Moltke, who had aimed the first strike against Russia. Taking into account the vast territorial expanse of Germany's eastern neighbour and its growing defensive strength, he proposed to aim a rapid, decisive opening blow against France. Further, realizing that frontal assaults against mass armies would be costly and often indecisive, Schlieffen decided to strike at the enemy's flank. The plan that gradually emerged through the 1890s and the first years of the 20th century envisaged that only small numbers were to be left in the east to contain any threat by slowly mobilizing Russian forces, while the great bulk of Germany's armies were to be deployed in the west. A flanking movement would have greatest success in the north, through Belgium and possibly Holland, the south being too mountainous to allow the rapid movement of large



Schlieffen

E. Bieber, Berlin

bodies of troops. Hence, Schlieffen proposed to hold the southern portion of the Western Front with relatively few men, while concentrating a vast force in the north, which would sweep through Belgium and northern France, enveloping the French armies and eventually crushing them against Germany's southern wing. This, in essence, was the Schlieffen Plan as it was finalized in 1905, the year of its author's retirement.

The plan was not applied in its pure form at the beginning of World War I. Schlieffen's successor, Helmuth von Moltke, drastically reduced the strength of the attacking armies and thus, is often blamed for Germany's failure to win a quick, decisive victory.

Schliemann, Heinrich (b. Jan. 6, 1822, Neubukow, Mecklenburg-Schwerin—d. Dec. 26, 1890, Naples), German archaeologist and excavator of Troy, Mycenae, and Tiryns; he is often considered to be the modern discoverer of prehistoric Greece.



Schliemann, detail of an engraving by A. Weger, after a photograph

By courtesy of the Deutsche Staatsbibliothek, East Berlin

Youth and early career. Schliemann was the son of a poor pastor. A picture of Troy in flames in a history book his father had given him when he was seven years old remained in his memory throughout his life and sustained his fervent belief in the historical foundations of the Homeric poems. At the age of 14 he was apprenticed to a grocer, and it was in the grocer's shop that he heard Homer declaimed in the original Greek. After several years in the shop, ill health forced him to leave, and he became a cabin boy on a ship bound from Hamburg to Venezuela. After the vessel was wrecked off the Dutch coast, he became office boy and then bookkeeper for a trading firm in Amsterdam. He had a passion and a flair for languages, as well as a remarkable memory; these factors, combined with great energy and determination, enabled him to learn to read and write fluently between 8 and 13 languages—accounts vary, but his competence certainly included Russian and both ancient and modern Greek.

In 1846 his firm sent him to St. Petersburg as an agent. There he founded a business on his own and embarked, among other things, on the indigo trade. In 1852 he married Ekaterina Lyschin. He made a fortune at the time of the Crimean War, mainly as a military contractor. In the 1850s he was in the United States and became a U.S. citizen, retaining this nationality for the rest of his life. Returning to Russia he retired from business at the age of 36 and began to devote his energies and money to the study of prehistoric archaeology, particularly the problem of identifying the site of Homeric Troy. To train himself, he travelled extensively in Greece, Italy, Scandinavia, Germany, and Syria and then went around the world, visiting India, China, and Japan (he wrote a book about the last two countries). He also studied archaeology in Paris.

In 1868 Schliemann took his large fortune to Greece, visiting Homeric sites there and in Asia Minor, and the following year he published his first book, *Ithaka, der Peloponnes und Troja* ("Ithaca, the Peloponnese, and Troy"). In this work he argued that Hisarlık, in Asia Minor, and not Bunarbashi, a short distance south of it, was the site of Troy and that the graves of the Greek commander Agamemnon and his wife, Clytemnestra, at Mycenae, described by the Greek geographer Pausanias, were not the *tholoi* (vaulted tombs) outside the citadel walls but lay inside the citadel. He was able to prove both theories by excavation in the course of the next few years. He had divorced his Russian wife, Ekaterina, and married in 1869 a young Greek schoolgirl named Sophia Engastromenos, whom he had selected through a marriage bureau.

Discovery of Troy. Although some isolated discoveries had been made before he began digging, Schliemann has rightly been called the creator of prehistoric Greek archaeology. The French geologist Ferdinand Fouqué dug at Santorin in 1862 and found fresco-covered walls of houses and painted pottery beneath 26 feet (8 metres) of pumice, the result of the great eruption that divided the original island into Thera (modern Thira) and Therasis (modern Thirasia). Geologists at that time dated the Santorin eruption to 2000 BC, which suggested a great antiquity for Fouqué's finds and the existence of prehistoric cultures hitherto unknown in the Aegean. The English archaeologist Frederick Calvert had dug at Hisarlık, and in 1871 Schliemann took up his work at this large man-made mound. He believed that the Homeric Troy must be in the lowest level of the mound, and he dug uncritically through the upper levels. In 1873 he uncovered fortifications and the remains of a city of great antiquity, and he discovered a treasure of gold jewelry, which he smug-

gled out of Turkey. He believed the city he had found was Homeric Troy and identified the treasure as that of Priam. His discoveries and theories, first published in *Trojanische Altertümer* (1874; "Trojan Antiquity"), were received skeptically by many scholars, but others, including the prime minister of England, William Ewart Gladstone, himself a classical scholar, and a wide public, accepted his identification.

When he proposed to resume work at Hisarlık in February 1874, he was delayed by a lawsuit with the Ottoman government about the division of his spoils, particularly the gold treasure, and it was not until April 1876 that he obtained permission to resume work. In 1874–76 Schliemann dug instead at the site of the Treasury of Minyas, at Orchomenus in Boeotia, but found little except the remains of a beautiful ceiling. During this delay he also published *Troja und seine Ruinen* (1875; "Troy and Its Ruins") and began excavation at Mycenae. In August 1876, he began work in the *tholoi,* digging by the Lion Gate and then inside the citadel walls, where he found a double ring of slabs and, within that ring, five shaft graves (a sixth was found immediately after his departure). Buried with 16 bodies in this circle of shaft graves was a large treasure of gold, silver, bronze, and ivory objects. Schliemann had hoped to find—and believed he had found—the tombs of Agamemnon and Clytemnestra, and he published his finds in his *Mykenä* (1878; "Mycenae").

After an unsuccessful excavation in Ithaca in 1878, he resumed work at Hisarlık the same year. He conducted a third excavation at Troy in 1882–83 and a fourth from 1888 until his death. In his first season he had worked alone with his wife, Sophia. In 1879 he was assisted by Emile Burnouf, a classical archaeologist, and by Rudolf Virchow, the famous German pathologist, who was also the founder of the German Society for Anthropology, Ethnology, and Prehistory. In his last two seasons Schliemann had the expert assistance of Wilhelm Dörpfeld, who was a practical architect and had worked at the German excavations at Olympia. Dörpfeld brought to Troy the new system and efficiency of the German classical archaeologists working in Greece, and he was able to expose the stratigraphy at Troy more clearly than before and to revolutionize Schliemann's techniques. In 1884, Schliemann, together with Dörpfeld, excavated the great fortified site of Tiryns near Mycenae.

Toward the end of his life, Schliemann suffered greatly with ear trouble and travelled in Europe, visiting specialists and hoping for a cure. None was forthcoming. In great pain and alone, on Dec. 25, 1890, while walking across a square in Naples, he collapsed; he died the next day.

Assessment. Schliemann's work of discovery in archaeology is easy to assess. He discovered Homeric Troy as well as a city that existed long before Homer—a prehistoric Bronze Age civilization in Turkey; this was also what he discovered at Mycenae. Hitherto, ancient historians had thought of four empires: Greece, Rome, Egypt, and Babylon-Assyria; Schliemann discovered two new civilizations and enormously lengthened the perspective of history. He nearly discovered a third, namely that of prehistoric Crete.

He had long thought that there must have existed in the Mediterranean a civilization earlier than Mycenae and Bronze Age Hisarlık, and he guessed that it might be in Crete. At one time he contemplated excavation in Crete, but he could not agree to the price asked for the land; thus, the discovery of the pre-Mycenean civilization of Minoan Crete was left to Sir Arthur Evans 10 years after Schliemann's death.

Schliemann was one of the first popularizers of archaeology. With his books and his dispatches to *The Times,* the *Daily Telegraph,* and other papers he kept the world informed and excited by his archaeological discoveries as no one previously had been able to do. It has been said that "every person of culture and education lived through the drama of discovering Troy." Schliemann became a symbol not only of the new archaeological scholarship of the second half of the 19th century but also of the romance and excitement of archaeology. Scholars and the public were inspired by him, and when he died Sir John Myres, Camden Professor of Ancient History at the University of Oxford, said that to many it seemed that "the spring had gone out of the year."

When Schliemann began excavating, no corpus of accepted practice existed for archaeological fieldwork. Like Sir Flinders Petrie and Augustus Pitt-Rivers, he was a pioneer. Stratigraphy had been observed and understood in the Danish peat bogs, the Jutland barrows, and the prehistoric Swiss lake dwellings, but Hisarlık was the first large dry-land man-made mound to be dug. It is not surprising that Schliemann was at first puzzled by what he found, but, eventually, with the assistance of Dörpfeld, he was able to untangle the stratigraphy. There is a wide variation in the assessment of his technique as an excavator. He did extremely well for someone starting to dig in the 1870s, yet he is often unfairly criticized by those who are excavating similar mounds in the Middle East 100 years later.

(G.E.D.)

BIBLIOGRAPHY. Schliemann's own books, *Ilios* (1880, reprinted 1968) and *Troy and Its Remains* (1875, reprinted 1968), deserve reading not only for their account of his own reconnaissances and excavations but also for the autobiographical material contained. For a well-documented, authoritative account of Schliemann and his work, see Leo Deuel, *Memoirs of Heinrich Schliemann* (1977), which is based on Schliemann's biographical writings, letters, and excavation reports. Carl Schuchhardt, *Schliemanns Ausgrabungen im Lichte der heutigen Wissenschaft* (1889; *Schliemann's Excavations and Archaeological and Historical Studies,* 1891, reprinted 1971), is a contemporary assessment of his role in the development of archaeology.

Schlöndorff, Volker (b. March 31, 1939, Wiesbaden, Ger.), motion-picture director, member of the postwar cinema movement in West Germany.

Schlöndorff studied filmmaking in Paris, serving as an assistant to Louis Malle, Alain Resnais, and Jean-Pierre Melville. After directing several projects abroad for French television in the early 1960s, he returned to Germany and joined the burgeoning Junger Deutscher (Young German) film movement. His first feature, *Der Junge Törless* (1966; *Young Törless,* 1968), an adaptation of the Robert Musil novella *Die Verwirrungen des Zöglings Törless,* earned him instant recognition. This study of a sensitive boy in a brutal German military academy exhibited the cool, straightforward directorial style that would come to distinguish Schlöndorff from his more idiosyncratic contemporaries, notably Werner Herzog and Rainer Werner Fassbinder.

After a short period of rather poorly received efforts, Schlöndorff formed his own film company, the first production of which (1970) was an adaptation of the Bertolt Brecht play *Baal,* starring Fassbinder. The following year, Schlöndorff married an actress who had appeared in the film, Margarethe von Trotta, with whom he collaborated professionally through the mid-1970s and who later directed films of her own. Notable among their collaborative works was *Die verlorene Ehre der Katharina Blum* (1973; *The Lost Honor of Katharina Blum,* 1975), adapted from the Heinrich Böll novel.

Working independently of his wife from the late 1970s, Schlöndorff achieved critical and commercial success in Europe and the U.S. with his adaptation (1979) of the Günter Grass novel *Die Blechtrommel* (*The Tin Drum*), which won the Golden Palm at the Cannes Film Festival and the Academy Award for best foreign film. The film's episodic structure and expressionistic style marked a departure from his earlier work. Later films include *Die Fälschung* (1981; *Circle of Deceit,* 1982), filmed on location in war-torn Beirut, and an adaptation of the Marcel Proust novel *Swann in Love* (1984).

Schlosser, Friedrich (b. Nov. 17, 1776, Jever, Prussia—d. Sept. 23, 1861, Heidelberg, Baden), historian and teacher whose universal histories stressing a moralistic and judgmental approach to the past were the most popular historical works in Germany before the rise of Leopold von Ranke and his demands for more scientific standards of scholarship.

Schlosser was the son of a lawyer and studied theology at the University of Göttingen (1794–97). After serving as a tutor and then vice rector at the college at Jever, he was named professor of history at the University of Frankfurt and became the librarian there in 1814. Three years later he began to teach history at the University of Heidelberg, where he remained until his death.

Schlosser's principal work is the *Weltgeschichte für das deutsche Volk,* 18 vol. (1854–56; "World History for the German People"), now highly criticized for its didactic and moralistic tone but quite popular in his time. His *Geschichte des 18. Jahrhunderts und des 19. bis zum Sturz des französischen Kaiser Reichs,* 6 vol. (1836–48; "History of the 18th and 19th Centuries to the Downfall of the French Empire") is a study dominated by the political ideals of 1789. An earlier work, an account of the iconoclastic emperors (1812), is among his best monographs and stands as one of the first studies in Byzantine history. Generally, however, modern scholars criticize Schlosser for his moralistic standards and also for his uncritical analysis.

Schlumberger, Conrad and Marcel (respectively b. Oct. 2, 1878, Guebwiller, Ger.—d. May 9, 1936, Stockholm; b. June 21, 1884, Guebwiller—d. Aug. 19, 1953, Normandy, Fr.), German brothers, geophysicists and petroleum engineers noted for their invention, in 1928, of a method of continuous electric logging of boreholes.

Conrad taught at the École Supérieur des Mines in Paris from 1907 until 1923, when he resigned his professorship of physics to join his brother Marcel in developing applications of physics for use in mining and petroleum geology. In 1913 Conrad developed the first geophysical method of detecting a nonmagnetic ore deposit. In 1923 the brothers conducted the first large-scale petroleum survey in Romania. They also developed a recording thermometer for oil wells. In 1929 the Schlumbergers discovered a correlation between increased electric potential and the location of oil sands within a borehole; in 1931 they marketed a technique that incorporated electric-potential measurements into the well log.

In 1912 they founded Schlumberger Ltd., which extended the use of their techniques all over the world. Their developments brought major and universally adopted changes to petroleum-extraction practices everywhere.

Schlumbergera, cactus genus of three species, family Cactaceae, native to Brazil, grown for its striking elongated flowers, unique in the family and adapted to pollination by hummingbirds. All grow perched on trees or shrubs, sometimes in shady places among rocks.

S. russelliana and *S. truncata* (long known

as *Zygocactus*) have short flattened stem segments. The common Christmas cactus (*q.v.; S. bridgesii*), blooming about Christmas time in the Northern Hemisphere, may be a hybrid of these two. The two remaining species, *S. opuntioïdes* and *S. obtusangula,* have rounded stem segments but similar flowers.

The species formerly called *Schlumbergera gaertnerai,* the spring-flowering Easter cactus (*q.v.*), is now placed in the genus *Rhipsalidopsis.*

Schlüter, Andreas (baptized May 22, 1664?, Hamburg?—d. 1714, St. Petersburg, Russia), sculptor and architect, the first important master of the late Baroque style in Germany,



"The Great Elector," over-life-size bronze statue by Andreas Schlüter, 1703; in the forecourt of Schloss Charlottenburg, Berlin

By courtesy of the Staatliche Schlosser und Garten, Berlin; photograph, Marburg—Art Resource/EB Inc.

noted for infusing the bravura style of Baroque sculpture with a tense, personal quality.

Schlüter's early life is obscure, but he received training in Danzig and was active in Warsaw (1689–93). In 1694 he was called to Berlin as court sculptor by the elector Frederick III, and it is with Berlin and the Hohenzollern, the royal family of Prussia, that his name is primarily associated. The bronze statue of Frederick III (1696–97), now at Kaliningrad (formerly Königsberg), and the equestrian statue of the great elector Frederick William (completed in 1703), now in the forecourt of Schloss Charlottenburg, Berlin, are among the most important of his surviving sculptures. Both testify to Schlüter's familiarity with the work of the sculptor Gian Lorenzo Bernini in Rome and that of the sculptor François Girardon at the French court.

Between 1698 and 1706 Schlüter was actively engaged in Berlin in directing building operations and supplying sculptural decorations for the arsenal, the royal palace, and the old post office, which was demolished in 1889. The royal palace (considered to be his greatest achievement) was a casualty of World War II, but the sculptured keystones from the arsenal, particularly the series of dying warriors, survive as the supreme example of Schlüter's genius. The collapse of the Mint Tower, built on sandy soil adjacent to the royal palace, brought an abrupt end to Schlüter's career as supervisor of the royal buildings and saddened his last years. He was summoned by Peter the Great to St. Petersburg in 1713 but died the following year without having achieved anything of note there.

Schmalkaldic Articles, one of the confessions of faith of Lutheranism, written by Martin Luther in 1536. The articles were prepared as the result of a bull issued by Pope Paul III calling for a general council of the Roman Catholic Church to deal with the Reformation movement. (The council was actually postponed several times until it met in Trent in 1545.) John Frederick I, Lutheran elector of Saxony, wished to determine what issues could be negotiated with the Roman Catholics and what could not be compromised. He asked Luther to review earlier statements of faith by the Reformers to determine what was absolutely essential to the faith. After Luther had prepared the articles, he invited several Reformers to Wittenberg to discuss them, and after some minor changes eight theologians signed them. They were then sent to the Elector in January 1537.

In February 1537 the Protestant secular heads of state who were members of the Schmalkaldic League met with several theologians at Schmalkalden to decide how to deal with a council of the Roman Catholic Church. Luther became ill and could not attend, but John Frederick I presented Luther's articles to the gathering. Because of Luther's somewhat controversial doctrine of the Lord's Supper, Melanchthon urged that the Augsburg Confession and its Apology, previously presented to Emperor Charles V, adequately presented the Reformer's faith and that additional statements should not be added. This decision was adopted and the Schmalkaldic Articles were not officially accepted. They were, however, circulated and read, and 44 theologians signed them as an expression of their personal faith. Subsequently, they were included in the *Book of Concord* (1580).

The Schmalkaldic Articles are divided into three sections. The first discusses the unity of God, the Trinity, the Incarnation, and Christ, and on these subjects Luther believed there was no real controversy between Roman Catholics and Protestants. The second section dealt with Christ and justification by faith. According to Luther, "On this article rests all that we teach and practice against the pope, the devil, and the world." This section also discusses the mass, monastic orders, and the papacy. The third section discusses 15 articles that could be considered by Roman Catholics and Protestants. It includes such subjects as sin, the Law, repentance, the sacraments, confession, the ministry, and a definition of the church.

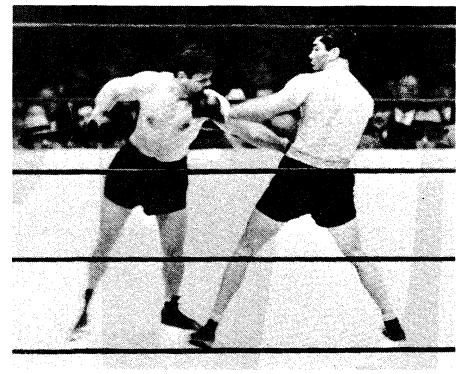
Schmalkaldic League, German SCHMALKALDISCHER BUND, during the German Reformation, a defensive alliance formed by Protestant states of the Holy Roman Empire to defend the newly formed Lutheran churches from attack by the Roman Catholic emperor Charles V. Established in 1531 at Schmalkalden, Ger., the league was led by Philip the Magnanimous of Hesse and John Frederick I of Saxony. Among its other original member states were Brunswick, Anhalt, Mansfeld, Magdeburg, Bremen, Strassburg, and Ulm.

Fearing that the league would ally itself with his enemy, Francis I of France, Charles was forced to grant it de facto recognition until 1544, when he made peace with Francis. He then began military operations against its leaders and effectively destroyed it by 1547.

Schmeling, Max, byname of MAXIMILIAN SCHMELING (b. Sept. 28, 1905, Klein Luckow, Brandenburg, Ger.), German world heavyweight boxing champion from June 12, 1930, when he defeated Jack Sharkey, until June 21, 1932, when he was outpointed by Sharkey in 15 rounds at Long Island City, N.Y., Schmeling became the first European to win the world heavyweight title in the 20th century.

Schmeling, who from 1919 to 1922 studied business, had won the European light-heavyweight title and the German heavyweight championship when he went to the United States in 1928. He attracted attention there with his facial resemblance to former champion Jack Dempsey. The most notable victory of Schmeling's career was a 12-round knockout of Joe Louis in New York City, June 19, 1936. Louis, after winning the heavyweight title in 1937, knocked out Schmeling in one round in New York City, June 22, 1938.

By the late 1930s, Schmeling became very unpopular in the United States and elsewhere because of his adherence to Nazi teachings. Later he turned against the Nazi government, which, for punishment, assigned him to the parachute forces in 1941. He was wounded during the German airborne invasion of Crete in that year. Schmeling returned to boxing in 1947–48, winning three of five fights in



Schmeling (right) fighting Mickey Walker, 1932

AP/Wide World Photos

Germany before retiring at 43. He had 70 bouts, winning 55, 38 by knockouts. He later became an executive of a soft-drink company. His publications concerning his life and career include *Erinnerungen* (1977; "Memoirs").

Schmidt, Arno (Otto) (b. Jan. 18, 1914, Hamburg—d. June 3, 1979, Celle, W.Ger.), German writer whose novels and short stories were highly experimental, employing complex structure, idiosyncratic orthography, and near-pornography.

He was educated at the University of Breslau, worked in a textile business (1934–39), and while in the army in World War II was captured by the British and held as a prisoner of war until 1945. He turned to writing in 1946–47 and published in 1949 *Leviathan,* a collection of short stories in which God is malignant and society evil. This work would join with two others in a savagely pessimistic trilogy entitled *Nobodaddys Kinder* (1963; "Nobodaddy's Children"). Other early works were *Das steinerne Herz* (1956; "Heart of Stone") and *Die Gelehrtenrepublik* (1957; *The Egghead Republic*).

His most monumental work was *Zettels Traum* (1970; "Zettel's Dream"), which was Joycean in its language and complexity and occupied 1,330 pages of triple-columns, each column rendering a different narrative of thought processes in a 24-hour period. Structural experimentation continued in such novels as *Schule der Atheisten* (1972; "School for Atheists") and *Abend mit Goldrand* (1975; *Evening Edged in Gold*).

Schmidt also wrote critical essays and translations of the works of various English authors, including James Joyce and William Faulkner.

Schmidt, Bernhard Voldemar (b. March 30, 1879, Naissaar, Estonia—d. Dec. 1, 1935, Hamburg), optical instrument maker who invented the telescope named for him, an instrument widely used to photograph large sections of the sky because of its large field of view and its fine image definition.

Schmidt worked as a telegraph operator, photographer, and designer until 1898. In 1901 he went to the engineering school at Mittweida,

Ger., to study and remained there until 1926 to install a small workshop and observatory. The parabolic mirrors and the 16-inch telescope he made during this time established his reputation as an optical technician.

In 1926 Schmidt joined the staff of the Hamburg Observatory, Bergedorf, and three years later he conceived a new mirror system for telescopes. All previous reflecting telescopes designed to view large areas were subject to image defects, particularly the type known as spherical aberration when spherical mirrors were used, and to a type of blurring of the image, known as coma, even a short way off the optical axis if parabolic mirrors were used. Schmidt succeeded in designing a telescope in which these distortions were eliminated by a combination of a specially figured lens and a spherical mirror placed some distance behind it.

Schmidt, Helmut (b. Dec. 23, 1918, Hamburg, Ger.), Social Democratic politician who was chancellor of West Germany from 1974 to 1982.

The son of a teacher, Schmidt served in the Wehrmacht (German Army) during World War II, serving in an armoured division on the Eastern Front and later in the Ardennes offensive and earning an Iron Cross. After the war he joined the Social Democratic Party, studied economics at the University of Hamburg, and then served in the economics and transport sector of the Hamburg municipal government (1949–53). He was elected to the Bundestag (1953–61), returned to service in Hamburg (1961–65), and was reelected to the Bundestag from 1965 on. Schmidt became a vice-chairman of the Social Democratic Party in 1968 and served as minister of defense (1969–72) and minister of finance (1972–74) in the government of Chancellor Willy Brandt.

As a leading member of the Social Democratic Party, which held power through its alliance with the liberal Free Democratic Party, Schmidt was elected to the chancellorship of West Germany on May 16, 1974, following the resignation of Willy Brandt. Schmidt proved to be a capable and popular chancellor and was reelected in 1976 and 1980. During the worldwide recession of the early 1980s, however, his refusal to cut West Germany's social-welfare programs prompted the centrist Free Democrats to defect from his governing coalition. Having lost his voting majority in the Bundestag, Schmidt resigned the chancellorship upon a vote of no confidence in the Bundestag on Oct. 1, 1982. His successor was Helmut Kohl of the Christian Democratic Union. Schmidt continued to serve as a member of the Bundestag until his retirement from politics in 1987. He was the author of numerous books on German political affairs and European international relations.

During his chancellorship, Schmidt won the esteem of many West Germans and became one of the most respected and influential of Western Europe's leaders. In foreign affairs he sought reconciliation with the Soviet-bloc countries of eastern Europe while at the same time maintaining West Germany's partnership with the United States. He similarly cultivated closer ties with the German Democratic Republic (East Germany) while maintaining West Germany's pivotal membership in the European Community and NATO military alliance.

Schmidt, (Johann) Kaspar: *see* Stirner, Max.

Schmidt, Maarten (b. Dec. 28, 1929, Groningen, Neth.), Dutch-born American astronomer whose identification of the wavelengths of the radiation emitted by quasars (quasi-stellar objects) led to the theory that they may be among the most distant, as well as the oldest, objects ever observed.

Schmidt was educated at the universities of Groningen and Leiden, receiving his Ph.D. from Leiden in 1956, and was scientific officer of the Leiden Observatory until 1959. He joined the staff of the Mount Wilson and Palomar Mountain Observatories (now Hale Observatories) in California in 1959, at the same time joining the faculty of astronomy at the California Institute of Technology. From 1978 to 1980 Schmidt was the director of the Hale Observatories. His early work included the creation of a mathematical model of the Milky Way Galaxy based on all the available data concerning the distribution of the stars and interstellar gas and dust. Schmidt's model led to greater understanding of the structure of the galaxy and its dynamical properties.

An even more important achievement, however, was Schmidt's study of an unusual extragalactic phenomenon, quasars, which he and other astronomers in the 1960s came to believe were exceptionally distant from the Earth and were receding from the Earth with a velocity greater than that of any other known celestial object. In their searches through space, Schmidt and his colleagues found quasars receding so quickly and existing so far away that their light may have been traveling up to 15 billion years in order to reach the Earth. Some astronomers, including Schmidt, theorized that these very distant and very old quasars are actually galaxies in the early stages of formation. Thus Schmidt's discovery and interpretation of quasars challenged many previously accepted theories of the origin and age of the universe.

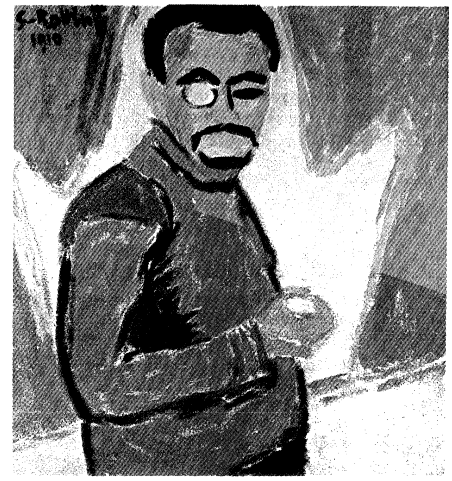
Schmidt, Wilhelm (b. Feb. 16, 1868, Hörde, Ger.—d. Feb. 10, 1954, Fribourg, Switz.), German anthropologist and Roman Catholic priest who led the influential cultural-historical European school of ethnology. He was a member of the Society of the Divine Word missionary order.

Schmidt was early influenced by such anthropologists as Franz Boas and Edward Westermarck, but he was most profoundly impressed by the ideas of Fritz Graebner on cultural diffusion formulated in the theory of Kulturkreise (*q.v.*). In 1906 he founded the journal *Anthropos,* which reported ethnographic field research by missionaries of his order stationed in all parts of the world, most notably in New Guinea and Togo.

Schmidt studied the evolution of the family and correlated different family types with subsistence patterns. He also suggested that even in primitive societies the individual exerts an influence on community institutions. After World War I he attempted to apply Graebner's cultural-diffusion principle on a worldwide basis. He published extensively, addressing many of his writings on the family and social ethics to general readers. His major work is *Der Ursprung der Gottesidee,* 12 vol. (1912–55; "The Origin of the Idea of God"). In this and in his *Ursprung und Werden der Religion* (1930; *The Origin and Growth of Religion*), Schmidt maintained that most primitive peoples believed in a supreme being and that their religion might correctly be regarded as monotheistic.

Schmidt-Rottluff, Karl, also called KARL SCHMIDT (b. Dec. 1, 1884, Rottluff, near Chemnitz, Ger.—d. Aug. 9, 1976, West Berlin), German painter and printmaker, noted for his Expressionistic landscapes and nudes.

In 1905 Schmidt-Rottluff began to study architecture in Dresden, where he met Ernst Ludwig Kirchner and Erich Heckel, fellow architecture students who shared his passion for art. Together they formed the organization of Expressionist artists known as Die Brücke. Kirchner was the intellectual and spiritual leader of Die Brücke, while Schmidt-Rottluff



"Self-Portrait with Monocle," oil on canvas by Schmidt-Rottluff, 1910; in the Nationalgalerie, Berlin

By courtesy of the Nationalgalerie, Staatliche Museen Preussischer Kulturbesitz, Berlin

was drawn to the emotive "storm of colour" of a new member of the group, Emil Nolde. Such woodcuts, however, as "Woman with Hat" (1905) indicated that he had already begun to realize the expressive potential of flat, patterned design. His painting "Windy Day" (1907) shows the artist's transition from his early Impressionistic style to the mature style characterized by boldly dissonant colours of "Self-Portrait with Monocle" (1910).

In 1911 Schmidt-Rottluff moved to Berlin, where he painted works in which the harsh colours and jagged forms achieve a vigorous brutality. Other works of this period have angular, geometric forms and distorted space, revealing his new interest in Cubism. His later woodcuts, such as his "Head of Christ" and his "Two Heads" (both 1918), betray the lingering influence of Cubism as well as his new enthusiasm for African sculpture.

During the 1920s Schmidt-Rottluff's work became more pleasing, losing much of its former vigour and integrity. Nevertheless, when the Nazis gained power in Germany, he was forbidden to paint. After World War II he taught art and resumed painting, although he never regained the power of his early works.

Schmidt telescope, also called SCHMIDT CAMERA, telescope in which a spherical primary mirror receives light that has passed through a thin aspherical lens, called a correcting plate, that compensates for the image distortions—namely, spherical aberrations—produced by the mirror. The Schmidt telescope is thus a catadioptric telescope; *i.e.,* its optics involve both the reflection and refraction of light. Because the Schmidt telescope uses a spherical collecting mirror instead of a paraboloidal one (as conventional reflecting telescopes do), it is free from astigmatism and so has a wide field of view. The Schmidt instrument can, in effect, provide a sharper image of a larger area of the celestial sphere than ordinary reflectors and is thus ideal for star surveys.

The device was invented in 1930 by Bernhard Schmidt (*q.v.*) of the Bergedorf Observatory, Hamburg. The Schmidt-Maksutov telescope, invented by D.D. Maksutov in 1941, is similar in design and purpose to the Schmidt telescope but has a spherical meniscus in place of the correcting plate of the Schmidt.

Schmucker, S(amuel) S(imon) (b. Feb. 28, 1799, Hagerstown, Md., U.S.—d. July 26, 1873, Gettysburg, Pa.), American Lutheran theologian and educator.

A principal exponent of a reformed American Lutheran Church, he joined in the establishment of the General Synod (1820) that coordinated the various Lutheran churches in the United States and helped found Gettysburg

Seminary (1826; now Lutheran Theological Seminary) and Pennsylvania College (chartered in 1832 as Gettysburg College). In his *Definite Synodical Platform* (published anonymously in 1855) he reinterpreted the Augsburg Confession in terms of 19th-century liberal theology, Pentecostal piety, and the need for an American expression of Lutheranism integrating with other churches. He collaborated in organizing the Evangelical Alliance (1846) and wrote *Elements of Popular Theology* (1834) and *The Unity of Christ's Church* (1870). His *Definite Platform* was rejected by the Lutheran membership, which had recently been increased by conservative immigrants.

Schnabel, Artur (b. April 17, 1882, Lipnik, Austria—d. Aug. 15, 1951, Axenstein, Switz.), Austrian pianist and profound and generous teacher, whose performances, recordings, and editions made him a legend in his own time



Schnabel, 1950
Jack Greenstone—Camera Press

and a model of scholarly musicianship to all later pianists.

Schnabel was a child prodigy and studied in Vienna with the celebrated pianist and teacher Theodor Leschetizky. He lived and taught in Berlin until the Nazis drove him to Switzerland; he had made his U.S. debut in 1921 and for a time lived in New York City, but he later returned to Europe to live.

Schnabel specialized in the music of Ludwig van Beethoven, Johannes Brahms, and Franz Schubert. Never a virtuoso pianist, he did not teach technique or concern himself with mere technical mastery. His playing, much of which is preserved on early recordings, is reflective and expressive. Though little known as a composer, Schnabel was influenced by the contemporary composer Arnold Schoenberg, whom he knew in Berlin, and he composed intermittently throughout his life. He never played his own or other modern music in public.

Schnabel's thoughts on music were published as *Reflections on Music* (1933) and *Music and the Line of Most Resistance* (1942) and were more concretely expressed in his controversial edition of Beethoven's piano sonatas.

schnauzer, any of three breeds of dogs—the standard, miniature, and giant schnauzers—developed in Germany. The standard, or medium-sized, schnauzer is the stock from which the other two breeds were derived. It is shown in paintings and in a statue dating from the 15th and 16th centuries. Originally a guard dog and ratter, it was highly valued for intelligence and courage. A robust dog, it is characterized by a blunt, heavily whiskered muzzle, a squared body, and a hard, wiry coat of black or salt-and-pepper. The standard schnauzer is most popular as a guard and companion; it has been used as a dispatch carrier, Red Cross dog, and police dog. It stands 17 to 20 inches (43 to 51 centimetres) and weighs 26 to 37 pounds (12 to 17 kilograms).



Standard schnauzer
Sally Anne Thompson—EB Inc.

The miniature schnauzer, developed from small standard schnauzers and affenpinschers, was first shown as a distinct breed in 1899. It resembles the standard schnauzer but stands 12 to 14 inches (30.5 to 35.5 centimetres) and weighs 13 to 15 pounds (6 to 7 kilograms). Its coat is salt-and-pepper, silver and black, or black. Compact and strong, it is valued as an active, hardy pet.

The giant schnauzer, largest and most recent of the three breeds, was developed by Bavarian cattlemen who wanted a cattle dog like the standard schnauzer but larger. To produce such a dog, the standard schnauzer was crossed with various working dogs and, later, with the black Great Dane. The giant schnauzer, like the others, is a robust dog with a wiry coat. It stands 21 to 26 inches (54.5 to 65 centimetres), weighs 66 to 78 pounds (30 to 35.5 kilograms), and is salt-and-pepper, black, or black-and-tan. Originally a cattle dog, it was later used as a butcher's dog and a brewery guard. Since the beginning of the 19th century, it has been used extensively in German police work.

The standard and giant schnauzers are placed in the working-dog group of the American Kennel Club; the miniature is classed as a terrier.

Schneidemühl (Poland): *see* Piła.

Schneider, Hannes (b. 1890, Stuben am Arlberg, Austria—d. April 26, 1955, North Conway, N.H., U.S.), Austrian-born ski instructor who developed what came to be called the Arlberg technique, based on the snowplow, stem, and stem Christiania turns, and who helped popularize skiing in the United States.

As a teenager, Schneider observed that the then favoured way of skiing, derived from Nordic skiing, with erect posture and knees rigid, did not fit the Alpine terrain. As a young ski instructor, he developed a technique involving a crouch with the weight held forward on the skis. This technique stressed speed and made use of many turning movements which, although already known, came under his instruction to be used more in combination. In World War I he served with the Austrian army and taught skiing.

After the war Schneider appeared in a German ski film and founded his Arlberg school at St. Anton, which became internationally famous. When the Nazis seized his school after the Anschluss, he came to the United States in 1938, and a year later founded a school at North Conway. From it came many U.S. ski instructors.

Schneider, Johann: *see* Agricola, Johann.

Schneider, (Joseph) Eugène (b. March 29, 1805, Bidestroff, Fr.—d. Nov. 27, 1875, Paris), one of the great industrialists of the 19th century and a prominent figure in French politics.

Schneider lost his father when quite young and, left penniless, started working in the banking house of Baron Seillière. He proved to be bright, capable, and energetic and in 1830 was made director of the Bazeilles ironworks. In 1836, with his older brother Adolphe, he bought the metalworking factories at Le Creusot, the royal foundry started by Louis XVI. The company prospered, and, when Adolphe died in 1845, Joseph took over as sole owner. Schneider et Cie, now Schneider SA, became one of the greatest industrial establishments in the world. The company expanded into shipbuilding and armaments, built the first steam locomotive (1838) and river steamboat (1840) in France and acquired major concerns in Czechoslovakia, Hungary, Romania, Poland, and elsewhere. Innovations were made in labour relations and workmen's compensation for Creusot employees.

Schneider decided to enter politics and in 1845 and 1846 was elected deputy to the national legislature. For a brief period in 1851, he served as minister of agriculture and commerce. In 1852 he was again elected deputy and from that time on supported Napoleon III. Reelected in 1857, 1863, and 1869 and serving at various times as vice-president and president of the legislature, Schneider was known as a strong advocate of liberal empire. After his death, the company was run by his two sons, both of whom went into politics and became deputies. His grandson Charles-Prosper-Eugène Schneider directed the family firm during World War I, when it manufactured armour plate, aircraft, and other war matériel. After World War II there were subsidiaries in Luxembourg, Belgium, Switzerland, Brazil, Canada, and the United States.

Consult the INDEX *first*

Schneirla, Theodore Christian (b. July 23, 1902, Bay City, Mich., U.S.—d. Aug. 20, 1968, New York City), U.S. animal psychologist who performed some of the first studies on the behaviour patterns of army ants.

Schneirla was educated at the University of Michigan, Ann Arbor (M.S., 1925; Sc.D., 1928), and joined the staff of New York University in 1928. With a grant from the National Research Council, he made the first of eight trips to the Barro Colorado Island, Panama Canal Zone, to study the behaviour of army ants in 1932. "Studies on Army Ants in Panama," published the next year, provided new insight into their behaviour. He discovered that these ants operate on a 36-day cycle consisting of a 16-day nomadic pattern followed by a 20-day stationary phase. In 1934 he reported that ants follow a particular pattern when moving into new territory and that raids by these insects peak once during the morning and again in the afternoon. Sudden changes in weather also were found to give rise to sudden bursts of activity. In 1944 he showed that their raids were caused by the level of excitability of the ant colony and not by a scarcity of prey.

In 1942 Schneirla became associate professor of animal psychology at New York University and in 1943, associate curator of the Department of Animal Behavior at the American Museum of Natural History, New York City. After his return from a study of army ants in southern Mexico, he became the full curator of the museum in 1947. Soon afterward he brought back the first army ants to enter the United States.

Schneirla was the author of a large number of scientific papers and the co-author of several books on psychology, including *Principles of Animal Psychology* (with N.R.F. Maier; 1935) and *Recent Experiments in Psychology* (with L.W. Crafts; 1938).

Schnitger, Arp (b. July 9, 1648, Schmalenfleth, in Oldenburg—d. July 24 or 25, 1719, Neuenfelde, Imperial Free City of Hamburg), one of the most skilled organ builders of the

Baroque era, whose fine instruments inspired composers such as Johann Sebastian Bach.

Schnitger was born into a family of woodworkers; his father was a carver, and Arp was apprenticed to a cousin at age 18. Three years after his cousin's death, in 1676, Schnitger moved to Neuenfelde, where he donated an organ to the church in which he is buried. Of six children born to his first wife, two became notable organ builders.

Schnitger built about 150 organs, some of them quite large. Among the finest was the one played by Bach at St. Jakobi's Church in Hamburg. Although Italian influence can be detected in the pipework of his latest organs, Schnitger built in the northern, Lutheran style. His surviving instruments are transparent and clear sounding, ideal for the contrapuntal style (based on interwoven melodic lines) of the north German music of his time. His pipes were generally of tin–lead alloy rather than wood; as was traditional, they fell into two classes, wide scale (female) and narrow (male). In both classes, which were not meant to be combined, he made possible a satisfying variety of registrations (combinations of stops of different tone and pitch), while avoiding strong contrasts of loudness.

Schnitter, Johann: *see* Agricola, Johann.

Schnitzer, Eduard: *see* Emin Paşa, Mehmed.

Schnitzler, Arthur (b. May 15, 1862, Vienna—d. Oct. 21, 1931, Vienna), Austrian playwright and novelist known for his psychological dramas that dissect turn-of-the-century Viennese bourgeois life.

Schnitzler, the son of a well-known Jewish physician, took a medical degree and practiced medicine for much of his life, interesting himself particularly in psychiatry. He



Schnitzler, etching by Johann Lindner, 1898

By courtesy of the Bild-Archiv, Osterreichische Nationalbibliothek, Vienna

made his name as a writer with *Anatol* (1893; Eng. trans., 1911), a series of seven one-act plays lightly depicting the casual amours of a wealthy young Viennese man-about-town. Although these plays were much less probing than his later works, they revealed a gift of characterization, a power to evoke moods, and a detached, often melancholic, humour.

Schnitzler's *Reigen* (1897; *Merry-Go-Round,* 1953), a cycle of 10 dramatic dialogues, depicts the heartlessness of men and women in the grip of lust. A scandal in 1920, when it was finally performed, in 1950 it was made into a successful French film, *La Ronde,* by Max Ophüls. Most at home in creating a single, precisely shaded mood for a one-act play or short story, Schnitzler often evoked the atmosphere of the corrupt self-deception he saw in the last years of the Habsburg empire. He explored human psychology, portraying egotism in love, fear of death, the complexities of the erotic life, and the morbidity of spirit induced by a weary introspection. He depicted the hollowness of the Austrian military code of honour in the plays *Liebelei* (1896; *Playing with Love,* 1914) and *Freiwild* (1896; "Free Game"). His most successful novel, *Leutnant Gustl* (1901; *None but the Brave,* 1926), dealing with a similar theme, was the first European masterpiece written as an interior monologue. In *Flucht in die Finsternis* (1931; *Flight into Darkness,* 1931), he showed the onset of madness, stage by stage. The play *Professor Bernhardi* (1912; Eng. trans., 1928) and the novel *Der Weg ins Freie* (1908; *The Road to the Open,* 1923) concern the position of Jews in Austria. His other works include plays, novels, collections of stories, and several medical tracts.

Schnorr von Carolsfeld, Julius (b. March 26, 1794, Leipzig—d. May 24, 1872, Dresden, Saxony), painter and designer who figured importantly in the German Nazarene movement.

Schnorr received his earliest instruction from his father, Hans Veit Schnorr, a draftsman, engraver, and painter, and in 1818 he went to Rome where he was associated with a group of painters who called themselves the Nazarenes, or Lucas Brotherhood (Lukasbund). Inspired by early Renaissance art and the works of Dürer, Schnorr's oil paintings were characterized by a precise linearity, clear bright colours, and a multiplicity of symbolic detail. He shared with the other Nazarenes an interest in a revival of fresco painting and the creation of a "monumental art." Together with Johann Overbeck, Peter von Cornelius, and Philipp Veit, Schnorr received a commission to decorate the entrance hall of the Villa Massimo with frescoes after Ariosto.

Schnorr left Rome and settled in Munich in 1827, where he served King Ludwig I, transplanting to Germany the art of wall painting learned in Italy. For his *Picture Bible* (1852–60), an English commission arising out of a visit to London in 1851, he designed over 200 woodcuts. He also designed the windows, manufactured at the royal factory at Munich, for St. Paul's Cathedral, London.

Schnorr von Carolsfeld, Ludwig (b. July 2, 1836, Munich—d. July 21, 1865, Dresden, Saxony), German tenor, known for his Wagnerian roles.

Schnorr made his first solo appearance in 1855 with the Karlsruhe opera. He married the singer Malvina Garriques and moved to Dresden in 1860, where he established himself as a singer in lieder and oratorio as well as opera. Among the roles in which he was especially admired were Tannhäuser and Lohengrin.

Richard Wagner heard von Carolsfeld in 1862 and asked him and his wife to begin studying the title roles in *Tristan und Isolde,* which Wagner was then working on. The physical demands of the opera caused them some concern, but Wagner persuaded them to undertake it. The first performance of *Tristan und Isolde* occurred on June 10, 1865, in Munich after a particularly demanding rehearsal period. Von Carolsfeld developed a chill but went on to perform three more times as Tristan, once as Erik in *Die fliegende Holländer* (his last public performance), and at a private concert before Ludwig II. He returned to Dresden and began rehearsals for *Don Giovanni* but developed a feverish condition that led to delirium, rampant gout, and finally to a stroke five days later. On his deathbed he burst into song and called on Wagner's name. His wife's grief made it impossible for her to continue her stage career, but she wrote songs, taught for a time, and published a book of her and her husband's poems.

Schober, Johann (b. Nov. 14, 1874, Perg, Austria—d. Aug. 19, 1932, Baden, near Vienna), conservative administrator and twice prime minister of Austria (1921–22 and 1929–30) who established friendly relations with the Czechoslovak republic but was unable to negotiate a union between Austria and Germany.



Schober, 1918

By courtesy of the Bild-Archiv, Osterreichische Nationalbibliothek, Vienna

A career police officer, Schober had become president of the Austrian police by 1918. During the revolution of that year, he ensured police loyalty to the new republican regime, a decision that probably prevented considerable bloodshed. He became chancellor in June 1921. The Christian Social Party and the Pan-Germans supported his government, and he took the initiative in reestablishing friendly relations with the successor states of the late Habsburg Empire by signing the Treaty of Lány with Czechoslovakia in December 1921. Resigning over a dispute with the Pan-Germans in May 1922, he returned to his police post. He served as chancellor again from 1929 to 1930 and as vice chancellor and foreign minister from December 1930 to January 1932. Schober's agreement of March 1931 with Germany would have led to an Austro-German customs union, but France and Czechoslovakia forestalled that move.

Schoeck, Othmar (b. Sept. 1, 1886, Brunnen, Switz.—d. March 8, 1957, Zürich), Swiss musician, one of the principal composers of lieder of his time.

Schoeck studied at Zürich and in 1907 with Max Reger in Leipzig. On his return to Zürich he conducted choral societies until 1917. From 1917 to 1944 he was conductor of the symphony concerts at Sankt Gallen. His principal song cycles, for voice and small ensemble, include *Elegie* (1922–23), on poems of N. Lenau and J. von Eichendorff; *Gaselen* (1923), on poems of G. Keller; and *Wandersprüche* (1928), on poems of Eichendorff.

Schoelcher, Victor (b. July 22, 1804, Paris—d. Dec. 26, 1893, Houilles, Fr.), French journalist and politician who was France's greatest advocate of ending slavery in the empire.

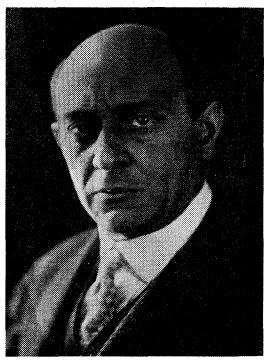
Although born into a wealthy porcelain-manufacturing family, Schoelcher showed little inclination for a business career. After a trip to the United States in 1829, where he was horrified by the abuses of slavery, Schoelcher became a dedicated abolitionist.

He worked as a journalist from 1829 to 1848, writing ceaselessly on the barbarism of slavery. As undersecretary for the navy in 1848, Schoelcher prepared the famous decree that abolished slavery in the colonies. He was elected deputy to the French national legislature from Martinique (1848) and from Guadeloupe (1849). As deputy, he worked passionately to eliminate the abuses of colonialism and pleaded the cause of blacks in the Assembly.

With Napoleon III's coup d'état (1851), Schoelcher was exiled. He went to live in England, where he stayed until finally allowed to return to France in 1870. His reputation and popularity were untarnished, and he was elected deputy in 1871 and senator for life in 1875. For the rest of his life, he campaigned for

social reforms, an end to capital punishment, and tolerance in colonial administration. He was a prolific author and wrote many books dealing with social and political issues.

Schoenberg, Arnold (Franz Walter), Schoenberg also spelled SCHÖNBERG (b. Sept. 13, 1874, Vienna—d. July 13, 1951, Los Angeles), Austrian-American composer who created a new method of composition based on a row, or series, of 12 tones—a method called atonality (*q.v.*). He was also one of the



Schoenberg
Pictorial Parade

most influential teachers of the 20th century, among his most significant pupils were Alban Berg and Anton Webern.

Early life. Schoenberg's father, Samuel, owned a small shoe shop in the Second, then predominantly Jewish, district, of Vienna. Neither Samuel nor his wife, Pauline (née Nachod), was particularly musical, although, like most Austrians of their generation, they enjoyed music. There were, however, two professional singers in the family—Heinrich Schoenberg, the composer's brother, and Hans Nachod, his cousin. Nachod, a gifted tenor, was the first to sing the role of Waldemar in Schoenberg's *Gurrelieder.*

Before he was nine years old, Schoenberg began composing little pieces for two violins, which he played with his teacher or with a cousin. A little later, when he acquired a viola-playing classmate, he advanced to the writing of string trios for two violins and viola. His meeting with Oskar Adler (later the famed astrologer and author of *Das Testament der Astrologie*) was a decisive one. Adler encouraged him to learn the cello so that a group of friends could play string quartets. Schoenberg promptly began composing quartets, although he had to wait for the "S" volume of *Meyers Grosses Konversations-Lexikon* (an encyclopaedia that his family was buying on the installment plan) to find out how to construct the sonata-form first movement of such works.

Schoenberg's father died in 1890. To help the family finances, the young man worked as a bank clerk until 1895. During this time he came to know Alexander von Zemlinsky,a rising young composer and conductor of the amateur orchestra Polyhymnia in which Schoenberg played cello. The two became close friends, and Zemlinsky gave Schoenberg instruction in harmony, counterpoint, and composition. This resulted in Schoenberg's first publicly performed work, the *String Quartet in D Major* (1897). Highly influenced by the style of Brahms, the quartet was well received by Viennese audiences during the 1897–98 and 1898–99 concert seasons.

First major works. A great step forward took place in 1899, when Schoenberg composed the string sextet *Verklärte Nacht* (*Transfigured Night*), a highly romantic piece of program music (unified by a nonmusical story or image). It was based on a poem of the same name by Richard Dehmel and was the first piece of program music written for such an ensemble. Its programmatic nature and its harmonies outraged conservative program committees. Consequently, it was not performed until 1903, when it was violently rejected by the public. Since then it has become one of Schoenberg's most popular compositions, both in its original form and in Schoenberg's later versions for string orchestra.

In 1901 Schoenberg decided to move to Berlin, hoping to better his financial position. He married Mathilde von Zemlinsky, his friend's sister, and began working as musical director at the Überbrettl, an intimate artistic cabaret. He wrote many songs for this group, among them, *Nachtwandler* (*Sleepwalker*) for soprano, piccolo, trumpet, snare drum, and piano (published 1969). Schoenberg did not find this position sufficiently rewarding, either artistically or materially. The German composer Richard Strauss helped him to get a job as composition teacher at the Stern Conservatory and used his influence to secure him the Liszt stipend awarded by the Society for German Music. With the encouragement of Strauss, Schoenberg composed his only symphonic poem for large orchestra, *Pelleas und Melisande* (1902–03), after the drama by the Belgian writer Maurice Maeterlinck. Back in Vienna in 1903, Schoenberg became acquainted with the Austrian composer Gustav Mahler, who became one of his strongest supporters.

Schoenberg's next major work was the *String Quartet No. 1 in D Minor,* Opus 7 (1904). The composition's high density of musical texture and its unusual form (the conventional four movements of a "classic" string quartet blended into one vast structure played without interruption for nearly 50 minutes) caused difficulties in comprehension at the work's premiere in 1907. A similar form was used in the more concise *Chamber Symphony in E Major* (1906), a work novel in its choice of instrumental ensemble. Turning away from the "monster" post-Romantic orchestra, Schoenberg wrote for a chamber-like group of 15 instruments.

During these years, Schoenberg's activity as a teacher became increasingly important. The young Austrian composers Alban Berg and Anton Webern began studying with him in 1904; both gained from him the impetus to their notable careers, and Schoenberg, in turn, benefitted greatly from the intellectual stimulation of his loyal disciples. He stated at the beginning of his *Harmonielehre* ("Theory of Harmony"; 1911), "This book I have learned from my pupils." His great gifts as teacher are manifest in this work as well as in his textbooks—*Models for Beginners in Composition* (1942), *Structural Functions of Harmony* (1954), *Preliminary Exercises in Counterpoint* (1963), and *Fundamentals of Musical Composition* (1967).

Evolution from tonality. Until this period all of Schoenberg's works had been strictly tonal; that is, each of them had been in a specific key, centred upon a specific tone. However, as his harmonies and melodies became more complex, tonality became of lesser importance. The process of "transcending" tonality can be observed at the beginning of the last movement of his *Second String Quartet* (1907–08). This work is innovative in another respect, too: it is the first string quartet to include a vocal part. The opening words of the Finale, "Ich fühle Luft von anderen Planeten" ("I feel air from another planet"), by the poet Stefan George, have often been symbolically interpreted in the light of Schoenberg's breakthrough to a new world of sound.

On Feb. 19, 1909, Schoenberg finished his piano piece Opus 11, No. 1, the first composition ever to dispense completely with "tonal" means of organization. Such pieces, in which no one tonal centre exists and in which any harmonic or melodic combination of tones may be sounded without restrictions of any kind, are usually called atonal, although Schoenberg preferred "pantonal." Atonal instrumental compositions are usually quite short; in longer vocal compositions, the text serves as a means of unification. Schoenberg's most important atonal compositions include *Five Orchestral Pieces,* Opus 16 (1909); the monodrama *Erwartung* (*Expectation*), a stage work for soprano and orchestra, Opus 17 (1924); *Pierrot Lunaire,* 21 recitations ("melodramas") with chamber accompaniment, Opus 21 (1912); *Die glückliche Hand* (*The Hand of Fate*), drama with music, Opus 18 (1924); and the unfinished oratorio *Die Jakobsleiter* (begun 1917).

Schoenberg's earlier music was by this time beginning to find recognition. On Feb. 23, 1913, his *Gurrelieder* (begun in 1900) was first performed in Vienna. This gigantic cantata calls for unusually large vocal and orchestral forces. Along with Mahler's *Eighth Symphony* (*Symphony of a Thousand*), the *Gurrelieder* represents the peak of the post-Romantic monumental style. This music was received with wild enthusiasm by the audience, but the embittered Schoenberg could no longer appreciate or acknowledge their response.

In 1911, unable to make a decent living in Vienna, he had moved to Berlin. He remained there until 1915, when, because wartime emergency, he had to report to Vienna for military service. He spent brief periods in the Austrian Army in 1916 and 1917, until he was finally discharged on medical grounds. During the war years he did little composing, partly because of the demands of army service and partly because he was meditating on how to solve the vast structural problems that had been caused by his move away from tonality. He wanted to find a new principle of unification that would help him to control the rich harmonic and melodic resources now at his disposal. Near the end of July 1921, Schoenberg told a pupil, "Today I have discovered something which will assure the supremacy of German music for the next 100 years." This was the method of composition with 12 tones related only to one another. Schoenberg had just begun working on his *Piano Suite,* Opus 25, the first 12-tone piece.

In the 12-tone method, each composition is formed from a special row or series of 12 different tones. This row may be played in its original form, inverted (played upside down), played backward, or played backward *and* inverted. It may also be transposed up or down to any pitch level. All of it, or any part of it, may be sounded successively as a melody or simultaneously as a harmony. In fact, all harmonies and melodies in the piece must be drawn from this row. Although such a method might seem extremely restrictive, this did not prove to be the case. Using this technique, Schoenberg composed what many consider his greatest work, the opera *Moses und Aron* (begun in 1930).

For the rest of his life, Schoenberg continued to use the 12-tone method. Occasionally he returned to traditional tonality, for, as he liked to say, "There is still much good music to be written in C major." Among these later tonal works are the *Suite for String Orchestra* (1934); the *Variations on a Recitative for Organ,* Opus 40 (1940); and the *Theme and Variations for Band,* Opus 43A (1943).

After World War I Schoenberg's music won increasing acclaim, although his invention of the 12-tone method aroused considerable opposition. In 1923 his wife, Mathilde, died after a long illness, and a year later he married Gertrud Kolisch, the sister of the violinist Rudolf Kolisch. His success as a teacher continued to grow. In 1925 he was invited to

direct the master class in musical composition at the Prussian Academy of Arts in Berlin.

It seemed that Schoenberg had reached the peak of his career. His teaching was well received, and he was writing important works: the *Third String Quartet,* Opus 30 (1927); the opera *Von Heute auf Morgen* (*From Today to Tomorrow*), Opus 32 (1928–29, first performed in 1930); *Begleitmusik zu einer Lichtspielszene* (*Accompaniment to a Film Scene*), Opus 34 (1929–30). But political events proved his undoing. The rise of National Socialism in Germany in 1933 led to the extirpation of Jewish influence in all spheres of German cultural life. Schoenberg was dismissed from his post at the academy. He emigrated to the United States via Paris, where he formally returned to the Jewish faith, which he had abandoned in his youth. In November 1933 he took a position at the Malkin Conservatory in Boston, and in 1934 he moved to California, where he spent the remainder of his life, becoming a citizen of the United States in 1941. He held major teaching positions at the University of Southern California (1935–36) and at the University of California at Los Angeles (1936–44).

Schoenberg's major American works show ever-increasing mastery and freedom in the handling of the 12-tone method. Some of the outstanding compositions of his American period are the *Violin Concerto,* Opus 36 (1934–36); the *Fourth String Quartet,* Opus 37 (1936); the *Piano Concerto,* Opus 42 (1942); and the *Fantasia* for violin with piano accompaniment, Opus 47 (1949). He also wrote a number of works of particular Jewish interest, including *Kol Nidre* for mixed chorus, speaker, and orchestra, Opus 39 (1938), and the *Prelude to the Genesis Suite* for orchestra and mixed chorus, Opus 44 (1945).

On July 2, 1951, Hermann Scherchen, the eminent conductor of 20th-century music, conducted the "Dance Around the Gold Calf" from *Moses und Aron* at Darmstadt, W.Ger., as part of the program of the Summer School for New Music. The telegram telling of the great success of this performance was one of the last things to bring Schoenberg pleasure before his death 11 days later. (D.N./Ed.)

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Schoenheimer, Rudolf (b. May 10, 1898, Berlin, Ger.—d. Sept. 11, 1941, New York, N.Y., U.S.), German-born American biochemist whose technique of "tagging" molecules with radioactive isotopes made it possible to trace the paths of organic substances through animals and plants and revolutionized metabolic studies.

Schoenheimer was a graduate in medicine from the University of Berlin (1923) and taught biochemistry at Leipzig and Freiburg until 1933. He then left Germany for Columbia University, where he became an associate of Harold C. Urey, discoverer of deuterium (heavy hydrogen) and investigator of other isotopes. There, in collaboration with David Rittenberg, he used isotopes to label food components. These isotopes could be recognized in the tissues of animals to which they were fed, thus contributing to knowledge of what happened to foodstuffs in metabolism. Schoenheimer is known also for his studies of cholesterol and its relationship to atherosclerosis. At the height of his career, Schoenheimer committed suicide.

Schöffe, in Germany, a lay jurist or assessor assigned primarily to a lower criminal court to make decisions both on points of law and on fact jointly with professional jurists. A *Schöffe* may also sit on a higher court.

Since 1976, in the higher court, two *Schöffen* sit along with three professional jurists. In the lower court, two *Schöffen* and one professional judge hear cases. Although *Schöffen* are considered an important part of the German legal system, many professional jurists, including lawyers as well as judges, tend to believe that their influence is continuing to wane and that they may eventually be abolished because of their alleged tendency to project personal rather than legalistic opinions.

The lay jurists were introduced by Charlemagne in the late 8th century as a permanent feature of the judicial system and in some cases were given the same power as judges to make decisions. Originally the *Schöffen* were not required to have legal training, and by the late 15th century their offices had become hereditary. By the 17th century the *Schöffen* were being replaced by professional judges. A reversion occurred in the 19th century, when the lay system of *Schöffen* was reintroduced as a means of tempering the power of the newly initiated jury system in minor criminal cases. The jury was eliminated in 1924, and the *Schöffen* were removed by the Nazis. Both systems were reinstituted in West Germany in 1950; a law of 1976, however, reduced the number of *Schöffen.*

The *Schöffen* are elected by local councils; government officials, doctors, clergymen, and persons more than 65 years of age may be excluded, while persons under 30 are always excluded.

Schöffer, Nicolas (b. Sept. 6, 1912, Kalocsa, Austria-Hungary [now in Hungary]), Hungarian-born French artist best known for his sculptures employing mechanical movement, light, and sound.

Schöffer studied painting at the School of Fine Arts in Budapest from 1932 to 1935 and then at the École des Beaux-Arts in Paris. He became a French citizen in 1948. Between 1941 and 1951 he held a variety of jobs, including those of foundry worker and hotel porter.

Schöffer's early metal sculptures, from the mid-1940s, reflect the hard-edged, self-consciously "modern" influences of Constructivism and Neoplasticism. The later kinetic works, which are variously concerned with the viewer's experience of space, light, and time, Schöffer christened "spatiodynamic," "luminodynamic," and "chronodynamic." These works characteristically employ rotation devices, sound machines, and screens onto which continually changing patterns of colour and shadow are projected, as, for example, in the spatiodynamic tower at Liège (1961). His work has frequently been used in conjunction with experimental theatre (*e.g.,* "Night of Poetry," 1956–57).

Schöffer, Peter (b. 1425?, Gernsheim, Hesse [Germany]—d. 1502, Mainz [Germany]), German printer who assisted Johannes Gutenberg and later opened his own printing shop.

Schöffer studied in Paris, where he supported himself as a copyist, and then became an apprentice to Gutenberg in Mainz. He entered the printing business as the partner of Gutenberg's creditor, Johann Fust, whose daughter he later married. The best-surviving examples of his craftsmanship are the 1457 Mainz Psalter and the 1462 48-line Bible. The Psalter was the first printed book to give the date and place of printing and the printers' names.

Schöffer cast the first metallic type in matrices and used it for the second edition of the Vulgate Bible. By the time of his death he had printed more than 300 books.

schola cantorum, medieval papal singing school and associated choir, the ancestor of the modern Sistine Choir. According to tradition, the schola cantorum was established by Pope Sylvester I (d. 335) and was reorganized by Pope Gregory I (d. 604), but the first written mention of it dates from the 8th century. The purpose of the schola was to teach both singing techniques and the plainsong repertory, which was then learned by oral tradition. Under Pope Gregory the course of study was said to be nine years. In the gradual standardization of Western church chant, the schola's musicians were a prime influence. Scholae cantorum were also established elsewhere, some becoming major musical centres (*e.g.,* Aix-la-Chapelle [now Aachen, Ger.] under Charlemagne).

Schola Cantorum is also the name of the school established in Paris in 1894 by the composer Vincent d'Indy, the choral conductor Charles Bordes, and the organist Alexandre Guilmant. Intended as a centre of church music, it later developed into a general conservatory, although stressing plainsong in its teaching.

Scholarios, Georgios (Greek Orthodox leader): *see* Gennadios II Scholarios.

scholasticism, the philosophical systems and speculative tendencies of various medieval Christian thinkers who, working on a background of fixed religious dogma, sought to solve anew general philosophical problems (as of faith and reason, will and intellect, realism and nominalism, and the provability of the existence of God), initially under the influence of the mystical and intuitional tradition of patristic philosophy and especially Augustinianism and later under that of Aristotle.

A brief treatment of scholasticism follows. For full treatment, *see* MACROPAEDIA: Philosophical Schools and Doctrines, Western.

In the early Middle Ages the authority of the Church Fathers still remained important, especially that of the Pseudo-Dionysus, with his hierarchically ordered cosmos. (Pseudo-Dionysus wrote under the name of Dionysus the Areopagite—one of St. Paul's converts—around AD 500 in order to clothe his own works in a borrowed authority.) The impact of the controversial theologian Peter Abelard in the 11th century, however, brought logic to the forefront of scholastic philosophy and rendered reliance upon the authority of the Fathers alone inadequate.

For such medieval theologians as Albertus Magnus and Thomas Aquinas, reason assumed an important role in theology, not as the antithesis of faith, but as its supplement. Thus the scholastics made a systematic attempt to map out the field of theology as a science and in so doing developed new treatises on matters that had previously belonged to preaching (*e.g.,* the sacraments). They began to prevail over the more contemplative and monastic schools, which held that theology consisted in wisdom rather than in science. They borrowed freely from the philosophy of Aristotle, which

came to them largely via the Islāmic philosophers Averroës (1126–98) and Avicenna (980–1037). They aimed at a synthesis of learning in which theology surmounted the hierarchy of knowledge.

The primary methods of teaching were the *lectio* (lecture) and the *disputatio* (formal debate), which consisted largely in the presentation and analysis of syllogisms. Although there was fairly general agreement as to method and aim, Scholastics did not always agree among themselves on points of doctrine. Distinct schools of theology emerged, the most influential being those of the Franciscan Duns Scotus, for whom a world created in God's groundless, absolute freedom could exhibit no "necessary reasons," and the Dominican St. Thomas Aquinas, for whom faith, in general, presupposed and therefore required natural reason. The Thomist position tended increasingly to prevail, and Aquinas was eventually declared "common doctor" of the church and considered the repository of sound and orthodox doctrine. His *Summa Theologiae* ("Summary of Theology") became the standard textbook of theology, and the era of the great commentaries on Aquinas began. One of the most famous was that of a 16th-century Dominican, Cardinal Thomas de Vio, commonly known as Cajetan.

The polemical atmosphere of the Reformation and Counter-Reformation introduced a new factor. While Protestant theologians stressed scriptural and patristic authority and despised the Scholastics as logic-chopping obscurantists, Catholic theologians came to rely on the latter more and more heavily. The *Metaphysical Disputations* of the late-16th-century Jesuit Francisco Suárez, however, reveal a concern for the spirit rather than the letter of Scholasticism. Rather than a commentary on Aquinas, his work is an original philosophical treatise inspired by Aquinas and others.

The first author to try to extract a philosophy (apart from theology) from Aquinas was the Dominican John of St. Thomas in the 17th century with his *Cursus Philosophicus,* and this example was much followed. The medieval synthesis was still further fragmented as new treatises were devised on such subjects as ecclesiology, apologetics, moral theology, and cosmology. Nevertheless, the medievals were retained as a point of reference, and these philosophers and theologians saw themselves as the heirs to the Scholastic tradition. The 18th and 19th centuries were a period of decadent Scholasticism. The tradition survived as a form of emasculated Aristotelianism, out of touch with contemporary thought and science; it continued to be taught in Latin, providing what amounted to a memory test for Catholic seminarians.

A Thomist revival was announced and stimulated by Pope Leo XIII's encyclical *Aeterni Patris* (1879); so-called Neoscholasticism became the dominant school in the Roman Catholic universities, although it proved at first incapable of dialogue with contemporary philosophy and played a conservative role in the Modernist crisis of the early years of the 20th century. Subsequently, however, Neoscholasticism and Neothomism earned renewed respect on the basis of the historical scholarship of the French Christian philosopher Étienne Gilson and others, who traced the original contributions of the Scholastics and their influence on subsequent philosophy.

Schollander, Don, byname of DONALD ARTHUR SCHOLLANDER (b. April 30, 1946, Charlotte, N.C., U.S.), first swimmer in history to win four gold medals in a single Olympiad (Tokyo, 1964), in which he also set a world record (4 min 12.2 sec) in the 400-metre freestyle and an Olympic Games record (53.4 sec) in the 100-metre freestyle event (both records subsequently broken); and a member of the U.S. teams that established world records while winning the 400-metre and 800-metre relay races (both records subsequently broken).

A product of the U.S. age-group swimming program and the Santa Clara (Calif.) Swim Club, Schollander was noted for his speed, perfection of stroke, and effortless crawl. He broke several U.S. and world freestyle records in the early 1960s and in 1963 became the first to swim 200 metres in less than 2 minutes, improving the time for this distance in nine record-breaking swims between July 1963 and August 1968. In 1964, prior to the Olympics, he lowered the world 200-metre freestyle standard to 1 min 57.6 sec, and he also broke the world 400-metre freestyle record before reducing it once more in the Olympics. In the 1968 Olympic Games in Mexico City, he won a silver (second-place) medal in the 200-metre freestyle, after setting a world record of 1 min 54.3 sec in the trials for the U.S. team.

Schomberg, Frederick Herman, duke of, original name FRIEDRICH HERMANN VON SCHÖNBERG (b. Dec. 16, 1615, Heidelberg, Palatinate—d. July 1, 1690, Boyne, Ire.), German soldier of fortune, a marshal of France, and an English peer, who fought in the service of various countries in the major European wars between 1634 and 1690.

Schomberg was the son of the Protestant court marshal of Frederick V, elector Palatine, and of Anne, daughter of an English peer, the 5th Lord Dudley. He volunteered under Frederick Henry of Orange in 1633 and, from 1634 to 1637 during the Thirty Years' War, served in the army of Bernard of Saxe-Weimar for campaigns on the upper Rhine. In 1639 he again went to Holland for some years of service.

In 1650 Cardinal Mazarin, in the crisis of the Fronde, secured him and his German infantry for the French royal army that defeated the rebel Marshal de Turenne at the Battle of Rethel (Dec. 15, 1650). Schomberg was appointed *maréchal de camp* on Oct. 28, 1652, after Turenne had changed sides, and was one of Turenne's best officers in the campaigns against the Spaniards and the Prince de Condé.

In 1660 he went to Lisbon to organize a Portuguese army against Spain. After placing Dom Pedro (later Pedro II) in power in a palace revolution in 1668, he returned to his position in the French army, having become naturalized as a Frenchman. During the Dutch War (1672–78) he went to England in 1673 on the invitation of Charles II to form an army for the proposed invasion of Holland, but soon returned to the French Army and was on Louis XIV's staff at the siege and capture of Maastricht (June 1673); in 1675 he was one of eight marshals of France appointed on Turenne's death.

The revocation of the Edict of Nantes (1685) drove Schomberg, a Protestant, from France, but he was welcomed by Frederick William of Brandenburg, "the Great Elector." In 1688 the Elector lent him and a Prussian force to William of Orange (later William III of Great Britain), whom he accompanied to England. He was naturalized as English in April 1689 and in May was created duke of Schomberg (as well as baron of Teyes, earl of Brentford, and marquess of Harwich). He went to Ireland as commander in chief against James II in August 1689 and was killed by some Irish cavalry at the Battle of the Boyne.

Schomburgk, Sir Robert Hermann (b. June 5, 1804, Freyburg am der Unstrut, Saxe-Albertine—d. March 11, 1865, Schöneberg, near Berlin), German-born British explorer and surveyor whose "Schomburgk Line" marked the boundary of British Guiana from 1841 to 1895. He was knighted in 1844.

Schomburgk was educated in Germany, and in 1829 he went to the United States and from there in 1831 visited Anegada, one of the British Virgin Islands. He surveyed it and noted the frequency of the wrecks, particularly of U.S. ships, which occurred upon it. In 1835



Schomburgk, engraving
BBC Hulton Picture Library

the Royal Geographical Society sent Schomburgk to explore British Guiana. On this trip he discovered the giant water lily, *Victoria regia,* and in 1840 produced his *Description of British Guiana.* In 1841 he surveyed the colony and fixed its boundary, being knighted on his return to England in 1844. He continued his geographical surveys as British consul to Santo Domingo (1848), now the Dominican Republic, and to Bangkok (1857) in Siam, now Thailand. His health declining, he retired in December 1864.

Schön Martin: *see* Schongauer, Martin.

Schönbein, Christian Friedrich (b. Oct. 18, 1799, Metzingen, Swabia—d. Aug. 29, 1868, Sauersberg, near Baden-Baden), German chemist who discovered and named ozone (1840) and was the first to describe guncotton (nitrocellulose). His teaching posts included one at Epsom, Eng., before he joined the faculty at the University of Basel, Switz. (1828), where he was appointed professor of chemistry and physics in 1835.

His discovery of guncotton began with an accident in his wife's kitchen. When he used her cotton apron to wipe up some spilled nitric and sulfuric acid, it disintegrated, leading to his work on nitrocellulose. He also did research on the passivity of iron, the properties of hydrogen peroxide, and catalysis. In his lifetime he produced more than 360 scientific papers.

Consult the INDEX *first*

Schönbrunn, Schloss, Rococo-style 1,440-room summer palace of the Habsburgs in Vienna. Johann Bernhard Fischer von Erlach's first design for the building, meant to rival France's Palace of Versailles, was done in 1690. A second, somewhat less ornate, plan, however, dating from 1695–96 was adopted, and the palace was finished by 1711.

It was first modified in 1737 by Johann's son Josef Emanuel Fischer von Erlach and again in 1744 by Nikolaus Pacassi. The formal gardens were originally laid out *c.* 1705–06 by Jean-Nicolas Jadot de Ville-Issey and from 1765 were redesigned by Ferdinand von Hohenberg. Schönbrunn Tiergarten, perhaps the oldest zoo in Europe, was founded within the grounds in 1752. The entire park complex, open to the public since 1918, covers more than 2 sq km (¾ sq mi).

Schönbrunn, Treaty of (Oct. 14, 1809), agreement signed at the Schloss Schönbrunn

in Vienna after Austria's premature war of liberation against Napoleon collapsed with its defeat at Wagram and its failure to get the Prussian support it had expected. Austria lost about 32,000 square miles (83,000 square kilometres) of territory with approximately 3,500,000 inhabitants.

Under the terms of the treaty, France received part of Croatia, Fiume, Istria, and Trieste and most of Carinthia and Carniola; Russia, having backed Napoleon, received the Tarnopol section of East Galicia; the Grand Duchy of Warsaw obtained West Galicia, with Kraków and Lublin; and Bavaria acquired Salzburg, Berchtesgaden, the Innviertel, and half of the Hausruckviertel. Austria also agreed to pay a large indemnity, reduce its army to 150,000 men, and break diplomatic and trade relations with Britain. The treaty was followed by a short period of close ties between France and Austria.

Schöneberg, district of Berlin, Germany. The original 13th-century peasant settlement of Alt-Schöneberg was merged in 1874 with Neu-Schöneberg, which was founded by Frederick the Great in 1750 to accommodate weavers from Bohemia, now in Czechoslovakia.

The present district was formed in 1920 by uniting Schöneberg with Friedenau. The Supreme Court Building on the Potsdamer Strasse became in 1945 the seat of the Allied Control Council, and in 1948 the town hall became the administrative centre of West Berlin. In the belfry hangs the *Freiheitsglocke* (Freedom Bell), a replica of the U.S. Liberty Bell donated to West Berlin in 1951. Industries include printing, brewing, and the production of precision instruments, optical goods, and telecommunications equipment. Pop. (1986 est.) 134,610.

Schönemann, Johann Friedrich (b. Oct. 21, 1704, Crossen, Prussia—d. March 16, 1782, Schwerin, Mecklenburg), actor-manager who was influential in the development of Germany's public theatre.

Schönemann made his professional debut in 1725 with a traveling harlequin troupe and in 1730 joined Caroline Neuber's theatre company, where he was admired for his comedic abilities. In 1740 Schönemann (who had already broken with Neuber) and his wife, actress Anna Rachel Weigler, formed a company of their own, which toured at first but after 1751 played chiefly in Schwerin and Hamburg. Although Schönemann concentrated on French plays such as those of Corneille, Voltaire, and Molière, the theatre gained great influence through its staging and acting techniques. Schönemann never overcame the stiff acting style of traditional German drama, but his shrewd management attracted and encouraged the more natural acting techniques of such stars as Konrad Ekhof, Sophie Schröder, and Konrad Ackermann.

Later, Schönemann neglected the company for an unsuccessful career in horse trading, finally abandoning the theatre in 1757. He spent the last years of his life as an impoverished court retainer.

Schönerer, Georg, Ritter von (knight of) (b. July 17, 1842, Vienna—d. Aug. 14, 1921, Rosenau bei Zwettl, Austria), Austrian political extremist, founder of the Pan-German Party (1885). He was a virulent anti-Semite and was perhaps the best known spokesman for popular antidemocratic sentiments in the late empire.

A left-wing Liberal when first elected to the Reichsrat (federal parliament) in 1873, Schönerer gradually developed what was to be his characteristic Prussophile, anti-Semitic position. He eventually acquired a strong personal following, especially among the Viennese lower middle class and the fraternities (*Burschenschaften*). His Pan-German Party languished after his imprisonment for an assault on a newspaper office (1888) but quickly revived following his reelection to parliament in 1897. Schönerer led the attacks upon the pro-Czech language ordinances of that year and was popularly credited with having driven the prime minister, Count Kasimir Badeni, from office. He became closely associated with the anti-Catholic *Los von Rom* movement after 1898, though more for nationalistic than for religious reasons. As a national political figure, he reached the peak of his influence in 1901, when 21 Pan-Germans were returned to the Reichsrat; his violent temperament, however, so disrupted the party that by 1907 it had all but disappeared from Austrian parliamentary politics. This did not diminish his ideological influence.

Schongauer, Martin, byname SCHÖN MARTIN, or HIPSCH (HÜBSCH) MARTIN (German: "Beautiful Martin") (b. 1445/50, Colmar, Alsace—d. Feb. 2, 1491, Breisach, Baden), German artist, considered one of the finest engravers of the 15th century.

Schongauer was the son of Caspar Schongauer, a goldsmith of Augsburg. In 1465 he registered at the University of Leipzig but apparently remained there only for a short time. It is not clear whether he was there as a student or as a visiting artist enjoying the university's protection from interference by the local painters' guild. That he was a student appears more likely because no work of his has ever been discovered that could with certainty be dated earlier than 1469, and because the wide distribution of his work did not get under way until the late 1470s. In 1469 his name is mentioned for the first time in the Colmar register of property. The same date appears also on three of his early drawings, but these dates and signatures were added by Albrecht Dürer, who may have received them from Schongauer's brothers when he arrived in Colmar the year after Martin's death. In 1488 Schongauer left Colmar and moved to Breisach, in Baden, where he died.

According to contemporary sources, Schongauer was a prolific painter whose panels were sought in many countries. Few paintings by his hand survive. Among these, the "Madonna in a Rose Garden" (1473), altarpiece of the Church of Saint-Martin in Colmar, ranks first in importance. This work combines monumentality with tenderness, approaching the manner of the great Flemish painter Rogier van der Weyden, by whom Schongauer was profoundly influenced. Other paintings by Schongauer include two wings of the Orliac altar (Colmar Museum); six small panels among which the "Nativity" (Berlin) and the "Holy Family" (Vienna) are the most mature; and finally the murals of the "Last Judgment" in the cathedral of Breisach, probably his last work (uncovered in 1932).

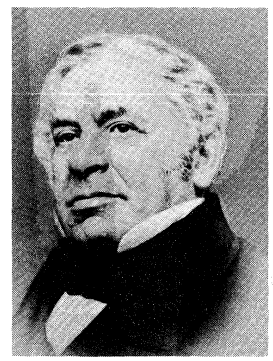
It is as an engraver that Schongauer stands without rival in northern Europe in his time. He was influenced by and may have studied with the master engraver who signed his work simply "E.S." (*see* Master E.S.). Schongauer's engraved work, consisting of about 115 plates, all signed with his monogram, is a final manifestation of the late Gothic spirit. Technically he brought the art of engraving to maturity by expanding its range of contrasts and textures, thus introducing a painter's viewpoint into an art that had been primarily the domain of the goldsmith. The larger and more elaborate engravings, such as the "Temptation of St. Anthony" or the "Death of the Virgin," belong to his earlier period. In his later years he preferred smaller plates, even for such subjects as the "Passion of Christ," a set of 12 engravings. Some of his most eloquent plates are single figures, such as the "Madonna in a Courtyard" and "St. Sebastian." Within the diversity of trends in German art in this period, Schongauer represents the most idealistic and aristocratic element, devoting his art mainly to Christian subjects and shunning the often bawdy realism of some of his fellow engravers. The grace of his work became proverbial even in his lifetime and gave rise to such names as "Hübsch ["charming"] Martin" and "Schön Martin" ("Bel Martino" in Italian), whereby the German adjective *schön* ("beautiful") often became confused with the artist's family name.

Schönherr, Karl (b. Feb. 24, 1867, Axams, Austria—d. March 15, 1943, Vienna), Austrian writer known for his simple, robust plays dealing with the political and religious problems of peasant life.

Schönherr was the son of a country schoolmaster and became a practicing physician in Vienna. His first publications (1895) were unassuming dialect poems and short stories, but in 1897 he wrote a play, *Der Judas von Tirol* (rewritten 1927; "The Judas of the Tirol"), in which the Judas of a rural passion play becomes a real-life betrayer. *Glaube und Heimat* (1910; "Faith and Homeland"), often considered his best play, concerns peasant resistance to the Counter-Reformation of the church.

Acknowledging Norwegian dramatist Henrik Ibsen as his master, Schönherr stood midway between realism and symbolism. Using few characters, his dramas have the directness of fate, as events inexorably push his characters through successions of crises. Other important works with peasant themes include *Die Bildschnitzer* (1900; "The Woodcarvers"), *Erde* (1907; "Earth"), and *Volk in Not* (1915; "A People in Distress"). Schönherr also wrote several plays about the problems of the medical profession and of the middle class; the best include *Vivat academia* (1922), *Es* (1923; "It"), and *Die Hungerblockade* (1925; "The Hunger Blockade"). His stories and sketches are concerned with similar themes. His works were collected in *Gesammelte Werke* (1927). Most of his plays were first produced in the Burgtheater and in the Deutsches Volkstheater in Vienna.

Schönlein, Johann Lukas (b. Nov. 30, 1793, Bamberg, Ger.—d. Jan. 23, 1864, Bamberg), German physician whose attempts to establish medicine as a natural science helped create modern methods of the teaching and practice of clinical medicine.



Schönlein, *c.* 1860
Archiv fur Kunst und Geschichte, Berlin

A professor of medicine at the universities of Würzburg (1824–33), Zürich (1833–40), and Berlin (1840–59) Schönlein was the first to use the microscope in conjunction with chemical analyses of urine and blood in the diagnosis of disease. He found and described (1839) the fungus (*Achorion schonleinii*) responsible for the skin disease favus and coined the term *hemophilia* (1828).

Schönlein was the first to describe the minute hemorrhages of the skin occurring in cases of anaphylactoid (allergic) purpura (Schön-

lein–Henoch purpura) and purpura rheumatica (Schönlein's disease; 1837), characterized by the appearance on the skin of small purple spots, by swelling, pain, and tenderness of joints, and frequently by swelling of the hands, feet, or eyelids.

Schönwald, Albert (musician): *see* Siklós, Albert.

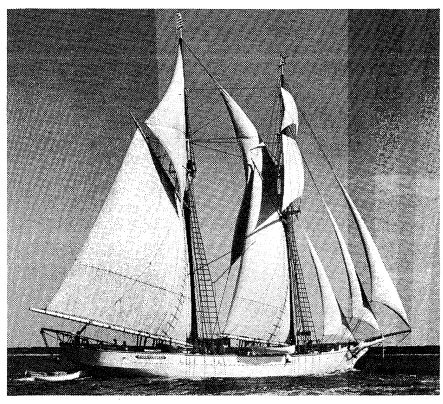
School of ———: *see under* substantive word (*e.g.*, Antioch, School of).

Schoolcraft, Henry Rowe (b. March 28, 1793, Albany County, N.Y., U.S.—d. Dec. 10, 1864, Washington, D.C.), American explorer and ethnologist noted for his discovery of the source of the Mississippi River and for his writings on Indians of the North American plains.

Schoolcraft's initial contact with the frontier came during a mineralogical trip through present Missouri and Arkansas (1817–18). He next served as topographer on an expedition to the upper Mississippi and Lake Superior region (1820) and published a journal of his travels in 1821. His experience among the Indians led to his appointment as a federal agent to the Indian tribes of the Lake Superior region. There in 1822 he took a bride who was part Ojibwa, and her tribe became the subject of his special study. In 1832 he again explored the upper reaches of the Mississippi River and located its source at Lake Itasca in present Minnesota. His *Narrative of an Expedition . . . to Itasca Lake . . .* (1834) was reissued, with an account of the 1820 expedition, in *Summary Narrative* (1855).

As superintendent of Indian affairs for Michigan (1836–41), Schoolcraft concluded a treaty with the Ojibwa (1836) in which the tribe ceded much of northern Michigan to the United States. His chief contribution to ethnology is to be found in his *Historical and Statistical Information Respecting the History, Condition, and Prospects of the Indian Tribes of the United States*, 6 vol. (1851–57). F. Nichols' *Index to Schoolcraft's "Indian Tribes of the United States"* (1954) greatly enhanced the value of the original volumes. Another important work was Schoolcraft's *Algic Researches* (1839; 1856 ed., *The Myth of Hiawatha*), the basis of Henry Wadsworth Longfellow's *Song of Hiawatha.*

schooner, a sailing ship rigged with fore-and-aft sails on its two or more masts. To the foremast there may also be rigged one or more square topsails or, more commonly,



The *Shenandoah,* two-masted schooner
Ted Heidenreich Jr.

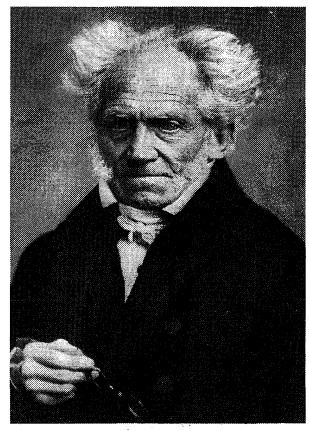
one or more jib sails or Bermuda sails (triangular sails extending forward to the bowsprit or jibboom). Though probably developing out of a Dutch design of the 17th century, the first genuine schooner was developed in the British North American colonies, probably at Gloucester, Massachusetts, in 1713, by a shipbuilder named Andrew Robinson.

Although ships with square-rigged sails are excellent for long voyages before trade winds, they are poor for coastal sailing, where all varieties of winds must be dealt with. Fore-and-afters, or schooners, handle better in coastal winds, have shallower drafts for shallow waters, and require a smaller crew in proportion to their size. By the end of the 18th century the schooner had become the most important North American ship, used for the coastal trade and for fishing, as on the Grand Banks, off Newfoundland; and soon after 1800 the schooner caught the attention of European shipwrights, who built versions of their own. The fore-and-after became popular all over the world. In the United States, where speed became a premium in the China trade and the California gold trade in the mid-19th century, the schooner design was married to that of the old full-rigged, three-masted merchantman, resulting in the famous clipper ships.

Schooreel, Jan van, Schooreel also spelled SCHOOREL, or SCHOORL: *see* Scorel, Jan van.

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Schopenhauer, Arthur (b. Feb. 22, 1788, Danzig, Prussia [now Gdańsk, Pol.]—d. Sept. 21, 1860, Frankfurt am Main), German philosopher, often called the "philosopher of pessimism," who was primarily important as the exponent of a metaphysical doctrine of the will in immediate reaction against Hegelian idealism. His writings influenced later existential philosophy and Freudian psychology.



Schopenhauer, 1855
Archiv fur Kunst und Geschichte, West Berlin

Early life and education. Schopenhauer was the son of a wealthy merchant, Heinrich Floris Schopenhauer, and his wife, Johanna, who later became famous for her novels, essays, and travelogues. In 1793, when Danzig came under Prussian sovereignty, they moved to the free city of Hamburg. Arthur enjoyed a gentlemanly private education. He then attended a private business school, where he became acquainted with the spirit of the Enlightenment and was exposed to a Pietistic attitude sensitive to the plight of man. In 1803 he accompanied his parents for a year on an extensive journey through Belgium, England, France, Switzerland, and Austria.

The sudden death of his father in April 1805 precipitated a decisive change in his life. His mother and his young sister Adele moved to Weimar, where his mother succeeded in joining the social circle of the poets J.W. von Goethe and Christoph Martin Wieland (often called the German Voltaire). Arthur himself had to remain in Hamburg for more than a year, yet with more freedom to engage in the arts and sciences. In May 1807 he was finally able to leave Hamburg. During the next two years, spent in Gotha and Weimar, he acquired the necessary academic preparation for attendance at a university.

In the fall of 1809 he matriculated as a student of medicine at the University of Göttingen and mainly attended lectures on the natural sciences. As early as his second semester, however, he transferred to the humanities, concentrating first on the study of Plato and Immanuel Kant. From 1811 to 1813 he attended the University of Berlin (where he heard such philosophers as J.G. Fichte and Friedrich Schleiermacher, with little appreciation); and in Rudolstadt, during the summer of 1813, he finished his dissertation, which earned him the doctor of philosophy degree from the University of Jena.

Active maturity. The following winter (1813–14) he spent in Weimar, in intimate association with Goethe, with whom he discussed various philosophical topics. In that same winter the Orientalist Friedrich Majer, a disciple of Johann Gottfried Herder, introduced him to the teachings of Indian antiquity—the philosophy of Vedānta and the mysticism of the Vedas (Hindu scriptures). Later, Schopenhauer considered that the *Upaniṣads* (philosophic Vedas), together with Plato and Kant, constituted the foundation on which he erected his own philosophical system.

In May 1814 he left his beloved Weimar after a quarrel with his mother over her frivolous way of life, of which he disapproved. He then lived in Dresden until 1818, associating occasionally with a group of writers for the *Dresdener Abendzeitung* ("Dresden Evening Newspaper"). Schopenhauer finished his treatise *Über das Sehn und die Farben* (1816; "On Vision and Colours"), supporting Goethe against Isaac Newton.

His next three years were dedicated exclusively to the preparation and composition of his main work, *Die Welt als Wille und Vorstellung* (1819; *The World as Will and Idea*). The fundamental idea of this work—which is condensed into a short formula in the title itself—is developed in four books composed of two comprehensive series of reflections that include successively the theory of knowledge and the philosophy of nature, aesthetics, and ethics.

The first book begins with Kant. The world is my representation, says Schopenhauer. It is only comprehensible with the aid of the constructs of man's intellect—space, time, and causality. But these constructs show the world only as appearance, as a multiplicity of things next to and following one another—not as the thing in itself, which Kant considered to be unknowable. The second book advances to a consideration of the essences of the concepts presented. Of all the things in the world, only one is presented to a person in two ways: he knows himself externally as body or as appearance, and he knows himself internally as part of the primary essence of all things, as will. The will is the thing in itself; it is unitary, unfathomable, unchangeable, beyond space and time, without causes and purposes. In the world of appearances, it is reflected in an ascending series of realizations. From the blind impulses in the forces of inorganic nature, through organic nature (plants and animals) to the rationally guided actions of men, an enormous chain of restless desires, agitations, and drives stretch forth—a continual struggle of the higher forms against the lower, an eternally aimless and insatiable striving, inseparably united with misery and misfortune. At the end, however, stands death, the great reproof that the will-to-live receives, posing the question to each single person: Have you had enough?

Whereas the first two books present the will in an affirmative mode, the last two, dealing

with aesthetics and ethics, surpass them by pointing to the negation of the will as a possible liberation. Evoking as their leading figures the genius and the saint, who illustrate this negation, these books present the "pessimistic" world view that values nonbeing more highly than being. The arts summon man to a willless way of viewing things, in which the play of the passions ceases. To the succession of levels achieved by the realizations of the will corresponds a gradation of levels in the arts, from the lowest—the art of building (architecture)—through the art of poetry to the highest of arts—music. But the arts liberate a person only momentarily from the service of the will. A genuine liberation results only from breaking through the bounds of individuality imposed by the ego. Whoever feels acts of compassion, selflessness, and human kindness and feels the suffering of other beings as his own is on the way to the abnegation of the will to life, achieved by the saints of all peoples and times in asceticism. Schopenhauer's anthropology and sociology do not, in the manner of Hegel, commence with the state or with the community; they focus upon man—patient, suffering man who toils by himself—and show him certain possibilities of standing his ground and of living together with others.

The book marked the summit of Schopenhauer's thought. In the many years thereafter, no further development of his philosophy occurred, no inner struggles or changes, no critical reorganization of basic thoughts. From then onward, his work consisted merely of more detailed exposition, clarification, and affirmation.

In March 1820, after a lengthy first tour of Italy and a triumphant dispute with Hegel, he qualified to lecture at the University of Berlin. Though he remained a member of the university for 24 semesters, only his first lecture was actually held; for he had scheduled (and continued to schedule) his lectures at the same hour when Hegel lectured to a large and ever-growing audience. Clearly, he could not successfully challenge a persistently advancing philosophy. Even his book received scant attention. For a second time Schopenhauer went on a year-long trip to Italy, and this was followed by a year of illness in Munich. In May 1825 he made one last attempt in Berlin, but in vain. He now occupied himself with secondary works, primarily translations.

Scholarly retirement in Frankfurt. During his remaining 28 years, he lived in Frankfurt, which he felt to be free from the threat of cholera, and left the city only for brief interludes. He had finally renounced his career as a university professor and lived henceforth as a recluse, totally absorbed in his studies (especially in the natural sciences) and his writings. His life now took on the shape that posterity first came to know: the measured uniformity of the days; the strict, ascetic life-style modeled after Kant; the old-fashioned attire; the tendency to gesticulative soliloquy.

His leisure, though, was not idle. In 1836, after 19 years of "silent indignation," he published his short treatise *Über den Willen in der Natur* (*On the Will in Nature*), which skillfully employed the queries and findings of the rapidly expanding natural sciences in support of his theory of the will. The preface for the first time openly expressed his devastating verdict on the "charlatan" Hegel and his clique. He also published essays.

The second edition of his main work (1844), which included an additional volume, failed to break what he called "the resistance of a dull world." The little weight that Schopenhauer's name carried became evident when three publishers rejected his latest work. Finally, a rather obscure Berlin bookseller accepted the manuscript without remuneration. In this book, which brought the beginning of worldwide recognition, Schopenhauer turned to significant topics hitherto not treated individually within the framework of his writings: the work of six years yielded the essays and comments compiled in two volumes under the title *Parerga und Paralipomena* (1851). The *Parerga* ("Minor Works") include fragments concerning the history of philosophy; the famous treatise "Über die Universitäts-Philosophie"; the enigmatically profound "Transzendente Spekulation über die anscheinende Absichtlichkeit im Schicksale des Einzelnen" ("Transcendent Speculation on the Apparent Premeditation in Personal Fate"); the "Versuch über das Geistersehn und was damit zusammenhängt" ("Essay on Ghost-seeing and Its Related Aspects")—the first investigation, classification, and critical reflection concerning parapsychology; and the "Aphorismen zur Lebensweisheit" ("Aphorisms on Practical Wisdom"), a serene and brilliant account garnered from his long life. The *Paralipomena* ("Remnants"), or as Schopenhauer called them "separate, yet systematically ordered thoughts on various subjects," included essays on writing and style, on women, on education, on noise and sound, and on numerous other topics.

During the last years of his life, he added the finishing touches to most of his works. Even a third edition of his main work, containing an exultant preface, appeared in 1859 and, in 1860, a second edition of his *Ethics*. Soon after Schopenhauer's sudden and painless death, Julius Frauenstädt published new and enlarged editions, with many handwritten additions, of the *Parerga and Paralipomena* (1862), *On the Fourfold Root* (1864), the essay *On the Will in Nature* (1867), the treatise on colours (1870), and finally even a fourth edition of his main work (1873). Later that same year Frauenstädt published the first complete edition of his works in six volumes.

Influence. During this time, the actual impact and influence of Schopenhauer began to spread. By turning away from spirit and reason to the powers of intuition, creativity, and the irrational, his thought has affected—partly via Nietzsche—the ideas and methods of vitalism, of life philosophy, of Existential philosophy, and of anthropology. Through his disciple Julius Bahnsen and through Eduard von Hartmann's philosophy of the unconscious, the connection to modern psychology and to Sigmund Freud and his school can be established. The philosophy of history of Jacob Burckhardt, a Swiss cultural historian, also proceeds from Schopenhauer. Within the German cultural realm, Schopenhauer's influence on music and literature brings to mind such diverse names as Richard Wagner, Hans Pfitzner, Wilhelm Busch, Gerhart Hauptmann, Frank Wedekind, and Thomas Mann. Since 1911 the Schopenhauer Society in Frankfurt am Main has been dedicated to the study, exposition, and dissemination of Schopenhauer's philosophy. (Ar.Hü./Ed.)

MAJOR WORKS. *Über die vierfache Wurzel des Satzes vom zureichenden Grunde* (1813, reissued 1847; *On the Fourfold Root of the Principle of Sufficient Reason,* 1889); *Über das Sehn und die Farben* (1816, rev. 1854 after Latin adaptation, *Commentatio Exponens Theoriam Colorum Physiologicam, Eandemque primariam,* 1830); *Die Welt als Wille und Vorstellung: vier Bücher, nebst einem Anhange der die Kritik der Kantischen Philosophie enthält* (1819; augmented editions 1844 and 1859; *The World As Will and Idea,* 3 vol., 1883–86; *The World As Will and Representation,* 2 vol., 1958); *Über die Freiheit des menschlichen Willens* and *Über das Fundament der Moral,* published together as *Die beiden Grundprobleme der Ethik* (1841; *The Basis of Morality,* 1903, 1965; first section, *On the Freedom of the Will,* 1960); *Parerga und Paralipomena,* 2 vol. (1851; selections trans. as *Religion: A Dialogue,* 1889; *The Wisdom of Life,* 1890; *Counsels and Maxims,* 1890; *Studies in Pessimism,* 1891; *The Art of Literature,* 1891; *Essays from the Parerga and Paralipomena,* 1951). *Der handschriftliche Nachlass* ("Manuscript Remains"), selections 1864 and 1891–93, critical edition (vol. 1–3, 5, 1966–70; vol. 4 in prep.), the first complete edition of the *Nachlass* manuscripts, including the marginal inscriptions in Schopenhauer's private library; trans. *Baltasar Gracians Hand-Orakel und Kunst der Weltklugheit* (many German editions).

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Schorel, Jan van, Schorel also spelled SCHOREEL: *see* Scorel, Jan van.

schorl, a black, iron-containing mineral of the tourmaline (*q.v.*) family.

schorlomite, a titanium-rich variety of the mineral andradite (*q.v.*).

schottische, social folk dance for couples, possibly Scottish or German in origin. It became a popular ballroom dance in the 19th century in Europe and the Americas, and it appears in many folk-dance traditions, including the Scottish, Scandinavian, and Mexican.



Schottische, engraving, 1886
Culver Pictures

The step pattern common to the numerous variations is three brisk steps and a hop. Commonly, couples circle around the room, promenading forward, turning round each other, or varying the dance with additional figures. The music is in $\frac{2}{4}$ or $\frac{4}{4}$ time.

Schottky effect, increase in the discharge of electrons from the surface of a heated material

by application of an electric field that reduces the value of the energy required for electron emission. The minimum energy required for an electron to escape the surface of a specific material, called the work function, is supplied by the heat. A very weak electric field may be applied that simply sweeps the already emitted electrons away from the surface of the material. When the field is increased, a point is reached for quite moderate fields at which the value of the work function itself is lowered. As the applied field (voltage) is further increased, the work function continues to decrease, so that the electron emission current continues to increase. At very high values of the applied field, however, the electron emission undergoes an excessive increase because of the onset of a different type of emission, called high-field emission or, simply, field emission.

Schouten Islands, Indonesian KEPULAUAN SCHOUTEN, formerly MISORE ISLANDS, archipelago in the Pacific Ocean across the entrance to Teluk (bay) Cenderawasih, off the northern coast of Irian Jaya *propinsi* (West New Guinea province), Indonesia. The first European sighting of the group was by the Dutch navigator Willem Corneliszoon Schouten. The chief islands are Biak, Supiori, and Numfoor. The town of Biak, on the southern coast of Biak, is the main settlement and administrative centre. The islands, particularly Numfoor and Biak, are among the most densely populated areas of Irian Jaya.

This group should not be confused with another island group of the same name, also off the northern coast of New Guinea but belonging to Papua New Guinea.

Schouwburg, first permanent theatre in Amsterdam, built on the Keizergracht ("Emperor's Canal") in 1637 by Dutch architect Jacob van Campen. It opened on Jan. 3, 1638, with a production of *Gysbrecht van Aemstel*, a historical tragedy about Amsterdam by Joost van den Vondel; the play is still performed annually in The Netherlands. The stage, raised about seven feet above the floor, had no proscenium arch or front curtain. A permanent, two-level stage facade consisted of pillars between which were set painted flat panels to indicate different settings. Two balcony stages were positioned over the side pillars. The elliptical auditorium was provided with two tiers of boxes and an upper gallery with a sloped floor and rows of benches. The flat timber roof supported a barrel vault.

In 1664–65 the old theatre was demolished and a new one built by Jan Vos in the Italian Baroque style with a proscenium and an elaborate system of wings, traps, flies, and machines. It was closed by the Puritans between 1747 and 1749 and was completely destroyed by fire in 1772. A new Schouwburg was built by V.E. Witte at a location near the city walls on the Leidseplein in 1774. It was in use until 1890, when it, too, burned to the ground.

Schoyffelin, Hans Leonhard: *see* Schäuffelein, Hans Leonhard.

schreibersite, meteoritic mineral of iron and nickel phosphide [$(FeNi)_3P$], which is present in all iron meteorites. It often is found in plates and as shells around troilite nodules.

Rodlike schreibersite is called rhabdite and was once thought to be a separate species. The crystals of both varieties belong to the tetragonal system. For detailed physical properties, *see* native element (table).

Schreiner, Olive (Emilie Albertina), pseudonym RALPH IRON (b. March 24, 1855, Wittebergen, Cape Colony, S.Af.—d. Dec. 11, 1920, Cape Town), writer and crusader, perhaps one of the most unusual personalities ever to emerge from southern Africa. She had a powerful intellect, advanced and passionately held views on politics and society, and great vitality, somewhat impaired by asthma and severe depressions. Her brother William Philip Schreiner (*q.v.*) was prime minister of Cape Colony from 1899 to 1902.

Although Schreiner had no formal education, she read widely and was taught by her formidable mother. From early childhood she had an active fantasy life. From 1874 until 1881 (when she went to England, hoping to study medicine) she earned her living as a governess; during this time she wrote two semiautobiographical novels, *Undine* (published 1928) and *The Story of an African Farm* (1883), and began *From Man to Man* (1926), at which she worked intermittently for 40 years but never finished.

The Story of an African Farm was an immense and immediate success in Europe and North America, bringing its author, though published pseudonymously, many distinguished admirers, including W.E. Gladstone, and some intimate friends, including Havelock Ellis. The book's originality, assured handling of narrative and description, exotic background, and vigorous expression of unconventional views on religion and marriage gave it wide appeal.

Notable among her other works are an attack on the activities of Cecil Rhodes and his associates, *Trooper Peter Halkett of Mashonaland* (1897), and a widely acclaimed "bible" of the Women's Movement, *Woman and Labour* (1911).

Schreiner, William Philip (b. Aug. 30, 1857, Wittebergen, Cape Colony—d. June 28, 1919, Llandrindod Wells, Radnor, Wales), South African politician who was prime minister of Cape Colony at the outbreak of the South African War (1899–1902); he was the younger brother of author and political activist Olive Schreiner (*q.v.*). A moderate politician, he had tried to prevent the war and later was a champion of African civil rights.

Schreiner became a member of the Cape Colony Parliament in 1893 and was a minister in the government of Cecil Rhodes in 1893 and 1894–96. Elected prime minister in 1898, he first sought a peaceful settlement of differences between the British and the Boers and then tried to keep Cape Colony neutral in the war that followed. His government fell in 1900. Although he was elected a delegate to the South African constitutional convention in 1909, Schreiner did not attend, choosing rather to defend in court an African chief unjustly accused of rebellion. He opposed the draft constitution because it did not guarantee the franchise to Africans. Subsequently he was appointed to the Senate of the newly formed Union of South Africa as a representative of non-whites. In 1914 he left the Senate to serve as the Union's high commissioner in London.

Schrieffer, John Robert (b. May 31, 1931, Oak Park, Ill., U.S.), American physicist and winner, with John Bardeen and Leon N. Cooper, of the 1972 Nobel Prize for Physics for developing the BCS theory (for their initials), the first successful microscopic theory of superconductivity.

Educated at the Massachusetts Institute of Technology, Cambridge, and the University of Illinois, Urbana, where he received his Ph.D. in 1957, Schrieffer was a young graduate student when he helped explain why metals lose electrical resistance at very low temperatures. His principal contribution to the BCS theory came to him one day as he was riding the subway.

Schrieffer taught at the University of Chicago (1957–59) and the University of Illinois (1959–62) before joining the faculty of the University of Pennsylvania, Philadelphia, where in 1964 he was named Mary Amanda Wood professor of physics. Schrieffer was Andrew D. White professor at large at Cornell University (1969–75) and from 1980 professor of physics at the University of California at Santa Barbara. He published *Theory of Superconductivity* in 1964 and was awarded the Comstock Prize of the National Academy of Sciences in 1968. He also received the John Ericsson Medal of the American Society of Swedish Engineers, and he is a member of the American Academy of Arts and Sciences.

Schröder, Friedrich Ludwig (b. Nov. 3, 1744, Schwerin, Mecklenburg—d. Sept. 3, 1816, Rellingen), German actor, theatrical manager, and playwright, the first to bring Shakespeare to the German stage.

Schröder began his career as a child actor in the company of his stepfather, Konrad Ernst Ackermann, learning what he could from Ackermann, who was a remarkable comedian, and from his mother, actress Sophie Schröder. His decisive inspiration, however, came from Konrad Ekhof (*q.v.*), who had joined Ackermann's company in 1764.

In 1771 Schröder became the manager of the Hamburg National Theatre, where he remained for nine years. Highlights of his first Hamburg period were his Shakespearean productions, in which he played the ghost of Hamlet's father, Hamlet, Iago, Shylock, Lear, Falstaff, and Macbeth. He established himself as the leading actor of the period. He also presented to Hamburg audiences the early dramas of Goethe—*Götz von Berlichingen*, *Clavigo*, and *Stella*—and the plays of such other Shakespeare-inspired Sturm und Drang dramatists as Friedrich Maximilian von Klinger and Heinrich Leopold Wagner. From England he imported Edward Moore's *Gamester* and George Lillo's *London Merchant*.

Schröder left Hamburg in 1780 and spent four years at the Vienna Burgtheater, where he created the bases of the ensemble performing for which that company later became known. From 1785 to 1798 he was again director of the Hamburg theatre, where he produced many of the plays he had written in Vienna.

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Schröder-Devrient, Wilhelmine (b. Dec. 6, 1804, Hamburg—d. Jan. 26, 1860, Coburg, Ger.), German soprano celebrated for her portrayal of the great dramatic roles of German opera.

The daughter of a celebrated baritone and a renowned actress, Schröder-Devrient received early training in movement and diction from her parents and appeared in both ballet and children's roles in the theatre as a child. She made her operatic debut in Vienna in 1821 as Pamina in Wolfgang Amadeus Mozart's *Die Zauberflöte*. In the following year Carl Maria von Weber chose her to create the role of Agathe in his *Der Freischütz* and Ludwig van Beethoven asked her to appear as Leonore in the Vienna revival of his *Fidelio*. Both roles brought her tremendous acclaim. Indeed, she is often credited with much of the success of the revival of *Fidelio*, which had not been well received in its premiere.

Richard Wagner, who saw her as Leonore, felt that she had awakened in him his vocation as a composer. She later created the roles of Adriano in *Rienzi*, Senta in *Die fliegende Holländer*, and Venus in *Tannhäuser* for him. From 1822 to 1847 she sang primarily in Dresden, Saxony, but also appeared in Berlin, Weimar (Saxe-Weimar-Eisenach), Paris, and London, achieving her greatest successes in highly dramatic roles such as Donna Anna in Mozart's *Don Giovanni*, Weber's *Euryanthe*, Vincenzo Bellini's *Norma*, and Leonore in *Fidelio*. Her performances in art song recitals and concerts were much admired. Her last operatic appearance was at Riga, Latvia, Russian

Empire, in 1847, and her last known concerts were in Germany in 1856.

Schrödinger, Erwin (b. Aug. 12, 1887, Vienna—d. Jan. 4, 1961, Vienna), Austrian theoretical physicist who contributed to the wave theory of matter and to other fundamentals of



Schrödinger
Foto IWAN

quantum mechanics. He shared the 1933 Nobel Prize for Physics with the British physicist P.A.M. Dirac.

Schrödinger entered the University of Vienna in 1906 and remained there, with brief interruptions, until 1920. He saw military service in World War I and then went to Zürich in 1921, where he remained for the next six years. There, in a six-month period in 1926, at the age of 39, a remarkably late age for original work by theoretical physicists, he produced the papers that gave the foundations of quantum wave mechanics. In those papers he described his partial differential equation that is the basic equation of quantum mechanics and bears the same relation to the mechanics of the atom as Newton's equations of motion bear to planetary astronomy. Adopting a proposal made by Louis de Broglie in 1924 that particles of matter have a dual nature and in some situations act like waves, Schrödinger introduced a theory describing the behaviour of such a system by a wave equation. The solutions to Schrödinger's equation, unlike the solutions to Newton's equations, are wave functions that can only be related to the probable occurrence of physical events. The definite and readily visualized sequence of events of the planetary orbits of Newton is, in quantum mechanics, replaced by the more abstract notion of probability. (This aspect of the quantum theory made Schrödinger and several other physicists profoundly unhappy, and he devoted much of his later life to formulating philosophical objections to the generally accepted interpretation of the theory that he had done so much to create.)

In 1927 Schrödinger accepted an invitation to succeed Max Planck, the inventor of the quantum hypothesis, at the university in Berlin, and he joined an extremely distinguished faculty that included Albert Einstein. He remained at the university until 1933, at which time he reached the decision that he could no longer live in a country in which the persecution of Jews had become a national policy. He then began a seven-year odyssey that took him to Austria, Great Britain, Belgium, the Pontifical Academy of Science in Rome, and—finally in 1940—the Dublin Institute for Advanced Studies, founded under the influence of Premier Eamon de Valera, who had been a mathematician before turning to politics. Schrödinger remained in Ireland for the next 15 years, doing research both in physics and in the philosophy and history of science. During this period he wrote *What Is Life?*, an attempt to show how quantum physics can be used to explain the stability of genetic structure. Although much of what Schrödinger had to say in this book has been modified and amplified by later developments in molecular biology, his book remains one of the most useful and profound introductions to the subject. In 1956 Schrödinger retired and returned to Vienna as professor emeritus at the university.

Assessment. Of all of the physicists of his generation, Schrödinger stands out because of his extraordinary intellectual versatility. He was at home in the philosophy and literature of all of the Western languages, and his popular scientific writing in English, which he had learned as a child, is among the best of its kind. His study of ancient Greek science and philosophy, summarized in his *Nature and the Greeks* (1954), gave him both an admiration for the Greek invention of the scientific view of the world and a skepticism toward the relevance of science as a unique tool with which to unravel the ultimate mysteries of human existence. Schrödinger's own metaphysical outlook, as expressed in his last book, *Meine Weltansicht* (1961; *My View of the World*), closely paralleled the mysticism of the Vedānta.

Because of his exceptional gifts, Schrödinger was able in the course of his life to make significant contributions to nearly all branches of science and philosophy, an almost unique accomplishment at a time when the trend was toward increasing technical specialization in these disciplines. (J.Be./Ed.)

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Schrödinger equation, the fundamental equation of the science of submicroscopic phenomena known as quantum mechanics. The equation, developed (1926) by the Austrian physicist Erwin Schrödinger, has the same central importance to quantum mechanics as Newton's laws of motion have for the large-scale phenomena of classical mechanics.

Essentially a wave equation, the Schrödinger equation describes the form of the probability waves (or wave functions [*see* de Broglie wave]) that govern the motion of small particles, and it specifies how these waves are altered by external influences. Schrödinger established the correctness of the equation by applying it to the hydrogen atom, predicting many of its properties with remarkable accuracy. The equation is used extensively in atomic, nuclear, and solid-state physics.

Schruns, town, *Bundesland* (federal province) Vorarlberg, western Austria, on the Ill River at the mouth of the Litz Bach; it adjoins the village of Tschagguns and is the main town of the Montafontal (valley), southeast of Feldkirch. It has a long-established cattle market. An international summer resort since the early 19th century, Schruns has a modern spa and has become a winter-sports centre. It also manufactures textiles and is a lumber centre. Pop. (1981) 3,729.

Schubart, Christian Friedrich Daniel (b. March 24, 1739, Obersontheim, Swabia—d. Oct. 10, 1791, Stuttgart, Württemberg), German poet of the Sturm und Drang period, known for his pietistic and nationalistic leanings.

He entered the University of Erlangen in 1758 but left after two years. After he attempted to earn a livelihood as a private tutor and an assistant preacher, his musical talents gained him the appointment of organist in Geislingen and subsequently in Ludwigsburg; but in consequence of a somewhat dissolute life, which found expression in a parody of the litany, he was expelled from the region. He then visited in turn Heilbronn, Mannheim, Munich, and Augsburg. In Augsburg he made a considerable stay, began his *Deutsche Chronik* (1774–78; "German Chronicle") and eked out a subsistence by reciting from the latest works of prominent poets. Owing to a bitter attack upon the Jesuits, he was expelled from Augsburg and fled to Ulm, where, for obscure reasons (probably for a satirization of the Duke of Württemberg), he was arrested in 1777 and imprisoned without trial for 10 years in the fortress of Hohenasperg. Here he studied mystical works and composed poetry. His *Sämtliche Gedichte* (1785–86; "Collected Poems") are characterized partly by the bombast of the Sturm und Drang period, partly by intense religious feelings of a pietistic nature, and partly by patriotic fervour. He was set at liberty in 1787, at the instance of Frederick II the Great, king of Prussia, and expressed his gratitude in *Hymnus auf Friedrich den Grossen* ("Hymn to Frederick the Great"). Schubart was now appointed musical director and manager of the theatre at Stuttgart, where he continued his *Deutsche Chronik* and began his autobiography, *Schubarts Leben und Gesinnungen* (1791–93; "Schubart's Life and Mind"), but he died before its completion.

Schubert, Franz (Peter) (b. Jan. 31, 1797, Himmelpfortgrund, near Vienna—d. Nov. 19, 1828, Vienna), Austrian composer who bridged the worlds of Classical and Romantic music, noted for the melody and harmony in his songs (lieder) and chamber music. Among other works are *Symphony in C Major* (*The Great;* 1828), *Symphony in B Minor* (*Unfinished;* 1822), masses, and piano works.

Early life and career. Schubert's father, Franz Theodor Schubert, was a schoolmaster; his mother, Elisabeth, whose maiden name was Vietz, was in domestic service at the time of her marriage. Franz was their fourth surviving son. His elder brothers were Ignaz, Karl, and Ferdinand, and there was a younger sister, Maria Theresa. The elder Franz Schubert was a man of character who had established a flourishing school. The family was musical and cultivated string quartet playing in the home, the boy Franz playing the viola. He received the foundations of his musical education from his father and his brother Ignaz, continuing later with organ playing and musical theory under the instruction of the parish church organist. In 1808 he won a scholarship that earned him a place in the imperial court chapel choir and an education at the Stadtkonvikt, the principal boarding school for commoners in Vienna, where his tutors were Wenzel Ruzicka, the imperial court organist, and, later, the composer Antonio Salieri, then at the height of his fame. Schubert played the violin in the students' orchestra, was quickly promoted to leader, and in Ruzicka's absence conducted. He also attended choir practice and, with his fellow pupils, cultivated chamber music and piano playing.



Schubert, detail of a watercolour by W.A. Rieder, 1825; in the Historisches Museum der Stadt Wien
By courtesy of the Historisches Museum der Stadt Wien

From the evidence of his school friends, Schubert was inclined to be shy and was reluctant to show his first compositions. His earliest works included a long *Fantasia for Piano Duet,* a song, several orchestral overtures, various pieces of chamber music, and three string quartets. An unfinished operetta on a text by August von Kotzebue, *Der Spiegelritter* (*The Looking-glass Knight*), also belongs to those years. The interest and encouragement of his friends overcame his shyness and eventually brought his work to the notice of Salieri. In 1812 Schubert's voice broke; he left the college but continued his studies privately with Salieri for at least another three years. During this time he entered a teachers' training college in Vienna and in the autumn of 1814 became assistant in his father's school. Rejected for military service because of his short stature, he continued as a schoolmaster until 1818.

The numerous compositions written between 1813 and 1815 are remarkable for their variety and intrinsic worth. They are the products of young genius, still short of maturity but displaying style, originality, and imagination. Besides five string quartets, there were three full-scale masses and three symphonies. His first full-length opera, *Des Teufels Lustschloss* (*The Devil's Palace of Desire*), was finished while he was at the training college. But at this period song composition was his chief, all-absorbing interest. On Oct. 19, 1814, he first set to music a poem by Goethe, "Gretchen am Spinnrade" ("Gretchen at the Spinning Wheel"), from *Faust;* it was his 30th song and in this masterpiece he created at one stroke the German lied (art song). The following year brought the composition of more than 140 songs.

The many unfinished fragments and sketches of songs left by Schubert provide some insight into the working of his creative mind. Clearly, the primary stimulus was melodic. The words of a poem engendered a tune. Harmony (chordal structure of a composition) and modulation (change of key) were then suggested by the contours of the melody. But the external details of the poet's scene—natural, domestic, or mythical—prompted such wonderfully graphic images in the accompaniments as the spinning wheel, the ripple of water, or the "shimmering robe" of spring. These features were fully present in the songs of 1815. The years that followed deepened and enriched but did not revolutionize these novel departures in song. During 1815 Schubert also continued to be preoccupied with his ill-fated operas: between May and December he wrote *Der vierjährige Posten* (*A Sentry for Four Years*), *Fernando, Claudine von Villa Bella,* and *Die Freunde von Salamanka* (*The Friends of Salamanca*).

At this time Schubert's outward life was uneventful. Friends of his college days were faithful, particularly Josef von Spanun, who in 1814 introduced him to the poet Johann Mayrhofer. He also induced the young and brilliant Franz von Schober to visit Schubert. Late in 1815 Schober went to the schoolhouse in the Säulengasse, found Schubert in front of a class with his manuscripts piled about him, and inflamed the young composer, a willing listener, with a desire to break free from his duties. In the spring of 1816 Schubert applied for the post of music director in a college at Laibach (now Ljubljana, Yugos.) but was unsuccessful. His friends tried to interest Goethe in the songs and in April 1816 sent a volume of 16 settings to the poet at Weimar. It produced no result. At length, in December 1816, Schober persuaded Schubert to apply for leave of absence. Despite his father's reluctance, he obtained the leave and subsequently spent eight months with Schober, living in the home of his friend's widowed mother.

Early in 1817 Schober brought the baritone Johann Michael Vogl to his home to meet Schubert. As a result of this meeting, Vogl's singing of Schubert's songs became the rage of the Viennese drawing rooms. His friendships with the Huttenbrenner brothers, Anselm, a composer, and Josef, an amateur musician, and with Josef von Gahy, a pianist with whom he played duets, date from these days. But this period of freedom did not last, and in the autumn of 1817 Schubert returned to his teaching duties. He wrote to his friends of himself as a *verdorbener* ("frustrated") musician. The two earlier years had been particularly fruitful. Songs of this period include "Ganymed," "Der Wanderer," and the *Harper's Songs* from Goethe's novel *Wilhelm Meister.* There were two more symphonies: *No. 4 in C Minor,* which Schubert himself named the *Tragic* (1816), and the popular *No. 5 in B Flat Major* (1816). A fourth mass, in C major, was composed in 1816. The year 1817 is notable for the beginning of his masterly series of piano sonatas. Six were composed at Schober's home, the finest being *No. 7 in E Flat Major* and *No. 11 in B Major.*

Schubert's years of uncongenial schoolmastering ended in the summer of 1818. His frustrated period in the spring had produced only one substantial work, the *Symphony No. 6 in C Major.* In the meantime his reputation was growing, however, and the first public performance of one of his works, the *Italian Overture in C Major,* took place on March 1, 1818, in Vienna. In June he left the city to take up the post of music master to the two daughters of Johann, Count Esterházy, in the family's summer residence at Zseliz, Hung. Letters to his friends show him in exuberant spirits, and the summer months were marked by a fresh creative outburst. The piano duets *Variations on a French Song* in E minor and the *Sonata in B Flat Major,* sets of dances, songs, and the *Deutsche Trauermesse* (*German Requiem*) were completed.

Maturity. On his return to Vienna he shared lodgings with Mayrhofer and during the winter months composed the operatta *Die Zwillingsbrüder* (*The Twin Brothers*). Although sponsored by Vogl, the production of the work was postponed, and in June 1819 Schubert and Vogl set off for a protracted holiday in the singer's native district of upper Austria. The composer delighted in the beauty of the countryside and was touched by the enthusiastic reception given everywhere to his music. At Steyr he composed the first of his widely known instrumental compositions, the *Piano Sonata in A Major,* D. 664, and the celebrated *Trout Quintet* for piano and strings. The close of 1819 saw him engrossed in songs to poems by his friend Mayrhofer and by Goethe, who inspired the masterly *Prometheus.*

In June 1820 *Die Zwillingsbrüder* was performed with moderate success in Vienna, Vogl doubling in the parts of the twin brothers. It was followed by the performance of incidental music for the play *Die Zauberharfe* (*The Magic Harp*), given in August of the same year. The lovely, melodious overture became famous as the *Rosamunde* overture. Schubert was achieving renown in wider social circles than the restricted spheres of friend and patron. The wealthy and influential Sonnleithner family was interested in his development; their son Leopold became a great friend and supporter. At the close of the year 1820, Schubert composed the *Quartettsatz* (*Quartet-Movement*) in C minor, heralding the great string quartets of the middle 1820s, and another popular piece, the motet for female voices on the text of Psalm XXIII. In December 1820 he began the choral setting of Goethe's *Gesang der Geister über den Wassern* (*Song of the Spirits over the Water*) for male-voice octet with accompaniment for bass strings, D. 714, completed in February 1821.

All of Schubert's efforts to publish his own work were fruitless. Early in 1821, however, a few friends offered his song "Erlkönig" ("Erl King") on a subscription basis. The response was so successful that enough money was raised for the printing of "Gretchen am Spinnrade" also. Eighteen months later, opus 12 had been reached.

In Vienna the popularity of Schubert's songs and dance music became so great that concert parties were entirely devoted to them. These parties, called *Schubertiaden,* were given in the homes of wealthy merchants and civil servants, but the wider worlds of opera and public concerts still eluded him. He worked during August 1821 on a seventh symphony in E minor and major, but this, too, was put aside, along with many other unfinished works of the period. His determination to establish himself in opera led him in September and October to spend a short holiday with Schober at St. Pölten, where the friends devoted their energies to the production of a three-act opera, *Alfonso und Estrella.* It was completed in February 1822 but was never performed. While spending a few days at Atzenbrugg in July 1822, with Schober and other friends, he produced the document called *Mein Traum* ("My Dream"), describing a quarrel between a music-loving youth and his father. The autumn of 1822 saw the beginning of yet another unfinished composition—not, this time, destined to obscurity: the *Symphony in B Minor* (*Unfinished*), which speaks from Schubert's heart. Two movements and a half-finished scherzo were completed in October and November 1822. In November of the same year Schubert composed a piano fantasia in which the variations are on a theme from his song "Der Wanderer" and completed the *Mass in A Flat Major.*

At the close of 1822 Schubert contracted a venereal disease, probably syphilis, and the following year was one of illness and retirement. He continued to write almost incessantly. In February 1823 he wrote the *Piano Sonata in A Minor,* and in April he made another attempt to gain success in Viennese theatres with the one-act operetta *Die Verschworenen* (*The Conspirators*), the title being changed later (because of political censorship) to *Der häusliche Krieg* (*Domestic Warfare*). The famous work of the year, however, was the song cycle *Die schöne Müllerin* (*The Miller's Beautiful Daughter*), representing the epitome of Schubert's lyrical art. Schubert spent part of the summer in the hospital and probably started work—while still a patient—on his most ambitious opera, *Fierrabras.* The work was rejected by the directorate of the prestigious Kärntnertor Theatre in Vienna. The year 1823 closed with Schubert's composition of the music for the play *Rosamunde,* performed at Vienna in December.

The early months of 1824 were again unhappy. Schubert was ill, penniless, and plagued by a sense of failure. Yet during these months he composed three masterly chamber works: the *String Quartet in A Minor,* a second string quartet in D minor containing variations on his song "Der Tod und das Mädchen," and the *Octet in F Major* for strings and wind instruments. His dejection is manifest in a letter of March 31, 1824, to the painter Leopold Kupelwieser in which he speaks of himself as "the most unfortunate, the most miserable being in the world." In desperate need of money, he returned in the summer to his teaching post with the Esterházy family and in May 1824 went again to Zseliz. Once more his health and spirits revived. The period was marked by some magnificent piano duets, the *Piano Sonata in C Major* (*Grand Duo*), the *Variations on an Original Theme in A Flat Major,* and the *Divertissement à la hongroise* (*Hungarian Divertissement*).

Although his operas remained unperformed, there were frequent public performances of his

songs and part-songs in Vienna during these and the following years. Publication proceeded rapidly, and his financial position, though still strained, was at any rate eased. This is the period of the *Lady of the Lake* songs, including the once popular but later neglected "Ave Maria." Instrumental compositions are the piano sonatas in A minor and in D major, the latter composed at Badgastein. He sketched a symphony during the summer holiday (in all probability the beginnings of the *Symphony in C Major* [*Great*], completed in 1828). New friends Moritz von Schwind, a young painter, and Eduard Bauernfeld, a dramatist, were almost continuously in his company during this period.

Last years. The resignation of Salieri as imperial *Kapellmeister* (musical director) in 1824 had led to the promotion of his deputy, Josef Eybler. In 1826 Schubert applied for the vacant post of deputy *Kapellmeister,* but in spite of strong support by several influential people he was unsuccessful. From then until his death two years later he seems to have let matters drift. Neither by application for professional posts nor submission of operatic work did he seek to establish himself. It can hardly be believed that Schubert was unaware of his exceptional powers; yet, together with an awareness of genius and the realization that it opened doors into cultivated society went the knowledge of his humble birth and upbringing and also of his somewhat uncouth bearing. This self-consciousness made him diffident, reserved, and hesitant. His life was almost entirely devoted to composition, and he derived his livelihood from publishers' fees and occasional teaching.

The songs of 1826 include the settings of Shakespeare's "Hark! Hark! the lark!" and "Who is Silvia?" written during a brief stay in the village of Währing. Three fine instrumental works of this summer and autumn are the last *String Quartet in G Major,* the *Piano Sonata in G Major,* and the beginning of the *Piano Trio in B Flat Major.* In 1827 he composed the first 12 songs of the cycle *Winterreise* (*Winter Journey*). Beethoven's death in 1827 undoubtedly had a profound effect on Schubert, for there is no denying that a more profound, more intellectual quality akin to that in Beethoven's music appears in his last instrumental works. Some of them, especially the *Piano Trio in E Flat Major* (1827) and the *Piano Sonata in C Minor* (1828), suggest the authority of Beethoven, yet his own strong individuality is never submerged. In September 1827 Schubert spent a short holiday in Graz. On his return he composed the *Piano Trio in E Flat Major* and resumed work on Part II of the *Winterreise.* This is the period of his piano solos, the *Impromptus* and *Moments musicaux.*

A succession of masterpieces marks the last year of his life. Early in the year he composed the greatest of his piano duets, the *Fantasy in F Minor.* The *Great Symphony* was concluded in March, as was also the cantata *Miriams Siegesgesang* (*Miriam's Victory Song*). In June he worked at his sixth mass—in E flat major. A return to songwriting in August produced the series published together as the *Schwanengesang* (*Swan Song*). In September and early October the succession was concluded by the last three piano sonatas, in C minor, A major, and B flat major, and the great *String Quintet in C Major*—the swan song of the Classical era in music.

The only public concert Schubert gave took place on March 26, 1828. It was both artistically and financially a success, and the impecunious composer was at last able to buy himself a piano. At the end of August he moved into lodgings with his brother Ferdinand. Schubert's health, broken by the illness of 1823, had deteriorated, and his ceaseless work had exhausted him. In October he developed typhoid fever as a result of drinking tainted water. His last days were spent in the company of his brother and several close friends.

It is said that Schubert's place in the history of music is equivocal, for he stands between the worlds of Classical and Romantic music. He can, however, be considered as the last of the great Classical composers. His music, subjectively emotional in the Romantic manner, poetically conceived, and revolutionary in language, is nevertheless cast in the formal molds of the Classical school—with the result that in the 20th century it has become increasingly apparent that Schubert more truly belongs to the age of Haydn, Beethoven, and Mozart than to that of Schumann, Chopin, and Wagner. (M.J.E.B./Ed.)

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Schuch, Franz (b. *c.* 1716, Vienna—d. 1763, Hamburg), German comic actor and theatre manager who popularized a vernacular version of the commedia dell'arte form and combined the improvisational character Hans Wurst with the Italian stock character Harlequin.

Schuch arrived in Germany with his itinerant company in the 1740s and remained there until his death. Under his management the troupe was extremely popular and created serious competition for the new literary theatre companies such as that of Caroline Neuber. Schuch's troupe achieved sufficient success to attract Konrad Ekhof, the greatest German actor of his day, to work with them for a brief period and later employed the actor-playwright Johann Brandes. Although Johann Gottsched, the prominent dramatic theorist and patron of Neuber, sought to eliminate improvisational troupes, Gotthold Ephraim Lessing, the playwright and critic, greatly admired Schuch's company.

Schuch's acting possessed a quality of commonness undefiled by triviality or grossness. The work of his company was appreciably more refined than that of earlier groups, yet it was sufficiently rooted in the everyday to maintain a wide popularity. Although improvisation of dialogue and physical comedy were still central to the entertainments the company performed, the general structure was more controlled and was presented with greater subtlety. Schuch habitually played the sly servant of the commedia, Harlequin, but he modified the character and gave it popular national appeal by incorporating within it the by-then traditional Hans Wurst.

Shortly after Schuch's death the company declined due to its mismanagement by his sons, but in 1765 Karl Döbbelin moved it to Berlin and put it back on a sound basis.

Schuchert, Charles (b. July 3, 1858, Cincinnati, Ohio, U.S.—d. Nov. 20, 1942, New Haven, Conn.), American paleontologist who was a leader in the development of paleogeography, the study of the distribution of lands and seas in the geological past.

While supporting his siblings after the death of their father, Schuchert developed an intense interest in fossils. During the 1880s he earned a livelihood drawing illustrations of fossil bryozoans and brachiopods for state geological surveys, meanwhile building up his own impressive collection of specimens. Schuchert served as curator of the U.S. National Museum (where he was best known for his taxonomic work) from 1894 to 1904. He was then appointed professor of paleontology at Yale University, where he served until his retirement as professor emeritus in 1923. Schuchert's *A Text-Book of Geology* (1915; with L.V. Pirsson) remained the standard text for historical geology until mid-century. He was the foremost authority on the paleogeography of North America, his efforts in this field culminating in his publication of the first volume of *Historical Geology of North America* (1935), a massive synthesis of contemporary knowledge on that subject. He also wrote *Textbook of Historical Geological Paleogeography of North America* and *The Earth and Its Rhythms* (1927).

Schulberg, Budd (Wilson) (b. March 27, 1914, New York City), American novelist, screenwriter, and journalist.

The son of the Hollywood motion-picture producer Benjamin Percival ("B.P.") Schulberg (1892–1957), who for many years was production chief at Paramount Studios, Schulberg grew up in Hollywood and became a "reader" and then a screenwriter after completing his education at Dartmouth College, Hanover, N.H., in 1936. He began to write and publish short stories and became a member of the Communist Party, but he broke with the Communists in 1939, when they insisted that his first novel be written to reflect Marxist dogma. That work, *What Makes Sammy Run* (1941), about an unprincipled motion-picture studio mogul, was a great success.

During and after World War II, Schulberg served as an officer in the Navy and the Office of Strategic Services. He was awarded the Army Commendation Ribbon for collecting visual evidence of Nazi war crimes for the Nürnberg trials. In 1947 he published his second novel, *The Harder They Fall,* a fictional exposé of corrupt practices in professional boxing. In 1950 his novel *The Disenchanted* won an American Library Award for fiction. In 1954 his screenplay for the widely acclaimed *On the Waterfront* won him an Academy Award for best story and screenplay. In the 1960s Schulberg helped establish the Douglass House Watts Writers Workshop in the Watts district of Los Angeles after the riots there, and in 1971 he founded the Frederick Douglass Creative Arts Center in New York City.

In *Moving Pictures: Memories of a Hollywood Prince* (1981), Schulberg described his childhood spent in the centre of the American motion-picture industry.

Schulenburg, Ehrengarde Melusina, Gräfin von der (countess of): *see* Kendal, Ehrengarde Melusina, duchess of.

Schuller, Gunther (b. Nov. 22, 1925, New York City), American composer and performer noted for his wide range of activity in both jazz and classical music and for his works embracing both jazz and advanced 12-tone el-

ements (*i.e.,* deriving melodies and harmonies of a composition from an arbitrary ordering of the 12 notes of the chromatic scale).

Schuller was born into a family of musicians. His grandfather was a conductor in Germany, and his father was a violinist with the New York Philharmonic for 41 years. Though largely self-taught, Schuller became a virtuoso French hornist, playing with the Cincinnati Symphony and Metropolitan Opera orchestras. His interest in jazz developed early when he became a fan of Duke Ellington; he developed symphonic adaptations of several Ellington pieces and in 1955 composed *Symphonic Tribute to Duke Ellington.* Though not considered a jazz soloist, he played with jazz ensembles such as the Modern Jazz Quartet and wrote widely about aspects of popular music. He taught at the School of Jazz, Lenox, Mass., in 1959 and was the music director of the First International Jazz Festival in Washington in 1962. He also taught at the Yale School of Music from 1964 to 1967.

As a composer, Schuller began in the path of Anton von Webern (known for his concise 12-tone compositions). The *Cello Concerto* (completed 1945) is considered a rather conventional work. Later, his chamber music became notable for its unusual instrument combinations, such as the *Fantasia Concertante* (1947) for three oboes or three trombones and piano, and the *Double Bass Quartet* (1947). By 1955 Schuller was well along in combining elements from disparate musical styles in works such as his *12 by 11,* for chamber orchestra and jazz improvisation. Other works, including *Spectra* (first performed 1960, for sextuple orchestra), *Variants* (1961, ballet choreographed by George Balanchine), a piano concerto, and a symphony, continue this trend.

Schuller's later works include *The Fisherman and His Wife* (1970, opera for children with a libretto written by John Updike); *Capriccio Stravagante* (1972); *Triplum II* (1975), which combines serialism with romanticism within a classical structure; *Deaï* (1978) written for two orchestras and symbolizing the merging of East and West; and *Contrabassoon Concerto* (1979), the first concerto ever written for that instrument. Schuller also formed the New England Conservatory Ragtime Ensemble, whose recording *Red-Back Book,* consisting of the works of Scott Joplin, became a best seller and was awarded a "Grammy" in 1973 from the National Academy of Recording Arts and Sciences.

From 1967 to 1977 Schuller was president of the New England Conservatory of Music, and he has served as artistic director of summer activities of the Boston Symphony Orchestra at Tanglewood and at the Berkshire Music Center, both in Massachusetts.

Schuller is the author of *Horn Technique* (1962) and *Early Jazz: Its Roots and Musical Development* (1968). In 1960 he received an award from the National Institute of Arts and Letters, and in 1971 he received the Rogers and Hammerstein award.

Schulmeister, Karl (b. Aug. 5, 1770, Neu-Freistett, Alsace, Fr.—d. May 8, 1853, Strasbourg), chief of espionage for Napoleon I.

Throughout his life Schulmeister nurtured the curious conviction that he was descended from Hungarian nobility, although his father was just a poor country parson. In his youth he entered business in a small way, and, like many others in Alsace, he also became a smuggler, a calling he continued for many years even after entering the service of Napoleon.

In 1799 Schulmeister became acquainted with Anne-Jean-Marie-René Savary. By 1804, and perhaps much earlier, he had become a secret agent under Savary, then a general and chief of intelligence. In 1805 Savary presented Schulmeister to Napoleon with the words "Here, sire, is a man, all brains and no heart." Later that year he arrived in Vienna in the guise of a Hungarian nobleman who had been exiled from France on suspicion of espionage. He met Baron Mack von Leiberich, commander of the Austrian Army, who took a liking to the young refugee and obtained a commission for him, attaching him to his staff as chief of intelligence. Schulmeister used this position to feed Mack false information, including specially printed French newspapers and letters that indicated unrest and opposition to Napoleon within France. He also bribed two Austrian officers to provide seemingly independent confirmation of his information. Convinced that French troops were withdrawing from the front to suppress the rebellion, Mack took the field with his entire army in October 1805. He was quickly surrounded by superior French forces and forced to surrender at Ulm.

Between 1805 and 1809 Schulmeister distinguished himself both in battle and as a spy, undertaking missions as far away as Ireland and England. In 1809 he was appointed commissary general of the armies in the field, a post in which he was able to amass a substantial fortune. Later that year, on Napoleon's second occupation of Vienna, Schulmeister was appointed commissioner of police for the city. Schulmeister carried out his duties in Vienna with ruthless efficiency. Finally, through Savary's influence, he was appointed to direct the French secret service. Through the influence of Empress Marie-Louise, however, he lost his post, after which he retired to his estates. In 1814 a regiment of Austrian artillery was specially detached from the campaign against Napoleon's army to demolish his country home. After the Hundred Days Schulmeister was reduced to poverty and kept a tobacconist stall in Strasbourg.

Schultz, Dutch, byname of ARTHUR FLEGENHEIMER (b. Aug. 2, 1902, Bronx, N.Y., U.S.—d. Oct. 23, 1935, Newark, N.J.), American gangster of the 1920s and '30s who ran bootlegging and other rackets in New York City.

Born in the Bronx, Schultz took his alias from an old-time Bronx gangster and advanced from burglaries to bootlegging, ownership of breweries and speakeasies, and policy rackets in the Bronx and parts of Manhattan. His gang engaged in a number of bloody gang wars. In 1933 he was acquitted of a charge of income-tax fraud; but, in hiding out for months prior to the trial, he had lost much of his business to his New York rivals. From Newark, N.J., he tried to rebuild his New York rackets but became the target of New York special prosecutor Thomas E. Dewey. In October 1935 he broached the idea of assassinating Dewey, outlining a plot to Albert Anastasia and perhaps other mobsters. The New York crime bosses disliked the possible publicity, and on the evening of Oct. 23, 1935, Schultz and three of his bodyguards were bullet-riddled in a Newark restaurant by New York gunmen Charles Workman and Mendy Weiss.

Schultz, Henry (b. Sept. 4, 1893, Szarkowszczezyzna, Pol., Russian Empire—d. Nov. 26, 1938, San Diego, Calif., U.S.), pioneer Polish-born American econometrician.

Schultz was educated in New York City and did graduate work at Columbia University, where he came in contact with such economists as E.R.A. Seligman and W.C. Mitchell. After World War I he studied economics and statistics under Karl Pearson in London, returning to the United States to work as a statistician. He came under the influence of H.L. Moore and completed a pioneering econometric study of demand. He was at the University of Chicago from 1926 until his death.

While at Chicago he examined the data relating to large numbers of commodities in an effort to confront economic theory with data. In later work he developed econometric methods, especially regression techniques, and his efforts culminated in *The Theory and Measurement of Demand* (1938). This book drew not only upon his statistical studies but also upon a detailed knowledge of the body of mathematical economic theory, especially the work of Vilfredo Pareto. Schultz surveyed the available statistical methods and then applied some of these to a wide range of commodities to obtain demand curves and the attendant elasticities. Schultz's book, combining economic theory with econometrics, surpassed any work of the period in that area.

Schultz, Theodore William (b. April 30, 1902, near Arlington, S.D., U.S.), American economist whose influential studies of the role of "human capital"—education, talent, energy, and will—in economic development won him a share (with Sir W. Arthur Lewis) of the 1979 Nobel Prize for Economics.

Schultz graduated from South Dakota State College in 1927 and took his Ph.D. in 1930 at the University of Wisconsin, where he was much influenced by John R. Commons and other unorthodox thinkers. He taught at Iowa State College from 1930 to 1943 and at the University of Chicago from 1943 to 1972; he was head of the economics department from 1946 to 1961.

Schultz's view of economic development was grounded in the conviction that agricultural development is the indispensable precondition to industrialization. In applying classical economic analysis to agriculture in poor countries, he proposed that human capital could be studied in the same terms commonly applied to capital in the usual sense. The result was a theory of investment in and returns from human capital as the wellspring of development and as the only genuine solution to the problem of poverty.

Among his publications were *Agriculture in an Unstable Economy* (1945), *The Economic Value of Education* (1963), *Economic Growth and Agriculture* (1968), *Investment in Human Capital* (1971), and *Investing in People: The Economics of Population Quality* (1981).

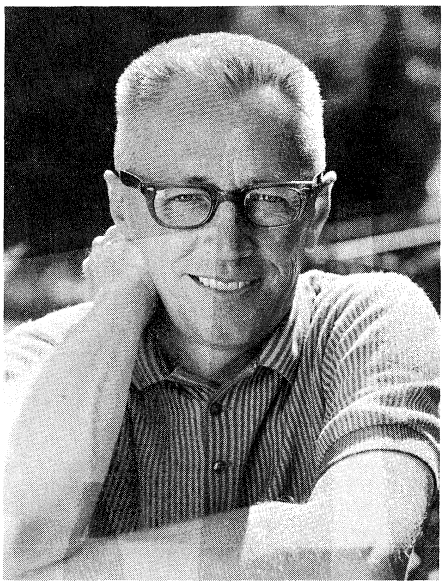
Schultze, Max (Johann Sigismund) (b. March 25, 1825, Freiburg, Ger.—d. Jan. 16, 1874, Bonn), German zoologist and cytologist who defined the cell as a mass of protoplasm with a nucleus (1861) and recognized protoplasm, with its nucleus, as a fundamental substance found in both plants and animals.

Schultze was lecturer in anatomy at the University of Halle but left in 1859 to accept a chair at the University of Bonn, becoming director of the Anatomical Institute there in 1872. He was an outstanding histologist, introducing several new techniques including the use of osmic acid for staining fine details of cells. His scientific writings included important monographs on the nerve endings of such sense organs as the internal ear (1858), the nose (1863), and the retina of the eye (1866). Schultze also founded the journal *Archiv für mikroskopische Anatomie* in 1865 and served as its editor until his death.

Schulz, Charles (b. Nov. 26, 1922, Minneapolis, Minn., U.S.), creator of "Peanuts," one of the most successful American comic strips of the mid-20th century.

Schultz, the son of a barber, studied cartooning in an art correspondence school after graduating in 1940 from high school. He served in the Army from 1943 to 1945 and returned first as an instructor with the art school and then as a free-lance cartoonist with the St. Paul Pioneer Press and the Saturday Evening Post (1948–49). He created the "Peanuts" strip (originally entitled "Li'l Folks") in 1950, introducing a group of three-, four-, and five-year-old characters based upon

semiautobiographical experiences. The main character is Charlie Brown, who represents a sort of "everyman," a sensitive but bland and unremarkable child. Schulz channelled the loneliness that he experienced in his Army days and the frustations of everyday life into Charlie Brown, who is often made the butt of jokes. One of Schulz's initial themes arose



Schulz
By courtesy of CBS

from the cruelty that exists among children. The character of Snoopy, a beagle hound with frustrated dreams of glory, is often portrayed as being wiser than the children. Other characters include Sally, Charlie Brown's little sister; the tyrannical and contrary "fussbudget," Lucy; her younger brother, Linus, who drags his security blanket wherever he goes; Schroeder, whose obsession is playing Beethoven on a toy piano; Peppermint Patty; Marcie; Pigpen; and the bird Woodstock.

The "Peanuts" comic strip has been adapted to television and to the stage, and Schulz wrote the screenplays for two feature-length animated films. He was co-author of *Charlie Brown, Snoopy and Me* (1980).

Schumacher, Kurt (b. Oct. 13, 1895, Kulm, West Prussia, Ger.—d. Aug. 20, 1953, Bonn), German politician and first chairman of the revived Social Democratic Party of Germany (Sozialdemokratische Partei Deutschlands; SPD) after World War II.

Schumacher, the son of a merchant, was educated at Halle, Berlin, and Münster universities. After serving in World War I in which he lost his right arm, he became in 1920 political editor of the Social Democratic *Schwäbische Tagwacht.* He occupied a state legislative seat in the Württemberg diet, 1924–31, and was a member of the Reichstag, 1930–33. After the Nazis came to power in 1933, Schumacher was arrested and spent the next 10 years in concentration camps. Released between March and August 1943 and again in February 1944, he was rearrested after the plot against Hitler on July 20, 1944.

He began to reorganize the Social Democratic Party after the German defeat, and in October 1945 at Hanover he was chairman of its first open meeting in 12 years. In May 1946 he became chairman of the SPD for the three western zones. He sought to broaden the base of his party by appealing to the middle class and the religious, and in the Berlin elections of 1947 the SPD emerged with a higher vote than ever before. His refusal to compromise with the Communists, on the other hand, resulted in constant attacks from the Soviet zone. A long illness, culminating in 1948 in the amputation of his left leg, further weakened his attenuated health, and he became increasingly bitter toward his political opponents. In 1949 he became leader of the opposition in the *Bundestag,* and thereafter he consistently opposed the Schuman Plan, the customs union between France and the Saar, and German rearmament. He was, however, almost fanatic in his desire for a reunited Germany.

Schuman, Robert (b. June 29, 1886, Luxembourg—d. Sept. 4, 1963, Metz, Fr.), French statesman who founded the European Coal and Steel Community and worked for economic and political unity leading to an eventual establishment of a "United States of Europe."

Schuman, a member of the French National Assembly from 1919, was arrested by the German Gestapo in September 1940 after the German occupation of France. He escaped in 1942 and worked in the Résistance until France was liberated (1944). A founder of the Roman Catholic Mouvement Républicain Populaire (MRP), he served as minister of finance (July–November 1946), premier (November 1947–July 1948 and August–September 1948), foreign minister (July 1948–December 1952), and minister of justice (1955–1956).

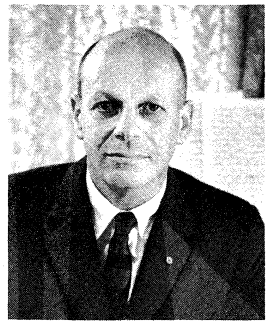
While foreign minister he developed the Schuman Plan (*q.v.*; 1950) to promote European economic and military unity and a Franco-German rapprochement to prevent another war between the two nations. The economic aspects of his plan were realized in 1952 in the European Coal and Steel Community, a six-nation western European eco-



Robert Schuman, c. 1948–50
H. Roger-Viollet—Harlingue

nomic union, the first in a series of economic agreements leading to the formation of the European Economic Community (the Common Market) in 1958. He served as president of the Assembly, the consultative arm of the Common Market, from 1958 to 1960 and was an assembly member until February 1963.

Schuman, William (Howard) (b. Aug. 4, 1910, New York City), U.S. composer, educator, and administrator whose symphonies, ballets, and chamber music are noted for their



William Schuman
By courtesy of the Juilliard School, New York City

adaptation of European models to American themes.

Schuman was educated in the public schools, with occasional music lessons on the violin. His symphonic training began with Charles Haubiel and continued with Roy Harris. A first symphony and string quartet were performed and later withdrawn. The *Second Symphony*, also later withdrawn, was introduced by the Boston Symphony Orchestra in 1939. The *American Festival Overture* and the *Third String Quartet* (both in 1939), the *Third Symphony* (1941), and the cantata *A Free Song* (1942), based on poems by Walt Whitman, established Schuman's reputation and won numerous awards.

Schuman taught at Sarah Lawrence College, Bronxville, New York (1935–45), and then became president of the Juilliard School of Music (1945–62). There he brought about academic reforms and innovations in teaching method and curriculum. He was president of the Lincoln Center for the Performing Arts in New York City (1962–69) and then entered private business.

Schuman's *Symphonies No. 3* (Boston, 1941) and *No. 4* (Cleveland, 1942) utilize polyphonic textures in old forms such as passacaglia, fugue, and chorale. The *Fifth Symphony*, for strings (1943), was commissioned by the Koussevitzky Music Foundation, the *Sixth Symphony* (1949) by the Dallas Symphony Orchestra, and the *Eighth Symphony* by the New York Philharmonic Orchestra for its opening season at Lincoln Center in 1962. The latter is one of his most successful works.

In addition, Schuman composed the ballets *Undertow* (1945), *Night Journey* (1948), and *Judith* (1950). He also wrote four string quartets, an opera with a baseball setting, (*The Mighty Casey*, 1953; revised as a cantata, *Casey at the Bat*, performed 1976) and various choral works. Among his later orchestral compositions were *The Young Dead Soldiers* (1976), which accompanies text by Archibald MacLeish, and *Concerto on Old English Rounds* (1976).

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Schuman Plan, proposal by French foreign minister Robert Schuman on May 9, 1950, for the creation of a single authority to control the production of steel and coal in France and West Germany, to be opened for membership to other European countries. The proposal was realized in the European Coal and Steel Community (*q.v.*).

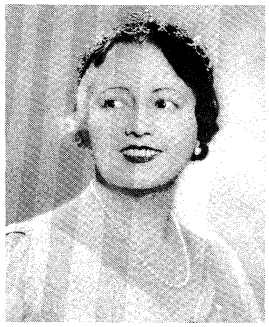
Schumann, Clara, *née* CLARA JOSEPHINE WIECK (b. Sept. 13, 1819, Leipzig—d. May 20, 1896, Frankfurt am Main), German pianist, composer, and wife of composer Robert Schumann.

Encouraged by her father, she studied piano from the age of five and by 1835 had established a reputation throughout Europe as a child prodigy. In 1838 she was honoured by the Austrian court and also elected to the prestigious Gesellschaft der Musikfreunde (music society in Vienna).

Despite strong objections from her father, she married Schumann in 1840, and she bore him eight children between 1841 and 1854. Though family responsibilities curtailed her career, she taught at the Leipzig Conservatory, composed, and toured frequently.

After the death of her husband in 1856, she developed a close professional and personal friendship with the composer Johannes Brahms. She edited the collected edition of her husband's works (published 1881–93). Her own compositions include works for orchestra (among them a piano concerto), chamber music, songs, and many character pieces for solo piano. *Clara Schumann*, a biography by Joan Chissell, was published in 1983.

Schumann, Elisabeth (b. June 13, 1885, Merseburg, Ger.—d. April 23, 1952, New York City), German-born U.S. soprano known for her interpretation of lieder and of the music of Mozart and Richard Strauss.



Elisabeth Schumann, 1937

By courtesy of the Curtis Institute of Music, Philadelphia

Schumann made her debut at the Hamburg Opera in 1910. In 1914 she took the part of Sophie in Strauss's *Der Rosenkavalier* at the Metropolitan Opera, New York City. She sang at the Vienna Opera in 1919 and in 1921 toured the United States with Richard Strauss. In 1938 she settled in the United States, taught at the Curtis Institute at Philadelphia, and in 1944 became a U.S. citizen. She was for a time married to the conductor Karl Alwin. In 1948 her work *German Song* was published in London.

Schumann, Robert (Alexander) (b. June 8, 1810, Zwickau, Saxony—d. July 29, 1856, Endenich, near Bonn), German Romantic composer renowned particularly for his piano music, songs (*Lieder*), and orchestral music. Many of his best known piano pieces were written for the pianist who became his wife in 1840, Clara Schumann.

The early years. Schumann's father was a bookseller and publisher. After four years at a private school, the boy entered the Zwickau Gymnasium (high school) in 1820 and remained there for eight years. He began his musical education at the age of six and in 1822 produced his earliest known composition, a setting of Psalm 150. At the same time he began to show at least equal literary ability, embarking on plays (a comedy and two "horror dramas") and poems, including some translations of Horatian odes, which have been preserved. In 1827 he came under the musical influence of the Austrian composer Franz Schubert and the literary influence of the German poet Jean Paul Richter, both of which proved deep and enduring; in the same year he composed some songs (all of which have since been published).

In 1828 Schumann left school and, under pressure from his mother and his guardian (his father having died), entered the University of Leipzig as a law student. At Leipzig his time was devoted not to the law but to song composition, improvisation at the piano, and attempts to write autobiographical novels in the manner of Richter. For a few months he studied the piano seriously with a celebrated teacher, Friedrich Wieck, and thus got to know Wieck's nine-year-old daughter Clara, a brilliant pianist who was just then beginning a successful concert career.

In the summer of 1829 he left Leipzig for Heidelberg, where one of the law professors, Anton Friedrich Justus Thibaut, was known as a writer on musical aesthetics, and under Thibaut's influence Schumann made the acquaintance of a great deal of early choral music. He composed waltzes in the style of Franz Schubert, afterward used in his piano cycle *Papillons* (1832), and practiced industriously with a view to abandoning law and becoming a virtuoso pianist—with the result that his mother agreed to allow him to return to Leipzig in October 1830 to study for a trial period with Wieck, who thought highly of his talent but doubted his stability and capacity for hard work.

His Opus 1, also a set of variations, was published in 1831. An accident to one of the fingers of his right hand, which put an end to his hopes of a career as a virtuoso, was perhaps not an unmitigated misfortune, since it confined him to composition. For Schumann, this was a period prolific in piano pieces, which were published either at once or, in revised forms, later.

Two important piano works arose from a love affair with another of Wieck's pupils, Ernestine von Fricken: first, the cycle *Carnaval* (1835), based on the letters (and notes) A, S (Es, *i.e.*, E♭), C, H (B♮ in German), which spelled the town, Asch, where she lived and also were contained in his own name; and, second, the *Études symphoniques* (*Symphonic Studies,* 1834), variations on a theme by her father. The affair lasted for more than a year, but long before the engagement was formally broken off (Jan. 1, 1836) Schumann had fallen in love with the then 16-year-old Clara Wieck. Clara returned his kisses but obeyed her father when he ordered her to break off the relationship. Schumann found himself abandoned for 16 months, during which he expressed his alternate despair and resignation in the great *Fantasy in C Major* for piano, drank wildly, sought consolation with other girls, and even published a bitter, veiled lampoon on Clara in the *Neue Zeitschrift für Musik* (*New Journal for Music,* a periodical that he had helped to found in 1834 and of which he had been editor and principal proprietor since the beginning of 1835). Clara herself made the first move toward a reconciliation, and on Sept. 13, 1837—her 18th birthday—Schumann formally asked her father's permission to marry her; the request was at first evaded rather than refused.



Robert and Clara Schumann, lithograph by J. Hofelich

The Bettmann Archive

The mature years. Schumann now entered upon one of his most fertile creative periods, producing a series of imaginative works for piano. Even this was not a time of unalloyed happiness, for Clara refused to marry without financial security, and her father still withheld his consent. A formal statement by Clara on June 15, 1839, initiated legal proceedings for the setting aside of that condition. The affair dragged on for more than a year; it was taken to a court of appeal, which still upheld one of Wieck's objections, that Schumann was a heavy drinker, and then to a yet higher court, which ruled that Wieck must produce proof of habitual drunkenness. This he failed to do, and on Sept. 12, 1840, the marriage took place. Early that year Schumann returned to a field he had neglected for nearly 12 years, that of the solo song; in the space of 11 months (February–December 1840) he composed nearly all the songs on which so much of his reputation rests: the cycles *Myrthen* (*Myrtles*), the two *Liederkreise* (*Song-Cycles*) on texts by Heinrich Heine and Joseph Eichendorff, *Dichterliebe* (*Poet's Love*), *Frauenliebe und Leben* (*Woman's Love and Life*), and many separate songs.

Clara had been pressing him to widen his scope, to launch out in other media—above all, the orchestra. He had in earlier days made at least five unsuccessful attempts at works for piano and orchestra; even the *Symphony in G Minor* was never finished. Now in January–February 1841 he composed the *Symphony No. 1 in B Flat Major,* which was at once (March 31) performed under the German composer Felix Mendelssohn at Leipzig; an *Overture, Scherzo, and Finale* (April–May); a *Phantasie* for piano and orchestra (May) which was expanded into the famous *Piano Concerto in A Minor* by the addition of two more movements in 1845; another symphony, in D minor (June–September); and the sketches for yet a third symphony, in C minor, of which only one movement, the scherzo, survives as a piano piece, in *Bunte Blätter,* Opus 99, No. 13. The orchestral impulse was temporarily spent.

Between June 1842 and January 1843 he wrote several chamber works, a new departure for him. The year 1843 was marked by Schumann's most ambitious work so far, a "secular oratorio" (originally conceived as an opera), *Das Paradies und die Peri* (*Paradise and the Peri*), on Thomas Moore's *Lalla Rookh.* He made his debut as a conductor—a role in which he was invariably ineffective—with its first performance (December 4).

During his work on *The Peri* the Staatliche Hochschule für Musik, Leipzig, had been opened with Mendelssohn as director and Schumann as professor of "piano playing, composition, and playing from score"; again he had embarked on activities for which he was unsuited. The first few months of 1844 were spent on a concert tour of Russia with Clara, which depressed Schumann by making him conscious of his inferior role. On returning to Leipzig he resigned the editorship of the *Neue Zeitschrift.* In August he composed some numbers for an opera on Goethe's *Faust,* but work was interrupted by a serious nervous collapse, which led to the Schumanns' leaving Leipzig. From December 1844 to September 1850 he and Clara lived in Dresden, where his health was gradually restored. In December 1845 he began another symphony, *No. 2 in C Major,* but because of aural nerve trouble nearly 10 months passed before the score was finished.

Attempts to get posts in Leipzig and Vienna had also been abortive. In the end, for want of anything better, Schumann accepted the appointment of municipal director of music at Düsseldorf. At first things went tolerably well; in 1850–51 he composed the *Cello Concerto in A Minor* and the *Symphony No. 3 in E Flat Major* (the *Rhenish*) and drastically rewrote the 10-year-old *Symphony in D Minor,* ultimately published as *No. 4.* He also conducted eight subscription concerts, but temperamental differences soon showed themselves, and Schumann's shortcomings as a conductor became obvious. There were a number of painful scenes and chaotic rehearsals; in December 1852 he was asked to resign but declined, and in October 1853 the choir's refusal to sing

Mendelssohn's *Die erste Walpurgisnacht* under him brought the final break.

On Feb. 10, 1854, Schumann complained of a "very strong and painful" attack of the ear malady that had troubled him before; this was followed by aural illusions, such as the dictation by angels of a theme (actually a reminiscence of his violin concerto) on which he proceeded to write some variations for piano. On February 26 he asked to be taken to a lunatic asylum and the next day attempted suicide by drowning. (He had contemplated suicide on at least three occasions during the 1830s.) On March 4 he was removed to a private asylum at Endenich, near Bonn, where he lived for nearly two and a half years, able to correspond for a time with Clara and his friends. One or two visits by Brahms or the young violinist Joseph Joachim agitated him terribly, and Clara was kept from him until July 27, 1856, when it was realized that the end was near. He seemed to recognize her but was unable to speak intelligibly before his death two days later. (G.E.H.A.)

MAJOR WORKS. *Orchestral works.* Symphonies: Four complete symphonies, *No. 1 in B Flat Major,* op. 38 (*Spring Symphony;* 1841); *No. 2 in C Major,* op. 61 (1846); *No. 3 in E Flat Major,* op. 97 (*Rhenish Symphony;* 1850); *No. 4 in D Minor,* op. 120 (1841; rewritten 1851). Overtures: Overture to Byron's *Manfred,* op. 115 (1848–49). Concerti: *Piano Concerto in A Minor,* op. 54 (1841–45); *Cello Concerto in A Minor,* op. 129 (1850).

Chamber music. Three string quartets; three piano trios; three violin sonatas; *Piano Quintet in E Flat Major,* op. 44 (1842); *Piano Quartet in E Flat Major,* op. 47 (1842).

Vocal music. Songs: Numerous sets of solo songs with piano, including the song-cycles *Liederkreis* (on poems by Heine), op. 24 (1840); *Liederkreis* (on poems by Eichendorff), op. 39 (1840); *Frauenliebe und Leben,* op. 42 (1840); *Dichterliebe,* op. 48 (1840). Opera: *Genoveva,* op. 81 (1847–50). Choral works with orchestra: *Das Paradies und die Peri,* op. 50 (1841–43).

Piano music. Theme and Variations on the Name of Abegg, op. 1 (1830); *Papillons,* op. 2 (1832); *Études symphoniques,* op. 13 (1834); *Carnaval,* op. 9 (1834–35); *Davidsbündlertänze,* op. 6 (1837); *Fantasiestücke,* op. 12 (1837); *Kinderszenen,* op. 15 (1838); *Kreisleriana,* op. 16 (1838); *Fantasy in C Major,* op. 17 (1836); three piano sonatas.

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Schumann-Heink, Ernestine, *née* RÖSSLER (b. June 15, 1861, Liben, near Prague—d. Nov. 17, 1936, Hollywood), Austrian contralto singer who was one of the principal interpreters of the operas of Wagner and Richard Strauss before the outbreak of World War I.



Ernestine Schumann-Heink as Fidès in *Le Prophète, c.* 1901

By courtesy of the Metropolitan Opera Association Archives

Schumann-Heink made her debut at Dresden, Ger., in 1878 as Azucena in Verdi's *Il trovatore.* She sang in Wagnerian operas at Bayreuth between 1896 and 1906 and created the role of Klytemnestra in Strauss's *Elektra* in 1909. From 1899 to 1904 she sang at the Metropolitan Opera in New York City. She often gave recitals and once toured the United States with an operetta. Although known primarily as a Wagnerian singer—her most noted role was Erda in Wagner's *Siegfried*—her repertory included about 150 roles, among them Bizet's Carmen, Fidès in Meyerbeer's *Le Prophète,* and Orlovsky in *Die Fledermaus* by Johann Strauss. She took the names of two of her husbands, Ernst Heink and Paul Schumann. In the latter part of her life she was known for her radio broadcasts in the United States.

Schumpeter, Joseph A(lois) (b. Feb. 8, 1883, Triesch, Moravia—d. Jan. 8, 1950, Taconic, Conn., U.S.), Moravian-born U.S. economist and sociologist known for his theories of capitalist development and business cycles.

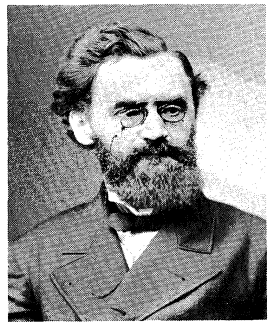
Schumpeter was educated in Vienna and taught at the universities of Czernowitz, Graz, and Bonn, before joining the faculty of Harvard (1932–50). In 1919 he served briefly as minister of finance in the Austrian government. His influence in the field of economic theory was powerful. In his widely read *Capitalism, Socialism, and Democracy* (1942), he argued that capitalism would eventually perish of its own success, giving way to some form of public control or socialism. His *History of Economic Analysis* (1954; reprinted 1966) is an exhaustive study of the development of analytic methods in economics. His other books include *Theorie der wirtschaftlichen Entwicklung* (1912; *The Theory of Economic Development,* 1934; reprinted 1968) and *Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process,* 2 vol. (1939; rev. ed. 1964).

Schurz, Carl (b. March 2, 1829, Liblar, near Cologne—d. May 14, 1906, New York City), German-U.S. political leader, journalist, orator, and dedicated reformer who pressed for high moral standards in government in a period of notorious public laxity.

As a student at the University of Bonn, Schurz participated in the abortive German revolution of 1848, was imprisoned, escaped, and eventually came to the United States (1852). He settled in Wisconsin (1856), quickly became active in the anti-slavery movement, and as a delegate to the Republican National Convention of 1860, worked for the nomination of Abraham Lincoln for president. His reward was appointment as minister to Spain in 1861, but within a year he returned to the United States to advocate the immediate emancipation of the slaves.

Schurz joined the Union army in 1862 and was appointed brigadier general of volunteers. In the following year and a half he commanded troops at the Second Battle of Bull Run (August 1862) and at the battles of Chancellorsville, Gettysburg, and Chattanooga (all in 1863). The conduct of his troops at Chancellorsville and Gettysburg was criticized, but Schurz apparently retained the respect of his fellow Union officers.

After the war Schurz toured the South to report on conditions for Pres. Andrew Johnson. Strongly advocating support of Negro rights, the report emphasized granting the franchise to freedmen as a condition of state readmission to the Union. Johnson, however, resisted these views and shelved the report. In 1866 Schurz became editor of the *Detroit Post* and then editor and part owner of the German-language *St. Louis Westliche Post.*



Schurz

By courtesy of the Library of Congress, Washington, D.C.

In Missouri he won his only elective office, serving as U.S. senator from 1869 to 1875. In that period he broke with Pres. Ulysses S. Grant on the issue of political corruption, on Reconstruction policy, and on the proposed annexation of Santo Domingo. These conflicts led him in 1872 to help organize the Liberal Republican Party, opposing Grant's renomination. Four years later, however, he rejoined the regular Republicans, supporting Rutherford B. Hayes on the issues of good government and hard money. In return, he served as President Hayes's secretary of the interior (1877–81), promoting civil service reform and an improved Indian policy.

Returning to journalism and writing, Schurz edited the *New York Evening Post* and *The Nation* in the early 1880s, wrote biographies of Henry Clay (1887) and Abraham Lincoln (1889), and in the 1890s was an editorial writer for *Harper's Weekly.* Pursuing his advocacy of honest government, he headed the National Civil Service Reform League from 1892 to 1901. His one important venture into politics during this time was his role in encouraging reform-minded Republicans, commonly called Mugwumps, to support the presidential candidacy of Democrat Grover Cleveland in 1884. A biography is Claude M. Fuess, *Carl Schurz: Reformer* (1932).

Schuschnigg, Kurt von (b. Dec. 14, 1897, Riva del Garda, Trento, Austria-Hungary—d. Nov. 18, 1977, Mutters, near Innsbruck, Austria), Austrian statesman and chancellor who struggled to prevent the takeover of Austria (March 1938) by Nazi Germany.

As an Innsbruck lawyer of monarchist political sympathies attached to the Christian Social Party, he was elected to the federal Nationalrat (lower house of parliament) in 1927. Later, in the government of Engelbert Dollfuss (1932–34) he was first appointed minister of justice (1932), then minister of education (1933); and after Dollfuss' assassination (1934) he was named federal chancellor. He eliminated the threats to his government posed by

the Heimwehr, a national paramilitary defense force led by his vice chancellor, Ernst Rüdiger, Fürst von Starhemberg, whom he forced out of office in May 1936; in October he disbanded the Heimwehr. Schuschnigg's subsequent concessions to Hitler on the status of Austrian Nazis, however, more than offset his earlier successes.

After a humiliating capitulation to Hitler at Berchtesgaden (February 1938), he determined to reassert national independence through a plebiscite to be held on March 13. But his plans were effectively negated by the German invasion and annexation of Austria (*Anschluss*), March 11–13.

Schuschnigg had been forced to resign on March 11 and was imprisoned by the Nazis shortly thereafter. He was freed only after World War II (May 1945). He lived and taught in the United States (1948–67), after which he returned to Austria where he wrote *Im Kampf Gegen Hitler* (1969; *The Brutal Takeover*, 1971).

Schütz, Heinrich, Latin HEINRICUS SAGITTARIUS (b. Oct. 8, 1585, Köstritz, Saxony—d. Nov. 6, 1672, Dresden), composer, widely regarded as the greatest German composer before J.S. Bach.



Schütz, detail of a portrait by an unknown artist; in Karl Marx University, Leipzig, Ger.

By courtesy of the Universitatsbibliothek, Karl Marx Universitat, Leipzig, Ger.

In 1599 he became a chorister at Kassel, where the Landgrave of Hesse-Kassel provided him with a wide general education. In 1608 Schütz entered the University of Marburg to study law, but in 1609 he went to Venice, where for three years he studied music at the Landgrave's expense; his chief teacher there was Giovanni Gabrieli. In Venice Schütz wrote his first known works, a set of Italian madrigals for five voices (published 1611). In 1613 he returned to Germany and went to Leipzig to resume his legal studies. Shortly afterward the Landgrave offered him the post of second organist at the court in Kassel. In 1614 he went to Dresden to supervise the music for the christening of the son of the Elector of Saxony, and in 1617 the Landgrave gave him a permanent post in the electoral chapel. In 1628 Schütz again visited Venice, where Claudio Monteverdi was now the chief musical figure; it is possible that Schütz studied with him. Three years after his return to Dresden, Schütz left the Elector's court, which was being seriously affected by plague and by the turmoils of the Thirty Years' War. From 1633 to 1635 he was chapelmaster to the royal court of Copenhagen. From 1635, apart from further visits to the Danish court, he remained, in spite of his frequent pleas for dismissal, in the Elector's service at Dresden.

After the early set of madrigals, almost all of Schütz's known works are vocal settings of sacred texts, with or without instruments. Of his known secular works, *Dafne* (performed 1627), the first German opera, and compositions for the marriage of Johann Georg II of Saxony in 1638 were lost. Schütz's special achievement was to introduce into German music the new style of the Italian monodists (as typified in Monteverdi's work) without creating an unsatisfactory hybrid. His music remains extremely individual and German in feeling. After the Latin of *Symphoniae sacrae I* (published 1629), he used the vernacular. The first German requiem was his *Musikalische Exequien* (published 1636) for soloists and choir, in which the writing for solo voice or duet is often florid in the Italian manner, while the choral sections are firmly based on German chorale tradition. The final section is for double choir, a form that recalls Schütz's studies with the earlier Venetian composers. Other principal works from the middle of his life are two sets of *Kleine geistliche Konzerte* (published 1636, 1639) for solo voice and continuo, *Geistliche Chormusik* (published 1648), and *Symphoniae sacrae II* and *III* (published 1647, 1650) for various combinations of voices and instruments. In all of these works, Schütz's strong dramatic sense has been noted.

The *Christmas Oratorio* (from a publication of 1664) for soloists, choir, and instruments foreshadows his austere last works. These are a cappella Passions, settings of the text of the Gospels according to Matthew, Luke, and John. In these works even the sparing vocal figuration of the *Christmas Oratorio* is absent. The plain scriptural text is delivered by the soloist in a kind of recitative, generally syllabic, while the words of the Jews, high priests, etc., are set as brief polyphonic choruses.

Schutzbund, in full REPUBLIKANISCHER SCHUTZBUND (German: Republican Defense League), paramilitary socialist organization active in Austria between World Wars I and II. Compared with its chief right-wing opponent force, the Heimwehr, the Schutzbund was tightly organized, having been created in 1923 from the workers' guards by the Austrian Social Democratic Party, of which the Schutzbund remained an adjunct. It was also descended from the People's Guard of 1918, a Social Democratic weapon against the Communists; it considered as its main objective the protection of a social reform program hated by Austria's conservative bourgeois parties.

After regular demonstrations, sometimes leading to conflict, throughout the 1920s, a clash in 1927 between Schutzbund and reactionary forces culminated in the accidental shooting of an old man and a child by the latter. Left-wing anger at the acquittal of the killers by a Vienna jury and the burning of a judicial court building resulted in worse disorders, which led to the suspension of Parliament in 1933. In February 1934 a short civil war resulted in the small Schutzbund being crushed by government troops and the Heimwehr after only four days' fighting. Following the *Anschluss* of 1938 the Nazis tried to win the proletariat with concessions, such as reinstating Schutzbund leaders into civilian life; but the organization's active life had ended in 1934.

Schutzstaffel (Nazi Germany): *see* SS.

Schutzvereinigung (Swiss league): *see* Sonderbund.

Schuyler, Philip John (b. Nov. 11, 1733, Albany, N.Y.—d. Nov. 18, 1804, Albany, N.Y., U.S.), American soldier, political leader, and member of the Continental Congress. Born into a prominent New York family, Schuyler served in the provincial army during the last French and Indian War (1755–60), rising to the rank of major. After the war he went to England (1761–63) to help negotiate the settlement of colonial war claims. He served in the New York Assembly (1768–75) and was a delegate to the Second Continental Congress in Philadelphia (1775–77). When the Revolutionary War broke out in 1775 he was commissioned one of the four major generals in the Continental Army.

Placed in command of the northern department, he made preparations for an invasion of Canada, but shortly after the expedition started, he fell ill, and the actual command devolved upon Gen. Richard Montgomery. Nonetheless, when the invasion proved a failure Schuyler's reputation suffered, and two years later, with the fall of Ft. Ticonderoga, N.Y., he was accused of incompetence and neglect of duty and was replaced by Gen. Horatio Gates. Court-martialled at his own insistence in 1778, Schuyler was acquitted of all charges, and resigned from the army the following year.

Schuyler was again a member of the Continental Congress (1778–80), and then served in the New York state senate (1780–84, 1786–90). He campaigned actively in New York for ratification of the new U.S. Constitution, and was one of his state's first two U.S. senators (1789–91). In 1791 he was defeated for reelection by Aaron Burr, and returned to the state senate (1792–97). He recaptured his seat from Burr in 1797, but was forced by ill health to retire less than a year later.

Schwab, Charles M(ichael) (b. Feb. 18, 1862, Williamsburg, Pa., U.S.—d. Sept. 18, 1939, New York City), entrepreneur of the early steel industry in the United States, who served as president of both the Carnegie Steel Company and United States Steel Corporation and later pioneered Bethlehem Steel into one of the nation's giant steel producers.

Schwab, the son of a woollen worker and blanket manufacturer, received a modest education in Loretto, Pa. After working briefly as a grocery clerk, he took a job as a labourer in the Andrew Carnegie-owned Edgar Thomson Steel Works at Braddock, Pa. It was there that his extraordinary ability to ingratiate himself and to facilitate harmonious working relationships led to his swift rise to the top of the Carnegie empire.

By the age of 19 he was assistant manager of the plant; and, after the plant superintendent was killed in an accident in 1887, Schwab took over management of the Thomson Works. Then in 1892 Andrew Carnegie appointed Schwab to heal the wounds between labour and management and to get the Homestead plant back into normal production after the bloody strike there. So greatly did Schwab improve labour and community relations at Homestead while simultaneously increasing production efficiency through technological advances that in 1897—at the age of 35—Charles M. Schwab became president of the Carnegie Steel Company at an annual compensation in excess of $1,000,000.

In December 1900, Schwab had dinner with financier J. Pierpont Morgan and broached the idea of creating a huge steel combine from several competing companies. Schwab made a list of the companies to be consolidated, proposed a method of financing, and then acted as intermediary between Morgan and Carnegie in the sale of the latter's operations. When the United States Steel Corporation came into being in 1901, 39-year-old Schwab was—at J.P. Morgan's insistence—made its first president. During his two-year stint at the head of U.S. Steel, Schwab earned more than $2,000,000 annually.

But Schwab's genius for human relations could not keep him at peace with the corporation's directors and with Morgan, and in 1903 he resigned. He then devoted his energies and his wealth to building up a much smaller enterprise—Bethlehem Steel Company—in which he had acquired a controlling interest in 1901. Schwab merged Bethlehem with the U.S. Shipbuilding Corporation to create Bethlehem Steel Corporation in 1904, and he eventually developed it into a rival of the steel-making giant that he and Morgan had jointly formed. Bethlehem first specialized in

making steel girders for skyscrapers but then boomed as a consequence of its supplying war matériel to the Allied powers during World War I. Between April and December of 1918, Schwab served—at the appointment of Pres. Woodrow Wilson—as director general of the Emergency Fleet Corporation, charged with greatly expediting the nation's shipbuilding capabilities.

Bethlehem and Schwab were later portrayed as "merchants of death" for making huge profits during the war years, but government charges to that effect were later repudiated by the courts. As president of the American Iron and Steel Institute from 1927 to 1932, Schwab was clearly the senior spokesman for the U.S. steel industry. He entered the last decade of his life with enormous wealth and prestige.

The Great Depression, some unwise investments, and a lifestyle too lavish even for a fortune estimated at $200,000,000 took their toll. He scaled down his expenses somewhat, but by the time that he died of heart disease in 1939 he was insolvent, having depleted the great fortune that he had accumulated as an authentic American tycoon.

Schwabach, Articles of, early Lutheran confession of faith, written in 1529 by Martin Luther and other Wittenberg theologians and incorporated into the Augsburg Confession by Philipp Melanchthon in 1530. It was prepared at the request of John the Steadfast, elector of Saxony, to provide a unifying document for the various Reformers and their followers, and was accepted by the secular leaders of Saxony and Brandenburg. Luther used the confession as the basis for the Articles of Marburg (October 1529). John submitted it as Saxony's official confession of faith to Emperor Charles V at Innsbruck in May 1530, prior to the Diet of Augsburg.

Schwabe, Samuel Heinrich (b. Oct. 25, 1789, Dessau, Anhalt—d. April 11, 1875, Dessau), amateur German astronomer who discovered that sunspots vary in number in a cycle of about 10 years; he announced his findings in 1843, after 17 years of almost daily observations. Schwabe also made (1831) the first known detailed drawing of the Great Red Spot on Jupiter. He was awarded the Gold Medal of the Royal Astronomical Society in 1857 and was elected a foreign member of the Royal Society in 1868—a singular honour for an amateur scientist at that time.

Schwaben (historic region, Germany): *see* Swabia.

Schwaben, English SWABIA, *Regierungsbezirk* (administrative district), southwestern corner of Bavaria *Land* (state), southern Germany. Schwaben is bordered by Austria to the south, Baden-Württemberg *Land* to the west, and the *Regierungsbezirke* of Mittelfranken (Middle Franconia) to the north and Oberbayern (Upper Bavaria) to the east. Created in 1934, the district occupies an area of 3,859 square miles (9,994 square km) and is coextensive with the eastern portion of the larger historic region of Swabia (*q.v.*). It derives its name from that of the Suebi, a Germanic people who (together with the Alemanni) occupied the territory between the upper Rhine and upper Danube rivers in the 3rd century AD and later expanded their holdings eastward to the Lech River. In 1806 the free imperial cities and small principalities comprising eastern Swabia were ceded to the Kingdom of Bavaria by Napoleon in his reorganization of Germany.

Schwaben lies in southern Germany's Alpenvorland (Alpine Foreland), largely on the Iller-Lech plateau where many river valleys drain from south to north. Comprising a series of glacial gravel terraces, the plateau is bounded by the Danube River to the north, the Lech River to the east, and the Iller River, which forms a section of Schwaben's boundary with Baden-Württemberg *Land,* to the west. A repeating pattern of fertile terraces, lined with small villages and situated between forested ridges and marshy valley floors, forms the predominant landscape. South of the plateau, tiers of morainic foothills with scenic alpine meadows, forests, and lakes comprise the Allgäu, Germany's leading cheese- and butter-producing region. Kempton serves as the marketing centre for the highly developed dairy industry and has textile, paper, and engineering industries. Further south the foothills rise to the steep mountain meadows and peaks of the Allgäuer Alpen (Allgäu Alps) near the Austrian border. Many popular winter and summer sports resorts, as well as health spas and medicinal springs, are located in the area, the best known being Oberstdorf. Near the resort town of Füssen, tourists can visit Neuschwanstein Schloss, the famous "fairy castle" built for King Ludwig II of Bavaria in 1869–86. North of the Danube River the Ries, a circular fertile lowland centred around the town of Nördlingen, forms a natural break between the Schwäbische Alb (Swabian Alps) and Fränkische Alb (Franconian Jura). The chief crops produced in the Ries include sugar beets, potatoes, and a variety of grains.

Industry in Schwaben is concentrated around the cities of Augsburg, the administrative seat, and Neu Ulm and radiates from the urban areas in ribbons along the Danube, Iller, Lech, and Wertach rivers. Augsburg, the third largest industrial centre in Bavaria and a major transportation junction, manufactures machinery, electrical products, textiles, and clothing. Neu Ulm's industries produce motor vehicles and machinery.

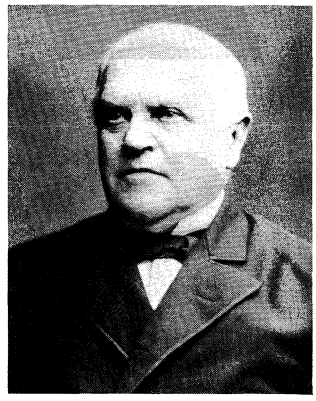
Bavarian Swabians speak Swabian, one of three main German dialects in Bavaria. The dialect's use in Bavaria is limited to the southwest because historically the north–south valleys formed a natural ethnographic barrier to eastward expansion. The predominant rural housing pattern in the morainic zone of southern Schwaben is one of dispersed farmsteads. Housing units are generally two stories with a vast overhanging roof and large balcony. The ground floor is used for livestock stalls, with living quarters above. In northern Schwaben the Ries is noted for its picturesque nucleated villages having a radial arrangement of streets converging on the village centre. A well-preserved example is Nördlingen, once a free imperial city and now a popular tourist stop along the Romantische Strasse (Romantic Highway), a route from Würzburg through Schwaben to the Alps. The town is centred around the Church of St. George (1427–1505) and surrounded by rings of old houses and a complete circle of medieval town walls. Higher education in the *Regierungsbezirk* is centred in Augsburg and includes the University of Augsburg, Rudolph Diesel polytechnic, and three colleges of music. More than three-quarters of the population of Schwaben are Roman Catholics. Pop. (1989 est.) 1,565,809.

Schwäbisch Gmünd, city, Baden-Württemberg *Land* (state), southwestern Germany, on the Rems River, east of Stuttgart just north of the Swabian Alps. The Roman *limes* (a defensive line of fortifications against the Germanic tribes) passed over the northern part of the city, where two castles were located. Chartered in 1162 and a free imperial city from 1268 to 1802, it has been noted for precious metalworking since the 14th century. Historic landmarks include the late Romanesque Johanneskirche (*c.* 1230) and the 14th-century Gothic Cathedral of the Holy Cross, and there are remains of the old fortifications. The city is a centre of the jewelry industry, and glassware manufacture was introduced after World War II by craftsmen from Gablonz (Jablonec), Czech. It has a technical school for precious metalworking. Pop. (1989 est.) 57,861.

Schwäbisch Hall, city, Baden-Württemberg *Land* (state), southern Germany, on the Kocher River, east of Heilbronn. The centre of the Hohenlohe lands, a free imperial city from 1276 to 1802, it owed both its foundation and its prosperity to its saline springs and the salt trade. It retains its medieval character, with a fine marketplace, half-timbered houses, and wooden bridges. Notable landmarks are the Gothic church of St. Michael (1527, on Romanesque foundations) at the top of a magnificent Baroque flight of steps (used as a summer open-air-theatre stage), the Gothic Fish Fountain (1509), and the Rococo town hall (1731–35). The Benedictine-abbey mountain fortress of Komburg is nearby. Schwäbisch Hall is a busy spa and manufactures building materials, electrical goods, and textiles. Pop. (1989 est.) 31,375.

Schwagerina, extinct genus of fusulinid foraminiferans, small, single-celled protozoans related to the modern amoeba but possessing a hard shell capable of being preserved in the fossil record. *Schwagerina* is a useful guide, or index, fossil for Early Permian rocks and time (the Permian Period began 286,000,000 years ago and lasted 41,000,000 years). Various forms or species of *Schwagerina* are recognized on the basis of distinctive shell form and internal structure. Many extensive petroleum deposits are associated with *Schwagerina.*

Schwann, Theodor (b. Dec. 7, 1810, Neuss, Prussia—d. Jan. 11, 1882, Cologne), German physiologist who founded modern histology by defining the cell as the basic unit of animal structure.



Schwann
Bruckmann—Art Reference Bureau

After studying medicine in Berlin, Schwann assisted the physiologist Johannes Peter Müller (1834–38). In 1836, while investigating digestive processes, he isolated a substance responsible for digestion in the stomach and named it pepsin, the first enzyme prepared from animal tissue. While professor of physiology at the University of Louvain, Belg. (1839–48), he observed the formation of yeast spores and concluded that the fermentation of sugar and starch was the result of life processes. He knew Matthias Schleiden well, and a year after the latter, working at University of Jena, advanced the cell theory for plants, Schwann extended it to animals in his *Microscopic Researches into Accordance in the Structure and Growth of Animals and Plants* (1839).

At the universities of Louvain and Liège, in Belgium (1849–79), he also investigated muscular contraction and nerve structure, discovering the striated muscle in the upper esophagus and the myelin sheath covering peripheral axons, now termed Schwann cells. He coined the term metabolism for the chemical changes that take place in living tissue, iden-

tified the role played by microorganisms in putrefaction, and formulated the basic principles of embryology by observing that the egg is a single cell that eventually develops into a complete organism.

Schwartz, Delmore (b. Dec. 8, 1913, Brooklyn, N.Y., U.S.—d. July 11, 1966, New York City), American poet, short-story writer, and literary critic noted for his lyrical descriptions of cultural alienation and the search for identity.

Educated at the University of Wisconsin, New York University, and Harvard University, Schwartz later taught at Harvard and at a number of other schools. His first book, *In Dreams Begin Responsibilities* (1939), which brought him immediate fame, included the short story of the title and a group of poems remarkable for their lyric beauty and imaginative power. His subsequent publications included *Shenandoah* (1941), a verse play; *Genesis, Book I* (1943), a long introspective poem; *The World Is a Wedding* (1948) and *Successful Love, and Other Stories* (1961), short stories dealing primarily with middle-class Jewish family life. His lucid and sensitive literary criticism was published in various periodicals. His *New and Selected Poems, 1938–1958* appeared in 1959. Schwartz served as an editor for *Partisan Review* (1943–55) and *The New Republic* (1955–57). The brilliant but mentally unstable Schwartz was the model for the title character in Saul Bellow's novel *Humboldt's Gift* (1975).

Schwartz, Melvin (b. Nov. 2, 1932, New York City), American physicist and entrepreneur who, along with Leon M. Lederman and Jack Steinberger, received the Nobel Prize for Physics in 1988 for their research concerning neutrinos (subatomic particles that have no electric charge and virtually no mass).

Schwartz studied physics at Columbia University, New York City, and received his Ph.D there in 1958. He taught at Columbia from 1958 to 1966 and then was a professor of physics at Stanford University from 1966 to 1983. From 1970 he was president of Digital Pathways, Inc., a company that he founded to design computer-security systems.

Schwartz received the Nobel Prize for research he and his Columbia colleagues Lederman and Steinberger performed at Brookhaven National Laboratory in 1960–62. Neutrinos almost never interact with matter, and consequently it had been extremely difficult to detect them in laboratory research. (It was estimated that from a sample of 10 billion neutrinos traveling through the Earth, only one neutrino would interact with a particle of matter during the entire passage.) Acting on Schwartz's suggestion, the three researchers devised a way to increase the statistical probability of neutrino interactions by producing a beam consisting of hundreds of billions of neutrinos and sending the beam through a detector of solid matter. To achieve this, the scientists used a particle accelerator to generate a stream of high-energy protons, which were then fired at a target made of the metal beryllium. The bombardment produced a stream of different particles, including those called pions (pi mesons) that, as they traveled, decayed into muons (mu mesons) and neutrinos. The stream of particles exiting from the beryllium target then passed through a steel barrier 13.4 m (44 feet) thick that filtered out all other particles except neutrinos. This pure neutrino beam subsequently entered a large aluminum detector in which a few neutrinos interacted with the aluminum atoms. In analyzing these interactions, the three physicists discovered a new type of neutrino, which came to be known as the muon neutrino.

Schwarz-Bart, André (b. 1928, Metz, Fr.), French novelist, author of what is regarded as one of the greatest literary works of the post-



Schwarz-Bart, 1959
Keystone

World War II period: *Le Dernier des justes* (1959; *The Last of the Just*).

Schwarz-Bart's parents, Polish Jews, moved to France in 1924. By 1941, when he was 13, they had been deported and killed by the Nazis. Young Schwarz-Bart, scarcely knowing French, was active in the Resistance movement and later, while working as a marginal labourer, taught himself to read and write French from library books. *Le Dernier des justes* probes the conscience of Europe during centuries of persecution and genocide of the Jewish people. It retraces the martyrdom of one of the traditional Jewish Lamed Waw Tzaddiqim ("The 36 Just Men"), Ernie Lévy, who, caught in the madness of Nazism, suffers every possible horror.

In 1966 Schwarz-Bart, with his West Indian wife, Simone, published *Un plat de porc aux bananes vertes* ("A Plate of Pork with Green Bananas"). It was the first of a cycle of novels in which the authors approach the problem of racism, tracing the historical misfortunes of blacks. Schwarz-Bart wrote *La Mulâtresse Solitude* (1972; *A Woman Named Solitude*); his wife wrote alone *Pluie et vent sur Télumée Miracle* (1972; "Rain and Wind on Télumée Miracle"; Eng. trans. *The Bridge of Beyond*) and *Ti Jean L'horizon* (1979).

Schwarzburg, either of two sovereign states in Germany before 1918, descended from the Thuringian lands that had been held by the medieval counts of Schwarzburg. Over the centuries the Schwarzburg lands were divided, redivided, or consolidated until the lines of Schwarzburg-Sondershausen and Schwarzburg-Rudolstadt emerged in 1584. The counts of Schwarzburg-Sondershausen were recognized as princes of the Holy Roman Empire in 1697 and those of Schwarzburg-Rudolstadt in 1710. Both principalities, as sovereign states, entered the Confederation of the Rhine in 1807 and the German Confederation in 1815. Both states declared themselves for Prussia in the Seven Weeks' War and entered the North German Federation (1866) and the German Empire (1871). On the death of the childless Charles Günther of Sondershausen in 1909, both states came under the rule of Günther Victor of Rudolstadt, in personal union. On the German Revolution of 1918, the prince abdicated, and both states became republics before merging themselves, in 1920, in the new state of Thuringia (Thüringen).

Schwarze Elster River, right-bank tributary of the Elbe River, rising in the Lusatian Mountains, about 4 miles (7 km) northwest of Bischofswerda, Ger. Flowing north, it leaves the mountains near Kamenz, where it turns northeast to enter the Upper Lusatia region. Between Hoyerswerda, where it turns west, and Senftenberg, the river passes through a lignite (brown coal) mining district and has been developed for industry. West of Senftenberg the river flows through forests into Lower Lusatia, a rich agricultural plain; there it receives several tributaries. At Elsterwerda it turns northwest and completes its 112-mile-(180-kilometre-) long course 9 miles (14 km) southeast of Wittenberg, where it joins the Elbe. The Schwarze Elster drains a basin of 2,123 square miles (5,498 square km).

Schwarzenberg, Felix, Fürst zu (prince of) (b. Oct. 2, 1800, Krummau, Bohemia [now Český Krumlov, Czech.]—d. April 5, 1852, Vienna), Austrian statesman who restored the Habsburg empire as a great European power after its almost complete collapse during the revolutions of 1848–49.

Entering the Austrian army in 1818, Schwarzenberg transferred to the diplomatic service in 1824 and became a protégé of the chief minister Prince Klemens von Metternich, serving in the Austrian embassies to Portugal, Russia, France, England, Sardinia, and the Two Sicilies.

With the outbreak of the 1848 revolutions in Italy, Schwarzenberg joined the Austrian army of Field Marshal Joseph, Graf Radetzky, in northern Italy and was wounded at Goito. When revolution broke out in Vienna on Oct. 6, 1848, Schwarzenberg tried to induce the military commander in that city to make a stand and remained there until October 13—four days after being summoned to join the Austrian imperial court, then in flight to Olmütz. On the advice of his brother-in-law, Alfred, prince von Windischgrätz (the field marshal on whom the court depended), Schwarzenberg was bidden to form a government in Vienna on October 19. On November 21 he was declared prime minister and foreign minister. He secured the replacement of



Felix, Fürst zu Schwarzenberg, detail from a lithograph by L. Müller
By courtesy of the Bild-Archiv, Osterreichische Nationalbibliothek, Vienna

the feebleminded emperor Ferdinand I by the 18-year-old Francis Joseph I (Dec. 2, 1848) and dissolved the Austrian constitutional convention assembled at Kremsier. The Kremsier Reichstag had drawn up a constitution that would have granted Austria's many nationalities far-reaching autonomy. The constitution sponsored by Schwarzenberg and introduced by decree on March 4, 1849, however, transformed the Habsburg empire into a unitary, centralized, absolutist state, with extensive imperial powers and the virtual elimination of special privileges for the empire's historic lands. The insurgent Hungarians were crushed with large-scale Russian military aid (1849), and Radetzky restored Austrian primacy in northern Italy.

While reestablishing order within Austria, Schwarzenberg pursued a strong foreign policy. At the Frankfurt Parliament (1848–49) he opposed the German nationalists who wished to exclude the non-German Habsburg lands from a new German state. Friction with Prussia almost led to war in 1850, but Austria, backed by Russia, forced Prussia to renounce its intentions to form a German state without Austria. Schwarzenberg thus obtained the revival of the former German Confederation in its old form. His efforts to join the Ger-

man Zollverein (customs union) and to bring the whole Habsburg empire into the German Confederation were, however, rejected by Germany's princes in 1851. With imperial power securely reestablished, he persuaded Francis Joseph to abolish the 1849 constitution on Dec. 31, 1851, thus introducing a new era of absolutism; but Schwarzenberg's pivotal role soon ended with his death.

Schwarzenberg, Karl Philipp, Fürst zu (prince of) (b. April 15, 1771, Vienna—d. Oct. 15, 1820, Leipzig [Germany]), Austrian field marshal and diplomat who was one of the most successful Allied commanders in the Napoleonic Wars and who contributed significantly to the French emperor's defeat in 1813–14.

Scion of one of the oldest aristocratic houses of the Habsburg empire, Schwarzenberg joined the Austrian army in 1787 and served against the Turks from 1788 to 1789. He was a cavalry officer during the War of the First Coalition against Revolutionary France (1792–97), and he distinguished himself during the War of the Second Coalition (1798–1802), covering the Austrian withdrawal after the defeat at Hohenlinden (1800). Saving his troops after the Austrian defeat at the Battle of Ulm (1805), Schwarzenberg became vice president of the Hofkriegsrat (Supreme Imperial War Council) and planned the creation of a popular militia to defend the Austrian domains. He partly initiated the army reforms that made possible Austria's early successes in the next war against Napoleon (1809), in which he also distinguished himself as a field commander in the Battle of Wagram. Schwarzenberg's most noteworthy diplomatic efforts were persuading the emperor Alexander I to delay Russian support of France in 1809 and, as ambassador to France, negotiating, one year later, the marriage between Napoleon and the Austrian emperor Francis I's daughter Marie-Louise. He also negotiated Austria's agreement to participate with France in the war of 1812 against Russia.



Karl Philipp, Fürst zu Schwarzenberg; engraving by J.G. Mansfeld

By courtesy of the Heeresgeschichtliches Museum, Vienna

In command of the Austrian contingent of Napoleon's army invading Russia, Schwarzenberg, in accordance with Austrian policy, held his forces back and during the winter of 1812–13 retreated into Austrian territory, thus facilitating the junction between Russian and Prussian forces. Henceforward he headed the party at the Austrian court that urged war against Napoleon, and in August 1813, when this policy prevailed, he was promoted to field marshal and appointed commander in chief of the Allied forces. On the advice of Field Marshal Joseph, Graf Radetzky, Schwarzenberg united the Allied armies near Leipzig and dealt Napoleon the decisive defeat (at the Battle of Leipzig) that liberated Germany. Following that success he pushed the French westward across the Rhine River and directed the Allies' operations in France that led to the final collapse of Napoleon's forces in 1814.

As head of the Hofkriegsrat from 1814, Schwarzenberg argued for more easily defensible frontiers for the Habsburg empire. At the Congress of Vienna (1815) he opposed Prussia's demand for all of Saxony, which would have meant the Prussian encirclement of Austrian-held Bohemia. He suffered a stroke in 1817 and died three years later.

Schwarzkopf, Elisabeth, in full OLGA MARIA ELISABETH FRIEDERIKE SCHWARZKOPF (b. Dec. 9, 1915, Jarotschin, near Posen, Ger. [now Poznań, Pol.]), German soprano who performed in the major opera houses of the Western world and is remembered especially for her mastery of German songs known as lieder.

She studied at the Berlin High School for Music from 1934, winning various prizes. She also studied at Leicester in England, under a League of Nations scholarship. Her first appearance on the stage was as a flower maiden in *Parsifal* at the Berlin Municipal Opera (1938), where she was soon singing various roles. She captured the attention of Maria Ivogün, a Hungarian soprano, who taught her lieder singing. Schwarzkopf's debut as a recitalist was in Berlin in 1942.

Schwarzkopf was the principal coloratura soprano at the Vienna State Opera from 1944 to 1950. She appeared frequently at Covent Garden in London, La Scala in Milan, and at the Bayreuth and Salzburg festivals. Her voice was powerful yet flexible and had a warm tone that, together with her interpretive talents, made her a successful singer of such diverse roles as Mimi (*La Bohème*), Pamina (*The Magic Flute*), Sophie (*Der Rosenkavalier*), and Madame Butterfly.

She created the role of Anne Trulove in Igor Stravinsky's *The Rake's Progress* (1951). She is especially associated with the roles of Zerbinetta in Richard Strauss's *Ariadne auf Naxos,* which she first portrayed in 1941, and Marschallin in *Der Rosenkavalier.* Schwarzkopf sang lieder in her American debut in New York City in October 1953, and thereafter she toured for a year in the United States.

In October 1955 she began singing opera in the United States with the San Francisco Opera Company, premiering as Marschallin. Nine years later she appeared for the first time at the Metropolitan Opera in New York City in the same role and sang with the Metropolitan for two seasons.

In 1971 Schwarzkopf announced her retirement from the stage. In 1975 she gave a farewell recital tour in the United States. She was married in 1953 to Walter Legge, artistic director for a recording company and a founder of the London Philharmonic. Working with her husband, she recorded the major Mozart operas, Richard Strauss's songs, and works by J.S. Bach, Johannes Brahms, Gustav Mahler, and Hugo Wolf. She also appeared in a film of a Salzburg stage production of *Der Rosenkavalier* (1961).

Schwarzschild, Karl (b. Oct. 9, 1873, Frankfurt am Main, Ger.—d. May 11, 1916, Potsdam), German astronomer whose contributions, both practical and theoretical, were of primary importance in the development of 20th-century astronomy.

Schwarzschild's exceptional ability in science became evident at the age of 16, when his paper on the theory of celestial orbits was published. In 1901 he became professor and director of the observatory at the University of Göttingen, and eight years later he was appointed director of the Astrophysical Observatory at Potsdam.

While at Göttingen, Schwarzschild introduced precise methods in photographic photometry. The results of his studies clearly demonstrated the relationship between the spectral type and colour of a star. He pioneered in the use of a coarse grating (for example, a glass plate with closely spaced parallel lines etched into it) in the course of measurement of the separation of double stars; the technique has found widespread use in determining stellar magnitude and colour. He also developed certain basic methods for the analysis of solar spectra obtained during eclipses.

Schwarzschild enunciated the principle of radiative equilibrium and was the first to recognize clearly the role of radiative processes in the transport of heat in stellar atmospheres. His hypothesis of stellar motion is one of the most important results to come out of his fundamental work in modern statistical methods in astronomy. He also made theoretical studies of the pressure exerted on small, solid particles by radiation.



Schwarzschild

By courtesy of Bildarchiv Preussischer Kulturbesitz BPK, Berlin

Schwarzschild made fundamental contributions to theoretical physics and to relativity. He was one of the great pioneers in developing the theory of atomic spectra proposed by Niels Bohr. Independently of Arnold Sommerfeld, Schwarzschild developed the general rules of quantization, gave the complete theory of the Stark effect (the effect of an electric field on light), and initiated the quantum theory of molecular spectra.

Schwarzschild gave the first exact solution of Einstein's general gravitational equations, which led to a description of the geometry of space in the neighbourhood of a mass point. He also laid the foundation of the theory of black holes by using the general equations to demonstrate that bodies of sufficient mass would have an escape velocity exceeding the speed of light and, therefore, would not be directly observable.

While serving in the imperial German army during World War I, Schwarzschild contracted a fatal illness.

Schwarzschild radius (physics): *see* gravitational radius.

Schwarzwald (Germany): *see* Black Forest.

Schwassmann-Wachmann 1, Comet, comet discovered photographically by the German astronomers Friedrich Carl Arnold Schwassmann and Arthur Arno Wachmann in 1927. It has the most nearly circular orbit of any comet known (eccentricity 0.131) and remains always between the orbits of Jupiter and Saturn. It is also remarkable for explosion-like changes in its brightness, which sometimes increases by several magnitudes in a matter of hours.

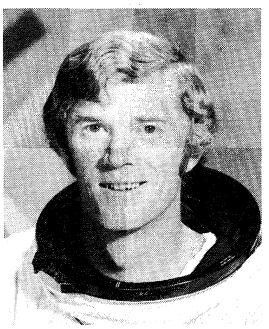
Schwechat, town, *Bundesland* ("federal state") Niederösterreich, northeastern Austria, on the west bank of the Danube near the mouth of the Schwechat River, just southeast of Vienna. The site of a Roman camp, the town was first mentioned in the 11th century and was granted market rights in 1624. It was a district of Vienna from 1938 until it was returned to Niederösterreich in 1954. The Rococo parish church of St. Jakob (1764) has notable interior decorations. A brewing (lager beer) town, it is also an important industrial centre with a major oil

refinery, chemical industries, and flour mills. The main Vienna airport is at Schwechat. Pop. (1981) 14,844.

Schwedt, in full SCHWEDT AN DER ODER, city, Brandenburg *Land* (state), eastern Germany, on the Westoder River, southwest of Szczecin (German Stettin), Pol. Mentioned as a town in 1265, it was the seat of a lordship that passed from Pomerania (Polish Pomorze) to Brandenburg in 1479. From 1689 to 1788 it was a seat of the Hohenzollern line of the Brandenburgs. The town suffered widespread destruction in World War II, but the palace (1719–23) survived. Traditionally the centre of a tobacco-growing region, Schwedt has grown rapidly since World War II through extensive industrial development. An oil refinery—connected by pipeline with the U.S.S.R., with the Baltic port of Rostock, and with the Leuna chemical complex near Halle—commenced operations in 1964. Fertilizer and paper plants have also been established. Pop. (1989 est.) 52,419.

Schweickart, Russell L(ouis) (b. Oct. 25, 1935, Bailey's Corner, N.J., U.S.), U.S. astronaut, participant in the Apollo 9 mission (March 3–13, 1969), in which the Lunar Landing Module was given its first manned flight test.

Schweickart and Comdr. James A. McDivitt spent 28 hours in the Lunar Module, separating it from the Command Module, flying it more than 100 miles (160 kilometres), opening its hatches so that Schweickart could take a 40-minute space walk, then making a rendezvous and docking about 6½ hours later. David R. Scott piloted the Command Module.



Schweickart, 1971

By courtesy of the National Aeronautics and Space Administration

After graduating (1956) from the Massachusetts Institute of Technology (MIT), Cambridge, Schweickart spent four years as a pilot in the U.S. Air Force before returning to MIT, which awarded him an M.S. degree in aeronautics and astronautics in 1963, the year in which he was selected for the manned space program.

When Project Apollo ended, Schweickart remained in administrative positions in the National Aeronautics and Space Administration until taking a leave of absence in 1976 to serve as science adviser to Gov. Edmund G. Brown, Jr., of California, then as chairman of the California Energy Commission.

Schweidnitz (Poland): *see* Świdnica.

Schweigaard, A(nton) M(artin) (b. April 11, 1808, Kragerø, Nor.—d. Feb. 1, 1870, Christiania), Norwegian jurist and economic reformer who helped bring about Norway's change to a capitalist economy.

A professor of jurisprudence and economics in the 1830s and 1840s and an extremely influential publicist for economic liberalism, Schweigaard was elected to the Storting (parliament) in 1842, serving in that body until 1869. As a legislator and as a member of various parliamentary and governmental committees, he was a leader in Norway's transition from a mercantilist–agricultural economy to one of free enterprise. Coordinating his activities with Frederik Stang, his kindred spirit in the government, Schweigaard helped to bring about such essential economic reforms as free trade, freedom of choice of occupation, and road and railway development. He was also a supporter of a modern, as opposed to a classical, educational curriculum and a zealous champion of the temperance movement. When he left Parliament in 1869, Norway was well on its way to a modernized economy.

Schweinfurt, city, Bavaria *Land* (state), central Germany, situated on the canalized Main River, northeast of Würzburg. First mentioned in 791, the city was the seat of a margrave in the 10th century and became a free imperial city in 1254. Schweinfurt was occupied during the Thirty Years' War (1618–48) by Gustavus Adolphus, who erected fortifications (ruins remain). It passed to Bavaria in 1803. Notable landmarks include the late Gothic town hall (1570–72), St. Johannes' Church (1554–62), and the Old Gymnasium (1581–83) housing the municipal museum. Friedrich Rückert, the 19th-century German lyrical poet, was born in Schweinfurt.

The city is the industrial centre of the Lower Franconia region and manufactures include steel, motor vehicles, and electronics. It is the centre of a wine-growing area and has breweries and an important sheep and cattle market. Pop. (1989 est.) 52,818.

Schweinfurth, Georg August (b. Dec. 29, 1836, Riga, Russia—d. Sept. 19, 1925, Berlin), German botanist and traveller who explored the region of the Upper Nile Basin known as the Bahr el Ghazal and discovered the Uele River, a tributary of the Congo.

Interest in African plants took him across the Red Sea to the Sudanese port of Suakin and overland to Khartoum (now the capital of The Sudan) in 1863.



Schweinfurth, detail from an engraving by A. Weger, after a photograph

Bavaria-Verlag

On his return to Berlin in 1866, he obtained a grant permitting him to conduct a botanical exploration in the Bahr el Ghazal region. He went back to Khartoum by way of Suakin in January of 1869, where he began his ascent of the White Nile and then ventured into the southwestern Sudan region with a party of ivory traders. He visited the Bongo and Mangbetu peoples as well as the allegedly cannibalistic Naim-Naim, who filed their teeth to points. He also provided the first authoritative account of the Congo pygmies. He crossed the Nile–Congo watershed and, in March 1870, reached the westward-flowing Uele River, an affluent of the Congo, which he mistook for a part of the Niger River. His discovery of the Uele, however, helped toward a final estimate of the extent of the Nile system. In 1873 he published *The Heart of Africa.* From 1875 to 1888 he lived in Cairo, studying the botany, geology, paleontology, and archaeology of Egypt and Near Eastern regions.

Schweitzer, Albert (b. Jan. 14, 1875, Kaysersberg, Upper Alsace, Ger.—d. Sept. 4, 1965, Lambaréné, Gabon), German theologian, philosopher, organist, and mission doctor in equatorial Africa, who received the 1952 Nobel Peace Prize for his efforts in behalf of "the Brotherhood of Nations."

The eldest son of a Lutheran pastor, Schweitzer studied philosophy and theology at Strasbourg, where he took the doctor's degree



Schweitzer, photograph by Yousuf Karsh

© Karsh from Rapho/Photo Researchers—EB Inc.

in philosophy in 1899, and in theology the following year. His *Von Reimarus zu Wrede* (1906; *The Quest of the Historical Jesus,* 1910) established him as a world figure in theological studies. During these years Schweitzer also became an accomplished musician, beginning his career as an organist in Strasbourg in 1893. Charles-Marie Widor, his organ teacher in Paris, recognized Schweitzer as a Bach interpreter of unique perception and asked him to write a study of the composer's life and art. The result was *J. S. Bach: le musicien-poète* (1905).

In 1905 Schweitzer announced his intention to become a mission doctor in order to devote himself to philanthropic work, and in 1913 he became a doctor of medicine. With his wife, Hélène Bresslau, who had trained as a nurse in order to assist him, he set out for Lambaréné in the Gabon province of French Equatorial Africa. There on the banks of the Ogooué (Ogowe) River, Schweitzer, with the help of the natives, built his hospital, which he equipped and maintained from his income, later supplemented by gifts from individuals and foundations in many countries. Interned there briefly as an enemy alien (German), and later in France as a prisoner of war during World War I, he turned his attention increasingly to world problems and was moved to write his *Kulturphilosophie* (1923; "Philosophy of Civilization"), in which he set forth his personal philosophy of "reverence for life," an ethical principle involving all living things, which he believed essential to the survival of civilization.

Schweitzer returned to Africa in 1924 to rebuild the derelict hospital, which he relocated some two miles up the Ogooué River. A leper colony was added later. By 1963 there were 350 patients with their relatives at the hospital and 150 patients in the leper colony, all served by about 36 white physicians, nurses, and varying numbers of native workers.

Schweitzer never entirely abandoned his musical or scholarly interests. He published *Die Mystik des Apostels Paulus* (1930; *The Mysticism of Paul the Apostle,* 1931), gave lectures and recitals throughout Europe, made record-

ings, and resumed his editing of Bach's works, begun with Widor in 1911 (*Bachs Orgelwerke,* 1912–14). His address upon receiving the Nobel Peace Prize, *Das Problem des Friedens in der heutigen Welt* (1954; *The Problem of Peace in the World of Today,* 1954), had a worldwide circulation.

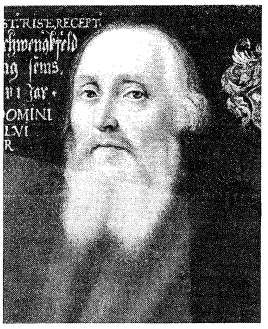
Schweiz: *see* Switzerland.

Schweizerische Nationalpark (Switzerland): *see* Swiss National Park.

Schweizerisches Zivilgesetzbuch: *see* Swiss Civil Code.

Schwenckfeld (von Ossig), Kaspar (b. 1489, Ossig, Lower Silesia—d. Dec. 10, 1561, Ulm), German theologian, writer, and preacher who led the Protestant Reformation in Silesia, founded the movement called Reformation by the Middle Way, and established societies that in the United States survive as the Schwenckfelder Church.

Born into the nobility, Schwenckfeld grew up on the family estate and studied at the



Schwenckfeld, detail from a portrait by an unknown artist, 1556; in the Schwenkfelder Library, Pennsburg, Pa.

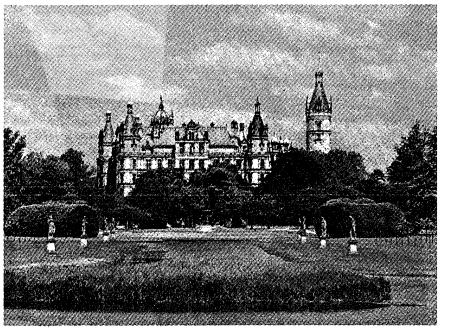
By courtesy of the Schwenkfelder Library, Pennsburg, Pa.

universities of Cologne and Frankfurt. In 1518, while serving as a counsellor to various courts (1511–23), he experienced a spiritual awakening. Seven years later he visited Martin Luther in Wittenberg to submit his views on the Eucharist. Their conference ended in disagreement, however, and Schwenckfeld returned to Silesia to further develop his own theology and his plan for reformation. His approach, designated the Middle Way, sought to establish a course between Catholic and Lutheran doctrines, both of which he claimed were diverting attention from Christ to external religious symbols. After publication of strongly anti-Catholic and anti-Lutheran views resulted in his final dismissal by the Duke of Liegnitz, Schwenckfeld went (1529) to Strassburg, where he met the theologians Sebastian Franck, Melchior Hofmann, and Michael Servetus and the Swiss physician Paracelsus and the Swiss Reformer Huldrych Zwingli, who had published Schwenckfeld's work on the sacraments. Because he was unable to reconcile his differences with Zwingli, Schwenckfeld was not invited to participate in the Colloquy of Marburg in 1529, where his views on the Eucharist were dismissed by the debaters.

Schwenckfeld's defense of his doctrines and the principles of religious liberty against the German Reformer Martin Bucer at a synod in Strassburg (1533) did not persuade the leaders of orthodox groups to relax their control over the synod. Unwelcome in the city, Schwenckfeld left, eventually settling in Ulm, from which he was expelled in 1539 by Lutherans angered by his emphasis on the deification of Christ's humanity. The next year he published a more detailed refutation of the attacks on his doctrine entitled *Grosse Confession* ("Great Confession"). This work stressed differences between Lutherans and Zwinglians regarding the Eucharist at a time when efforts were being made to reconcile them. An anathema was accordingly issued against him by the Schmalkaldic League, a defensive organization of Protestant princes; his books were placed on the Protestant index of prohibited reading; and he became a religious fugitive. His followers, meanwhile, divorced themselves from orthodox church circles and formed small societies and brotherhoods. Throughout the rest of his life he remained in hiding, frequently changing his home, writing under a variety of pseudonyms, and answering his critics with a constant flow of pamphlets and books. The brotherhoods remained active in southern Germany after Schwenckfeld's death, but their vitality was virtually destroyed during the Thirty Years' War.

Schwerin, until 1990 a *Bezirk* (district) of northwestern East Germany, formed in 1952 from parts of Mecklenburg and Brandenburg. With an area of 3,348 square miles (8,672 square km), it extended northward from the Elbe River toward the Baltic Sea and was bounded (west) by West Germany. The region consists of sandy plains and part of the Prignitz heathland, in the south, merging into the moraine of the Mecklenburgische Seenplatte (Mecklenburg Lake Plateau) in the north. The region is largely agricultural, supporting wheat and sugar beets on the moraine; and rye, potatoes, or pine plantations in the sand areas. Livestock raising and dairying are important, along with some fruit growing in the northeast, as well as forestry and peat cutting. The district's principal towns, all of them small, besides Schwerin (the former capital) were Güstrow, Bützow, Wittenberge, Parchim, and Perleberg. Pop. (1989 est.) 594,342.

Schwerin, city, capital of Mecklenburg-West Pomerania *Land* (state), northern Germany, on the southwestern shore of the Schweriner See (lake), southwest of Rostock. Originally a Wendish settlement first mentioned in 1018, the German town was founded and chartered by the Saxon duke Henry the Lion in 1160. A bishopric was established there *c.* 1170, and



Former ducal palace at Schwerin, Ger.

W. Krammisch—Bruce Coleman Inc./EB Inc.

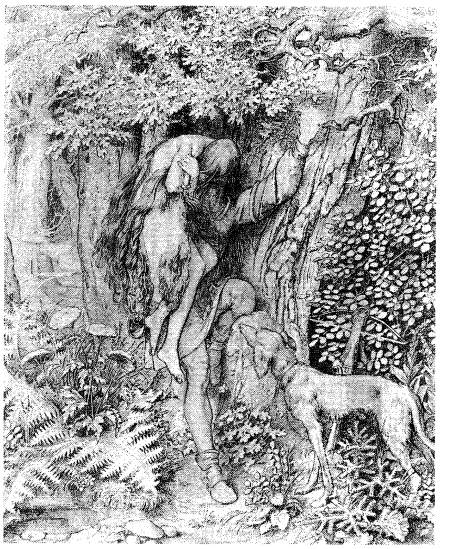
Schwerin also became the seat of a countship. The city and county of Schwerin passed in 1358 to Mecklenburg, as did the lands of the bishopric when it was secularized in 1648. The Reformation was introduced in 1524, and Schwerin was occupied (1624–31) during the Thirty Years' War by imperial troops under Albrecht von Wallenstein. The town was the capital of Mecklenburg-Schwerin from 1352 to 1471, from 1621 to 1695, and from 1701 until 1934, when it became the capital of a unified Mecklenburg *Land.* From 1952 to 1990 the city was capital of the Schwerin *Bezirk* (district) of East Germany. Historic buildings include the former ducal palace (rebuilt 1843–57), the palace church (1560–63), and the mainly Gothic cathedral (1270–1416; completed 1890).

A rail and commercial centre for a dairying and agricultural region, with light pharmaceutical industries, Schwerin experienced considerable industrial development after 1945. Manufactures include agricultural machinery, cranes, plastics, cables, wood products, and cigarettes. Pop. (1989 est.) 130,685.

Schwertbrüderorden: *see* Brothers of the Sword, Order of the.

Schwind, Moritz von (b. Jan. 21, 1804, Vienna—d. Feb. 8, 1871, Munich), Austrian-born German painter who was a leading early Romantic portrayer of an idealized Austria and Germany—of knights, castles, and the provincial charm of his own time.

Something of a bohemian in his youth, Schwind joined the composer Franz Schubert's circle of friends, roomed with him for a while, and painted the composer and his



"The Faithful Sister and the King's Son," pen and ink drawing by Moritz von Schwind, 1835; in the Münchner Stadtmuseum, Munich

By courtesy of the Munchner Stadtmuseum

piano soirees. Like Schubert, he was neglected in his native city. Often in arrears, he once painted a signboard for a coffee house to settle his debts there.

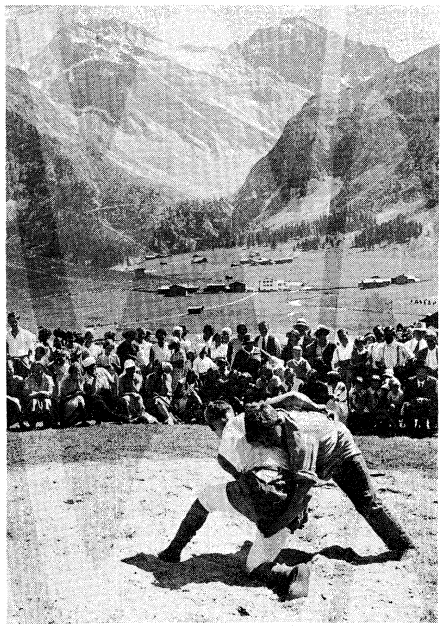
After a fit of despair, and with the encouragement of the painter Julius Schnorr von Carolsfeld, Schwind moved in 1828 to Munich, where his work quickly fetched high prices. In 1847 he became a professor at the Munich Academy, painting a set of historical cartoons for the famed Wartburg Castle and a triptych for the Church of Our Lady at Munich. Travels abroad were followed by a commission to paint the windows of the Glasgow cathedral.

Schwind is best known, however, for his pictures of honeymooners, leave-takers, musing wanderers, and the like. In these, sentimentality is tempered by genuine lyricism, sturdy craftsmanship, and a flair for precise detail.

Schwind's closing years brought more commissions than he could handle; but this period was blighted by failing vision and by the sorrows of the Franco-Prussian War, in which two nephews died in a single day.

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Schwingen (German: "swinging"), form of wrestling native to Switzerland and the Tirolese valleys. Wrestlers wear *Schwinghosen* (wrestling breeches) with strong belts on which holds are taken. Lifting and tripping are common, and the first man down loses the



Alpine *Schwingen* in the Sertig Valley, near Davos, Switz.
E. Meerkamper

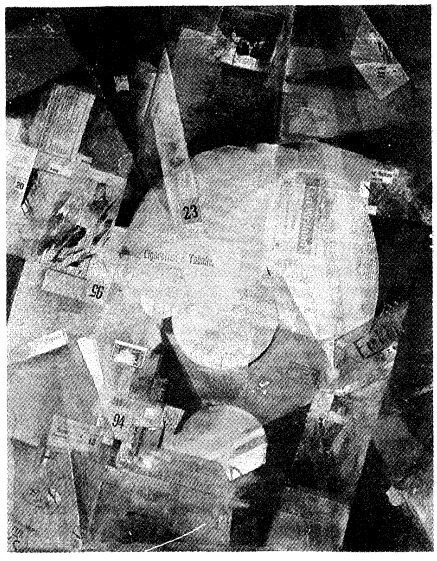
bout. *Schwingen* tournaments were organized as early as 1805.

Schwinger, Julian Seymour (b. Feb. 12, 1918, New York City), U.S. physicist, joint winner, with Richard P. Feynman (U.S.) and Tomonaga Shin'ichirō (Japan), of the Nobel Prize for Physics in 1965 for his work in formulating quantum electrodynamics and thus reconciling quantum mechanics with Einstein's special theory of relativity.

A child prodigy, Schwinger received his Ph.D. from Columbia University at age 21. From 1939 to 1941 he worked under J. Robert Oppenheimer at the University of California, Berkeley.

In 1945 Schwinger joined the faculty of Harvard University, where he formulated his theory of quantum electrodynamics, unaware that Feynman and Tomonaga were independently working on the same problem. From 1972 he was professor of physics at the University of California, Los Angeles.

Schwitters, Kurt (b. June 20, 1887, Hannover, Ger.—d. Jan. 8, 1948, Little Langdale, Westmorland, Eng.), German Dada artist and poet, best known for his collages and relief constructions.



"Picture with Light Center," collage of paper with oil on cardboard by Kurt Schwitters, 1919; in the Museum of Modern Art, New York City
By courtesy of the Museum of Modern Art, New York City

Soon after World War I Schwitters was attracted by the emerging Dada (*q.v.*) school, a nihilistic literary and artistic movement dedicated to the destruction of existing aesthetic values. Having been denied membership in the Berlin circle of Dada artists, he formed his own variant in Hannover. He began to create compositions assembled from various everyday used objects (train tickets, wooden spools, newspaper, string, cigarettes, and postage stamps). Similarly, his poems were composites of newspaper headlines, advertising slogans, and other printed ephemera. He referred to all of his artistic activities as *Merz,* a nonsense word derived from the second syllable of the word *Kommerz* (German: "commerce"). His collages were called *Merzbilden* ("*Merz* pictures"). Later, he also referred to all of his daily activities and even to himself by that name.

About 1920 Schwitters conceived the idea of building a cathedral of everyday objects. He built this three-dimensional assemblage, called *Merzbau* ("*Merz* building"), into his house in Hannover and continued to add to it for 16 years until there was little room left in the house for anything else. Unfortunately, it was destroyed during World War II.

In 1937, when the German government declared Schwitters' art decadent, he moved to Norway, where he began a second *Merzbau* (destroyed by fire in 1951). With the German invasion of Norway in 1940, however, Schwitters was forced to escape to England. There, with the aid of the Museum of Modern Art in New York City, he began work on the third *Merzbau* but died before completing it. *Merzbau III* is preserved at the University of Newcastle, Newcastle upon Tyne.

Schwyz, canton, central Switzerland, traversed by the valleys of the Muota and the Sihl. It has an area of 350 sq mi (908 sq km), of which more than three-quarters is reckoned as productive (forests covering about 92 sq mi); and about 25 sq mi are occupied by lakes, chiefly parts of Lakes Zürich and Lucerne, a small area of Lake Zug, and the whole of Lakes Lauerz and Sihl. Its highest point is the Ortstock (8,911 ft [2,716 m]), and two of the loftiest summits of the Rigi massif (the Kulm, 5,899 ft, and the Scheidegg, 5,463 ft) are within its borders; but, on the whole, the land is hilly rather than mountainous. The valley of Schwyz was first mentioned in 972 as Suittes. Later, a community of freemen settled at the foot of the Grosser Mythen (6,230 ft), subject only to the count of the Zürichgau, as representing the German king. In 1240 the community, then comprising the district around the village of Schwyz and the Muota Valley, obtained the privilege of being subject immediately to the empire. After Rudolf IV of Habsburg (later Rudolf I of Germany) refused to recognize its privileges, Schwyz took the lead in forming the Everlasting League of 1291 with the neighbouring districts of Uri and Unterwalden. The leadership of Schwyz in the early history of the league led to the application of its name in dialectical form, Schweiz (Switzerland), to the three founder cantons as early as 1320 and to the whole confederation by 1352 (although it became the official name only after 1803). After the victory over Austria at Sempach (1386), Schwyz greatly extended its borders. Schwyz opposed the Reformation and took part in the Battle of Kappel (1531), in which the Swiss Reformation leader Huldrych Zwingli fell. It formed part of the Helvetic Republic in 1798, regaining its status as an independent canton in 1803. Schwyz joined the Sonderbund (separatist Catholic league) in 1845. The cantonal constitution of 1848, which put an end to the ancient Landsgemeinde (open-air elections of the canton, with voting by show of hands), was revised in 1876 and 1898.

The canton is primarily pastoral and noted for its local breed of brown cattle. Industrial activity (textiles and furniture) is centred near Schwyz and Lake Zürich, and there are hydroelectric power plants along the Wägitaler See (lake). There are mountain railways, but few major railroad lines. The largest towns are the capital, Schwyz (*q.v.*), and the pilgrimage centre of Einsiedeln. The population is predominantly German speaking and Roman Catholic. Pop. (1983 est.) 98,707.

Schwyz, capital of Schwyz canton, central Switzerland, at the foot of the Grosser Mythen (6,230 ft [1,899 m]), just east of Luzern and 3 mi (5 km) northeast of Brunnen, its port on Lake Lucerne (Vierwaldstätter See). The traditional centre of the canton, its Bundesbriefarchiv (Federal Archives, 1936) houses the 1291 charter of the Swiss Confederation. Notable buildings include the Baroque Church of St. Martin (1769–74), the Gothic Kerchel



The town hall, Schwyz, Switz., with the Grosser Mythen peak in the background
Beringer and Pampaluchi

Chapel, the ancient St. Peter's nunnery (rebuilt 17th century), the cantonal historical museum, the town hall (1642–45), the Kollegium Mariahilf (a Roman Catholic college), and several 16th- and 17th-century patrician houses. A popular summer resort with a mild climate, it is the starting point for mountain tours; the well-known skiing regions of Ibergeregg, Holzegg, and Stoos are nearby. The population is largely Roman Catholic and German speaking. Pop. (1983 est.) 12,336.

Sciacca, town, Agrigento province, southern Sicily, Italy, northwest of Agrigento. Occupying the site of the Roman Thermae Selinuntinae, it has been known since antiquity as a health resort with hot sulfur springs. Although the coastal town has a modern appearance, notable older structures include the town walls (1336; rebuilt *c.* 1550), the ruined castle of Luna (a Spanish family who were rival lords of the town with the Perollo family in the 15th and 16th centuries), the 14th-century Palazzo Steripinto, and the 14th- and 15th-century church of Sta. Margherita.

Sciacca is an agricultural centre and has a fishing harbour. Pop. (1981 prelim.) mun., 34,294.

Sciadopitys verticillata (tree): *see* umbrella pine.

sciatic nerve, largest and thickest nerve of the human body that is the principal continuation of all the roots of the solar plexus. It emerges from the spinal cord in the lumbar

portion of the spine and runs down through the buttocks and the back of the thigh; somewhat above the back of the knee it divides into the tibial and the common peroneal nerve, both of which serve the lower leg and foot.

sciatica, pain along the course of the sciatic nerve, which runs from the lower back down the legs. The pain often develops following an unusual movement or exertion that places a strain on the lumbar portion of the spine, where the nerve has its roots, either immediately or after an interval of several hours to a few days. The pain may become more severe with coughing, sneezing, and flexion of the neck. It is relieved by positions that minimize traction on the sciatic nerve; for this reason, a person with sciatica tends to walk with the affected leg bent at the knee and externally rotated at the hip.

Sciatica is commonly associated with the rupture of a portion of an intervertebral disk into the spinal canal. Most cases, including those in which the nerve is displaced by protruding disk substance, can be treated effectively by bed rest on a firm mattress for several days to a few weeks. In some instances, however, surgical decompression of the nerve is necessary in order to prevent repeated attacks of disabling pain or to relieve serious, progressive disturbances in function of the sciatic nerve, which take the form of weakness and sensory loss in the leg.

Sciatica usually is a benign, if temporarily disabling, reflection of human structural imperfection. It may also, however, develop as a symptom of some local compressive lesion other than a protruded intervertebral disk; or it may indicate a more generalized disorder involving the peripheral nerves.

Scicli, town, Ragusa *provincia,* southeastern Sicily, Italy, south of Ragusa city. It flourished under the Saracens and Normans but later declined and was heavily damaged by the earthquake of 1693. Subsequently it was rebuilt on a regular pattern, and its principal buildings are in the Baroque style. Agriculture and asphalt mining are important. Pop. (1988 est.) 25,185.

science, any of various intellectual activities concerned with the physical world and its phenomena and entailing unbiased observations and systematic experimentation. In general, a science involves a pursuit of knowledge covering general truths or the operations of fundamental laws.

Science is treated in a number of articles in the MACROPAEDIA. For the history of Western and Eastern science, *see* Science, The History of. For the conceptualization of science and its interrelationships with culture, *see* Philosophies of the Branches of Knowledge. For the basic aspects of the scientific approach, *see* Physical Sciences, Principles of. For the historical development of the different sciences and their scope, component disciplines, methods, and principal problems, *see* Physical Sciences, The; Earth Sciences, The; Biological Sciences, The; Medicine; Engineering; Social Sciences, The.

For a description of the place of science in the circle of learning and for a list of both MACROPAEDIA and MICROPAEDIA articles on the subject, *see* PROPAEDIA: Part Ten, Division III.

Science, Museum of, in Boston, major American museum of science and technology, founded in 1830. Its exhibits include rocks, minerals, plants, mounted animals, models of rockets and satellites, medical topics, electricity, and other topics. The Charles Hayden Planetarium is on the museum grounds, and there is an extensive science library. Publications include a monthly newsletter.

Science and Industry, Museum of, science museum established in Chicago in 1926 by the philanthropist-founder Julius Rosenwald. He had seen the Deutsches Museum in Munich and wished to have a museum of the same type established in the United States. The collections are housed in the rebuilt (1928–32) Palace of Fine Arts from the World's Columbian Exposition that had been held in Chicago in 1893. The museum has major exhibits on mining, automobiles, telecommunications, aviation and aeronautics, space travel, agriculture, and medicine.

science fiction, literary genre developed in the 20th century in which the fiction writer treats how scientific discoveries, technological developments, and future events and societal changes affect human beings. The description of these influences may be a careful and informed extrapolation of scientific facts and principles, or it may range into farfetched areas flatly contradictory of such facts and principles. In either case, plausibility based on science is a requisite, so that such precursors of the genre as Mary Shelley's Gothic novel *Frankenstein, or the Modern Prometheus* (1818) and Robert Louis Stevenson's *Strange Case of Dr. Jekyll and Mr. Hyde* (1886) are science fiction, whereas Bram Stoker's *Dracula* (1897), based as it is purely on the supernatural, is not.

Science fiction was made possible only by the rise of modern science itself, notably the revolutions in astronomy and physics. Aside from the age-old genre of fantasy literature, which does not qualify, there were notable precursors: imaginary voyages to the moon or to other planets in the 18th century and space travel in Voltaire's *Micromégas* (1752); alien cultures in Jonathan Swift's *Gulliver's Travels* (1726); and science-fiction elements in the 19th-century stories of Edgar Allan Poe, Nathaniel Hawthorne, and Fitz-James O'Brien. Science fiction proper began, however, toward the end of the 19th century with the scientific romances of Jules Verne, whose science was rather on the level of invention, as well as the science-oriented novels of social criticism by H.G. Wells.

The development of science fiction as a self-conscious genre dates from 1926 when Hugo Gernsback (*q.v.*), who coined the portmanteau word scientifiction, founded *Amazing Stories* magazine, which was devoted exclusively to science-fiction stories. Published as they were in this and other pulp magazines with great and growing success, such stories were not viewed as serious literature but as sensationalism. With the advent in 1937 of a demanding editor, John W. Campbell, Jr., of *Astounding Science Fiction* (founded in 1930) and with the publication of stories and novels by such writers as Isaac Asimov, Arthur C. Clarke, and Robert A. Heinlein, science fiction emerged as a mode of serious fiction. Ventures into the genre by writers not devoted exclusively to science fiction, such as Aldous Huxley, C.S. Lewis, and Kurt Vonnegut, also added respectability.

A great boom in the popularity of science fiction followed World War II. The increasing intellectual sophistication of the genre and the emphasis on wider societal and psychological issues significantly broadened the appeal of science fiction to the reading public. Science fiction became international, extending into the Soviet Union and other eastern European nations. Serious criticism of the genre became common, and, in the United States particularly, science fiction was studied as literature in colleges and universities. Magazines arose that were dedicated to informing the science-fiction fan on all aspects of the genre. Cults developed around individual writers, and science-fiction works became paperback best-sellers.

Besides such acknowledged masters of the genre as Clarke, Heinlein, and Asimov, science-fiction writers of notable merit in the postwar period included A.E. Van Vogt, J.G. Ballard, Ray Bradbury, Frank Herbert, Harlan Ellison, Poul Anderson, Samuel R. Delany, Ursula K. LeGuin, Frederik Pohl, and Brian Aldiss. These writers' approaches included predictions of future societies on Earth, analyses of the consequences of interstellar travel, and imaginative explorations of forms of intelligent life and their societies in other worlds. Radio, television, and, notably in the 1970s and 1980s, film reinforced the popularity of the genre.

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Science Museum, in London, national museum of science and industry of Great Britain. Opened in 1857, it preserves and displays objects of significance to the history of the development of the physical sciences and technology and to modern research and exploration. The historical collection portrays the sciences of mathematics, astronomy, physics, and chemistry and also their applications. Galleries also focus on computing, space research, and recent scientific developments. The industrial collections include agriculture, transport, electrical, marine, and mechanical engineering, jet engines, geophysics, telecommunications, and domestic appliances. The museum houses the general collections of the Wellcome Museum of the History of Medicine.

The National Railway Museum, York, is a branch of the Science Museum, and presents the history and development of British railway engineering and its social aspects.

Science Museum of Victoria, in Melbourne, Australia, state museum of the history of science and technology. Founded in 1870, it includes displays and collections on agriculture, astronomy, general engineering, transport, armaments, energy, mining, bacteriology, public health, and photography. In addition to historical displays on X rays, horology, and electronics, it has the first Australian aircraft to fly—the Duigan biplane—and the first Australian-made Thomson steam motor car. The museum has a planetarium and runs an amateur radio station.

Sciences, Academy of, French ACADÉMIE DES SCIENCES, French scientific society established in 1666 by Jean-Baptiste Colbert to formalize the periodic private meetings in Paris that began about 1662 among a group that included René Descartes, Blaise Pascal, Pierre Gassendi, and Marin Mersenne. Under Colbert's sponsorship, the society first met in the royal library and in 1666 was called the Royal Academy of Sciences (Académie Royal des Sciences); but in 1699, reorganized under royal patronage, the society transferred to the Louvre under its present name. As early as 1721, the academy established prizes, the number of which has steadily risen. In 1793, after the French Revolution, the Convention suppressed the Academy of Sciences along with all other royal academies. Its functions were then assumed in 1795 by a branch of the newly formed National Institute. In 1816 the former name was restored, but the academy remained part of the Institute of France.

Its two large divisions—(1) mathematics and physics and (2) chemistry and natural his-

tory—are composed of sections devoted to geometry, mechanics, astronomy, geography and navigation, physics, chemistry, geology, botany, zoology, rural economy, and medicine and surgery. Among the outstanding foreign scientists associated with the Academy of Sciences were Benjamin Franklin and Albert Einstein. Membership ordinarily includes about 130 ordinary members, 160 correspondents, and 80 foreign associates.

Scientific American, American monthly magazine interpreting scientific developments to lay readers, the most highly regarded of its genre. It was founded in New York City in 1845 by Rufus Porter, a New England inventor, as a weekly newspaper describing new inventions. He sold it the following year to another inventor, Alfred Ely Beach, who had worked on the *New York Sun* under his inventor-editor father, Moses Y. Beach, and to a friend, Orson Munn. The era was rife with invention, and out of the paper's familiarity with patents and the problems of inventors grew a thriving patent agency giving advice on patent law and procedures to such inventors as Thomas Edison and Samuel F.B. Morse. This in turn strengthened the *Scientific American.* By the 1850s its circulation had reached 30,000, and it had begun to report on various sciences—*e.g.,* astronomy and medicine, apart from inventions. The paper early advocated subway transportation and in 1870 actually constructed a pneumatically operated subway of Beach's design under a section of Broadway. It was operated experimentally for a year.

The paper had been one of the first to use woodcut illustrations in the 19th century, and it was one of the first to use halftones in the 20th. It turned increasingly to reporting and explaining science to a curious public. In 1921 it became a monthly journal. Its articles, solidly based on scholarly research, well-written, and carefully edited, are accompanied by definitions of scientific terms and by illustrations. The magazine's popularity grew with the proliferation of scientific knowledge in the middle and late 20th century.

scientific theory, systematic ideational structure of broad scope, conceived by the imagination of man, that encompasses a family of empirical (experiential) laws regarding regularities existing in objects and events, both observed and posited. A scientific theory is a structure suggested by these laws and is devised to explain them in a scientifically rational manner.

In attempting to explain the things and events that he is presented with, the scientist employs (1) careful observation or experiments, (2) reports of regularities that he has found, and (3) systematic explanatory schemes (theories). The statements of regularities, if accurate, may be taken as empirical laws expressing continuing relationships among the things or characteristics observed. Thus, when empirical laws satisfy the scientist's curiosity by uncovering an orderliness in the behaviour of things or events, he may advance a systematic scheme, or scientific theory, to provide an accepted explanation of why these laws obtain.

Empirical laws and scientific theories differ in several ways. In a law, reasonably clear observational rules are available for determining the meaning of each of its terms; thus, a law can be tested by carefully observing the things and properties referred to by these terms. Indeed, they are initially formulated by generalizing or schematizing from observed relationships. In the case of scientific theories, however, some of the terms commonly refer to things that are not observed. This feature reveals the fact that theories are imaginative constructions of the human mind—the results of philosophical and aesthetic judgments as well as of observation—for they are only suggested by observational information rather than inductively generalized from it. Moreover, theories cannot ordinarily be tested and accepted on the same grounds as laws. Thus, whereas an empirical law expresses a unifying relationship among a small selection of observables, scientific theories have much greater scope, explaining a variety of such laws and predicting others as yet undiscovered.

A theory may be characterized as a postulational system (a set of premises) from which empirical laws are deducible as theorems. Thus, it can have an abstract logical form, with axioms, formation rules, and rules for drawing deductions from the axioms, as well as definitions for empirically interpreting its symbols. In practice, however, theories are seldom structured so carefully.

Scientology, official name CHURCH OF SCIENTOLOGY, religio-scientific movement developed in the United States in the 1950s by the author L. Ron Hubbard (1911–86). Its forerunner was Dianetics, a form of psychotherapy originated by Hubbard and later incorporated into Scientology. Hubbard introduced Dianetics to the public in 1950 with his best-selling book *Dianetics: The Modern Science of Mental Health.*

According to Dianetics, every experience is recorded in the mind as a mental image. Painful experiences, called engrams, are not completely available to the "analytic," or conscious, mind. When stimulated by later experiences, engrams, which are part of the "reactive," or subconscious, mind, cause irrational behaviour. Therapy requires working with an "auditor" to confront engrams in order to "clear," or free, the mind from them. Dianetics is thus a set of techniques for getting rid of engrams and thereby presumably achieving better mental health. Scientology includes a highly structured system of beliefs, including the role of the *thetan* (soul, life energy) in the physical universe, which is conceived of as MEST (matter, energy, space, time).

The Church of Scientology was formally established in the United States in 1954 and was later incorporated in Great Britain and several other countries. The church has often been criticized for its scientific and religious claims and for the financial demands that it makes on its followers. From the 1960s the church and various of its leaders faced government prosecutions as well as private lawsuits on charges of fraud, tax evasion, financial mismanagement, and conspiring to steal government documents, while the church on the other hand claimed it was being persecuted by government agencies and by established medical organizations. Former Scientology officials have charged that Hubbard used the tax-exempt status of the church to build a profitable business empire. The church's legal difficulties continued into the 1990s, causing its membership to drop.

Scillitan Martyrs, 12 North African Christians from Scilla (or Scillium) in Numidia who were tried in Carthage under the Roman emperor Marcus Aurelius. The *Acts* of their martyrdom is the earliest authentic document on Christianity in North Africa and represents the earliest specimen of Christian Latin. In brief legal form, the document (perhaps the official court transcript) names the seven men and five women, gives the date, and quotes the dialogue between the judge and those accused. Speratus, the Christians' principal spokesman, claimed that he and his companions had lived quiet and moral lives, paid their dues, and did no wrong to their neighbours. But for refusing to apostatize (deny their faith) or swear by the "genius" of the emperor, they were executed on July 13, 180, by order of the Roman proconsul Saturninus.

Scilly, Isles of, also called SCILLY ISLES, group of about 50 small islands and many more islets, lying southwest of Cornwall, England, 25–36 miles (40–58 km) off Land's End.

Totaling about 6 square miles (16 square km) in extent, the islands are composed of granite and are a continuation of the granite masses of the Cornish mainland. The islands reach an elevation of 165 feet (50 m) in St. Mary's, the largest island, and have rocky, dangerous coasts with many reefs. Because the islands' climate is exceptionally mild—the mean monthly temperatures range from 45° to 62° F (7° to 16° C)—their fauna and flora are quite different from those on the English mainland. Many subtropical plants flourish. Among an immense variety of seabirds that visit the islands, the roseate tern is the rarest British breeding tern, and the Manx shearwater has its only British breeding site in the islands. Seals live on the rocks and islets.

There are prehistoric remains in the form of barrows and rude pillars on the islands. Henry I (reigned 1100–35) gave the islands to the abbot of Tavistock in Devon. In the 16th century they became crown property and were leased in 1571 to Francis Godolphin, who built Star Castle above Hugh Town in 1593. During the English Civil Wars, Prince Charles sheltered there until his escape to Jersey in 1646. Early a haunt of pirates, the islands were later notorious for smuggling. In 1834 Augustus Smith succeeded the Godolphins as the islands' lessee, and in 1933 the main islands were handed over to the British crown.

Only five of the islands—St. Mary's, Tresco, St. Martin's, Bryher, and St. Agnes—are inhabited. Most of the people live on St. Mary's, which has a harbour at Hugh Town and a museum of Scilly history and prehistory. The major industries are tourism and commercial flower growing and vegetable growing, the latter made possible by the prevailing mild climate. Fishing is also significant. There are sea and helicopter services to the mainland at Penzance. Administratively, the islands are a distinct unit within England; their council serves the functions of both a district and a county. Pop. (1986 est.) 2,000.

scimitar-babbler, any of about 12 species of songbirds of the babbler family Timaliidae (order Passeriformes), which have long, curved bills used for uncovering insects in ground litter. Scimitar-babblers are 18 to 28 cm (7 to 11 inches) in length, with fairly long tails. Their plumage is mostly brown. They range through southern Asia to Australia and the Philippines. An example is the slaty-headed scimitar-babbler (*Pomatorhinus schisticeps*) found from India to Indochina. Another is the gray-crowned scimitar-babbler (*Pomatostomus temporalis*) of eastern Australia, which is black-masked.

scintillation counter, radiation detector that is triggered by a flash of light (or scintillation) produced when ionizing radiation traverses certain solid or liquid substances (phosphors), among which are thallium-activated sodium iodide, zinc sulfide, and organic compounds such as anthracene incorporated into solid plastics or liquid solvents. The light flashes are converted into electrical impulses by a photoelectric alloy of cesium and antimony, amplified about a million times by a photomultiplier tube, and finally counted. Sensitive to X rays, gamma rays, and charged particles, scintillation counters permit high-speed counting of particles and measurement of the energy of incident radiation.

Scioto River, river rising in Auglaize county, west-central Ohio, U.S., and flowing southeast and past Columbus, Circleville, and Chillicothe, joining the Ohio River at Portsmouth after a course of 237 mi (381 km). O'Shaughnessy (built 1925) and Griggs (1905) dams,

both near Columbus, impound narrow reservoirs for water supply. Tributaries include the Olentangy River and Big Walnut Creek. Hoover Dam (1955), on the latter, has created another reservoir near Columbus. The rich limestone soils of the river valley are exceptionally fertile. Scioto probably comes from the Iroquoian word for "deer."

Scipio, Publius Cornelius (d. 211 BC), Roman general, consul in 218 BC and later proconsul, during the Second Punic War between Rome and Carthage.

In 218 he sailed with an army to southern Gaul to prevent Hannibal the Carthaginian from advancing on Italy. Having arrived too late, he himself returned to Italy but boldly sent his army on to Spain under his elder brother Gnaeus Cornelius Scipio Calvus to check the Carthaginian forces still there. In northern Italy he hoped to fight delaying actions against Hannibal along the tributaries of the Po River. Being repulsed and wounded at the Ticinus, he retired to the Trebia, where he was joined by his colleague Tiberius Sempronius Longus, who insisted on fighting and was defeated (December 218).

In 217 Scipio was sent as proconsul to Spain; in a battle near the Ebro River he and his brother smashed Hasdrubal's attempt to break through to Italy (215), and by 212 they had captured Saguntum (modern Sagunto). From his base they could move farther south; advancing separately, however, they both met disaster and death—Publius on the upper Baetis (Guadalquivir), Gnaeus in the hinterland of Carthago Nova (Cartagena), in 211. In spite of this final defeat, they had for seven years denied Hannibal the resources of Spain.

Publius was the father of Scipio Africanus the Elder.

Scipio, Quintus Caecilius Metellus Pius: *see* Metellus Pius Scipio, Quintus Caecilius.

Scipio Africanus THE ELDER, Latin SCIPIO AFRICANUS MAJOR, in full PUBLIUS CORNELIUS SCIPIO AFRICANUS (b. 236 BC—d. 184/183, Liternum, Campania [now Patria, Italy]), Roman general noted for his victory over the Carthaginian leader Hannibal in the great



Silver coin from Carthago Nova, believed to be a portrait of Scipio Africanus the Elder; in the Royal Collection of Coins and Medals, National Museum, Copenhagen

By courtesy of the National Museum, Copenhagen

Battle of Zama (202 BC), ending the Second Punic War. For his victory he won the surname Africanus (201 BC).

Family background. Publius Scipio was born into one of the great patrician families in Rome; his father, grandfather, and great-grandfather had all been consuls in their day. In 218 BC Scipio's father, also named Publius, held the consulship in one of the most critical years of Rome's history. While with him during a cavalry engagement on the Ticinus, the young Scipio made his first appearance in history: seeing his father wounded and cut off by the enemy, he charged forward and saved him. This anecdote is recorded by the historian Polybius on the authority of Scipio's friend Laelius, and it may well be true.

Of Scipio's boyhood or the date of his marriage to Aemilia, daughter of Aemilius Paullus, consul of 216 who fell at Cannae, nothing is known. He had two sons: Publius, who was debarred by ill health from a public career and who adopted Scipio Africanus the Younger; and Lucius, who became praetor in 174. Scipio's physical appearance is shown on some coins minted at Carthago Nova (Cartagena)—which almost certainly bear his portrait—and also probably on a signet ring found near Naples.

Military career. Scipio served as a military tribune at the disastrous Battle of Cannae in 216. He escaped after the defeat to Canusium, where some 4,000 survivors rallied; there he boldly thwarted a plot of some fainthearts to desert Rome. Then in 213 he returned to a civilian career by winning the curule aedileship; the story is told that when the tribunes objected to his candidature because he was under the legal age, he replied "If all the Roman people want to make me aedile, I am old enough." Soon family and national disaster followed: his father and uncle were defeated and killed in Spain, where the Carthaginians swept forward to the line of the Ebro (211).

In 210 the Romans decided to send reinforcements to Spain, but it is said that no senior general would undertake the task and that young Scipio offered himself as a candidate; at any rate, the Roman people decided to invest him with a command there, although he was technically a *privatus* (not a magistrate). This grant by the people, to a man who had not been praetor or consul, of a military command outside Italy created an important constitutional precedent. Thus Scipio was given the chance to avenge his father's death in Spain, where he hoped not merely to hold the Carthaginian armies at bay and prevent them sending reinforcements to Hannibal in Italy but to resume his father's offensive policy, to turn back the tide of war, and to drive the enemy out of the peninsula. Such a task must have seemed fantastic in 210, but Scipio had the confidence and ability; it was achieved in the next four years.

From his headquarters at Tarraco (Tarragona) in 209, Scipio suddenly launched a combined military and naval assault on the enemy's headquarters at Carthago Nova, knowing that all three enemy armies in Spain were at least 10 days distant from the city. Helped by a lowering of the water in a lagoon, which exposed the northern wall, he successfully stormed the city. This tidal phenomenon, attributed to the help of Neptune, was perhaps caused by a sudden wind; at any rate, it increased the troops' belief in their commander's divine support. In Carthago Nova he gained stores and supplies, Spanish hostages, the local silver mines, a splendid harbour, and a base for an advance farther south.

After training his army in new tactics, he defeated the Carthaginian commander Hasdrubal Barca at Baecula (Bailen) in Baetica (208); whereas normally the two rear ranks of a Roman army closely supported the front line, Scipio in this battle, under a screen of light troops, divided his main forces, which fell upon the enemy's flanks. When Hasdrubal broke away, ultimately to join his brother Hannibal in Italy, Scipio wisely declined the impossible task of trying to stop him and decided rather to accomplish his mission in Spain—the defeat of the other two Carthaginian armies still there. This he brilliantly achieved in 206 at a battle at Ilipa (Alcalá del Río, near Seville), where he held the enemy's main forces while the wings outflanked them. He then secured Gades (Cádiz), thus making Roman control of Spain complete.

Elected consul for 205, Scipio boldly determined to disregard Hannibal in Italy and to strike at Africa. Having beaten down political opposition in the Senate, he crossed to Sicily with an army consisting partly of volunteers. While preparing his troops, he boldly snatched Locri Epizephyrii in the toe of Italy from Hannibal's grasp, though the subsequent misconduct of Pleminius, the man he left in command of the town, gave Scipio's political opponents cause to criticize him. In 204 he landed with perhaps 35,000 men in Africa, where he besieged Utica. Early in 203 he burned the camps of Hasdrubal (son of Gisgo) and his Numidian ally Syphax. Then, sweeping down on the forces that the enemy was trying to muster at the Great Plains on the upper Bagradas (modern Sūq al Khamīs, on the Majardah in Tunisia), he smashed that army by a double outflanking movement.

Battle of Zama. After his capture of Tunis, the Carthaginians sought peace terms, but Hannibal's subsequent return to Africa led to their renewing the war in 202. Scipio advanced southwestward to join the Numidian prince Masinissa, who was bringing his invaluable cavalry to his support. Then he turned eastward to face Hannibal at the Battle of Zama; his outflanking tactics failed against the master from whom he had learned them, but the issue was decided when the Roman and Numidian cavalry, having broken off their pursuit of the Punic horsemen, fell on the rear of Hannibal's army. Victory was complete, and the long war ended; Scipio granted comparatively lenient terms to Carthage. In honour of his victory he was named Africanus.

Late years. In 199 Scipio was censor and became *princeps Senatus* (the titular head of the Senate). Though he vigorously supported a philhellenic policy, he argued during his second consulship (194) against a complete Roman evacuation of Greece after the ejection of Philip V of Macedonia, fearing that Antiochus III of Syria would invade it; his fear was premature but not unfounded. In 193 he served on an embassy to Africa and perhaps also to the East. After Antiochus had advanced into Greece and had been thrown out by a Roman army, Scipio's brother Lucius was given the command against him, Publius serving as his legate (190); together the brothers crossed to Asia, but Publius was too ill to take a personal part in Lucius' victory over Antiochus at Magnesia (for which Lucius took the name Asiagenus).

Meantime, in Rome, Scipio's political opponents, led by the elder Cato, launched a series of attacks on the Scipios and their friends. Lucius' command was not prolonged; the generous peace terms that Africanus proposed for Antiochus were harshly modified; the "trials of the Scipios" followed. On the trials the ancient evidence is confusing: in 187 an attack on Lucius for refusing to account for 500 talents received from Antiochus (as war indemnity or personal booty?) was parried, and Africanus himself may have been accused but not condemned in 184. In any case, his influence was shaken, and he withdrew from Rome to Liternum in Campania, where he lived simply, cultivating the fields with his own hands and living on a *villa* (country farm) of modest size: Seneca later contrasted its small and cold bathroom with the luxurious baths of his own day. He had not long to live, however; embittered and ill, he died in 184 or 183, a virtual exile from his country. He is said to have ordered his burial at Liternum and not in the ungrateful city of Rome, where his family tomb lay outside, on the Appian Way.

The legend of Scipio. Such was Scipio's impact upon the Romans that even during his lifetime legends began to cluster around him:

he was regarded as favoured by Fortune or even divinely inspired. Not only did many believe that he had received a promise of help from Neptune in a dream on the night before his assault on Carthago Nova but that he also had a close connection with Jupiter. He used to visit Jupiter's temple on the Capitol at night to commune with the god, and later the story circulated that he was even a son of the god, who had appeared in his mother's bed in the form of a snake.

The historian Polybius thought that this popular view of Scipio was mistaken and argued that Scipio always acted only as the result of reasoned foresight and worked on men's superstitions in a calculating manner. But Polybius himself was a rationalist and has probably underestimated a streak of religious confidence, if not of mysticism, in Scipio's character that impressed so many of his contemporaries with its magnanimity and generosity. Thus, although Polybius had an intense admiration for Scipio, whom he called "almost the most famous man of all time," the existence of the legend, a unique phenomenon in Rome's history, indicates that Polybius' portrait is too one-sided.

Significance and influence. A man of wide sympathies, cultured and magnanimous, Scipio easily won the friendship of such men as Philip, king of Macedonia, and the native princes of Spain and Africa, while he secured the devotion of his own troops. Though essentially a man of action, he may also have been something of a mystic in whom, at any rate, contemporary legend saw a favourite of Jupiter as well as a spiritual descendant of Alexander the Great. One of the greatest soldiers of the ancient world, by his tactical reforms and strategic insight he created an army that defeated even Hannibal and asserted Rome's supremacy in Spain, Africa, and the Hellenistic East. He had a great appreciation of Greek culture and enjoyed relaxing in the congenial atmosphere of the Greek cities of Sicily, conduct that provoked the anger of old-fashioned Romans such as Cato. Indeed, he was outstanding among those Roman nobles of the day who welcomed the civilizing influences of Greek culture that were beginning to permeate Roman society. His Greek sympathies led him to champion Rome's mission in the world as protector of Greek culture; he preferred to establish Roman protection rather than direct conquest and annexation. For 10 years (210–201) he commanded a devoted army at the people's wish. His position might seem almost kingly; he had been hailed as king by Spanish tribes, and he may have been the first Roman general to be acclaimed as imperator (emperor) by his troops; but, though convinced of his own powers, he offered no challenge to the dominance of the Roman nobility ensconced in the Senate except by normal political methods (in which he showed no outstanding ability). Reaction against his generous foreign policy and against his encouragement of Greek culture in Roman life led to his downfall amid personal and political rivalries, but his career had shown that Rome's destiny was to be a Mediterranean, not merely an Italian, power.

Scipio's influence outlived the Roman world. Great interest was shown in his life during the early Renaissance, and it helped the early humanists to build a bridge between the classical world and Christendom. He became an idealized perfect hero who was seen to have served the ends of Providence. Petrarch glorified him in a Latin epic, the *Africa,* which secured his own coronation as poet laureate in 1341 on the Capitol, where, some 1,500 years earlier, the historical Scipio used to commune in the temple of Jupiter. (H.H.S./Ed.)

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Scipio Africanus THE YOUNGER, also called SCIPIO AEMELIANUS, Latin SCIPIO AFRICANUS MINOR, in full PUBLIUS CORNELIUS SCIPIO AEMILIANUS AFRICANUS NUMANTINUS (b. 185/184 BC—d. 129 BC, Rome), Roman general famed both for his exploits during the Third Punic War (149–146 BC) and for his subjugation of Spain (134–133 BC). He received the name Africanus and a "triumph" in Rome after his destruction of Carthage (146 BC). He received the name Numantinus for his reduction of Spanish Numantia (133 BC).

Background and early life. Scipio was the second son of Lucius Aemilius Paullus Macedonicus, hero of the Third Macedonian War and son of the consul (of the same name) who fell at the Battle of Cannae in 216. Paullus himself, twice consul, was an outstanding Roman leader who combined traditional Roman virtues with a keen interest in Greek culture. Soon after Scipio's birth, Paullus divorced his wife Papiria, and it was probably after their father's remarriage that Scipio and his elder brother, Quintus Fabius Maximus Aemilianus, were adopted into other families, although both remained in close contact with their natural father. While the elder brother was adopted by a grandson, or possibly a son, of Quintus Fabius Maximus Cunctator, the famous general of the Second Punic War, Scipio himself was adopted by Publius Scipio, the son of Scipio Africanus the Elder. Thus Scipio succeeded to the family tradition of two of Rome's greatest generals—the victor against Hannibal of Carthage and the conqueror of Perseus of Macedonia.

Scipio's upbringing is described in a passage of Plutarch's biography of his father, Aemilius Paullus, who

> brought up his sons in accordance with the traditional native type of education, as he himself had been brought up, but also, and more keenly, on the Greek pattern. For the young men were surrounded not only by Greek teachers, scholars, and rhetoricians, but also by Greek sculptors, painters, overseers of horses and hounds, and instructors in hunting.

This education, based on a combination of Greek and Roman culture, set the direction of Scipio's further interests. He was introduced to military life in 168, when he and his brother served under their father in the Third Macedonian War. At the decisive Battle of Pydna he followed up the routed enemy with such dash that he was reported missing and was feared killed. After the battle, his father put him in charge of the Macedonian royal game preserves in order to develop his strength and courage; his intellectual development was enriched with a legacy of books from the Macedonian royal library.

Friendship with Polybius. The most significant influence on Scipio's character was his friendship with the Greek historian Polybius, one of the thousand Achaean leaders who had been deported and detained without trial in Italy. Scipio and his brother persuaded the authorities to allow Polybius to remain in Rome, where he became a close friend and mentor of the two young men. No doubt Scipio was oppressed by the thought of the responsibility that he would have on becoming the head of the great house of the Scipios (it is uncertain when his adoptive father, Publius Scipio, died) as well as in representing the Aemilii. Under Polybius' guidance, he was determined to prove a worthy representative and to pursue the normal aims of a Roman noble: honour, glory, and military success.

Polybius emphasized two aspects of Scipio's character, his personal morality and his generosity. Of the former, he tells how Scipio sought to excel all his contemporaries in his reputation for temperance at a time when morals were generally declining and young men were becoming increasingly corrupt, partly because they had "caught the dissoluteness of Greek customs" and partly because of the great influx of public and private wealth as a result of the Macedonian War; "in about five years Scipio secured a general recognition of his character for goodness and purity" and generosity. Polybius, however, does not draw attention to an element of cruelty in Scipio's character that is noticeable in several episodes of his life; it may generally have had a deterrent purpose and not been an unusual trait in the Roman character, but not every Roman general celebrated a victory by throwing deserters to the wild beasts.

Military and political achievements. Scipio's early political apathy was soon cast aside; by 152 he had probably been elected quaestor, which was the first rung of an official career, and had entered the Senate. But at the same time, he was also pursuing his cultural interests: he was among the young nobles who were attracted by the lectures of three visiting Athenian philosophers whose views on political morality shocked more old-fashioned Romans, such as Cato. Scipio achieved public acclaim in 151. A series of disasters to Roman armies in Spain resulted in such reluctance to undertake military service in the peninsula that, in a dispute over the levy, the consuls who were responsible for it were even temporarily imprisoned by the tribunes who opposed the levy. In the crisis, Scipio, who had been assigned to Macedonia, inspired confidence by volunteering to serve in Spain instead; his example was immediately followed by other officers and men.

Serving as military tribune to Lucius Lucullus, Scipio displayed great personal courage in the Spanish campaigns; in 151 he killed a Spanish chieftain who had challenged him to single combat, and at Intercatia he won the mural crown (*corona muralis*), which was awarded to the first man to mount the walls of an enemy town. In 150 he was sent by Lucullus to Africa to obtain some elephants from the Numidian king Masinissa, the friend of his grandfather Africanus. While there he witnessed a great but indecisive battle between Masinissa and the Carthaginians; the latter then asked him to arrange a settlement, but, in the event, negotiations broke down. Scipio then left Africa, but he was soon to return not as a peacemaker but as a conqueror. When back in Rome, at Polybius' request, he managed to gain the somewhat grudging support of old Cato (whose son had married Scipio's sister Aemilia) for a proposal to release the 300 Achaean internees who still survived without trial. Thus a great blot on Rome's good name was at length partially removed.

In 150 war with Carthage was in the air. When it eventually broke out the following year, Scipio returned to Africa with the Roman army, serving again as military tribune, and his service was very effective. The two consuls besieged Carthage by land and sea, but later in the year, after one had returned to Rome, the Carthaginians launched a night attack upon the camp of the isolated Manilius, a situation that was retrieved only by the skill of Scipio. During the winter Scipio again displayed conspicuous ability when Manilius led two unsuccessful expeditions against the Carthaginian forces in the interior. Again he came into the limelight when the aged Masinissa, on the point of death, asked that the grandson of his friend Africanus arrange the future of his kingdom. Scipio decided to

divide Numidia between the king's three sons and thereby avoided any danger that a united Numidia might have presented.

Destruction of Carthage. As the war against Carthage dragged on without decisive result, Scipio resolved to return to Rome in 148 to stand for the curule aedileship, but such was his military record and the general disappointment with the conduct of the war that the Roman people wanted to see him in command. Because he was at least five years under the legal minimum age for the consulship and had not been praetor, his election as consul for 147 was remarkable. When a tribune, voicing the popular enthusiasm, threatened to veto the consular elections unless Scipio was accepted as a candidate, the Senate gave way and allowed the tribunes to introduce a bill to exempt Scipio from the legal restrictions; he was thus elected consul and given the African command.

Once back in Africa, he determined to starve out Carthage with a blockade by land and sea; gradually the cordon was drawn tighter around the beleaguered city, and in the spring of 146 it fell to his final assault: after six days of street fighting the citadel was captured and Carthage was destroyed. As Scipio surveyed the burning city and meditated on the fall of great nations, he wept and, grasping the hand of Polybius (the historian himself records the incident), said: "it is glorious, but I have a dread foreboding that some time the same doom will be pronounced upon my own country." After arranging for the organization of Carthaginian territory as the new Roman province of Africa, Scipio returned to Rome for a triumph and to be hailed as the second Africanus.

Thus, before the age of 40, Scipio had gained Rome's final victory over Carthage and had become a popular hero, but he still had many opponents in the Senate. He soon reached the crown of a noble's career by his election to the censorship of 142, though the other censor Lucius Mummius, who had brought peace to Greece by his sack of Corinth, was not a welcome colleague. Scipio carried out his censorial duties with sternness, in the spirit of the censorship of Cato, who had lived just long enough to express approval of Scipio's African command.

Siege of Numantia. The background of the next phase of Scipio's life was again Spain, where for years Rome had been engaged in war with the Celtiberians and had suffered a series of defeats and humiliating setbacks. One such scandal concerned the Senate's repudiation of a truce arranged by the commander Gaius Hostilius Mancinus and his young quaestor Tiberius Gracchus, which had saved a Roman army from destruction. The story cannot be repeated here, but, while Mancinus was shamefully condemned for his conduct, Gracchus was spared, thanks to his popularity at Rome for having rescued a trapped army. Scipio helped in Gracchus' escape, possibly because of their family relationship: Gracchus was his cousin and also his brother-in-law, though in fact Scipio's marriage to Sempronia had been a private failure. Scipio also urged the adoption of a more effective policy in Spain. This led to his own election to a second consulship for 134 and the command of the Celtiberian war; special legislation was needed, because a second consulship was unconstitutional.

Scipio took with him to Spain a number of volunteers and a corps of 500 friends and dependents as a kind of bodyguard (an embryonic praetorian cohort): these were perhaps all the more necessary because his first task was to rediscipline the Roman troops in Spain, who were in a shocking state. His main objective was to reduce the Celtiberian capital, the hill town of Numantia, which could not be stormed but had to be blockaded and starved out. Around the town he built seven camps, linked by a strong wall (traces of these works still survive), and, with overwhelming forces after an eight-month siege, he finally forced the 4,000 besieged to capitulate (133). The town was burned. Thus Rome's dominion in Spain was established beyond question, and Scipio returned to Rome for a second triumph in 132.

Last years. In the meanwhile, Rome had been shaken by a constitutional crisis. The tribune Tiberius Gracchus introduced a bill for the distribution of public lands among the poor of the city. His disregard of constitutional procedure and custom in forcing through his bill had provoked the Senate to use force to crush him and his supporters and thus initiated a period of increasing political upheaval and revolution (133). Absent in Spain during the crisis, Scipio was spared the necessity for actively taking sides. In view of his friend Laelius' earlier attempted land law, it may be conjectured that he would not have opposed the bill as such. But surely he did not approve of Tiberius' methods; when forced to give a public opinion he quoted Homer's line, "So perish all who do the like again," and he admitted that Tiberius "had been killed justly."

By his anti-Gracchan attitude Scipio lost much popularity, the more so when he helped to defeat a bill to legalize reelection to the tribunate. He then took up the cause of the Italian allies of Rome, who were discontented with the effects of Gracchus' land bill; he took some action to modify its working, at least as far as it concerned the allies. Then suddenly one morning, when he was due to make a speech on the Italian question, he was found dead in his bedroom (129 BC). His death remained an unsolved mystery. Various eminent people were suspected at the time or later (*e.g.,* Gaius Gracchus and even Sempronia or Cornelia), but murder is not likely; suicide is possible, but a natural death is more probable.

Assessment. As a soldier Scipio contributed much to the maintenance and extension of Rome's power in the world. For some 20 years he was an outstanding figure, but he had many political enemies, and his leadership was seldom unchallenged. His political aims and ideals have been variously assessed. Stern, upright, and conservative, he sought to maintain Rome's traditional virtues, which he felt were being undermined. He was also, however, a man of culture whose so-called Scipionic circle of friends and advisers included Laelius and Polybius. Through his support of such leading intellectual figures as the poet Terence, the satirist Lucilius, and the Stoic philosopher Panaetius, Scipio exerted much influence on the development of Latin literature and also upon the blending of Greek and Roman thought, not least in the adapting of Stoic ideas to Roman needs. To many later Romans, especially to Cicero, he was an ideal statesman, personifying in his personal virtue, cultural patronage, and aristocratic moderation the golden days of the republic.

(H.H.S./Ed.)

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Scipione, Francesco: *see* Maffei, Francesco Scipione, marchese di.

Scirophoria, also spelled SKIROPHORIA, in Greek religion, annual Athenian festival held at threshing time on the 12th of Skirophorion (roughly, June/July). Under the cover of a large white umbrella, which symbolized the protection of the Attic soil against the Sun's burning rays, the priestess of Athena (city goddess of Athens) and the priests of Poseidon (god of the sea) and Helios (sun god) walked from the Acropolis to a place called Skiron. The solemnity, which was probably a companion festival to the Thesmophoria (*q.v.*), may have been held in honour of the goddess Athena; more reliable traditions, however, indicate that it was in honour of Demeter, the goddess of fruitfulness, and her daughter Kore (Persephone).

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

scissors, cutting instrument consisting of a pair of opposed metal blades that meet and cut when the handles at their ends are brought together. The term shears sometimes denotes large-size scissors. Modern instruments are of two types: the more usual pivoted blades have a rivet or screw connection between the cutting ends and the handle ends; spring shears have a C-shaped spring connection at the handle ends.

Spring-type scissors probably date from the Bronze Age and were commonly used in Europe until the end of the Middle Ages. Pivoted scissors of bronze and iron were used in ancient Rome and in China, Japan, and Korea. In Europe their domestic use dates from the 16th century, but not until 1761, when Robert Hinchliffe of Sheffield, Eng., first used cast steel in their manufacture, did large-scale production begin. In the 19th century much hand-forged work was produced, with elaborately ornamented handles. By the end of the 19th century, styles were simplified for mechanical-production methods.

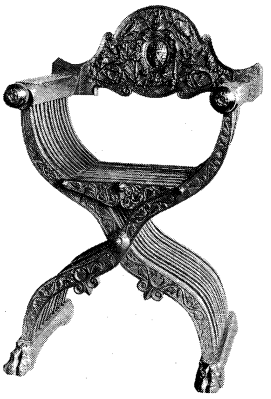
The two blades are made to twist or curve slightly toward one another so that they touch in only two places: at the pivot, or joint, and at the spot along the blades where the cutting is taking place. When completely closed, the points of the blades touch. In the case of the finest cutting instruments, the two unfinished metal blanks and the fasteners are coded with an identifying mark so they can be manufactured as a set.

Blanks are usually made from red-hot steel bars that are forged at high speed between the dies of drop hammers, but others also of satisfactory quality may be made from cold-forged blanks. The steel may contain from 0.55 to 1.03 percent carbon, the higher carbon content providing a harder cutting steel for certain applications. Stainless steel is used for surgical scissors. Certain nonferrous alloys that will not produce sparks or interfere with magnetism are employed in making scissors for cutting cordite and magnetic tape. Handle and blade are usually constructed in one piece, but in some cases the handles are electrically welded to the steel blades.

Expert sharpening is required to restore the edge-angle sharpness; each blade is passed smoothly and lightly across a grinding wheel, following the twist of the blade, with an even pressure throughout the stroke to avoid causing ridges or other irregularities.

A special form of shears used for sheet-metal work, called tin shears, or tin snips, is equipped with high-leverage handles to facilitate cutting the metal. Another special form, pruning shears, are designed for trimming shrubs and trees.

scissors chair, also called X-CHAIR, SAVONAROLA CHAIR, or DANTE CHAIR, chair supported by two crossed and curved supports either at the sides or at the back and front. Because of its basic simplicity, it is one of the oldest forms of chair or stool, its prototype reaching back to the 2nd millennium BC.



Scissors chair, Italian, 16th century; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London

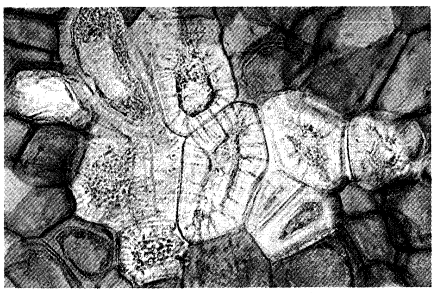
The seat, which was originally made of leather or fabric, could be stretched across the upper terminals of the X-shape or inserted at a lower level, just above the intersection, so that parts of the frame could be used as armrests. Because of their scissorslike principle, scissors chairs lent themselves to collapsible construction and thus appeared as folding stools in the early European Middle Ages, when they were used mainly for liturgical purposes. In the 16th century they were also used by sedentary craftsmen such as weavers, and in the 20th they commonly appear as garden furniture and in specialized forms, such as that of sketching stools.

In its static form the scissors chair was in continuous use throughout the centuries but became increasingly popular at the end of the 18th century because of a renewed interest in historic furniture; in the mid-19th century because of the use of strip metal in its construction; and in the opening years of the 20th century as a by-product of the Arts and Crafts movement.

Sciuridae, family of rodents (order Rodentia) that includes the individuals and groups known as chipmunk; flying squirrel; ground squirrel; marmot; prairie dog; squirrel (*qq.v.*).

SCLC: *see* Southern Christian Leadership Conference.

sclerenchyma, any of various kinds of hard, woody cells that serve the function of support in plants. Mature sclerenchyma cells are dead



Sclerenchyma

J.M. Langham

cells that have heavily thickened walls containing lignin. Such cells occur in many different shapes and sizes, but two main types occur: fibres and sclereids. Fibres are greatly elongated cells whose long, tapering ends interlock, thus providing maximum support to a plant. They can be found almost anywhere in the plant body, including the stem, the roots, and the vascular bundles in leaves. Sclereids are extremely variable in shape and are present in various tissues of the plant such as the periderm, cortex, pith, xylem, and phloem. They also occur in leaves and fruits and constitute the hard shell of nuts and the outer hard coat of many seeds.

scleritis, inflammation of the sclera, the white of the eye. The inflammation is of unknown cause but is thought to arise from infection, rheumatoid disease, gout, or disorders of menstruation. It occurs particularly among young women. A person who has scleritis experiences pain radiating from the eyes, which water and are sensitive to light. The condition may lead to glaucoma, to inflammation of the cornea or the uvea, or even to blindness. The treatment of scleritis is directed toward its underlying condition.

In a more superficial and less chronic form of scleritis, known as episcleritis, an inflamed nodule develops near the limbus, the area where the cornea and the sclera overlap. The nodule may disappear after a few weeks and then recur at another point.

scleroderma, also called PROGRESSIVE SYSTEMIC SCLEROSIS, chronic skin disease that hardens and fixes the skin to the underlying structures. The cause is unknown. The disease affects women more often than men and may begin at any age, but usually symptoms appear between the ages of 25 and 55. The primary structural changes consist of swelling and increase of collagen—the principal supportive protein of the connective tissues—with formation of dense, compact tissue that causes the skin to lose normal elasticity. Early in the disease there is a great deal of inflammation and irritation of the underlying tissue. Initial manifestations include stiffness and pain in the hands and fingers as well as tautness and thickening of the skin of the hands, with the disappearance of normal skin folds over the knuckles. Sometimes years intervene between these early manifestations and more serious signs of systemic involvement. These latter may include fever; difficulty in breathing; formation of fibrous tissue in the lungs; inflammation of the heart lining, the heart muscle, or the sac that encloses the heart; gastrointestinal disorders; and serious kidney malfunction. Subcutaneous calcification of tissues becomes more diffuse as the disease progresses. Finally, the scleroderma may become stabilized or may go through a long period of regression.

Steroid hormones may be used to lessen the swelling and inflammation. Heat, massage, and passive motion exercises have been of considerable value in preventing fixation deformity of the extremities. Sometimes a change of climate brings about improvement.

Sclerodermatales (fungus): *see* Lycoperdales.

sclerophyll, type of vegetation characterized by hard, leathery, evergreen foliage that is specially adapted to prevent moisture loss. Broad-leaved sclerophyll vegetation, including species such as holly (*Ilex*), is known as Mediterranean vegetation (*q.v.*) because it is characteristic of regions with a Mediterranean climate—hot, dry summers and mild, wet winters. Narrow-leaved sclerophyll vegetation is characteristic of species such as pines.

scleroprotein, any of several fibrous proteins of cells and tissues once thought to be insoluble but now known to be dissolved by dilute solutions of acids such as citric and acetic.

The two most important classes of scleroproteins are the collagens and the keratins. Others include fibroin, which forms about 67 percent of the content of natural silk (the remainder is the protein sericin); elastin, a structural protein of elastic fibres that occurs together with collagen in many tissues; certain proteins of marine sponges (spongin) and corals (gorgonin, antipathin); flagellin, a structural protein in the whiplike structures (flagella) of certain bacteria; and reticulin, found with elastin and collagen in mammalian skin. *See also* collagen; keratin.

sclerosis, multiple (neurological disease): *see* multiple sclerosis.

sclerotin, a dark-brown biological pigment formed by an enzyme-catalyzed tanning of protein. Sclerotin is found in the cuticle (external covering) and egg cases of insects, the body shell (carapace) of certain crustaceans, and the bristles of terrestrial and marine worms. Sclerotin not only darkens the cuticle of insects, thus contributing to the shielding of injurious light rays, as does melanin, but also effects a distinct protective hardening of the cuticular protein.

sclerotium, a persistent, vegetative, resting spore of certain fungi (*e.g., Botrytis, Sclerotium*). It consists of a hard, dense, compact mycelium (mass of filaments that make up the body of a typical fungus) that varies in form and has a dark-coloured covering. Size varies from a few cells to many; sometimes masses up to 10 cm (4 inches) are formed. The sclerotia of *Rhizoctonia* are common on potato tubers. The sclerotia of ergot (*q.v.*) are poisonous to animals, including humans.

Scodra (Albania): *see* Shkodër.

Scofield, (David) Paul (b. Jan. 21, 1922, Hurstpierpoint, Sussex, Eng.), English actor noted for his powerful performances in Shakespearean and other stage roles.

Scofield was trained as an actor at the Croydon Repertory Theatre School (1939) and at the Mask Theatre School (1940) in London. After touring with companies entertaining the troops during World War II, he joined the Birmingham Repertory Theatre and in 1946 moved to Stratford-upon-Avon, where he had his first great success—playing Henry V, Cloten in *Cymbeline,* Don Adriano de Armado in *Love's Labour's Lost,* Lucio in *Measure for Measure,* and Hamlet, among other Shakespearean roles. He had his first starring role in commercial theatre in 1949, playing Alexander the Great in Terence Rattigan's ill-fated *Adventure Story.*

Scofield had his greatest success in the role of Sir Thomas More in Robert Bolt's *A Man for All Seasons,* in which he appeared in London in 1960 and in New York City in 1961–62, winning the Antoinette Perry Award (1962) and other honours. The next year, he appeared at the Shakespearean Festival in Stratford, Ont., playing in *Coriolanus* and *Love's Labour's Lost.* Later successes in the theatre included the roles of Uncle Vanya (1970) and Volpone (1977).

Scofield made his motion-picture debut in 1955, and he played More in the film version of *A Man for All Seasons* (1966), for which he won the Academy Award for best actor. He later played Lear in Peter Brook's motion-picture version of *King Lear* (1971) and Tobias in *A Delicate Balance* (1973), written by Edward Albee and directed by Tony Richardson, from the Albee play. He also played the French king in *Henry V* (1989).

Ščokino (Russian S.F.S.R.): *see* Shchyokino.

Scolari, Paolo (pope): *see* Clement III.

scolecite, mineral closely related to natrolite (*q.v.*), a member of the zeolite family.

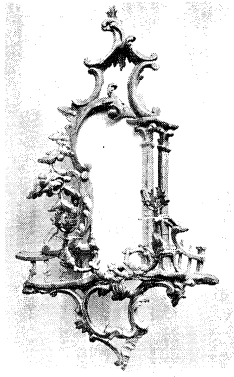
scoliosis, lateral deviation of the spine. Scoliosis is a type of spinal curvature (*q.v.*).

Ščolkovo (Russian S.F.S.R.): *see* Shchyolkovo.

sconce, wooden or metal bracket affixed to a wall and designed to hold candles, lamps, or other types of illumination. One of the earliest forms of lighting fixture for domestic and public use, sconces first appeared in classical antiquity, but more elaborate variants were stimulated by the custom that arose in the Eu-

ropean Middle Ages of affixing metal sconces holding candles to the walls of churches at their consecration. Various elaborations and refinements were added in the 17th century, including mirror or metal reflectors to intensify the light.

Carvers and gilders made sconces part of their stock-in-trade; and, as more care was lavished on interior design, sconces were influenced by the overall stylistic pattern of the rooms for which they were intended, assuming exuberant Rococo, Eastern, or classical shapes. In these more elaborate versions (which could



Wall sconce of carved and gilded wood in the Rococo Chippendale style, English, mid-18th century; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London

also include clocks as well as mirrors), the backplate was usually known as a girandole and came to signify a certain pretentiousness. Although wall brackets were used for supporting gaslights in the 19th century, they could not properly be described as sconces. The form was revived with the invention of electric lighting, which, combined with an appetite for the picturesque, stimulated the production of sconces supporting imitation wax candles topped by especially designed, flamelike bulbs.

Scone, town, eastern New South Wales, Australia, in the upper Hunter River valley. Gazetted in 1837 as the village of Invermein, it was renamed for Scone, Scot., and was proclaimed a municipality in 1888. It lies along the New England Highway and the main northern rail line, 80 miles (130 km) northwest of Newcastle. Scone is a market centre for a district producing sheep, cattle, racehorses, walnuts, and vegetables. Scone is also the area headquarters of soil and water conservation authorities, and Glenbawn Dam and reservoir (and an associated national park) are nearby. A local curiosity is Mount Wingen, or Burning Mountain (1,800 feet [550 m]); a cleft in its side emits smoke from an underground coal seam that has been smoldering for centuries. Pop. (1981) 3,949.

Scone, village, Tayside region, Scotland. It lies near the River Tay just north of Perth. Old Scone was traditionally the capital of the Pictish kingdom, succeeding Forteviot in the 8th century. Kenneth MacAlpin, first king of the united Scots and Picts, is believed to have brought the Stone of Scone (or Stone of Destiny), on which all Scottish kings were crowned, from Dunstaffnage Castle to Scone in the 9th century. Scone remained the normal place of the coronation of Scottish kings until the 15th century.

Scone was an early religious centre; a Culdee (Celtic) foundation there was superseded in 1120 by an Augustinian monastery until the latter was sacked and burned during the Reformation. Today, a mansion called the Scone Palace (1803–08) occupies the site of the former monastery. The village of Old Scone was



Scone Palace, Tayside

A.F. Kersting

removed to allow a park to be laid out around the new palace; and the village of New Scone was built nearby. Pop. (1981) 4,897.

scone, also called GIRDLE SCONE, quick bread of British origin and worldwide fame, made with leavened barley flour or oatmeal that is rolled into a round shape and cut into quarters before baking on a griddle. The first scones were baked in cast iron pans hung in the kitchen fires of rural England and Wales. With the advent of Eastern trade, scones became an integral part of the fashionable ritual of "taking tea," with which they are still served daily, hot and buttered, throughout Britain and many regions of its former empire.

Scones may be enriched by the addition of cream and eggs to the usual mixture of flour, soda, sugar, and salt. The dough is kneaded briefly, then rolled and cut to shape, usually triangular, and brushed with the reserved egg white prior to baking. Some recipes call for mashed potatoes. Scones made of baking powder dough sometimes contain currants. These are cut into various rounded, wedge, and diamond shapes and baked in an oven.

Scone, Stone of, also called STONE OF DESTINY, Scottish Gaelic LIA FAIL, stone that for centuries was associated with the crowning of Scottish kings and then, in 1296, was taken to England and later placed under the Coronation Chair. The stone, weighing 336 pounds (152 kg), is a rectangular block of pale yellow sandstone (almost certainly of Scottish origin) measuring 26 inches (66 cm) by 16 inches (41 cm) by 11 inches (28 cm). A Latin cross is its only decoration.

According to one Celtic legend the stone was once the pillow upon which the patriarch Jacob rested at Bethel when he beheld the visions of angels. From the Holy Land it purportedly traveled to Egypt, Sicily, and Spain and reached Ireland in about 700 BC to be set upon the hills of Tara, where the ancient kings of Ireland were crowned. Thence it was taken by the Celtic Scots who invaded and occupied Scotland. About AD 840 it was taken by Kenneth MacAlpin to the village of Scone.

At Scone, historically, the stone came to be encased in the seat of a royal coronation chair. John de Balliol was the last Scottish king crowned on it, in 1292, before Edward I of England invaded Scotland in 1296 and moved the stone (and other Scottish regalia) to London. There, at Westminster Abbey in 1307, he had a special throne, called the Coronation Chair, built so that the stone fitted under it. This was to be a symbol that kings of England would be crowned as kings of Scotland also.

Attached to the stone in ancient times was allegedly a piece of metal with a prophecy that Sir Walter Scott translated as

> Unless the fates be faulty grown
> And prophet's voice be vain
> Where'er is found this sacred stone
> The Scottish race shall reign.

When Queen Elizabeth I died without issue in 1603, she was succeeded by King James VI of Scotland, who became James I of England (or Great Britain). James was crowned on the Stone of Scone, and patriotic Scots said that the legend had been fulfilled, for a Scotsman then ruled where the Stone of Scone was.

On Christmas morning 1950 the stone was stolen from Westminster Abbey by Scottish nationalists who took it back to Scotland. Four months later it was recovered and restored to the abbey.

Scopas (fl. 4th century BC), Greek sculptor and architect of the late classical period who was ranked by ancient writers with Praxiteles and Lysippus as one of the three major sculptors of the second half of the 4th century BC. Scopas was influential in establishing the expression of powerful emotions as artistic themes. He was a native of Paros and probably belonged to a family of artists on that Greek island.

According to ancient writings, Scopas worked on three major monuments of the 4th century: the temple of Athena Alea at Tegea (in Arcadia), the temple of Artemis at Ephesus, and the Mausoleum at Halicarnassus. The temple of Athena Alea was a new temple, begun some time after 394 BC. The 2nd-century-AD Greek traveler Pausanias says that Scopas worked as architect as well as sculptor at the temple. He mentions him as the artist responsible for the statues of Asclepius and Hygieia that stood inside the temple on each side of the image of Athena Alea. It is also possible that Scopas worked on the pedimental sculptures of this temple, including extant fragments depicting the hunt of the Calydonian boar, which are preserved in the National Archaeological Museum at Athens. These extant heads show a highly forceful and individual style and may give an idea of Scopas' work; the heads have squarish forms, deep-set eyes, and tense features that convey a strong emotional intensity.

According to the 1st-century-AD Roman writer Pliny, Scopas carved the reliefs adorning one of the columns of the temple of Artemis, but, of the three decorated columns remaining, it is not likely that any are Scopas' work. He also worked on the sculptures of the Mausoleum at Halicarnassus with Bryaxis, Timotheus, and Leochares.

Scopas is now believed to be the sculptor of a group representing the destruction of the daughters of Niobe, formerly attributed to either Scopas or Praxiteles. Copies of the Niobe statues are in the Uffizi, Florence. Of the many freestanding sculptures attributed to Scopas, the "Maenad" (State Art Collection, Dresden) and the "Pothos" ("Longing") in the collection of the Palazzo dei Conservatori at Rome are the most noteworthy.

To make the best use of the Britannica, consult the INDEX *first*

Scopes Trial (July 10–21, 1925, Dayton, Tenn., U.S.), highly publicized trial of a Dayton, Tenn., high-school teacher, John T. Scopes, charged with violating state law by teaching the theory of evolution. In March 1925 the Tennessee legislature had declared unlawful the teaching of any doctrine denying the divine creation of man as taught by the Bible. World attention focused on the trial proceedings, which promised confrontation between Fundamentalist literal belief and liberal interpretation of the Scriptures. William Jennings Bryan (*q.v.*) led for the prosecution and Clarence Darrow (*q.v.*) for the defense. The judge ruled out any test of the law's constitutionality or argument on the validity of Darwin's theory, limiting the trial to the single question of whether or not John T. Scopes had taught evolution, which he admittedly had. He was convicted and fined $100. On appeal, the state supreme court upheld the constitutionality of the 1925 law but acquitted Scopes



"Gathering Data for the Tennessee Trial," cartoon by Rollin Kirby from the New York *World*, 1925
The Granger Collection

on the technicality that he had been fined excessively. The law was repealed in 1967.

scopolamine, also called HYOSCINE, alkaloid obtained from a number of plants of the family Solenaceae including the deadly nightshade, henbane, and Jimson weed. Scopolamine is the most pharmacologically active of several alkaloid substances found in belladonna, partly because of its greater solubility, which permits more rapid passage to the site of action. Like atropine, it has a depressant action on parasympathetic nerves and in larger doses on autonomic ganglia. It also has a marked depressant action on the central nervous system (brain and spinal cord), and this is the basis of its main therapeutic uses. Combined with morphine it produces "twilight sleep," a state of analgesia and amnesia. This drug combination has been used during childbirth, and similar combinations are used for preoperative medication. Scopolamine taken orally is an effective remedy for motion sickness, probably because of its central depressant and antispasmodic action. It also finds use in controlling the rigidity and tremor of Parkinson's disease. A toxic drug, it is administered only in minute quantities.

scops owl, any Old World owl of the genus *Otus,* differentiated from the New World species, which are called screech owls. *See* screech owl.

scorch, symptom of plant disease in which tissue is "burned" because of unfavourable conditions or infection by bacteria or fungi. Unfavourable conditions include hot, dry wind in full sun, an imbalance of soil nutrients, altered water table or soil grade, deep planting, compacted shallow soil, paved surface over roots, salt drift near the ocean, low temperatures, air pollutants, and girdling roots. Scorch is common as dead areas along or between the veins and margins of leaves. Control involves correcting the causative environmental condition: growing plants in fertile soil in a protected location and maintaining vigour by proper watering, fertilizing, pruning, and mulching. *See also* sunscald.

Scordisci, Celtic tribe that invaded Greece during the first part of the 3rd century BC, finally settling east of Sirmium at the junction of the Savus and the Danube rivers. They often raided Macedonia, forcing many Roman governors there to campaign against them during the late 2nd and early 1st centuries BC. By about 12 BC, however, they appear to have submitted to Roman control, and under the empire they were given some local autonomy.

score, notation, in manuscript or printed form, of a musical work, probably so called from the vertical scoring lines that connect successive related staves. A score may contain the single part for a solo work or the many parts that make up an orchestral composition. A full, or orchestral, score shows all the parts of a large work, with each part on separate staves in vertical alignment (though subdivisions of related instruments frequently share a stave), and is for the use of the conductor. (The notation for each performer, called a part, contains only the line or lines he is to perform.) Thus, the conductor can see at a glance what each performer should be playing and what the ensemble sound should be. Some conductors prefer to commit the score to memory in order to concentrate entirely on guiding the performance.

The reduction of a full score to fit the scope of the piano is called a piano score. Such a score, especially when it is of a complex piece, is often divided between two pianos. A vocal score, used for large works, such as operas and oratorios, in rehearsal, contains the piano reduction of the orchestral parts, along with the vocal lines indicated separately above the piano. The normal arrangement of parts as they appear in a full orchestral score is, from top to bottom of the page, woodwinds, brass, percussion, harps and keyboard instruments, and strings. If there is a solo part, as in a concerto, it customarily appears immediately above the strings. In vocal works the standard arrangement from top to bottom is soprano, alto, tenor, and bass, resulting in the often-used acronym SATB on the title page of scores for four-part vocal works.

The practice of writing music in score dates from the schools of polyphony (many-voiced music) in the early Middle Ages but declined during the 13th–16th century. At the beginning of the 13th century, it was replaced by the choirbook—a large manuscript in which soprano and alto parts usually faced each other on the upper halves of two opposite pages, with the tenor and bass parts occupying the lower halves (an economical arrangement because the upper parts, which sang the texts, required more space than the slow-moving lower parts). The music was read by the entire choir grouped around the choirbook set on a stand. In the 15th and 16th centuries, vocal and instrumental music was published in partbooks, each containing music for a single part. The parts of madrigals (a genre of secular partsong) were sometimes published crosswise on a single sheet, allowing singers to be seated around a rectangular table. The modern form of score, in which the bar lines are scored vertically throughout the parts, appeared in 16th-century Italy in the madrigals of Cipriano de Rore and the orchestral music of Giovanni Gabrieli.

One of the most demanding accomplishments a musician can attain is the ability to play a full orchestral score at the piano, without the aid of a piano reduction of the work. Score reading requires the player to bring out all essential features, such as harmony, melody, and counterpoint, so that an acceptable duplication of the full orchestra is achieved. To add to the difficulty, the player must be able to read at sight the alto and tenor clefs as well as the treble and bass clefs and to transpose the parts of those woodwinds and brass instruments whose notation is different from the actual sound. Following the performance of orchestral and choral works with the score generally enables experienced listeners to grasp more easily the general design of a work and to identify the ingredients of orchestral effects.

Scorel, Jan van, Scorel also spelled SCOREEL, SCHOREL, SCHOREEL, SCHOOREL, SCHOOREEL, SCHOORL, SCORELIUS, SCORELLIUS, also called the MAITRE DE LA MORTE DE MARIE (b. August 1495, Schoorel, near Alkmaar, Habsburg Netherlands—d. Dec. 6, 1562, Utrecht), Dutch Humanist, architect, engineer, and painter who established the painting style of the Italian Renaissance in Holland, just as his teacher Jan Gossaert did in Brussels.

Scorel studied with several local artists, but by 1517 he was in Utrecht working with Gossaert, who encouraged Scorel to travel. He went to Germany in 1519 and while in Nürnberg visited Albrecht Dürer. He visited in Switzerland and then made his way to Venice. In Venice he was impressed by the work of Giorgione and Jacopo Palma but soon left on a pilgrimage to Jerusalem that took him to Cyprus, Rhodes, and Crete.

Scorel then journeyed to Rome during the brief pontificate of the Utrecht-born pope Adrian VI and was made keeper of the papal collection and inspector of the Belvedere. The Pope gave Scorel a studio in the Vatican and sat for a portrait (1523). Scorel was deeply influenced by the work of both Michelangelo and Raphael while in Italy. In 1524, however, he returned to the Netherlands to become the canon of Utrecht, a position that guaranteed him an income for life.

In the large figurative compositions Scorel completed upon his return to Holland, he introduced such Italian elements as nudes, classical draperies and architecture, and spacious imaginary landscapes. However, the genre he truly excelled at was portraiture; the surviving works are painted in a more conventionally Northern style, and show his gift for characterization. His finest portraits were those of "Agatha Schoonhoven" (1529; Doria Pamphili Gallery, Rome), a "Young Scholar" (Museum Boymans–van Beuninge, Rotterdam), and a "Venetian Nobleman" (Landesmuseum für Kunst und Kulturgeschichte, Oldenburg, Ger.). Group portraits of pilgrims to Jerusalem are in Utrecht and Haarlem, although much of his work based on religious themes, especially the many altarpieces, was destroyed in the 16th century by Protestant iconoclasts. Scorel successfully combined the idealism of Renaissance Italy with the naturalism of northern European art in his painting, and bequeathed his style to succeeding generations of Dutch painters.

Scoresby, William (b. Oct. 5, 1789, Cropton, near Whitby, Yorkshire, Eng.—d. March 21, 1857, Torquay, Devon), English explorer, scientist, and clergyman who pioneered in the scientific study of the Arctic and contributed to the knowledge of terrestrial magnetism.

At the age of 10 Scoresby made his first Arctic whaling voyage aboard his father's ship, the "Resolution," which he later commanded in 1811. In 1813 he established that the temperature of polar waters is warmer at great depths than at the surface. His *Account of the Arctic Regions with a History and Description of the Northern Whale-Fishery* (1820) contained his own findings as well as those of earlier navigators. His voyage to Greenland in 1822, during which he surveyed 400 miles (650 kilometres) of the east coast, was his last venture into the Arctic. He then began divinity studies at Cambridge and later became a clergyman. His new career did not, however, end his scientific work. In 1848, while crossing the Atlantic, he made valuable observations on the height of waves. He also voyaged to Australia in 1856 to gather data on the Earth's magnetism.

Scoresby Sund, English SCORESBY SOUND, deep inlet of the Greenland Sea, which gives its name to the town of Scoresbysund. Scoresby Sund penetrates eastern Greenland for 70 mi (110 km). Numerous fjords (the longest 130 mi) extend to the edge of the inland ice cap, where they are fed by large glaciers. The sound, charted by William Scoresby in 1822, is dotted with islands; the largest, Milne Land, is about 60 mi long and 25 mi wide and rises to 7,987 ft (2,434 m). Scoresbysund, a hunting and fishing town founded in 1924 by Ejnar

Mikkelsen, lies north of the sound's mouth. Pop. (1982) Scoresbysund town, 424.

scoria, heavy, dark-coloured, glassy, pyroclastic igneous rock that contains many vesicles (bubble-like cavities). Foamlike scoria, in which the bubbles are very thin shells of solidified basaltic magma, occurs as a product of explosive eruptions (as on Hawaii) and as frothy crusts on some pahoehoe (smooth- or billowy-surfaced) lavas. Other scoria, sometimes called volcanic cinder, resembles clinkers or cinders from a coal furnace.

scorodite, mineral in the variscite group, hydrated iron arsenate ($FeAsO_4 \cdot 2H_2O$). It forms pale leek-green or grayish-green to liver-brown aggregates of crystals, or pale-green to pale-grayish or brownish-green earthy masses. Scorodite forms a continuous solid-solution series with mansfieldite in which aluminum replaces iron in the scorodite structure. Mansfieldite forms white to pale-gray crusts and porous masses. These minerals occur in weathered zones formed by the oxidation of arsenopyrite, as at Hesse-Nassau, Ger.; Laurium, Greece; Cornwall and Cumberland, Eng.; and the western U.S. For detailed physical properties, *see* arsenate mineral (table).

scorpaeniform, also called MAIL-CHEEKED FISH, any member of the order Scorpaeniformes, a group of bony fishes that includes the sea robins, sculpins, and numerous other forms found worldwide. They are characterized by a plate of bone running across each cheek.

A brief treatment of scorpaeniforms follows. For full treatment, *see* MACROPAEDIA: Fishes.

Scorpaeniforms generally reach about 30 centimetres (1 foot) in length, although the deep-sea redfish can grow up to 90 cm long. Most scorpaeniforms are typically fishlike in appearance, with spiny rays and scales, but a number of them have truly odd shapes. The lumpfishes are fat and jellylike, usually without scales, and have no sharp spines on their fins. The sea robins, by contrast, have large, pointed heads and protuberant eyes as well as large pectoral and dorsal fins. The stonefish is an irregularly shaped, deep-bodied fish that is able to mimic its background so perfectly that it looks like an eroded piece of coral lying on the bottom. It is the most venomous of all the scorpaeniforms, with dorsal spines that inject poison. Turkey fishes also inhabit the tropical waters of the Indo-Pacific, but unlike the stonefish they are free swimmers, brightly coloured with patterns of contrasting stripes to denote species. All have long, needlelike dorsal spines and can inflict extremely painful wounds.

The flatheads are bottom dwellers that bury themselves on the bottom with only their eyes showing. Their varied diet includes fishes, mollusks, crustaceans, and worms. The largest of them, the dusky flathead (*Platycephalus fuscus*) is an important food fish in Australia. The sea robins, also bottom dwellers, have an interesting adaptation of their pectoral fins. The lower rays are long and thick and act as organs of taste and touch; they even make it possible for the fish to walk along the bottom, at the same time probing for food. Like the flatheads, sea robins feed on small fish, crustaceans, mollusks, and other bottom dwellers.

The scorpaeniforms have adapted very well to fresh water, and the sculpin are found in many lakes and rivers of the Northern Hemisphere. They are numerous in North America, and two forms are found in the deep waters of Lake Baikal, which they share with species belonging to related families, the Cottomephoridae and Comephoridae. Some species remain in deep water year-round, while others use the bottom only to spawn. An interesting characteristic of the Comephoridae is the imbalance between numbers of each sex: only 3 to 4 percent of the population is male. The reasons for this are not yet known. The Comephoridae are live-bearers, whereas other cottoids are egg layers, with the males guarding the newly hatched fry.

scorpion, any of about 800 species of arachnids of the order Scorpionida having an elongated body and a segmented tail that is tipped with a venomous stinger.



Scorpion with young
J.A.L. Cooke

A brief treatment of scorpions follows. For full treatment, *see* MACROPAEDIA: Arachnids.

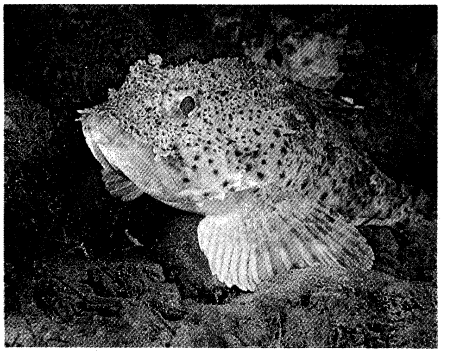
Scorpions range in size from 13 to 175 millimetres ($^1/_2$ to 7 inches) and have six pairs of appendages. The chelicerae, the small first pair, are used to tear apart prey. The pedipalps, the second pair, are large and have strong, clawlike pincers, which are held horizontally in front and are used as feelers and for grasping prey. The last four pairs, each equipped with a pincer, are walking legs.

Scorpions are nocturnal and feed mainly on insects and spiders. They grasp the prey with their large, powerful pedipalps and tear it apart, sucking the tissue fluids. Large prey is usually paralyzed before it is eaten.

During mating the male and female perform a "courtship dance." In *Buthotus alticola* this dance is preceded by a twining and untwining of the vertically held tails. After copulation the male is often devoured by the female. Fertilized eggs develop inside the female, and the young, which are born alive, stay on the female's back for about 12 days.

At least two general types of scorpion poison exist. One is local in effect and comparatively harmless to man; the other is a dangerous neurotoxin (nerve poison) that may cause death. Most scorpions prefer to retreat rather than to fight and do not sting humans unless molested.

scorpion fish, any of the numerous bottom-living marine fish of the family Scorpaenidae, especially those of the genus *Scorpaena*,



California scorpion fish (*Scorpaena guttata*)
Bud Meese from Root Resources—EB Inc.

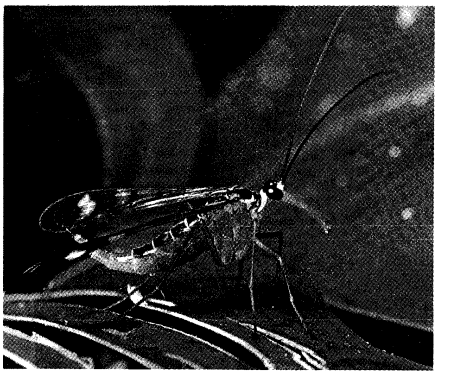
widely distributed in temperate and tropical waters. Sometimes also called rockfish, or stonefish, because they commonly live among rocks, scorpion fish are perchlike fish with large, spiny heads and strong, sometimes venomous, fin spines. The fin spines, with or without venom, can produce deep and painful wounds.

Many scorpion fish are rather dull in colour; others are brighter—often some shade of red. The largest members of the family grow about 1 metre (39 inches) long. Scorpion fish are carnivorous, generally sedentary fish. They often lie quietly on the bottom, and many blend closely with their surroundings by virtue of their colouring and (in some species) a variety of flaps and projections on the head and body. Better known species include the redfish (*q.v.*) and the highly coloured, venomous lion-fish (*q.v.*).

scorpion mouse, insect-eating rodent, a species of grasshopper mouse (*q.v.*).

scorpionfly, any insect of the order Mecoptera, characterized by chewing mouthparts at the tip of an elongated beak; long, many-segmented, threadlike antennae; and two pairs of membranous, net-veined wings that may be transparent, darkly spotted, or banded. The larva resembles a caterpillar; pupation occurs in the soil. Both larva and adult feed on dead animals, especially insects, and sometimes on plants.

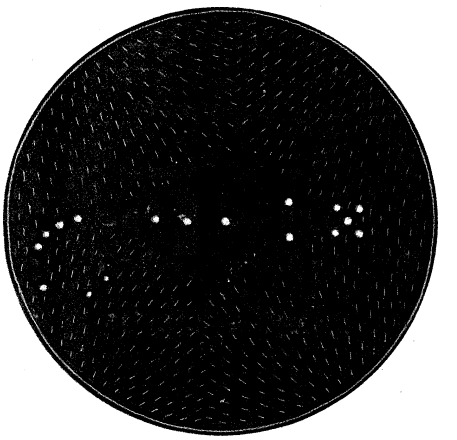
The scorpionfly is harmless to man and serves a useful function in nature as a scavenger. Its name refers to the way in which the male holds its genitalia (a bulblike segment at the end of the abdomen) over its back in a manner similar to that of a scorpion.



Scorpionfly (Mecoptera)
E.S. Ross

Scorpionida (arachnid order): *see* scorpion.

Scorpius (Latin: Scorpion), in astronomy, zodiacal constellation lying between Libra and Sagittarius, at about 16 hours 30 minutes right ascension (the coordinate on the celestial



Scorpius, illumination from a Book of Hours, Italian, *c.* 1475; in the Pierpont Morgan Library, New York City (MS. G.14)
By courtesy of the Pierpont Morgan Library, New York City, the Glazier Collection

sphere analogous to longitude on the Earth) and 30° south declination (angular distance south of the celestial equator). Antares (Alpha Scorpii), the brightest star, is of the first magnitude.

In astrology, Scorpius (or Scorpio) is the eighth sign of the zodiac, considered as governing the period from about October 24 to about November 21. Its representation as a scorpion is related to the Greek legend of the scorpion that stung Orion to death (said to be why Orion sets as Scorpius rises in the sky); another Greek myth relates that a scorpion caused the horses of the Sun to bolt when they were being driven for a day by the inexperienced youth Phaeton.

Scorpius X-1 (catalog number Sco X-1), brightest X-ray source in the sky, the first such object discovered in the direction of the constellation Scorpius. Detected in 1962, its X-radiation is not only strong but, like other X-ray sources, quite variable as well. Its variability exhibits two states, one at higher output with great variability on a time scale of minutes and another at lower output with the variability correspondingly lessened.

Scorpius X-1 was observed in visible light for the first time in 1966. Optically it is much less impressive, bluish in colour and appearing only faintly. The complete nature of Scorpius X-1 is not yet known, but it appears to be a close double star, one component of which is optically invisible—either a white dwarf star or a neutron star (*qq.v.*). Such is the case with most galactic X-ray sources. The X rays are generated when matter from the optically visible, bluish hot star falls onto the invisible collapsed companion. This matter is tremendously accelerated and crushed by the enormous gravity of the collapsed star. Unlike the majority of binary X-ray sources, the visible member does not appear to be very massive.

Scorsese, Martin (b. Nov. 17, 1942, Flushing, Long Island, N.Y., U.S.), American motion-picture writer, director, and producer who depicted harsh, often violent aspects of American culture in many of his films.

Scorsese received undergraduate and graduate degrees in film from New York University and returned there as an instructor in 1963. After editing several films for other directors and directing two modest features of his own, he won critical attention with *Mean Streets* (1973), which examines the conflict between church and street life in an Italian neighbourhood of New York City; the film was notable for its realistic detail and for its naturalistic, partially improvisatory performances. The following year Scorsese explored an altogether different subject in a similarly raw directorial style; *Alice Doesn't Live Here Anymore* follows a recently widowed woman and her son across the West in a loose, episodic journey of self-discovery.

With *Taxi Driver* (1976) Scorsese aroused controversy because of his use of graphic violence in the story of a psychopathic cab driver's loneliness and salvation in New York City. Some of his later films—including *New York, New York* (1977), *Raging Bull* (1980), and *The King of Comedy* (1982)—were considered by many critics to be unexceptional, but he achieved critical acclaim for *The Last Waltz* (1978), a documentary film of a rock band's break-up and final concert. His film *The Last Temptation of Christ* (1988), based on a novel by Níkos Kazantzakís, scandalized many Christians.

Scorza, Manuel (b. 1928, Lima—d. Nov. 27, 1983, Madrid), Peruvian poet, novelist, and political activist whose novels were translated into many languages.

In 1949 Scorza joined a group that resisted the dictatorship of General Manuel Odría; the same year, his first book of poems, *Actas de la remota lejanía* ("Proceedings of a Remote Distance"), was published and was confiscated by the local police. He was forced into exile and lived in many countries, barely managing to survive. *Las imprecaciones* (1955; "Imprecations"), a collection of poems, won him literary honours in Peru in 1956. That year he also joined the Movimiento Comunal and supported the peasant revolt that was raging in the Cerro de Pasco. He became secretary of the movement and wrote its political manifestos.

Los adioses (1959; "Farewells"), a collection of love poems, is tinged with sadness and nostalgia for what might have been. Later volumes of poetry include *Desengaños del mago* (1961; "Sad Lessons of Experience of the Magician") and *El vals de los réptiles* (1970; "Waltz of the Reptiles").

Scorza achieved national and international fame with his novels. After exile in Mexico in 1967 and the following year in Paris, he began to write the chronicles of the peasant revolt. His novel *Redoble por Rancas* (1970; *Drums for Rancas*) was the first of five volumes dealing with events in Peru (1955–62) and with the plight of the Indians, as well as with the shock produced by the clash of their culture with the dominant Spanish one. A basic theme in such later novels as *Historia de Garabombo, el invisible* (1972; "Story of Garabombo the Invisible"), *El jinete insomne* (1978; "The Insomniac Horseman"), *Cantar de Agapito Robles* (1978; "To Sing of Agapito Robles"), and *La tumba del relámpago* (1979; "The Tomb of the Lightning") is the animistic vision of life shared by the Indians.

Scorza finally settled in Paris and taught for a time at the École Normale Supérieure. He died in a plane crash.

scorzalite, phosphate mineral similar to lazulite (*q.v.*).

Scot, any member of an ancient Gaelic-speaking people of northern Ireland who settled in Scotland sometime in the 5th century AD. Originally (until the 10th century) "Scotia" denoted Ireland, and the inhabitants of Scotia were Scotti. The area of Argyll and Bute, where the migrant Scots settled, became known as the kingdom of Dalriada, the counterpart to Dalriada in Ireland. St. Columba inaugurated Christianity among them and helped raise Aidan to the kingship of Scottish Dalriada in 574. The Scots then expanded eastward into what came to be known as the Forest of Atholl and Strath Earn (valley of the Earn River) and northward into the area of Elgin. The union of the lands of modern Scotland began in 843, when Kenneth I MacAlpin, king of the Scots (Dalriada), became also king of the Picts and, within a few years, joined "Pict-land" to "Scot-land" to form the kingdom of Alba. By 1034, by inheritance and warfare, the Scots had secured hegemony over not only Alba but also Lothian, Cumbria, and Strathclyde—roughly the territory of modern mainland Scotland. In 1305 the kingdom was divided into Scotland, Lothian, and Galloway; in the 14th century Scotland came to be the name for the whole land, and all its inhabitants were called Scots, whatever their origin.

Scot, Michael (b. *c.* 1175—d. *c.* 1235), Scottish scholar and mathematician whose translations of Aristotle from Arabic and Hebrew are a landmark in the reception of that philosopher in the Latin West.

Scot was famous in the Middle Ages as an astrologer and soon acquired a popular reputation as a wizard. There is no evidence as to where he obtained his master's degree, and he first appears at Toledo in 1217, where he finished translating the treatise of al-Biṭrūjī (Alpetragius) on the sphere. In 1220 he was in Bologna and during the years 1224–27 may have been in papal service, as he is mentioned in several papal letters. A pluralist, he was promoted archbishop of Cashel in Ireland (May 1224) but declined the see a month later. He seems, however, to have held benefices in Italy from time to time. After 1227 he was at the Sicilian court of the emperor Frederick II and was mentioned as recently dead in a poem written early in 1236.

His works are mainly undated, but those on natural philosophy seem to predominate in his earlier, Spanish period, and those on astrology in his later, Sicilian period. At Toledo, in addition to his translation of al-Biṭrūjī, Scot translated Aristotle's *Historia animalium* from Hebrew or Arabic. He also translated, perhaps at this time, Aristotle's *De caelo,* and he was probably responsible for the translations of the *De anima* and the commentary by Averroës that is found in the same manuscripts. There is no evidence that Scot translated Aristotle's *Physics, Metaphysics,* or *Ethics.*

He wrote three treatises on astrology, and several alchemical works were ascribed to him. He appears in Dante's *Inferno* (xx) among the magicians and soothsayers and has the same role in Boccaccio.

Scotch heather: *see* heather.

Scotch whisky, any whiskey made primarily of malted barley. *See* whiskey.

scoter, also called SEA COOT (*Melanitta*), any of three species of sea duck of the family Anatidae. Within the divisions of true duck species, the scoter belongs in the diving duck group. Scoters are good swimmers and divers and are mainly marine except during the breeding season. The males are generally shiny black in colour. The surf scoter (*Melanitta perspicillata*) of North America breeds in the boreal forests and tundra of Canada and Alaska; it winters on coasts from Nova Scotia to Florida in the east and from the Aleutian Islands to southern California in the west. The white-winged, or velvet, scoter (*M. deglandi,* or *fusca*) is nearly circumpolar in distribution north of the equator, as is the black, or common, scoter (*M.,* or sometimes *Oidemia, nigra*). The black scoter is the least abundant in the New World. All three species of scoter feed mainly on marine animals such as clams; only about 10 percent of their diet is plant material. The three species may be seen feeding in mixed flocks.

Scotia Arc, island arc system consisting of the submarine Scotia Ridge, mountainous south Atlantic islands (clockwise from the north, the South Georgia, South Sandwich, and South Orkney islands), and the Antarctic Peninsula. This arc trends northward along the Antarctic Peninsula, then swings eastward to form a hairpin curve that returns to connect with Tierra del Fuego and the Andes of South America. The entire arc is about 2,700 miles (4,350 km) in length and is one of the few island arcs that does not border the Pacific Ocean. It began development during the Mesozoic era (245 million to 66.4 million years ago). The arc encloses the Scotia Sea and is terminated at its eastern end by the South Sandwich Trench, structurally part of the arc itself, reaching a maximum depth of 27,132 feet (8,270 m) in the Meteor Deep.

Scotia Sea, marine region, part of the South Atlantic Ocean, about 350,000 square miles (more than 900,000 square km) in area. It lies within a complex and tectonically active marine basin enclosed on the north, east, and south by the island-dotted Scotia Ridge. The ridge forms a west-opening submarine loop about 2,700 miles (4,350 km) long, connecting Tierra del Fuego of South America with northern Palmer Land of the Antarctic Peninsula. The western limit of the sea is formed by a discontinuous northwest-trending rise that separates the basin from the Drake Passage.

The Scotia Ridge, with an active volcanic arc-trench system at its eastern end, compares in form and geologic record to the similar Northern Antilles volcanic chain in the eastern Caribbean Sea. The Scotia Ridge region was thus given the name Southern Antilles by the early geologists Eduard Suess and Otto Nordenskjöld.

Named after the Scottish National Antarctic Expedition (1902–1904) vessel *Scotia,* under the command of William S. Bruce, the Scotia Sea has a lengthy record of exploration dating back to the 17th century. Through the 18th and 19th centuries, exploration was encouraged by a relentless search for new and ever-richer whaling and sealing grounds. Semipermanent and permanent settlements were established, particularly on South Georgia and the Falkland Islands. By the mid-20th century, sealing and whaling declined, and further exploration was largely scientific. During and since the International Geophysical Year (1957–59), the Scotia Sea region has been extensively explored, mainly by Chilean, Argentine, British, and American scientific teams.

The Scotia Sea is separated into two smaller basins, West Scotia Basin (the larger) and East Scotia Basin, by a slight rise connecting South Georgia with the South Orkney Islands. Water depths in the Scotia Sea generally range between 10,000 and 13,000 feet (3,000 to 4,000 m), but to the east, across the volcanic arc of the South Sandwich Islands, depths exceed 26,000 feet (7,900 m) in Meteor Deep of the South Sandwich Trench. Water of the southern seas in its unimpeded clockwise race around the Antarctic continent is funneled through the 600-mile- (965-kilometre-) wide Drake Passage and the Scotia Sea, pouring through several main passes of the Scotia Ridge.

The northern arm of the Scotia Ridge, including South Georgia, lies in the sub-Antarctic climatic zone, and the southern arm, south of the Antarctic Convergence, lies in the cold Antarctic zone. The biota varies accordingly. South Georgia supports a rich tundralike flora with at least 50 species of vascular plants, whereas islands in the Antarctic zone, including the South Orkneys and South Shetlands, can maintain only primitive communities of mainly seedless plants, such as lichens, mosses, and algae. Many species of birds, mostly sea and a few shore birds and land birds, including petrels, penguins, gulls, terns, skuas, and sheathbills, inhabit these regions. Other sea life south of the Convergence includes nearly 100 species of fish and several species of whales and seals. Human predation has seriously reduced the sea mammal population, some species being almost at the point of extinction. The accidental introduction of cats, dogs, mice, and rats threatens bird nesting grounds on some islands in the Scotia Sea.

Scotland, component country of the United Kingdom—with England, Wales, and Northern Ireland—and the most northerly of the four. It occupies about one-third of the island of Great Britain. It is bounded by England in the south and on the other three sides by sea: the Atlantic Ocean on the west and north and the North Sea on the east.

A brief treatment of Scotland follows. For full treatment, *see* MACROPAEDIA: United Kingdom: *Scotland.*

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

Physical and human geography. The country was originally called Caledonia, the name Scotland deriving from Scotia—a tract settled by the tribe of Scots who had migrated from Ireland. After being independent until 1707, Scotland assented to the Act of Union with England and became an integral part of the United Kingdom. It has no separate legislature; it now has 72 seats in the United Kingdom's House of Commons. All Scottish peers are now entitled to sit in the House of Lords. Scotland has no sovereign executive or political power, yet it retains vestiges of ancient sovereignty in its own legal and educational systems, a national church, and a separate administration.

Despite their diverse origins—including Celts, Angles, and Normans—the Scots in time have been fused into a fairly homogeneous population. English is the principal language; the Church of Scotland (Presbyterian) is the established religion.

Scotland is generally hilly, and it is traditionally divided into three geographic regions from north to south: the Highlands, the Lowlands, and the Southern Uplands. The Highlands are bisected from northeast to southwest by the fault line of the Great Glen, which is occupied by a series of lochs (lakes), of which Loch Ness is the best-known. The North West Highlands lie to the north of the Great Glen, and the more extensive Grampian Mountains lie to the south. The Lowlands region is low by comparison with adjoining areas but is by no means flat. The landscape is varied by series of hills and includes some of Scotland's best areas for arable farming. The Southern Uplands are not as high in elevation as the Highlands or as fractured in appearance. Glaciation has led to narrow, flat valleys separating table mountains throughout much of the region. Toward the southeast the Uplands open out into the Tweed Valley, which broadens into rich alluvial farmland, and to the southwest they slope toward the Galloway Peninsula.

Most of Scotland's hills and mountains are covered with grasses and shrubs. Peat, which occupies nearly one-tenth of Scotland's total area, is widespread in the lowlands and moors. Heather and bracken are typical large plants of the peatlands.

Scotland's climate is a temperate oceanic one that is milder than might be expected given Scotland's northerly latitude. Tiree (Tyree), in the Inner Hebrides off the western coast of Strathclyde region, has a mean temperature in winter of 41° F (5° C) in the coldest month, whereas Dundee on the east coast has 37° F (3° C). Dundee's mean temperature in the warmest month is 59° F (15° C), and Tiree's 57° F (14° C). Rainfall varies greatly. In the flat Outer Hebrides it does not exceed 40 inches (1,000 mm) a year, while, in the Ben Nevis area in the Highland region, rainfall is 142 inches (3,600 mm). Most of the east coast receives 25 to 32 inches (630 to 810 mm), but some two-thirds of Scotland's surface receives more than 40 inches (1,000 mm).

Until the growth of the North Sea oil industry, development of the Scottish economy had been slow. During the 1970s and early 1980s, however, tens of thousands of jobs were created by onshore oil-related enterprises, such as building oil-production platforms and servicing North Sea operations. In the late 1980s, however, as a result of a continuing depression in world oil prices, petroleum production declined and many of these jobs were lost.

Coal is Scotland's chief mineral resource, and the main mining areas are in Lothian, Fife, and Strathclyde regions. Other minerals that have been worked intermittently include gold, silver, lead, and chromite. Although peat is available to a depth of 2 feet (0.6 m) or more over extensive areas of the country, its economic value is limited. Water is a valuable resource, especially for generating electricity. Scotland also has coal- and oil-fired generating stations, but nuclear installations at Chapelcross, Hunterston, and Dounreay supply about two-fifths of Scotland's total electricity.

Scotland's marine-fishing industry accounts for more than two-thirds of all of the United Kingdom's fish and shellfish catch. Peterhead ranks as the top whitefish landing port of the European Community, and the Grampian region is one of the United Kingdom's main centres of fish processing. Agricultural development is moving toward greater efficiency through mechanization. In the Southern Uplands and the Highlands regions, hill-sheep farming is important, while in the northeast livestock rearing combined with the growing of animal-feed crops predominates. In the southwest, dairy farming is widespread. Wheat and barley are important crops, and specialized kinds of farming flourish in certain areas—*e.g.,* market gardens in East Lothian, raspberry fields in the Tayside region, and tomato farming under glass and the intensive cultivation of fruits in the Clydesdale district, Strathclyde region.

Forestry is also an important industry in Scotland, and one that has helped retain the population in rural areas. The electronics industry has expanded greatly since the 1960s, especially in Fife, Lothian, and Strathclyde region. Automobile manufacturing came to Scotland on a large scale in the early 1960s, while Scottish manufacture of clocks, watches, cash registers, precision instruments, and earth-moving machinery dates from World War II. The textile industry remains vital in the towns of Hawick, Galashiels, Selkirk, Peebles, Glasgow, and Ayr. The steel and shipbuilding industries, once mainstays of Scotland's economy, are now in decline. Printing and brewing are well-established industries in Edinburgh and Glasgow. Scottish ports handle many goods—more imports than exports, with a large proportion of the former for re-export. Air transportation has grown steadily from the major airports at Glasgow, Aberdeen, Prestwick, and Edinburgh.

A total of eight institutions of higher learning are found in Edinburgh (the political and cultural capital), Glasgow, St. Andrews, Aberdeen, Dundee, and Stirling. The annual Edinburgh International Festival has become one of the world's largest cultural events. The Scottish National Orchestra and the Scottish ballet enjoy excellent reputations, while folk songs and music are popular. Scottish writers can choose among three languages: Gaelic, Scots, and English—although English is by far the most prevalent. Scotland also boasts a National Gallery, a National Portrait Gallery, and the Royal Scottish Museum.

History. Evidence of human settlement in the area later known as Scotland dates from the 3rd millennium BC. By the time of the birth of Christ, the inhabitants were organized into many tribes of diverse origin. Between AD 82 and AD 208 the Romans invaded the region several times but failed to establish a lasting foothold there.

By the middle of the 9th century the separate kingdoms of the region became united into a largely Celtic monarchy that lasted until the end of the reign of Macbeth in 1057. Under Malcolm III, who followed Macbeth, and his successors, English influence was introduced into the country. When King Edward I of England attempted to impose direct English rule over Scotland in 1296, a revolt for independence broke out, which ended in 1328, when the English King Edward III recognized Robert Bruce, a leader of the revolt, as King Robert I of Scotland.

The Stuart (Stewart) monarchs who followed Bruce's son, David II, maintained close ties with France, England's enemy. With the onset of the Scottish Reformation led by John Knox, however, French influence and the Catholic church came under attack, and in 1567 the Catholic monarch, Mary, Queen of Scots, was forced to give up the Scottish throne in favour of her infant son, James VI. Thereafter the Presbyterian Church became established as Scotland's national church.

When Elizabeth I, Queen of England, died in 1603, James VI of Scotland, a relative of Eliz-

abeth, succeeded her on the English throne as King James I. Scotland and England remained separate kingdoms under a single monarch—except for the brief period during the English Civil War when the monarchy was deposed—until 1707, when the parliaments of both countries passed the Act of Union, which, together with Wales, joined the countries into the Kingdom of Great Britain. As a result of the Act, Scotland dissolved its parliament and sent representatives to the Westminster Parliament, after receiving guarantees of autonomy for Scottish laws and courts and the Presbyterian Established Church.

When Queen Anne, the last monarch of the house of Stuart, died in 1714, the house of Hanover came to the British throne. Many Highland Scots remained loyal to the Stuart line, however, and rebelled twice, in 1715 and 1745, to attempt to restore various Stuart pretenders to the British throne. Known as the Jacobites, after the Latin name of their leader, James Edward Stuart, the rebels were defeated both times by the British. The second Jacobite rebellion was the last effort by Scotland to resist English control, and thereafter the history of Scotland became part of the history of Great Britain.

From the 1820s on the Industrial Revolution was in full swing in Scotland, and with it came a dramatic increase in the country's population. Shipbuilding, coal mining, and iron and steel production replaced textiles as Scotland's chief industries at this time. The Liberal Party (from the mid-19th century) and then the Labour Party (from the early 20th century) tended to dominate modern Scottish politics. The late 20th century saw a decline in Scotland's traditional heavy industries as the country became a centre of electronics manufacturing and a base for the offshore extraction of petroleum from the North Sea fields. Area 30,418 square miles (78,783 square km). Pop. (1990 est.) 5,090,000.

Scotland, Church of, national church in Scotland, which accepted the Presbyterian faith during the 16th-century Reformation.

According to tradition, the first Christian church in Scotland was founded about 400 by St. Ninian. In the 6th century, Irish missionaries included St. Columba, who settled at Iona about 563. In 1192 the Scottish church was declared "a special daughter" of the Roman see, subject only to the pope. St. Andrews became an archiepiscopal see in 1472, followed by Glasgow in 1492.

The earliest Scottish Reformers were under Lutheran influence but were subsequently influenced by the Swiss Reformers. The Calvinistic tone of the Scottish Reformation was ascribable to John Knox (*q.v.*), who became the leader of the Scottish Reformation. Knox's admiration for John Calvin and for the reformation that Calvin led in Geneva is evident in Knox's Scots Confession, in the *Book of Common Order* (often known as Knox's liturgy), and in the Book of Discipline (later called the First Book of Discipline), the last of which discussed a plan for a godly church and commonwealth. The Scottish Reformers held a parliament in August 1560, which abolished the authority of the pope in Scotland, adopted the Scots Confession, and forbade the celebration of mass.

After the breach with Rome it was uncertain for more than a century whether the church in Scotland would be episcopal or presbyterian in government. Charles I, who ruled Scotland and England, preferred the episcopal form, while the Scottish people insisted on the presbyterian form. The struggle was long and complicated, but, when William and Mary became the English monarchs in 1689, Presbyterianism was permanently established in Scotland by constitutional act.

New problems then developed. In the late 17th century a large group of essentially professional clergymen known as Moderates became influential in the church. They were opposed by the Evangelicals, who held firmly to the traditional Calvinism of the Westminster Confession.

When the British Parliament restored patronage in Scotland in 1712, the people lost the right to elect their pastors to the landowners, which brought the Church of Scotland under the control of the Moderate ministers.

Dissension between the Moderates and the Evangelicals, who had been strengthened by religious revivals and the Sunday school movement, increased from 1833 to 1843. Finally a large group, led by Thomas Chalmers, left the established church and formed, in 1843, a Free Church of Scotland. All but one of the Church of Scotland missionaries and most of its best scholars joined the Free Church.

Gradually, better leadership replaced the Moderate party in the Church of Scotland. Patronage was abolished in 1874, and closer relations with the Free Church developed. In 1921 the state severed its old relation with the Church of Scotland, leaving it the national church but not the established state church. After several years of negotiations, the two churches united in 1929 under the old name of the Church of Scotland.

Subsequently the church continued to be active in missionary work and to take an active part in the Protestant ecumenical movement. Moves to affiliate it with the Church of England were defeated in 1959 and 1971.

Scotland, Free Church of: *see* Free Church of Scotland.

Scotland Yard, formally NEW SCOTLAND YARD, the headquarters of the London Metropolitan Police and, by association, a name often used to denote that force.

The London police force was created by an act introduced in Parliament in 1829 by the home secretary, Sir Robert Peel (hence the nicknames "bobbies" and "peelers" for policemen). This police force replaced the Bow Street Police, a small body of paid police in London who had been organized in the mid-18th century by the novelist and magistrate Henry Fielding. The original headquarters of the new London police force were at 4 Whitehall Place, with an entrance in Great Scotland Yard, from which the name originates. (Scotland Yard was so named because it stood on the site of a medieval palace that had housed Scottish royalty when the latter were in London on visits.)

At first the new police force, like their Bow Street predecessors, encountered little cooperation from the public, and when Scotland Yard stationed its first plainclothes police agents on duty in 1842, there was a public outcry against these "spies." The police force had gradually won the trust of the London public by the time Scotland Yard set up its Criminal Investigation Department (CID) in 1878, however. The CID was a small force of plainclothes detectives who gathered information on criminal activities. The CID was subsequently built up into the efficient investigative force that it now constitutes. It presently employs more than 1,000 detectives.

By the late 19th century, the London police headquarters at Scotland Yard had grown increasingly overcrowded, and so in 1890 a new headquarters building was completed on the Thames Embankment and named New Scotland Yard. The headquarters were subsequently moved from there to still another new building off Victoria Street (10 Broadway), also called New Scotland Yard, in 1967.

The area supervised by the London Metropolitan Police includes all of Greater London with the exception of the City of London, which has its own separate police force. The Metropolitan Police's duties are the detection and prevention of crime, the preservation of public order, the supervision of road traffic and the licensing of public vehicles, and the organization of civil defense in case of emergency. The administrative head of Scotland Yard is the commissioner, who is appointed by the crown on the recommendation of the home secretary. Beneath the commissioner are a deputy commissioner and four assistant commissioners, each of the latter being in charge of one of Scotland Yard's four departments; administration, traffic and transport, criminal investigation (the CID), and police recruitment and training. The CID deals with all aspects of criminal investigation and comprises the criminal record office, fingerprint and photography sections, the company fraud squad, a highly mobile police unit known as the flying squad, the metropolitan police laboratory, and the detective-training school.

Scotland Yard keeps extensive files on all known criminals in the United Kingdom. It also has a special branch of police who guard visiting dignitaries, royalty, and statesmen. Finally, Scotland Yard is responsible for maintaining links between British law-enforcement agencies and Interpol. Although Scotland Yard's responsibility is limited to metropolitan London, its assistance is often sought by police in other parts of England, particularly with regard to difficult cases. The Yard also assists in the training of police personnel in the countries of the Commonwealth.

Scots: *see under* Scottish (*e.g.,* Scottish law), except as below.

Scots Confession, Latin CONFESSIO SCOTICANA, first confession of faith of the Scottish Reformed Church, written primarily by John Knox and adopted by the Scottish Parliament in 1560. It was a moderate Calvinist statement of faith in 25 articles, although it stressed the Real Presence of Christ in the Eucharist more than later Reformed creeds did.

The Second Scots Confession, also called the King's Confession and the National Covenant (1581), was a supplement to the First Scots Confession. It was a strongly antipapal statement adopted by the king, council, and court and by all the Scottish people in 1581. It was also made a part of the National Covenant of 1638.

The Scots Confession was superseded by the Westminster Confession in 1647.

Scotsman, The, morning daily newspaper published in Edinburgh, widely influential in Scotland and long considered a leading exemplar of responsible journalism.

Founded in 1817 as a weekly, it began daily publication in 1855, when the newspaper Stamp Duty was abolished. Conservative in editorial stance, *The Scotsman* has been highly innovative in production and distribution as the first paper in Europe to own and operate wirephoto equipment and the first newspaper outside London to open an office in Fleet Street in that city. The paper is known for its balanced views and for its insistence on sound reporting on literature and the arts as well as in domestic and foreign news.

Scott, Alexander (b. *c.* 1525—d. *c.* 1585), Scottish lyricist who is regarded as one of the last of the *makaris* (or poets) of the 16th century, because of his skill in handling the old Scottish metrical forms.

Nothing is known of Scott's life, though he seems to have been familiar with Edinburgh and Dalkeith, Midlothian; he is probably the "old Scot" referred to by Alexander Montgomerie, his younger poetic contemporary, in a sonnet dated about 1584. His 35 extant poems are contained in the Bannatyne Manuscript (1568). Scott's reputation as a genuine minor lyric poet rests upon his love lyrics; these show a striking range of mood, from the tender to the coarse, and an ad-

mirable metrical suppleness and variety. He also left an amusing burlesque, "The Justing and Debait up at the Drum betuix William Adamsone and Johine Sym," and a ceremonial alliterative poem, "Ane New Yeir Gift to Quene Mary, quhen scho come first Hame, 1562," which gives an interesting reflection of early Reformation Scotland.

Scott, Charles Prestwich (b. Oct. 26, 1846, Bath, Somerset, Eng.—d. Jan. 1, 1932, Manchester), eminent British journalist who edited the *Manchester Guardian* (known as *The Guardian* since 1959) for 57 years.

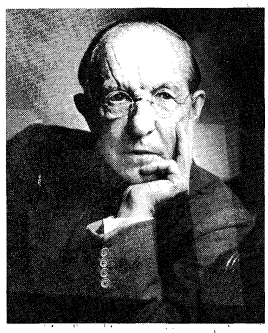
When Scott was a young boy ill health forced his removal from school, and he was sent to the Isle of Wight, where he was privately tutored. Having improved, he attended Corpus Christi College, Oxford, graduating in 1869. He worked briefly as an apprentice journalist for *The Scotsman* of Edinburgh, then joined *The Guardian* in 1871. He was named to the editorship the following year, when he was 26 years old. Scott introduced ideas and policies that made *The Guardian* one of the world's most respected papers. He demanded thoughtful writing of quality and insisted that the paper present the news honestly and fairly. He was quoted as saying, "Comment is free, but the facts are sacred." As editor he brought outstanding journalists to *The Guardian,* among them John Masefield, John Maynard Keynes, and Arnold Toynbee. He bought *The Guardian* in 1905 on the death of the publisher, J.E. Taylor, who was Scott's cousin.

Scott paid particular attention to *The Guardian*'s editorial page. Liberal in outlook under Scott's editorship, *The Guardian* supported many unpopular causes, including Irish Home Rule in 1886, despite heavy opposition. During World War I, when British nationalism was running high, Scott's *Guardian* presented minority views on such subjects as internationalism and pacifism.

Scott's wife died just before he bought *The Guardian,* and thereafter he devoted all his energies to the paper. On *The Guardian*'s 100th anniversary in 1921, Scott had been editor for nearly a half-century. He received commendations and congratulations from well-wishers throughout England. His second son, John Russell Scott, as *The Guardian*'s business manager, strengthened the paper's financial position to the point that it was able to buy out the *Manchester Evening News* in 1924. Charles Prestwich Scott retired in 1929, leaving the editorship to his younger son, who, however, drowned a scant four months later.

Scott, Duncan Campbell (b. Aug. 2, 1862, Ottawa—d. Dec. 19, 1947, Ottawa), Canadian regionalist poet who wrote of the untamed aspects of nature in the northern wilderness and life in the Indian territories.

An administrator for more than 50 years in the Department of Indian Affairs (1879–1932), Scott had a conscientious and sincere concern for Indians. His poetry was influenced by his close friend the Ottawa poet Archibald Lampman, whose work he edited on Lampman's death (1899). Scott produced several volumes of verse of uneven quality from 1893 (*The Magic House, and Other Poems*) to 1947 (*The Circle of Affection*). He also published two volumes of stories, *In the Village of Viger* (1896) and *The Witching of Elspie* (1923).



Duncan Campbell Scott, 1943
By courtesy of the Public Archives of Canada

Where the same name may denote a person, place, or thing, the articles will be found in that order

Scott, Dunkinfield Henry (b. Nov. 28, 1854, London—d. Jan. 29, 1934, Basingstoke, Hampshire, Eng.), English paleobotanist and leading authority of his time on the structure of fossil plants.

Before the age of 16 Scott had developed a strong interest in botany, but he did not pursue the subject at Christ Church, Oxford, from which he graduated in 1876. In 1880 he studied under the German botanist Julius Von Sachs at the University of Würzburg. Scott then held teaching posts at University College in London and the Normal School of Science. In 1892 he became honorary keeper of the Jodrell Laboratory in Kew, where he remained until 1906.

Scott's earliest published work was in plant anatomy. His *Introduction to Structural Botany* (1894, 1896) was a guide to the structure of both flowering and flowerless plants. His interest turned to paleobotany when an English paleobotanist, William Crawford Williamson, seeking a successor, asked Scott to assist him in his work. Together they published three papers on fossil-plant morphology under the title "Further Observations on the Organization of the Fossil Plants of the Coal Measures" (1894, 1895). After Williamson's death in 1895, Scott wrote a series of memoirs for the *Philosophical Transactions* of the Royal Society of London, the *Annals of Botany,* and other journals, in which he described many hitherto unknown fossil plants. In 1904 Scott and F.W. Oliver proposed the name Pteridospermeae for certain fernlike plants that differed from other plants of their class by bearing seeds. Scott's *Studies in Fossil Botany* (1900) greatly popularized paleobotany.

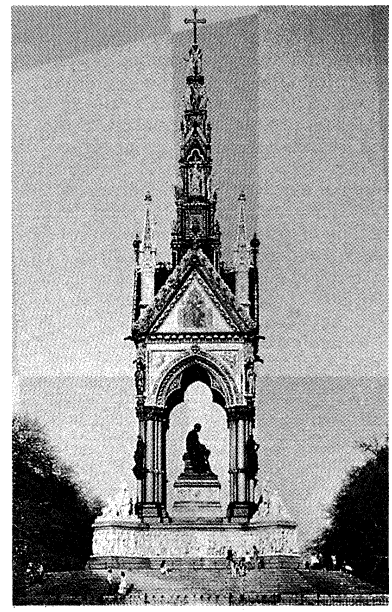
Scott, Francis Reginald, byname FRANK, or F.R., SCOTT (b. Aug. 1, 1899, Quebec—d. Jan. 31, 1985, Montreal), member of the Montreal group of poets in the 1920s and an influential promoter of the cause of Canadian poetry.

Scott helped found various literary magazines and also edited poetry anthologies. As a poet, he is at his best as a satirist and social critic. His *Overture* (1945), *Events and Signals* (1954), and *The Eye of the Needle* (1957) are written in a colloquial, conversational style. *Selected Poems* appeared in 1966 and *The Dance Is One* in 1973.

His literary career was paralleled by an active career in law and public life. A Rhodes scholar at the University of Oxford (1920–23), he returned to Canada and studied law at McGill University, where he became a member of the faculty (1928–69). During the 1930s he was active in the Cooperative Commonwealth Federation, a socialist party that became the New Democratic Party in the 1950s. As a socialist and an expert on constitutional law, he wrote *Social Planning for Canada* (1935), *Evolving Canadian Federation* (1958), and *Essays on the Constitution* (1977). He also served as a UN representative in Burma.

Scott, Sir George Gilbert (b. July 13, 1811, Gawcott, Buckinghamshire, Eng.—d. March 27, 1878, London), English architect, one of the most successful and prolific exponents of the Gothic Revival style during the Victorian period.

Scott was apprenticed to a London architect and designed the first of his many churches in 1838, but his real artistic education dates from his study of A.W.N. Pugin's works on medieval architecture. The first result of this study was the Martyrs' Memorial (1841) at Oxford, based on the Eleanor Crosses of the 14th century. Scott won the competition for the Nikolaikirche (1845–63) in Hamburg with a design in 14th-century German Gothic. This commission launched his career and earned him an international reputation. Among his best-known works are the Albert Memorial (1863–72) and the Midland Hotel (designed 1865; later called St. Pancras Hotel) attached to St. Pancras Station, both in London. Scott's importance rests partly upon the sheer number of important buildings he was associated with. Among the approximately 850 buildings that he designed, restored, or otherwise influenced are almost 500 churches, 39 cathedrals and minsters, and many buildings for colleges and universities. Because he was organizer and director of the largest English architectural firm of the period, Scott's own individual designs are difficult to determine.



The Albert Memorial, Kensington Gardens, London, by Sir George Gilbert Scott, 1863–72
C.M. Dixon

The restoration of long-neglected medieval cathedrals and abbeys, which was one aspect of the Gothic Revival, was a controversial issue even in the 19th century; and Scott's restoration of such famous monuments as Ely, Salisbury, and Lichfield cathedrals, as well as Westminster Abbey, has been regarded with mixed feelings by subsequent generations. His own account of his work can be read in his *Personal and Professional Recollections* (1879). Scott was knighted in 1872.

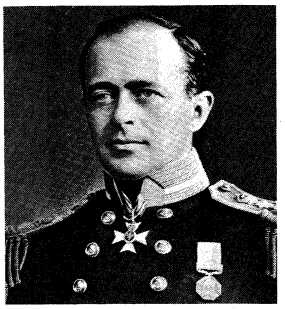
Scott, James: *see* Monmouth, James Scott, duke of.

Scott, John: *see* Eldon, John Scott, 1st earl of.

Scott, Robert Falcon (b. June 6, 1868, Devonport, Devon, Eng.—d. *c.* March 29, 1912, Antarctica), British naval officer and explorer who led the famed, ill-fated second expedition to reach the South Pole (1910–13).

Scott joined the Royal Navy in 1880 and by 1897 had become a first lieutenant. While commanding an Antarctic expedition on the HMS *Discovery* (1901–04), he proved to be a competent scientific investigator and leader and was promoted to captain upon his return to England.

In June 1910 Scott embarked on a second



Robert Falcon Scott

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

Antarctic expedition. Its aims were to study the Ross Sea area and reach the South Pole. Equipped with motor sledges, ponies, and dogs, he and 11 others started overland for the pole from Cape Evans on Oct. 24, 1911. The motors soon broke down, the ponies had to be shot before reaching 83°30′ S, and from there also the dog teams were sent back. On December 10 the party began to ascend Beardmore Glacier with three man-hauled sledges. By December 31 seven men had been returned to the base. The remaining polar party—Scott, E.A. Wilson, H.R. Bowers, L.E.G. Oates, and Edgar Evans—reached the pole on Jan. 18, 1912. Exhausted by their 81-day trek, they were bitterly disappointed to find evidence that Roald Amundsen had preceded them to the pole by about a month.

The weather on the return journey was exceptionally bad. Evans died at Beardmore (February 17). Food and fuel supplies were low. At the end of his strength and hoping to aid his companions by his own disappearance, Oates crawled out into a blizzard on March 17, at 79°50′ S. The three survivors struggled on for 10 miles (16.1 km) but then were bound to their tent by another blizzard that lasted for nine days. With quiet fortitude they awaited their death—11 miles from their destination. On March 29 Scott wrote the final entry in his diary:

> Every day we have been ready to start for our depot *11 miles* away but outside the door of the tent it remains a scene of whirling drift.... We shall stick it out to the end, but we are getting weaker, of course, and the end cannot be far. It seems a pity, but I do not think I can write more.

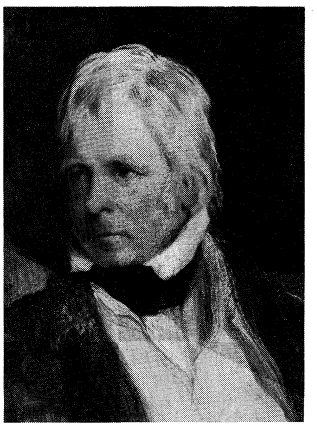
On Nov. 12, 1912, searchers found the tent with the frozen bodies, geological specimens from Beardmore, and Scott's records and diaries, which gave a full account of the journey. After his death Scott was regarded as a national hero for his courage and patriotism, and his widow was given the knighthood that would have been conferred on her husband had he lived. Roland Huntford's study *Scott and Amundsen* (1979) was newly critical in its examination of Scott's planning, judgment, and leadership on his fatal Antarctic expedition.

Scott, Sir Walter, 1ST BARONET (b. Aug. 15, 1771, Edinburgh—d. Sept. 21, 1832, Abbotsford, Roxburgh, Scot.), Scottish novelist, poet, historian, and biographer who is often considered both the inventor and the greatest practitioner of the historical novel.

Scott's father was a lawyer and his mother was the daughter of a physician. From his earliest years, Scott was fond of listening to his elderly relatives' accounts and stories of the Scottish Border, and he soon became a voracious reader of poetry, history, drama, and fairy tales and romances. He had a remarkably retentive memory and astonished visitors by his eager reciting of poetry. His explorations of the neighbouring countryside developed in him both a love of natural beauty and a deep appreciation of the historic struggles of his Scottish forebears.

Scott was educated at the high school at Edinburgh and also for a time at the grammar school at Kelso. In 1786 he was apprenticed to his father as writer to the signet, a Scots equivalent of the English solicitor (attorney). His study and practice of law were somewhat desultory, for his immense youthful energy was diverted into social activities and into miscellaneous readings in Italian, Spanish, French, German, and Latin. After a very deeply felt early disappointment in love, he married, in December 1797, Charlotte Carpenter, of a French royalist family, with whom he lived happily until her death in 1826.

In the mid-1790s Scott became interested in German Romanticism, Gothic novels, and Scottish border ballads. His first published work, *The Chase, and William and Helen* (1796), was a translation of two ballads by the German Romantic balladeer G.A. Bürger. A poor translation of Goethe's *Götz von Berlichingen* followed in 1799. Scott's interest in border ballads finally bore fruit in his collection of them entitled *Minstrelsy of the Scottish Border,* 3 vol. (1802–03). His attempts to "restore" the orally corrupted versions back to their original compositions sometimes resulted in powerful poems that show a sophisticated Romantic flavour. The work made Scott's name known to a wide public, and he followed up his first success with a full-length narrative poem, *The Lay of the Last Minstrel* (1805), which ran into many editions. The poem's clear and vigorous storytelling, Scottish regionalist elements, honest pathos, and vivid evocations of landscape were repeated in further poetic romances, including *Marmion* (1808), *The Lady of the Lake* (1810), which was the most successful of these pieces, *Rokeby* (1813), and *The Lord of the Isles* (1815).



Sir Walter Scott, detail of an oil painting by Sir Edwin Henry Landseer, 1824; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Scott led a highly active literary and social life during these years. In 1808 his 18-volume edition of the works of John Dryden appeared, followed by his 19-volume edition of Jonathan Swift (1814) and other works. But his finances now took the first of several disastrous turns that were to partly determine the course of his future career. His appointment as sheriff depute of the county of Selkirk in 1799 (a position he was to keep all his life) was a welcome supplement to his income, as was his appointment in 1806 as clerk to the Court of Session in Edinburgh. But he had also become a partner in a printing (and later publishing) firm owned by James Ballantyne and his irresponsible brother John. By 1813 this firm was hovering on the brink of financial disaster, and although Scott saved the company from bankruptcy, from that time onward everything he wrote was done partly in order to make money and pay off the lasting debts he had incurred. Another ruinous expenditure was the country house he was having built at Abbotsford, which he stocked with enormous quantities of antiquarian objects.

By 1813 Scott had begun to tire of narrative poetry, and the greater depth and verve of Lord Byron's narrative poems threatened to oust him from his position as supreme purveyor of this kind of literary entertainment. In 1813 Scott rediscovered the unfinished manuscript of a novel he had started in 1805, and in the early summer of 1814 he wrote with extraordinary speed almost the whole of his novel, which he titled *Waverley.* It was one of the rare and happy cases in literary history when something original and powerful was immediately recognized and enjoyed by a large public. A story of the Jacobite rebellion of 1745, it reinterpreted and presented with living force the manners and loyalties of a vanished Scottish Highland society. The book was published anonymously, as were all of the many novels he wrote down to 1827.

In *Waverley* and succeeding novels Scott's particular literary gifts could be utilized to their fullest extent. First and foremost, he was a born storyteller who could place a large cast of vivid and varied characters in an exciting and turbulent historical setting. He was also a master of dialogue who felt equally at home with expressive Scottish regional speech and the polished courtesies of knights and aristocrats. His deep knowledge of Scottish history and society and his acute observation of its mores and attitudes enabled him to play the part of a social historian in insightful depictions of the whole range of Scottish society, from beggars and rustics to the middle classes and the professions and on up to the landowning nobility. The attention Scott gave to ordinary people was indeed a marked departure from previous historical novels' concentration on royalty. His flair for picturesque incidents enabled him to describe with equal vigour both eccentric Highland personalities and the fierce political and religious conflicts that agitated Scotland during the 17th and 18th centuries. Finally, Scott was the master of a rich, ornate, seemingly effortless literary style that blended energy with decorum, lyric beauty with clarity of description.

Scott followed up *Waverley* with a whole series of historical novels set in Scotland that are now known as the "Waverley" novels. *Guy Mannering* (1815) and *The Antiquary* (1816) completed a sort of trilogy covering the period from the 1740s to just after 1800. The first of four series of novels published under the title *Tales of My Landlord* was composed of *The Black Dwarf* and the masterpiece *Old Mortality* (1816). These were followed by the masterpieces *Rob Roy* and *The Heart of Midlothian* (both 1818), and then by *The Bride of Lammermoor* and *A Legend of Montrose* (both 1819). It was only after writing these novels of Scottish history that Scott, driven by the state of his finances and the need to satisfy the public appetite for historical fiction that he himself had created, turned to themes from English history and elsewhere. He thus wrote *Ivanhoe* (1819), a novel set in 12th-century England and one that remains his most popular book. *The Monastery* and *The Abbot* followed in 1820, and *The Pirate* and *The Fortunes of Nigel* appeared in 1822. Two more masterpieces were *Kenilworth* (1821), set in Elizabethan England, and the highly successful *Quentin Durward* (1823), set in 15th-century France. The best of his later novels are *Redgauntlet* (1824) and *The Talisman* (1825), the latter being set in Palestine during the Crusades.

In dealing with the recent past of his native country, Scott was able to find a fictional form in which to express the deep ambiguities of his own feeling for Scotland. On the one hand he

welcomed Scotland's union with England and the commercial progress and modernization that it promised to bring, but on the other he bitterly regretted the loss of Scotland's independence and the steady decline of its national consciousness and traditions. Novel after novel in the "Waverley" series makes clear that the older, heroic tradition of the Scottish Jacobite clans (supporters of the exiled Stuart king James II and his descendants) had no place in the modern world; the true heroes of Scott's novels are thus not fighting knights-at-arms but the lawyers, farmers, merchants and simple people who go about their business oblivious to the claims and emotional ties of a heroic past. Scott became a novelist by bringing his antiquarian and romantic feeling for Scotland's past into relation with his sense that Scotland's interests lay with a prudently commercial British future. He welcomed civilization, but he also longed for individual heroic action. It is this ambivalence that gives vigour, tension, and complexity of viewpoint to his best novels.

Scott's immense earnings in those years contributed to his financial downfall. Eager to own an estate and to act the part of a bountiful laird, he anticipated his income and involved himself in exceedingly complicated and ultimately disastrous financial agreements with his publisher, Archibald Constable, and his agents, the Ballantynes. He and they met almost every new expense with bills discounted on work still to be done; these bills were basically just written promises to pay at a future date. This form of payment was an accepted practice, but the great financial collapse of 1825 caused the four men's creditors to demand actual and immediate payment in cash. Constable was unable to meet his liabilities and went bankrupt, and he in turn dragged down the Ballantynes and Scott in his wake because their financial interests were inextricably intermingled. Scott assumed personal responsibility for both his and the Ballantynes' liabilities and thus courageously dedicated himself for the rest of his life to paying off debts amounting to about £120,000.

Everyone paid tribute to the selfless honesty with which he set himself to work to pay all his huge debts. Unfortunately, though, the corollary was reckless haste in the production of all his later books and compulsive work whose strain shortened his life. After the notable re-creation of the end of the Jacobite era in *Redgauntlet,* he produced nothing equal to his best early work, though his rapidity and ease of writing remained largely unimpaired, as did his popularity. Scott's creditors were not hard with him during this period, however, and he was generally revered as the grand old man of English letters. In 1827 Scott's authorship of the "Waverley" novels was finally made public. In 1831 his health deteriorated sharply, and he tried a continental tour with a long stay at Naples to aid recovery. He was taken home and died in 1832.

Scott gathered the disparate strands of contemporary novel-writing techniques into his own hands and harnessed them to his deep interest in Scottish history and his knowledge of antiquarian lore. The technique of the omniscient narrator and the use of regional speech, localized settings, sophisticated character delineation, and romantic themes treated in a realistic manner were all combined by him into virtually a new literary form, the historical novel. His influence on other European and American novelists was immediate and profound, and though interest in some of his books declined somewhat in the 20th century, his reputation remains secure.

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Scott, Winfield (b. June 13, 1786, Petersburg, Va., U.S.—d. May 29, 1866, West Point, N.Y.), American army officer who held the rank of general in three wars and was the unsuccessful Whig candidate for president in 1852.

Commissioned a captain of artillery (1808), Scott fought in the War of 1812 and rose to the rank of major general. On the Niagara frontier he took part in the battles of Chippewa (July 5, 1814) and Lundy's Lane (July 25).



Winfield Scott

By courtesy of the National Archives, Washington, D.C.

After the war Scott remained in military service, studied tactics in Europe, and eventually became commanding general of the U.S. Army (1841–61). He earned the nickname "Old Fuss and Feathers" because of his emphasis on military formalities and proprieties, but he nevertheless possessed solid military talents. In 1838 he supervised the removal of the Cherokee Indians from Georgia and other Southern states to reservations west of the Mississippi River. During the Mexican War (1846–48) he commanded a seaborne invasion of Mexico that captured Veracruz (March 1847). After additional victories, he entered Mexico City on September 14, thus ending the war. For this service he was honoured by appointment to the brevet rank of lieutenant general.

A prominent Whig, Scott won his party's presidential nomination in 1852 but lost the election to Democrat Franklin Pierce, mainly because the Whigs were divided over the issue of slavery. Scott remained a popular old soldier and commanded the U.S. Army at the outbreak of the Civil War (April 1861) until age forced his retirement the following November.

Scottish bluebell (plant): *see* harebell.

Scottish Chaucerian: *see* makar.

Scottish deerhound, dog breed called the "royal dog of Scotland," known since the 16th century. It was once the exclusive property of the Scots nobility, who prized it as a hunter of the Scottish stag. Like the greyhound in build but larger and more heavily boned, the Scottish deerhound stands 28 to 32 inches (71 to 81 cm) and weighs 75 to 110 pounds (34 to 50 kg). Its coat is harsh and wiry and ranges from blue-gray to yellow-brown. This dog has traditionally been considered a strong, swift, and formidable hunter but a loyal and gentle companion.

Scottish Gaelic language, also called SCOTS GAELIC, or ERSE, a member of the Goidelic group of Celtic languages, spoken along the northwest coast of Scotland and in the Hebrides islands. Scottish Gaelic is a recent offshoot of the Irish language. Introduced into Scotland about AD 500 (displacing an earlier Celtic language), it developed into a distinct dialect of Gaelic in the 13th century. A common Gaelic literary language was used in Ireland and Scotland until the 15th century, by which time Scottish had diverged enough from Irish that mutual intelligibility was difficult, and Scottish Gaelic could be considered a separate language from Irish. Manuscripts in Scottish Gaelic began to appear at this time.

Scottish Highlands (Britain): *see* Highlands, the.

Scottish law, the legal practices and institutions of Scotland. At the union of the parliaments of England and Scotland in 1707, the legal systems of the two countries were very dissimilar. Scotland, mainly in the preceding century, had adopted as a guide much of the Roman, or civil, law as developed by the jurists of Holland and France. The law of Scotland is not founded on the law of Rome: the Scots turned to Roman law only when there was a gap in their own common, or customary, law. There is, however, a considerable infusion of Roman law.

In the period following the union there has been much assimilation of English law by the Scottish legal system. One reason is that much of the existing law of Scotland depends on statutes applicable to both countries. The House of Lords, consisting in its legal aspect until 1876 exclusively of English lawyers acting as the supreme court of appeal for Scotland, had a tendency to apply English law in Scottish appeals. The influence of text writers, some of whom have tended to treat English and Scottish law together, and the citation of English authorities in court have also had considerable effect. The greatest assimilation has been in the field of mercantile law.

Since the Act of Union the civil and criminal jurisdiction of the Scottish courts has remained separate and distinct from that of England. The supreme civil court is the Court of Session, which is composed of 18 judges and sits in the old Parliament House in Edinburgh. It is divided into an Outer House, consisting of 13 judges, and an Inner House, consisting of two divisions of 4 judges. Each division sits as a court of appeal to hear appeals from the Outer House or the sheriff courts. Appeal from the decision of this court is heard by the House of Lords.

The supreme criminal court of Scotland is the High Court of Justiciary, of which the judges are the same as those of the Court of Session. It sits not only in Edinburgh but also on circuit in certain cities and burghs. Trials before the High Court are always trials by jury, the Scottish jury consisting of 15 persons in criminal cases. The verdict may be returned by a majority and may in cases of reasonable doubt be one of "not proven." Since 1926 the High Court, sitting as a court of criminal appeal, has been empowered to hear appeals in certain cases tried by jury in either the High Court or the sheriff courts. There is no appeal in criminal cases to the House of Lords.

Scotland is divided for local judicial purposes into six sheriffdoms, for each of which the crown appoints a sheriff principal and a number of sheriffs. The sheriffs principal or sheriffs are judges presiding over the sheriff courts, a Scottish institution of great antiquity, and are mainly concerned with the hearing of appeals in civil cases and the performance of certain administrative duties. The sheriff court has a civil jurisdiction virtually concur-

rent with that of the Court of Session, and it also has a wide jurisdiction in criminal cases. Minor criminal offenses may be tried in the district court, usually presided over by justices of the peace appointed by the secretary of state.

Responsibility for the institution of criminal proceedings in the High Court, the sheriff court, and the district court rests with the lord advocate, who is assisted in this function by the solicitor general, 12 advocates depute, and procurators fiscal stationed throughout Scotland. The Crown Office in Edinburgh, of which the permanent head is the crown agent, is the department concerned with this work. The grand jury is unknown in Scotland.

Scottish literature, a body of writing that includes works in Scottish Gaelic, Lowland Scottish (or Lallans), standard English employed by Scots, and various combinations of English and Scottish languages.

A brief treatment of Scottish literature follows. For full treatment, *see* MACROPAEDIA: Celtic Literature; English Literature.

The earliest extant Lowland Scottish literature dates from the second half of the 14th century. The first writer of note was John Barbour, who wrote *The Bruce* (1376), a poem on the exploits of King Robert I the Bruce. Harry the Minstrel (Blind Harry, or Henry the Minstrel) continued the Barbour tradition of military epic by composing the heroic romance *Sir William Wallace* in the late 15th century. More prophetic of the sophisticated poetry that was to follow was *The Kingis Quair* (*The King's Book*), attributed to King James I of Scotland. It contains possibly the finest major love poem of the 15th century and ushered in the great age of Scottish literature—the years 1425 to 1550. The leading figures—Robert Henryson, William Dunbar, Gavin Douglas, and Sir David Lindsay—were strongly influenced by the works of Geoffrey Chaucer, but their courtly romances and dream allegories show a distinctively ornamental use of language that has a rich etymological and idiomatic texture. The elaborate style of their poetry has been termed excessive and artificial, but they succeeded in enlarging the Scottish literary use of the vernacular and managed to combine elements of satire and fantasy with an ideal of poetic utterance and diction that marked the apogee of the national literature.

Scottish prose during this period underwent its own significant development, particularly from 1450 to 1630. The first original literary prose appears in the theological writing of John Ireland, who was active in the 1480s. The inflexible and limited language of the 15th century became plainer and less Latinized in the historical writings of John Bellenden and John Leslie and especially in John Knox's *History of the Reformation in Scotland* (1567). Standing by itself is the *Complaynte of Scotland* (1548–49), which is interesting both as an exposition of Scottish patriotism and as an experiment in the various usages of Scottish prose.

The 17th century was an undistinguished age for literature in Lowland Scots. The union of the English and Scottish crowns in one person in 1603 and the removal of the Scottish court to England deprived writers of the court patronage that, in the absence of a wealthy and leisured middle class, was indispensable to the continued existence of secular literature in the vernacular. Ballads such as Robert Sempill's *Life and Death of Habbie Simson*, however, kept the vernacular tradition alive at the edges of an increasingly Anglicized body of Scottish writing.

In the early part of the 18th century there developed a cultural reaction against the implications of the union of England with Scotland (1707). This reaction was marked by the appearance of numerous anthologies of both popular and literary Scottish verse. Such works as James Watson's *Choice Collection of Comic and Serious Scots Poems* (1706) and Allan Ramsay's *Ever Green* (1724), however, while deliberately invoking past achievements in the Scottish language, could serve only to highlight the gradual Anglicization of both the Scottish political indentity and the Scottish language. This process ultimately led to the development of such major Scottish poets as Robert Burns and Robert Fergusson, who wrote in both English and Lowland Scots and produced bodies of work that led to the enrichment of both English and Scottish literature. They were not followed, however, by any significant Scottish literature for more than a century.

After World War I there occurred a "renaissance" in Scottish literature, especially in poetry. There arose an attempt to restore the prestige of the Scottish Gaelic language, making it a medium capable of expressing modern European intellectual concepts and universal ideas. Also called the Lallans (Lowlands) revival, it was a revitalization of the Lowland Scottish dialect, which had gradually degenerated, after the death of Robert Burns, into a vehicle of complacency and homeliness. The Scottish renaissance centred on Hugh MacDiarmid, a poet who expressed modern ideas in an eclectic blend of archaic words revived from the 16th century and the various Scottish dialects. The renaissance was further stimulated by the Saltire Society (1936–60), which published the quarterly *Saltire Review* to encourage research and writing in Scottish Gaelic. The enriched language that emerged was sometimes called by its critics synthetic Scots, or plastic Scots. The new intellectual climate also influenced the Scottish drama revival in the 1940s and the development, after World War II, of a new generation of Scottish poets called the Lallans Makars (the "Lowlands Makers" of poetry).

Scottish Lowlands (Scotland): *see* Lowlands.

Scottish National Dictionary, dictionary published in Edinburgh and containing all Scottish words known to be in use since about 1700. It is designed partly on regional lines and partly on historical principles.

Work commenced on this 10-volume set in 1931 and reached completion in 1976. It is to appear in a one-volume abridgement. In addition, work is going forward on the compilation of a dictionary of the Scottish language before 1700.

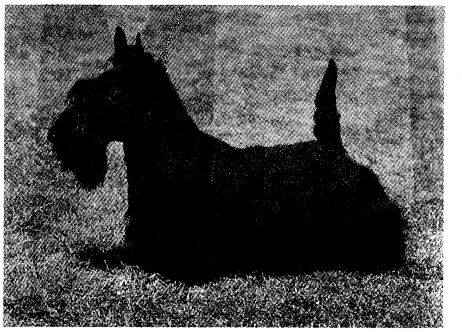
Entry words in the *Scottish National Dictionary* have been collected from Scottish literature, public records, private collections, special dialect treatises, glossaries, and other dictionaries. The historical treatment, with origin given where possible, takes into account numerous forms of usage and meaning that evolved from different regions and districts of the country. The variant spellings and uses are listed precisely, obsolete or colloquial status is noted, and illustrative quotations augment each entry.

Scottish National Party (SNP), political party founded in 1934 out of a union of the National Party of Scotland (founded 1928) and the Scottish Party (founded 1932). Its aim is "self-government for Scotland within the Commonwealth" and "a new relationship under the Crown," chiefly in acquiring joint responsibility with England for defense, foreign policy, and customs.

Moderate home rulers under John MacCormick left the party in 1942 and launched a National Assembly and Covenant, but the SNP itself remained committed to seeking independence and waging the fight in parliamentary and local elections—with scant success. In 1948 all those who were members of other parties were expelled from the SNP, and the party was reduced to a small, relatively unnoticed group, its membership by 1962 having reached a mere 2,000. Thereafter, things changed. After the 1966 election in which 23 SNP candidates polled 128,476 votes (5.03 percent), results improved dramatically. In 1974 it won 30.4 percent of the vote and 11 parliamentary seats, but it won only 2 seats in 1979 and 1983 and 3 seats in 1987.

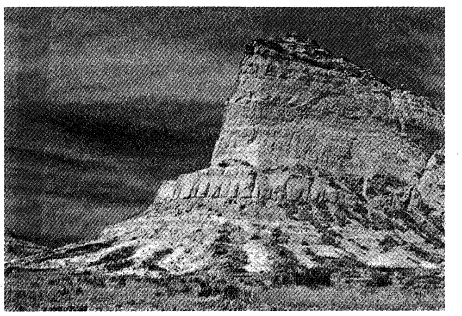
Scottish National Zoological Park and Carnegie Aquarium, collection of terrestrial and aquatic animals founded in 1913 by the Royal Zoological Society of Scotland in Edinburgh. More than 1,250 specimens of over 300 species are exhibited on the 30-hectare (75-acre) grounds. Included in the collection is one of the finest breeding colonies of penguins in the world. The zoo has developed a large variety of public education programs.

Scottish terrier, also called SCOTTIE, short-legged terrier breed often held by its admirers to be the oldest of the Highland terriers, although this contention has not been proved. A small, squat, bewhiskered dog with wide-set, alert-looking eyes, short legs, and a distinctive rolling gait, the Scottie has a hard, wiry coat, which may be black, brindle, gray, grizzled blue-gray, sand-coloured, or wheaten (pale yellowish brown). Adult height is about 25.5 cm (10 inches), with a weight of 8 to 10 kg (18 to 22 pounds). The breed is usually described as strong and plucky.



Scottish terrier
Sally Anne Thompson—EB Inc.

Scotts Bluff National Monument, national monument in Scotts Bluff county, western Nebraska, U.S. It lies along the North Platte River, opposite the city of Scottsbluff. The 5-square-mile (13-square-kilometre) area of the monument was established in 1919 and named for Hiram Scott, a fur trapper. Its focus is a large promontory, or bluff, that rises 800 feet (244 m) above the river. Part of an escarpment, the bluff was a prominent landmark on the Oregon and Mormon trails and is a memorial to those who on foot, on horseback, and in covered wagons moved America westward. A museum at the base of the bluff displays the history and art of the pioneer travelers.



Scotts Bluff National Monument, Nebraska
Milt and Joan Mann from CameraMann

Scottsboro, city, seat of Jackson County, northeastern Alabama, U.S., near the Tennessee River at the edge of the Cumberland Plateau. Named for Robert T. Scott, an early settler, it is basically a farming centre and also deals in cotton and clothing products and lumber. The community gained international attention in 1931 as the scene of the famous "Scottsboro Case," a trial at which nine black youths were convicted of raping two white women on a train. U.S. Supreme Court reversals of the convictions became landmarks in constitutional law and civil rights and had a great effect on improving the standard of racial justice throughout the United States.

The city is the site of two nuclear power plants and is an important part of the Tennessee Valley Authority. Russell Cave National Monument (25 mi [40 km] northeast) preserves a site populated by Stone Age people for more than 8,000 years. Pop. (1980) 14,758.

Scottsboro case, major U.S. civil rights controversy of the 1930s surrounding the prosecution in Scottsboro, Ala., of nine black youths charged with the rape of two white women. The nine, after nearly being lynched, were brought to trial in Scottsboro in April 1931 just three weeks after their arrest. Not until the first day of the trial were the defendants provided with the services of two volunteer lawyers.

Despite testimony by doctors who had examined the women that no rape had occurred, the all-white jury convicted the nine, and all but the youngest, who was 12 years old, were sentenced to death. The announcement of the verdict and sentences brought a storm of charges from outside the South that a gross miscarriage of justice had occurred in Scottsboro. The cause of the "Scottsboro Boys" was championed, and in some cases exploited, by Northern liberal and radical groups, notably the Communist Party of the U.S.A.

In 1932 the U.S. Supreme Court overturned the convictions (*Powell* v. *Alabama*) on the grounds that the defendants had not received adequate legal counsel in a capital case. The state of Alabama then retried one of the accused and again convicted him. In a 1935 decision (*Norris* v. *Alabama*), the U.S. Supreme Court overturned this conviction, ruling that the state had systematically excluded blacks from juries.

Alabama again tried and convicted another of the group, Haywood Patterson, this time sentencing him to 75 years in prison. Further trials of the rest of the defendants resulted in more reconvictions and successful appeals until, after persistent pressure from citizens' groups, the state freed the four youngest (who had already served six years in jail) and later paroled all but Patterson. Patterson escaped in 1948 and fled to Michigan, where, three years later, he was convicted of manslaughter in the stabbing death of another black. He died in prison.

The last known surviving member of the group, Clarence Norris, who had fled North after his parole in 1946, was granted a full pardon by the Governor of Alabama in 1976.

Scottsdale, city, Maricopa County, residential–resort suburb of Phoenix, south central Arizona, U.S. Its business district (in a Western frontier motif) is an arts and crafts centre and features Arizona-oriented fashions. The city is traversed by several canals of the Salt River Project; lettuce, grain, and cotton are grown in the surrounding area. Taliesin West, Frank Lloyd Wright's architectural school, is to the north. The community, named for Winfield Scott, who settled the site in 1895, was originally a stagecoach stop between Camp McDowell and Phoenix. Nearby is the Cosanti Foundation, an architectural and crafts complex devised by architect Paolo Soleri. Inc. town, 1951; city, 1961. Pop. (1980) 88,364.

Scotus, John: *see* Erigena, John Scotus.

scouring rush (plant): *see* horsetail.

Scrabble, board-and-tile game in which two to four players compete in forming words with lettered tiles on a 225-square board; words spelled out by letters on the wooden pieces interlock like words in a crossword puzzle.

Players draw seven tiles from a pool at the start and replenish their supply after each turn. Tiles in the pool and those of other players are kept secret so that a player can see only those tiles on the board and his own. A player may forfeit his turn and exchange any or all of his tiles for those in the pool. There are 100 letter tiles, each imprinted with a point value for different letters, approximately corresponding to the frequency of occurrence of the letter in English words. Words are scored by adding up the point values of their letters, multiplied by any of 61 premium squares that may be covered, such as double letter, triple letter, double word, and triple word.

Scoring as the game advances is possible both horizontally and vertically, with higher scores registered by forming two or more interlocking words at the same time. At the end of the game, when one player has no tiles or the board is deadlocked, the player who has scored the greatest number of points is the winner. Values of unused letters left to players are totalled and deducted from their scores.

Originally called Criss Cross, the game, which was based on the crossword puzzle and anagrams, was developed by Alfred M. Butts, an architect, in 1931. It was redesigned, renamed as Scrabble, and marketed by James Brunot in 1948. It was first sold in Great Britain in 1954.

Scrabble was later produced in many foreign languages, Braille, and magnetic editions and continued to be one of the leading board-and-tile games in the United States. Tournaments have been held in the United States since 1973.

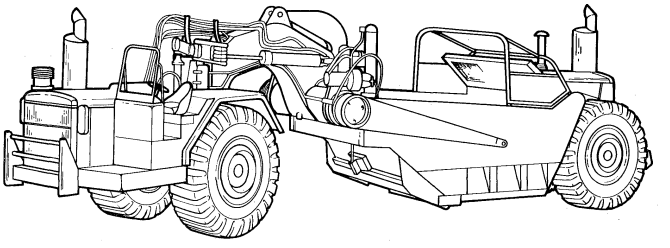
Scranton, city, seat (1878) of Lackawanna County, northeastern Pennsylvania, U.S., in the Lackawanna River Valley, on the western fringes of the Pocono Mountains; it is the centre of an urbanized industrial complex that includes Carbondale and Wilkes-Barre. Permanent settlement of the valley dates from 1788, when it was known as Deep Hollow. In the next few years a gristmill, a sawmill, and a charcoal furnace were built along the Lackawanna, but there was little development. The village was called Unionville, Slocum Hollow, and Harrison before it was named Scrantonia and finally Scranton in 1851 in honour of the family that established the Lackawanna Iron and Coal Company there in 1840. George W. and Selden Scranton began smelting iron from local ores, using an anthracite hot-blast process. The venture was successful, and by 1850 a rolling mill, a nail factory, and a steel-rail works were in operation. Subsequent development of the anthracite-coal industry overshadowed the iron industry and brought in waves of immigrant miners, whose wives were skilled in the silk weaving, clothing, and other industries. Scranton is noted for its production of Nottingham lace. With the decline of the coal industry in the 1950s, the city diversified its economy and received national recognition for its "Scranton Plan," which provided jobs through industrial expansion. Community contributions and private and state aid financed construction of many new plants. Leading manufacturers now produce textiles, apparel, electronic equipment, and metal products. The city is also a publishing and printing centre and a transportation hub with access to the Pennsylvania Turnpike.

Higher education facilities include the University of Scranton (Roman Catholic; 1888), Marywood College (1915), Lackawanna Junior College (1894), and an extension of the Pennsylvania State University (1921). The state school for the deaf and the International Correspondence Schools are also in Scranton. The city's Nay Aug Park has a zoo, gardens, and a model coal mine; its Everhart Museum of Natural History, Science, and Art has an outstanding bird collection. Inc. borough, 1853; city, 1866. Pop. (1980) city, 88,117; (1982 est.) Scranton–Wilkes Barre metropolitan area (SMSA), 727,200.

scrap metal, used metals that are an important source of industrial metals and alloys, particularly in the production of steel, copper, lead, aluminum, and zinc. Smaller amounts of tin, nickel, magnesium, and precious metals are also recovered from scrap.

Impurities consisting of such organic materials as wood, plastic, paint, and fabric can be burned off. Metallic impurities may be desirable, inert, or undesirable. Undesirable ones may be diluted to tolerable proportions by the addition of pure metal, or they may be removed by refining. Scrap is usually blended and remelted to produce alloys similar to or more complex than those from which the scrap was derived.

scraper, in engineering, machine for moving earth over short distances (up to about two miles) over relatively smooth areas. Either self-propelled or towed, it consists of a wagon with a gate having a bladed bottom. The blade scrapes up earth as the wagon pushes forward and forces the excavated material into the wagon. When the wagon is filled, the gate is closed, and the material is carried to the place of disposal. The scraper is the dominant tool in highway construction.



Tractor-scraper
By courtesy of Caterpillar Tractor Co.

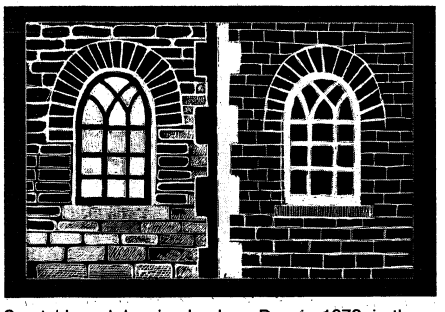
scraper, in music, percussion instrument consisting of a serrated surface that is rasped with a stick. Known since the Stone Age, it is often associated with magical powers and ritual, and is widely distributed geographically. Scrapers are commonly made of bone—*e.g.,* the Aztec *omichicahuaztli* used in memorial rites; gourd, such as the guiro of Mexican, Cuban, and Brazilian folk music and Latin-American dance bands; wood, as in the Chinese *yü,* or wooden tiger, used in Confucian ritual; horn, as in the *charrasca* (also called guiro) of Venezuelan folk music; and shell. They are sometimes resonated over a hole or a gourd.

The cog rattle, or ratchet, is a more complex scraper, consisting of a cog wheel set

in a frame to which a flexible tongue is attached; when the wheel revolves on its axle, the tongue scrapes the cogs. Found in Europe and Asia, cog rattles often served as signal instruments (in World War II, to warn of gas attack) or had ritual use (in medieval Roman Catholic services during the week before Easter). They are now common as toys and as festive noisemakers (a remnant of practices of creating a clamour to frighten away evil spirits). Richard Strauss scored for cog rattle in his symphonic poem *Till Eulenspiegel* (1895) and Igor Stravinsky for guiro in *The Rite of Spring* (1913).

scrapie, deadly disease of sheep and goats affecting the nervous system, so called because in the itchy variety (there is also a variety in which the animal is drowsy) the diseased animal rubs and scrapes against convenient objects. An extremely long period elapses between exposure and development of symptoms (up to two years for sheep). It is thought that scrapie is caused by a virus. Early symptoms, besides the scraping, include nervousness, slight tremors in head and neck, and grinding of the teeth. There is no fever. The sheep retains its appetite but loses weight, walks with an unsteady gait, and eventually is unable to stand. There is no cure. The animal may live beyond appearance of the first symptoms for as long as six months.

scratchboard, also called SCRAPERBOARD, a technique, greatly favoured by commercial artists and illustrators, for making drawings that can easily be reproduced and that closely resemble either wood engravings or woodcuts. Introduced in the 19th century, the process involves the use of a specially prepared board coated with a ground of chalk and glue or some similar absorbent substance, such as gesso. Textured boards with a prepared pattern or stippling are also available. The artist coats the board evenly with black drawing ink and works on it by scraping away with special tools, known as "scratch knives," those lines or surfaces he wants to appear white on the finished work. Corrections can easily be made by reapplying ink and then reworking the surface.



Scratchboard drawing by Joan Denvir, 1972; in the artist's collection
J. Denvir

Alternatively, if the artist wants to create the effect of a woodcut, as opposed to wood engraving, he removes large areas of ink and leaves the lines and surfaces appearing black-on-white. Essentially designed as a reproductive medium, scratchboard is hardly ever used to produce single, nonrepetitive drawings.

screamer, any of three species of South American waterfowl, constituting the family Anhimidae (order Anseriformes). The group is named for its raucous, far-carrying cry. Screamers are birds 75 centimetres (30 inches) high, inhabiting marshes, where they feed gregariously on water plants and make reed nests. They can soar for hours at great heights. With their dark, plump bodies, ringed necks, and chickenlike bills, screamers look like long-legged pheasants but are in fact akin to geese. Their anatomy is most peculiar. Screamers are one of the two groups of living birds lacking prongs on the ribs (uncinate processes). The skeleton is the most pneumatic known—even its outermost toe bones are hollow—and the skin contains a system of tiny air sacs, uniquely the source of crackling sounds. A screamer's feathers do not grow in distinct tracts with bare skin between but cover the body (legs excepted) completely—a condition shared only by the penguins and other large flightless birds. Further, it is armed with a pair of sizable bony forward-pointing spikes near the bend of each wing.

The horned screamer (*Anhima cornuta*), of northern South America, has a slender, forward-curving, calcified spike on its forehead. The crested screamer, or chaja (from its cry; *Chauna torquata*), of open country in east central South America, and the black-necked screamer (*C. chavaria*), of Colombia and Venezuela, have hind crests of feathers.

screech owl, any of numerous New World owls of the genus *Otus,* typical owls of the family Strigidae. Old World species of *Otus* are known as scops owls. Members of both groups possess a facial disk and ear tufts. Coloured



Common screech owl (*Otus asio*)
A.A. Allen—Bird Photographs, Inc.

in a concealing bark pattern, they are rather small owls, about 20 to 30 centimetres (8 to 12 inches) long. Many show considerable geographic variation; the northern races are larger but less heavily patterned than the southern races. Distributed almost worldwide, notable members of the genus are the common scops owl (*Otus scops*) of southern Europe, Asia, and Africa; the common screech owl (*O. asio*) of North America; and the flammulated owl (*O. flammeolus*) of western North America. They eat mostly small mammals, birds, and insects.

screen, projection: *see* projection screen.

screw, in machine construction, a usually circular cylindrical member with a continuous helical rib, used either as a fastener or as a force and motion modifier.

Although the Pythagorean philosopher Archytas of Tarentum (5th century BC) is the alleged inventor of the screw, the exact date of its first appearance as a useful mechanical device is obscure. Though invention of the water screw is usually ascribed to Archimedes (3rd century BC), evidence exists of a similar device used for irrigation in Egypt at an earlier date.

The screw press, probably invented in Greece in the 1st or 2nd century BC, has been used since the days of the Roman Empire for pressing clothes. A drawing of a clothes press with right- and left-hand screws was found in the ruins of Ponpeii, which was destroyed by the eruption of Vesuvius in AD 79. In the 1st century AD, wooden screws were used in wine and olive-oil presses, and cutters (taps) for cutting internal threads were in use.

In the notebooks of Leonardo da Vinci (1452–1519) there are sketches of a screw-operated printing press and a machine for cutting screws. James Watt (1736–1819) invented a screw press in which a letter, written in special ink, was squeezed against moist copy sheets to obtain duplicates.

In the Figure, which shows the main types of screws and screwheads in modern use, screws A, B, and F are used to clamp machine parts together, either when one of the parts has a threaded hole or in conjunction with a nut. These screws stretch when tightened, and the tensile load created clamps the parts together. Machine screws have various types of heads, most with screwdriver slots. They are made in smaller sizes than cap screws and bolts.

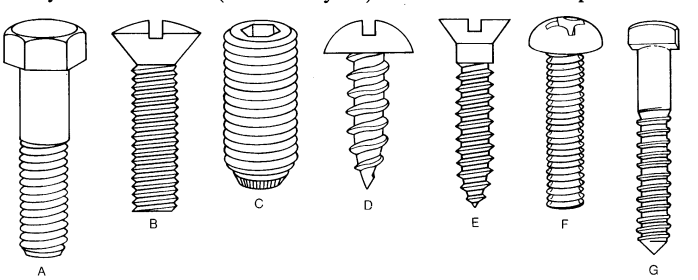
The setscrew C in the Figure fits into a threaded hole in one member; when tightened, the cup-shaped point is pressed into a mating member (usually a shaft) and prevents relative motion. Setscrews are also made with conical and cylindrical points that fit in matching holes and with slotted and square heads.

A stud is a rod threaded on both ends. It is permanently screwed into one member and clamped by means of a nut on the other end.

Self-tapping screws form or cut mating threads in such materials as metals, plastics, glass fibre, asbestos, and resin-impregnated plywood when driven or screwed into drilled or cored (cast) holes. The screw D in the Figure forms threads by displacing material adjacent to a pilot hole so that it flows around the screw. Thread-cutting tapping screws have cutting edges and chip cavities that produce a mating thread by removing material.

Wood screws (E) are made in a wide variety of diameters and lengths; when using the larger sizes, pilot holes are drilled to avoid splitting the wood. Lag screws (G) are large wood screws used to fasten heavy objects to wood. Heads are either square or hexagonal.

Screws that modify force and motion are known as power screws. A screwjack converts torque (turning moment) to thrust. The thrust (usually to lift a heavy object) is created by turning the screw in a stationary nut. By using a long bar to turn the screw, a small force at the end of the bar can create a large thrust force. Workpiece tables on machine tools are



Screws and screw heads
(A) Cap screw, (B) machine screw with oval head, (C) setscrew with hollow head, (D) self-tapping screw, (E) flat-head wood screw, (F) machine screw with Phillips head, (G) lag screw

moved linearly on guiding ways by screws that rotate in bearings at the ends of the tables and mate with nuts fixed to the machine frame. A similar torque-to-thrust conversion can be obtained by either rotating an axially fixed screw to drive a rotationally fixed nut along the screw or by rotating an axially fixed nut to drive a rotationally fixed screw through the nut.

screw moss, also called TWISTED MOSS, any member of the moss genus *Tortula* (order Bryales), which form yellow-green or reddish-brown cushions on walls, soil, rocks, trees, and sand dunes in the Northern Hemisphere. About 25 species are native to North America; the best known species in both North America and Great Britain are *T. muralis* and *T. ruralis.*

Screw moss ranges in height from 0.5 to 10 centimetres (about 1/5 to 4 inches), depending on the species. The tongue-shaped phyllids (leaves) are usually tipped by a long hair. The teeth surrounding the "mouth" of the capsule (spore case) are often spirally twisted and are united at the base into a tubular membrane.

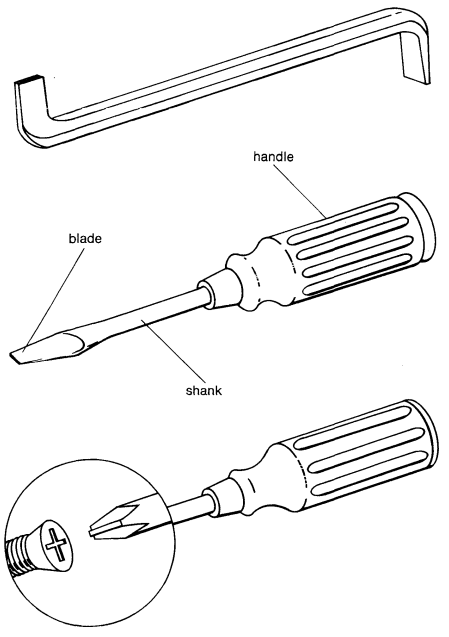
screw-pine, any of several species of *Pandanus,* shrubs and trees with slit-like aerial roots. *See* Pandanales.

Consult the INDEX *first*

screwdriver, tool, usually hand-operated, for turning screws with slotted heads. For screws with one straight diametral slot cut across the head, standard screwdrivers with flat blade tips and in a variety of sizes are used. Special screws with cross-shaped slots in their heads require a special screwdriver with a blade tip that fits the slots. The most common special screw is the Phillips head (Phillips Screw) as shown in the Figure.

The screwdriver shank is made of tough steel, and the tip is hardened to minimize wear. The handle is made of wood, metal, or plastic.

If a screw cannot be reached with a straight-shank screwdriver, an offset screwdriver is used; this tool has no handle but has a shank with a right-angle bend at both ends. One blade tip is in line with the shank, and the other is at right angles to the shank.



Screwdrivers
(Top) Offset screwdriver; (middle) parts of a screwdriver; (bottom) Phillips-head screwdriver

Screwdriver bits can be clamped in a brace, an automatic handle that rotates on being pushed toward the screwhead, or a gear reduction drive in a power drill.

Scriabin, Aleksandr (Nikolayevich) (b. Jan. 6 [Dec. 25, 1871, old style], 1872, Moscow—d. April 27 [April 14, O.S.], 1915, Moscow), Russian composer of piano and orchestral music noted for its unusual timbres through which the composer sought to explore musical symbolism.

Scriabin was trained as a soldier at the Moscow Cadet School from 1882 to 1889 but studied music at the same time, taking piano



Scriabin
Novosti Press Agency

lessons from N. Zverev. In 1888 he entered the Moscow Conservatory, where he studied the piano with V.I. Safonov and composition with S. Taneyev and A. Arensky. By 1892, when he was graduated from the conservatory, he had composed the piano pieces that constitute his opuses 1, 2, 3, 5, and 7. In 1897 he married the pianist Vera Isakovich and from 1898 until 1903 taught at the Moscow Conservatory. He then devoted himself entirely to composition and in 1904 settled in Switzerland. After 1900 he was much preoccupied with mystical philosophy, and his *First Symphony,* composed in that year, has a choral finale, to his own words, glorifying art as a form of religion. In Switzerland he completed his *Third Symphony, Le Divin Poème,* first given under A. Nikisch in Paris in 1905. The literary "program" of this work, devised by Tatiana Schloezer, with whom he had formed a relationship after abandoning his wife, was said to represent "the evolution of the human spirit from pantheism to unity with the universe ('The divine Ego')." Theosophical ideas similarly provided the basis of the orchestral *Poème de l'extase* (1908; New York City) and *Prometheus* (1911; Moscow), which called for the projection of colours onto a screen during the performance.

From 1906 to 1907 Scriabin toured the United States, where he gave concerts with Safonov and M. Altschuler, and in 1908 he frequented theosophical circles in Brussels. In 1909 he was encouraged by the conductor S. Koussevitzky, who both performed and published his works, to return to Russia. By then he was no longer thinking in terms of music alone; he was looking forward to an all-embracing "Mystery." This work was planned to open with a "liturgical act" in which music, poetry, dancing, colours, and scents were to unite to induce in the worshippers a "supreme, final ecstasy." He even went so far as to proclaim himself a sort of messiah whose function it was to "sound the final chord of our race, reuniting it with the Spirit." He wrote the poem of the "Preliminary Action" of the "Mystery" but left only sketches for the music.

Scriabin's reputation stems from his sensitive, exquisitely polished piano music. His piano works include 10 sonatas (1892–1913), an early concerto, and many preludes and other short pieces. Even his orchestral works create the impression of orchestrated piano music. An idolater of Chopin in his youth, he early developed a personal style. As his thought became more and more mystical, egocentric, and ingrown, his harmonic style—based on chords of fourths built up from the higher partials of the harmonic series—became ever less generally intelligible, and he failed to carry with him, as other harmonic innovators have done, enough admirers to establish his new idiom as a permanent, widely acceptable contribution to the language of music. Yet the synthesis he effected of Chopin, French Impressionism, R. Strauss, and undercurrents of Russian musical styles, gave him a place in the development of modern Russian music. A few works (*e.g.,* the *Piano Concerto in F Sharp Minor,* Opus 20; and the preludes for piano) brought him an enduring international following.

Scribe, (Augustin-) Eugène (b. Dec. 24, 1791, Paris—d. Feb. 20, 1861, Paris), French dramatist, master of the neatly plotted, tightly constructed, "well-made" play.

Scribe is now celebrated chiefly for his prodigious industry and his popular success. He wrote dramas of every kind, often in collaboration in what was virtually a literary factory. His comedies, expressing the values and predilections of bourgeois society and praising the virtues of commerce and family life, are intended for an audience with a limited capacity for idealism. He is also remembered for his historical plays, *Le Verre d'eau* (1840; "The Glass of Water"), which derives great historical events from a trivial incident, and *Bertrand et Raton* (1833; *The School for Politicians,* 1840). His *Adrienne Lecouvreur* (1849), a melodrama about an actress who loves a nobleman, unaware of his high rank and true identity, was favoured as a vehicle by such notable actresses of the day as Sarah Bernhardt and Helena Modjeska.



Scribe, engraving by Charles-Jérémie Fuhr after a photograph by Nadar (Gaspard-Félix Tournachon)
H. Roger-Viollet

Scribner FAMILY, originally spelled SCRIVENER, family of U.S. publishers whose firm, founded in 1846 and named Charles Scribner's Sons from 1878, issued books by a diversity of authors and also produced several periodicals.

Charles Scribner (b. Feb. 21, 1821, New York City—d. Aug. 26, 1871, Luzern, Switz.) established the firm in partnership with Isaac D. Baker (died 1850) in New York City. The Baker and Scribner list initially comprised philosophical and theological (mainly Presbyterian) books. Near the end of Scribner's life the firm began to publish reprints and translations of British and continental European literary works. After his death the company was headed successively by his three sons: John Blair (1850–79), Charles (1854–1930), and Arthur Hawley Scribner (1859–1932). During the long presidency (1879–1928) of the second Charles Scribner, the firm published such U.S. authors as Henry James, George Washington Cable, Theodore Roosevelt, George Santayana, Edith Wharton, Ring Lardner, and Ernest Hemingway and

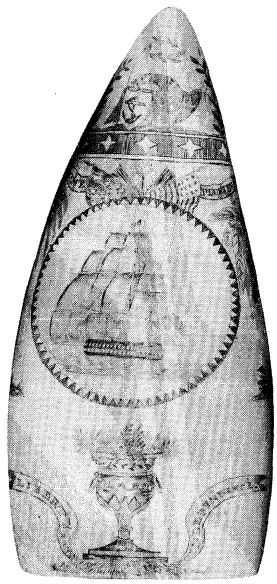


Charles Scribner, founder of Charles Scribner's Sons, engraving by W. Closson
By courtesy of Charles Scribner's Sons

the British authors George Meredith, Robert Louis Stevenson, Rudyard Kipling, J.M. Barrie, and John Galsworthy. Later presidents were Charles Scribner (1890–1952), son of the second Charles, and his son Charles, Jr., (1921–), who also served as president and, later, as trustee of the Princeton University Press, which had been founded (1905) by his grandfather.

Among the firm's periodicals were *Scribner's Monthly* (1870–81), *St. Nicholas* (1873–81), and *Scribner's Magazine* (1887–1939). The first two were sold to the Century Company, *Scribner's Monthly* reappearing as the *Century* (1881–1930) and *St. Nicholas* as a children's magazine (continuing until 1939) that provided first publication for many outstanding authors.

scrimshaw, the decoration of bone or ivory objects, such as shells, whale's teeth, or walrus tusks, with fanciful designs. The designs, executed by whale fishermen of American and Anglo-American origin, were carved with either a jackknife or a sail needle and then



Scrimshaw, incised sperm whale tooth, American, *c.* 1850; in the Kynett Collection, Mystic Seaport, Mystic, Conn.
From the collections at Mystic Seaport, Mystic, Conn.

etched in black. Among the subjects are whaling scenes, whaling ships, naval action, frigates, brigs, sailors' sweethearts, bouquets of flowers, Masonic emblems, coats of arms, and the Irish harp. Examples date from the late 17th century, but the craft reached its peak during the years 1830–50.

Scripps, Edward Wyllis (b. June 18, 1854, near Rushville, Ill., U.S.—d. March 12, 1926, at sea off Monrovia, Liberia), newspaper publisher who, after founding his first paper in 1878, organized the first major chain of newspapers in the United States and later (1907) established the United Press.

From 1872 Edward was employed by his half brother James Edmund Scripps (1835–1906) on newspapers in Detroit. On Nov. 2, 1878, he first published a paper of his own, the *Cleveland Penny Press* (afterward *Press*), and, by 1887, he also controlled papers in St. Louis, Detroit, and Cincinnati. In 1894, with his half brother George H. Scripps and Milton Alexander McRae, he formed the Scripps–McRae League of Newspapers, and in 1909 he established another chain, the Scripps Coast League, comprising papers on the West Coast. Eventually he owned 34 newspapers in 15 states. Written for what he called the "95 percent" (*i.e.,* ordinary people), his papers were low priced, politically independent, liberal, and pro-labour. In 1922 he transferred his interests to his son Robert Paine Scripps, who with Roy W. Howard reorganized the papers into the Scripps–Howard chain.

The Newspaper Enterprise Association (NEA), the first syndicate to supply feature stories, illustrations, and cartoons to newspapers, was founded by Scripps in 1902. Five years later he combined the Scripps–McRae Press Association (established 1897) with another news service to form the United Press (United Press International after a merger with the Hearst organization's International News Service in 1958).

In 1903 Edward and his half sister Ellen Browning Scripps (1836–1932) founded the Marine Biological Station of San Diego (later called the Scripps Institution of Oceanography), and in 1926 she established Scripps College (for women), Claremont, Calif.

Scripps Canyon, shallow submarine canyon in the Pacific off La Jolla, Calif.; it is the best studied of all submarine canyons by virtue of its proximity to Scripps Institution of Oceanography, for which it was named. The canyon's shallow tributary valleys head very close to shore in water only 40 ft (12 m) deep. The valley joins a larger canyon, La Jolla Canyon, at an axial depth of 980 ft, 1.3 mi from its head. There the walls of Scripps Canyon are V-shaped and have a height of approximately 360 ft.

script, in motion pictures, the written text of a film. The nature of scripts varies from those that give only a brief outline of the action to detailed shooting scripts, in which every action, gesture, and implication is explicitly stated. Frequently, scripts are not in chronological order, but in the order most convenient for filming. Their language approximates the patterns of ordinary speech. A script may be published as a literary work and never made into a motion picture, may be published for reading after the production is completed, or may be expanded into a novel—*e.g., On the Waterfront* (1954), by the U.S. writer Budd Schulberg.

The way in which a script is used is up to the individual director. D.W. Griffith (1875–1948), the U.S. pioneer in film technique and director of early film epics, worked virtually without a script, creating the movie as it was filmed. Mack Sennett (1880–1960) improvised slapstick on a fairly detailed script. On the other hand, the British director Alfred Hitchcock, known for his suspense thrillers, planned every detail before filming began, shooting the film almost exactly as it was written and working with the writer to obtain a precise visualization of every shot.

scriptorium, writing room set aside in monastic communities for the use of scribes engaged in copying manuscripts. Scriptoria were an important feature of the Middle Ages, most characteristically of Benedictine establishments because of St. Benedict's support of literary activities. All who worked in scriptoria, however, were not monks; lay scribes and illuminators from outside the monastic foundation reinforced the clerical scribes. From Greco-Roman times, secular accommodations for writing were maintained by libraries, publishers of manuscripts, universities, and similar institutions.

scripture, also called SACRED SCRIPTURE, the revered texts, or Holy Writ, of the world's religions. Scriptures comprise a large part of the literature of the world. They vary greatly in form, volume, age, and degree of sacredness; but their common attribute is that their words are regarded by the devout as sacred.

Sacred words differ from ordinary words in that they are believed either to possess and convey spiritual and magical powers, or to be the means through which a divine being or other sacred reality is revealed to men in phrases and sentences full of power and truth.

Most sacred scriptures were originally oral and were passed down through memorization from generation to generation until they were finally committed to writing. A few are still preserved orally, such as the hymns of the American Indians (only now being recorded by anthropologists). Many bear the unmistakable marks of their oral origin and can best be understood when recited aloud; in fact, it is still held by many Hindus and Buddhists that their scriptures lack, when read silently, the meaning and significance they have when recited aloud, for the human voice is believed to add to the recited texts dimensions of truth and power not readily grasped by the solitary reader.

Not all scriptures, however, were originally oral, nor were they in all parts directly effectual in rituals that sought the granting of magical and spiritual powers. The greater part of recorded scripture has either a narrative or expository character. The types of sacred and semisacred texts are, in fact, many and varied. Besides magical runes (ancient Germanic alphabet characters) and spells from primitive and ancient sources, they include hymns, prayers, chants, myths, stories about gods and heroes, epics, fables, sacred laws, directions for the conduct of rituals, the original teachings of major religious figures, expositions of these teachings, moral anecdotes, dialogues of seers and sages, and philosophical discussions; in fact, they include every form of literature capable of expressing religious feeling or conviction.

Types of sacred literature vary in authority and degree of sacredness. The centrally important and most holy of the sacred texts have in many instances been gathered into canons (standard works of the faith), which, after being determined either by general agreement or by official religious bodies, become fixed—*i.e.,* limited to certain works that are alone viewed as fully authoritative and truly beyond all further change or alteration. The works not admitted to the canons (those of a semisacred or semicanonical character) may still be quite valuable as supplementary texts.

A striking instance of making a distinction between canonical and semicanonical scriptures occurs in Hinduism. The Hindu sacred literature is voluminous and varied; it contains ancient elements and every type of religious literature that has been listed, except historical details on the lives of the seers and sages who produced it. Its earliest portions, namely, the four ancient Vedas (hymns) seem to have been provided by Indo-Aryan families in northwest India in the 2nd millennium BC. These and the supplements to them composed after 1000 BC, the *Brāhmaṇas* (commentaries and instruction in ritual), the *Āraṇyakas* (forest books of ascetics), and the *Upaniṣads*

(philosophical treatises), are considered more sacred than any later writings. They are collectively referred to as *Śruti* ("heard"; *i.e.,* communicated by revelation); whereas the later writings are labelled *Smṛti* ("remembered"; *i.e.,* recollected and reinterpreted at some distance in time from the original revelations). The former are canonical and completed, not to be added to nor altered, but the latter are semicanonical and semisacred.

Buddhist sacred literature recollects Gautama Buddha's life and teaching in the 6th century BC and first appeared in the dialect called Pāli, allied to the Māgadhī that he spoke. As time passed, and his movement spread beyond India, Buddhism adopted as its medium Sanskrit, the Indian classical language that was widely used in the ancient Orient. A distinction arose between the Theravāda (or "Way of the Elders"), preserved in Pāli and regarded as canonical, and the vast number of works written in Sanskrit within the more widely dispersed Buddhism called by its adherents Mahāyāna (the "Greater Vehicle"). The Mahāyāna works were later translated and further expanded in Tibetan, Chinese, and Japanese.

Whether the basic texts of indigenous Chinese religion should be called sacred, in the sense of Holy Writ, is open to question. Neither classical Taoism nor Confucianism can be said to have been based on revelation; the texts of these faiths were originally viewed as human wisdom, books written by men for men. They acquired authority, actually a canonical status, however, that caused them to be regarded with profound reverence and thus, in effect, as sacred. This certainly was true of the revered Taoist book, the *Tao-te Ching* ("Classic of the Way of Power"), and of the *Wu Ching* ("Five Classics") and the *Ssu Shu* ("Four Books") of Confucianism.

The most precisely fixed canons are those that have been defined by official religious bodies. The Jewish canon, known to Christians as the Old Testament, was fixed by a synod of rabbis held at Yavneh, Palestine, about AD 90. The semisacred books that were excluded were labelled by Christians the Apocrypha (Greek: "hidden away"). Roman Catholicism later included them in its canon. Jesus, the founder of Christianity, left nothing in writing, but he so inspired his followers that they preserved his sayings and biographical details about him in oral form until they were written down in the four Gospels. To these were added the letters of St. Paul and others, and the Book of Revelation to John, the whole forming a sacred canon called the New Testament, which was ecclesiastically sanctioned by the end of the 4th century AD. There was also a New Testament Apocrypha, but it did not achieve canonical status because of numerous spurious details.

Where no religious body has provided sanction or authorization, scriptures have had to stand on their own authority. Muslims believe that the Qur'ān does this easily. The Qur'ān, their only sacred canon or standard of faith, authenticates itself, they believe, by its internal self-evidencing power, for it is composed of the very words of God communicated to Muḥammad and recited by him without addition or subtraction. This faith of Muslims in the Qur'ān is similar to that of Fundamentalist Christians who believe that the Bible, as God's word, is verbally inspired from beginning to end.

There exists a large body of literature that possesses less of the aura of true scripture than the works just noted. They are interpretations about divine truth and divine commands, or stories that illustrate how persons, exalted or lowly, have acted (with or without awareness) in response to a divine stimulus. They are, in effect, supportive of true scripture.

An outstanding instance is the Talmud, a compendium of law, lore, and commentary that to many Jews has very nearly the authority of the Mosaic Torah (the Law, or the Pentateuch). Indeed, in the postbiblical rabbinical writings it was generally considered a second Torah, complementing the Written Law of Moses. Another instance is provided by the Christian Church. Its major creeds have, at one time or another, been regarded as infallible statements, to depart from which would be heresy. This is particularly true of the Apostles' Creed and the three "ecumenical creeds" of Nicaea (325), Constantinople (381), and Chalcedon (451). Roman Catholics add to these the papal decrees summarizing in credal form the conclusions of the councils of the Roman Catholic Church concerning the sacraments, transubstantiation (the changing of the substance of the bread and wine in the mass into the body and blood of Christ), confession, the immaculate conception of the Virgin Mary, papal infallibility, and the assumption of the body and soul of the Virgin Mary to heaven. More or less binding for Protestants are their distinctive statements of faith: the Augsburg Confession of 1530 (Lutheran), the Heidelberg Catechism of 1563 (Reformed), the Westminster Confession of 1646 and Shorter Westminster Catechism of 1647 (Presbyterian), and others.

During the last seven centuries in the West, some religious writings have attained a semisacred, if not a fully sacred, status: *Imitatio Christi* of Thomas à Kempis (1379/80–1471); John Bunyan's (1628–88) *Pilgrim's Progress;* Mary Baker Eddy's (1821–1910) *Science and Health with a Key to the Scriptures;* and the reputed discovery of Joseph Smith (1805–44), the *Book of Mormon.*

Scrivener FAMILY: *see* Scribner family.

scrofula, formerly tuberculosis, the terms "scrofulous," "strumous," and "tuberculous" being nearly interchangeable in the past, before the real nature of the disease was understood. The particular characteristics associated with scrofula have varied at different periods, but essentially what was meant was tuberculosis of the bones and lymphatic glands, especially in children. It is in this sense that the word survives. The old English popular name was "king's evil," so called from the belief that the sovereign's touch could effect a cure. *See also* tuberculosis.

Consult the INDEX *first*

Scroggs, Sir William (b. *c.* 1623, Deddington, Oxfordshire, Eng.—d. Oct. 25, 1683, London), controversial lord chief justice of England (1678–81), who presided over the trials of those accused of complicity in the Popish Plot of 1678 to put the Roman Catholic James, duke of York (later James II), on the throne.

Allegedly the son of a butcher, but probably the child of a grazier, Scroggs was educated at Oxford University and at Gray's Inn and fought briefly for Charles I early in the Civil War. Called to the bar in 1653, he practiced during the Protectorate. He found favour with Charles II, was knighted in 1665, and was made a judge of the Common Pleas in June 1676. He became chief justice of the King's Bench in May 1678.

Presiding over the Popish Plot trials, Scroggs completely trusted the revelations of the renegade Anglican priest Titus Oates and welcomed the verdicts of guilty on the accused Roman Catholics, harrying them with an execration of their faith. He convicted several "plotters," but, because he acquitted a few key figures, he was deluged with public abuse; only the House of Lords and a grateful King shielded him from impeachment by the House of Commons in January 1681. His unpopularity forced Charles to remove him from the bench in April 1681 with a pension.

scroll painting, art form practiced primarily in the Far East. The two dominant types may be illustrated by the Chinese landscape scroll, which is that culture's greatest contribution to the history of painting, and the Japanese narrative scroll, which developed the storytelling potential of painting to its greatest extent.

The earliest "illustrative" Chinese scrolls, forerunners of the narrative type, date from the late 4th century AD and teach Buddhist moral lessons. The continuous scroll form was fully developed by the 7th century. Such a scroll is opened from right to left and viewed on a table. The landscape hand scroll (*makimono*), a pictorial rather than narrative form, reached its greatest period in the 10th and 11th centuries with such masters as Hsü Tao-ning and Fan K'uan.

The viewer becomes a traveler in these paintings that offer the experience of moving through space and time. There is frequent depiction of roads or paths that seem to lead the viewer's eye into the work.

Only about 2 feet (0.6 metre) of such a scroll should be viewed at one time or the spirit of the work is violated. One problem faced by the artists was a need for multiple vanishing points in generating a sense of perspective, since the imaginary viewer was assumed not to be stationary. They solved this in a variety of ways, causing one perspective point to fade unnoticed into the next.

Nearly contemporary with the Chinese panoramic landscapes are the Japanese *emakimono,* scroll paintings of the 12th and 13th centuries. These are long horizontal scrolls, 10–15 inches (25–38 centimetres) wide and up to 30 feet long. This painting tradition is called *Yamato-e,* or Japanese painting, to distinguish it from Japanese work in the Chinese manner. In the earliest example of this form, *The Tale of Genji,* Japan's great literary masterpiece, is shown in pictures alternating with text. Eventually the illustration in such works stood nearly alone, and typical subjects were the stories and biographies popular during Japan's Middle Ages. The Japanese taste for sensation and drama finds vivid expression in these scrolls. The buildings pictured in them are frequently without roofs, so that intimate interior scenes can be shown, and backgrounds are tilted forward so as to pack more incident in a smaller space.

During the renaissance of Chinese tradition that followed this period, the *toko-no-ma,* an alcove intended for a picture or flower arrangement, was introduced. Paintings were made vertical instead of horizontal in order to fit this space. These hanging *kakemono,* with their static compositions and contemplative themes, are more in the nature of Western paintings.

scrollwork, in architecture and furniture design, use of curved elements suggesting such shapes as a sea wave, a vine, or a scroll of paper partly unrolled. In Classical architecture the main example would be the volutes or spiral scrolls of an Ionic capital, which also appear less prominently in the Corinthian and Composite orders. On friezes a common device is the Vitruvian, or running dog, or wave, scroll.

In the Early Gothic and Decorated periods of English architecture a type of scroll molding resembling a scroll of paper again came into fashion, and it is this type that occurs in 19th-century Gothic Revival furniture. During the various classical revivals, Greek and Roman types of scrollwork found their way into furniture design. An example would be the scrolled, or "swan-neck," pediment common in American 18th-century design.

Scrope, George Julius Poulett (b. March 10, 1797, London—d. Jan. 19, 1876, Fairlawn,

Surrey, Eng.), English geologist and political economist whose volcanic studies helped depose the Neptunist theory that rocks were formed by sedimentation from the oceans. Originally surnamed Thomson, he assumed the surname Scrope in 1821 on his marriage to the daughter of William Scrope, the last of the old earls of Wiltshire.

As an undergraduate he visited Naples in 1816–17, where his interest in volcanoes was stimulated by the activity of Vesuvius. In 1821 he examined the extinct volcanoes of the Auvergne, in central France, and collected material for his *On the Geology and Extinct Volcanoes of Central France* (1827).

Scrope began his studies when the doctrines of German geologist Abraham G. Werner were still predominant, but he was soon to play a part in the overthrow of Werner's Neptunist ideas. His first work, *Considerations on Volcanoes* (1825), is regarded as the earliest systematic treatise on volcanology, since it was the first attempt to frame a satisfactory theory of volcanic action and to show the part volcanoes have played in the Earth's history. He early appreciated the important part played by water in volcanic action, and he disposed of the theory that craters are formed by the buckling of the Earth's crust.

Soon after his marriage, Scrope settled at the family seat of Castle Combe, Wiltshire, and devoted his attention largely to social and political questions. He was a member of Parliament from 1833 until 1868 and published a long series of pamphlets and reviews advocating free trade and social reforms.

Scrophulariales, order of flowering plants that includes 18 families, about 870 genera, and approximately 11,800 species that are distributed on all the continents but Antarctica. About two-thirds of the plants are herbaceous (nonwoody); most of the rest are shrubs, and a few are woody vines or trees. The order includes food plants such as the tomato, plants from which drugs are derived, tobacco, and parasitic weeds.

A brief treatment of Scrophulariales follows. For full treatment, *see* MACROPAEDIA: Angiosperms.

About two-thirds of the Scrophulariales occur in the tropics, one-third in the temperate regions of the world, and about 50 species in the Arctic. Most of the order's plants are perennials, although there are also short-lived tropical herbs and long-lived tropical trees.

In size, the Scrophulariales cover a wide range, from the aquatic bladderwort (*Utricularia olivacea*), with stems that grow to about 4 inches (10 centimetres) in length, to the guayacan (*Tabebuia guayacan*), a tree that grows to about 164 feet (50 metres) in height and 6.5 ft in diameter. The smallest Scrophulariales fruits are the capsules produced by *Micranthemum,* less than 1/16 in. long, and the largest are those produced by the Indian trumpet flower (or midnight horror; *Oroxylum indicum*), 2–4 ft long and 3 in. wide, and by the sausage tree (*Kigelia pinnata*), 3 ft long and sometimes weighing more than 15 pounds (7 kilograms).

The Scrophulariales include aquatic and parasitic members. Among the aquatic plants are the bladderworts (Lentibulariaceae), of which the genus *Utricularia* is the only group of "carnivorous" plants to capture their prey (protozoans, crustaceans, worms, newly hatched fish) underwater. The two families of parasitic plants are the broomrapes (Orobanchaceae) and the figworts (Scrophulariaceae), the latter including all the known agriculturally important root parasites. Of the broomrapes, *Aeginetia* and *Christisonia* attack sugarcane, while the parasitic witchweeds (*Striga* and *Alectra*) of the figwort family attack corn (maize), sugarcane, rice, sorghum, peanuts (groundnuts), soybeans, and tobacco.

The most important food plant of the order is the potato (*Solanum tuberosum* of Solanaceae), grown as a staple food everywhere but in the tropical lowlands. It is a tuber (a swollen portion of an underground stem) native to the New World. The tomato (*Lycopersicon esculentum*) is another member of the Scrophulariales native to the New World that is now a major crop worldwide. Egg-



Beard tongue (*Penstemon*)
Werner Schulz

plant (*Solanum melongena*) is a native of India, the fruits of which are used as vegetables. Its common name refers to the egglike appearance of certain white-fruited varieties. The only spices of Scrophulariales are derived from various species of the *Capsicum* genus, native to tropical America. From them are produced paprika, cayenne, red pepper, and chilies. Sesame (*Sesamum orientale*), a native of the Old World, is prized for its oil and for its seeds, which are used as flavourings and in confections.

The potato family includes several species that yield valuable drugs. The belladonna plant (deadly nightshade; *Atropa belladonna*) produces belladonna and atropine, henbane (*Hyoscyamus niger*) is a source of scopolamine, and the jimsonweed yields stramonium. The foxglove (*Digitalis purpura*) of the figwort family is a source of digitalis. Some members of the potato family—such as jimsonweed, the tree daturas, *Methysticodendron amesianum,* pituri (*Duboisia*), and tobacco (*Nicotiana tabacum* and *N. rustica*)—have narcotic properties.

Many of the herbaceous members of the Scrophulariales are prized garden and greenhouse plants. They include the petunia (*Petunia*), snapdragon (*Antirrhinum*), African violet (*Saintpaulia*), gloxinia (*Acanthus*), and beard tongue (*Penstemon*). The matrimony vine (*Lycium*), the Cape fuchsia (*Phygelius*), and the shrimp plant (*Beleperone*) are used as ornamental shrubs. Ornamental trees with beautiful flower displays are the jacaranda (*Jacaranda mimosifolia*), the cork tree (*Millingtonia hortensia*), the tulip tree (*Spathodea campanulata*), and the catalpa (*Catalpa*). Flowering vines include the cat's-claw (*Doxantha unguis-cati*) and the flame vine (*Pyrostegia venusta*).

A few species of the order produce self-pollinating flowers that never open. Most members, however, have normally opening flowers that are pollinated variously by the wind (*e.g.,* the plantains, *Plantago*), insects, hummingbirds, and a few by bats (sausage tree and Indian trumpet flower).

Seeds are usually dispersed by wind, water, or animals. For a few members of the Scrophulariaceae family (*Veronica, Malampyrum, Pedicularis*), seeds are dispersed or even "planted" by ants, which seek them as food.

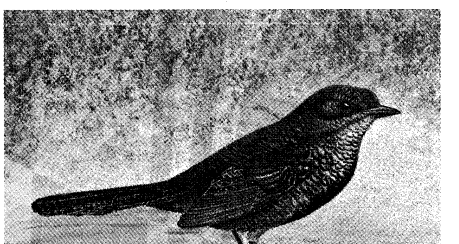
Most members of the order have capsular fruit, although some, such as the tomato, produce berries and others, such as the nolanas (Nolanaceae), produce mericarps (fruits divided into sections). The number of seeds that a plant produces varies from the single seed of *Globularia* and *Littorella* to the 333,000 seeds per plant produced by *Boschniakia rossica* of the broomrape family.

scrotum, in the male reproductive system, a thin external sac of skin that is divided into two compartments; each compartment contains one of the two testes, the glands that produce sperm, and one of the epididymides, where the sperm is stored. The scrotum is continuous with the skin of the lower abdomen and is located directly behind the penis and in front of the anus. The scrotal wall is a thin layer of skin lined with smooth muscle tissue (dartos fascia). The skin contains more pigment than that of surrounding areas and has many sebaceous (oil-producing) glands and sweat glands, as well as some hair. The two compartments of the scrotum are distinguished externally by a middle ridge called the raphe. Internally, the raphe connects to a muscular partition, the septum, which serves to divide the scrotum into its two areas.

The function of the scrotum is to protect the testes and to keep them at a temperature 1–8° below the normal body temperature of 98.6° F (37° C). The scrotum thus protrudes from the body wall: moreover, it contracts from cold, exercise, or sexual stimulation and expands and relaxes when warm. When contracted, it conserves heat; while relaxed it is smooth and elongated, permitting the circulation of air that effects cooling. The muscle tone of the scrotum becomes weakened and relaxed in older men. In animals whose scrotum is always tight against the body, as in rats, boars, and stallions, the testes are cooled by the intricate blood system that surrounds them. Failure of the scrotum to cool the testes, which occurs during high fevers or, in some animals, during the hot summer months, causes temporary sterility.

For a depiction of the scrotum in human anatomy, shown in relation to other parts of the body, *see* the colour Trans-Vision in the PROPAEDIA: Part Four, Section 421.

scrub-bird, either of two species of rare Australian birds comprising the family Atrichornithidae (order Passeriformes), allied to lyrebirds. Both species are brown, with a longish, pointed tail—rather like the brown thrasher of the United States. The 22-centimetre (9-inch) western, or noisy, scrub-bird (*Atrichornis clamosus*), discovered in dry brushlands of Western Australia in the 1840s, was believed extinct after 1889 but was rediscovered in 1961. The 18-cm (7-in.) rufous scrub-bird (*A. rufescens*), discovered in the 1860s in wet forests of New South Wales, 2,500 miles away from the other



Rufous scrub-bird (*Atrichornis rufescens*)
Painting by H. Douglas Pratt

species, is now known to range to Queensland, where it is protected in Lamington National Park.

Scrub-birds seldom fly but can disappear quickly afoot. Their near flightlessness is reflected in their anatomy: their clavicles are so poorly developed that they do not join, and, thus, scrub-birds are the only passerines lacking a wishbone. Their voice is remarkable: painfully loud, highly varied, and ventrilo-

quial. The nest, on the ground, is a bulky, domed affair lined, uniquely, with wood pulp that dries to a cardboardlike consistency.

scrub mite: *see* chigger.

scrub oak, any of several small, shrubby trees of the genus *Quercus,* in the beech family (Fagaceae), native to dry soils in North America. Specifically, scrub oak refers to *Q. ilicifolia,* also known as bear oak, native to the eastern United States. It is an intricately branched ornamental shrub, about 6 m (20 feet) tall, with hollylike leaves and many small, striped acorns. In the west are the California scrub oak (*Q. dumosa*), an evergreen shrub about 2.5 m (8 feet) tall, with leaves 2.5 cm (1 inch) long, and the Rocky Mountain scrub oak (*Q. undulata*), up to 9 m (30 feet) tall.

scrub typhus, also called TSUTSUGAMUSHI DISEASE, acute infectious disease in humans that is caused by the parasite *Rickettsia tsutsugamushi* and is transmitted to humans by the bite of certain kinds of trombiculid mites, or chiggers. The causative agent of scrub typhus, the bacterium *R. tsutsugamushi,* is primarily a parasite of certain mites, of which two closely related species, *Leptotrombidium* (*Trombicula*) *akamushi* and *L. deliens,* are the carriers of the disease. During their larval stage, these mites acquire the infection from wild rodents or other small animals. The infection is passed to humans when a mite larva bites a person. Scrub typhus occurs in Southeast Asia and its associated archipelagoes and in Japan, in which latter country the disease was first described (1899) and systematically investigated (1906–32). During World War II scrub typhus killed or incapacitated thousands of troops who were stationed in rural or jungle areas in the Pacific theatre.

A person falls ill with scrub typhus about 10 to 12 days after being bitten by an infected mite. A reddish or pinkish lesion appears at the site of the mite bite, and the person begins to experience headache, fever, chills, and general pains, along with swollen lymph glands. About one week after the fever has started, a pinkish rash develops over the skin of the trunk and may extend to the arms and legs. While the course of the fever may end in two weeks, it is not unusual for it to last three or even four weeks. A more or less extensive pneumonitis is common, and abnormalities in the heart, lungs, and blood may also arise, leading to impairment of heart function and circulatory failure. When untreated, scrub typhus can be fatal, but the course of the disease can now be arrested by the administration of chloramphenicol or the tetracyclines, upon which recovery is prompt and uneventful.

scrubland, area of low, evergreen, leatheryleaved, and often aromatic shrubs (or scrubs), commonly called Mediterranean vegetation. Scrublands are limited primarily to seacoast regions that have dry, hot summers and cool, wet winters.

A brief treatment of scrublands follows. For full treatment, *see* MACROPAEDIA: Biosphere.

Scrublands are found along the seacoasts of the Mediterranean Sea, western and southern Australia, and on the western coasts of both North and South America, in latitudes between 30° and 40° both north and south of the equator. These regions have a cover of dense vegetation that thrives during the winter months when there is adequate rainfall and temperatures during the night rarely fall below 10° to 15° C (50° to 60° F). Except for a very few common plant genera, the scrublands in each continent produce different flora.

The western coast of North America, particularly California, produces a kind of scrubland called the chaparral. The annual rainfall there varies between 250 and 500 mm (10 and 20 inches), and the summer is very dry. Annual plants like goldfields, tree poppies, and forget-me-nots are produced, along with perennials like the scrub oak, sages, mountain lilacs, and in drier inland regions, chamise and ribbon-woods. Along the lower slopes of mountains bordering the Mediterranean Sea—*i.e.,* in North Africa, Greece, southern France, Spain, and the western coast of the Middle East—are found scrublands called the macchie, which are dominated by mints, laurels, myrtles, brooms, rosemary, thyme, and olive and fig trees. Much of the original macchie has been transformed by human irrigation practices into crop-producing lands. The world's most extensive scrublands are found in Australia, which also provides the richest variety of scrubland flora. Scrublands predominate in those areas of western Australia that receive between 380 and 1,000 mm (15 and 40 inches) of rainfall annually. These scrublands support a total of about 1,000 species of scrubs, including members of the pea family, myrtles, sundews, and shrubby species of eucalyptus and acacia.

Scrublands in general do not change much in the course of a year. Most scrubland plants are evergreens, and the only marked change they undergo during seasonal variation pertains to leaf colour. During the dry summer months the leaves are olive green, but they are replaced by bright green new foliage during the wet months of winter. The growing season in scrublands is usually confined to the wet winter months, when temperatures rarely fall below freezing. The favourable winter climate allows seeds to germinate after sufficient rain has fallen. The most pronounced seasonal changes in the flora of scrublands are provided by annual plants, which complete their growing cycle during winter, before the onslaught of parched summer conditions.

Long periods of drought common to scrublands can kill many plant species that are not sturdy enough to thrive in desertlike conditions. The droughty summer months also make scrublands prone to fires, which sweep across the coastal plains and slopes, burning to their forest or desert boundaries. The fires do not eradicate most of the flora, however, because most scrubs sprout from their crown roots close to the ground and thus can usually regenerate themselves in one or two years.

Scrublands are not hospitable environments for most animals. The vegetation is dense, making it difficult for medium-sized and large mammals to travel through, and most of the aromatic herbs and scrubs are disagreeable or even toxic to many animals. Small seed-eating animals such as pocket mice and kangaroo rats may be found in scrublands, however. Insects, insect-eating birds, and reptiles also forage in scrublands, though they prefer to dwell in more habitable environments.

Scruggs, Earl (Eugene) (b. Jan. 6, 1924, Flint Hill, N.C., U.S.), American bluegrass banjoist, the developer of a unique instrumental style that helped to popularize the five-string banjo.

Scruggs, who came from a musical family, began to play his father's banjo at age 5, and by the age of 15 he was playing on local radio broadcasts. During his early teens Scruggs experimented with and eventually perfected a picking technique involving the thumb and first two fingers of the right hand—a technique that came to be called the "Scruggs style." In December 1945, he joined Bill Monroe's Blue Grass Boys, which had not previously featured a banjoist. This group became the prototypical bluegrass band and was often heard on the Grand Ole Opry radio show.

In 1948 Scruggs and Lester Flatt, the guitarist and tenor singer in the group, left to form their own band, the Foggy Mountain Boys. Flatt & Scruggs became one of the great bluegrass bands in its own right, making dozens



Earl Scruggs
Courtesy of the Country Music Foundation, Inc.

of records in the 1950s and '60s. Scruggs's original instrumental compositions—including "Foggy Mountain Breakdown," "Flint Hill Special," and "Earl's Breakdown"—were especially popular.

Flatt and Scruggs parted ways in 1969, and Scruggs joined his sons Gary, Randy, and later Steve in an electrified country-rock ensemble, the Earl Scruggs Revue. In 1980 Scruggs left full-time performing but continued to record music in a variety of styles. Scruggs was inducted into the Country Music Association Hall of Fame in 1985.

scruple, unit of weight in the apothecaries' system, equal to 20 grains, or ⅓ dram, and equivalent to 1.295 grams. In ancient times, when coinage weights customarily furnished the lower subdivisions of weight systems, the scruple (from Latin *scrupulus,* "small stone," or "pebble") was a unit of Roman commercial weight as well as a unit of coinage weight. One *drachma,* the basic Greek silver unit, consisted of three scruples.

scrying (divination): *see* crystal gazing.

scuba diving, swimming done underwater with a self-contained underwater-breathing apparatus. *See* underwater diving.

Ščučinsk (Kazakh S.S.R.): *see* Shchuchinsk.

Scudéry, Madeleine de (b. 1607, Le Havre, Fr.—d. June 2, 1701, Paris), French novelist and social figure whose romans à clef were immensely popular in the 17th century.

De Scudéry was the younger sister of the dramatist Georges de Scudéry. Madeleine de Scudéry moved to Paris to join her brother after the death of her uncle, who had cared for her after she and her brother had been orphaned. Clever and bright, she soon made her mark on the literary circle of the Hôtel de Rambouillet; by the late 1640s, she had replaced Madame de Rambouillet as the leading literary hostess in Paris and had established her own salon, known as the Société du Samedi (the Saturday Club).

Her first novel, *Ibrahim ou l'illustre bassa* (1642; *Ibrahim or the Illustrious Bassa*), was published in four volumes. Her later works were even longer; both *Artamène ou le grand Cyrus* (1649–53; *Artamenes or the Grand Cyrus*) and *Clélie, histoire romaine* (1654–60; *Clelia*) were published in 10 volumes. Contemporary readers, accustomed to such long novels, appreciated De Scudéry's works both for their bulk and for the glimpses they provided into the lives of important society figures of the day. These individuals were thinly disguised as Persian, Greek, and Roman warriors and maidens; De Scudéry herself appears in *Artamène* as Sappho, a name by which she was known to her friends.

Other of her works include *Almahide, ou l'es-*

clave reine (1660–63; "Almahide, or the Slave Queen"), *Mathilde d'Aguilar, histoire espagnole* (1667; "Mathilda of Aguilar, a Spanish Tale"), and *La Promenade de Versailles, ou l'histoire de Célanire* (1669; "The Versailles Promenade, or the Tale of Celanire"). Most of the novels were published anonymously or under the name of her brother Georges. They included long passages devoted to conversations on such topics as the education of women; these were excerpted and published separately.

Although her novels were exceptionally popular and were lauded by such notables as Madame de Sévigné, they also met with some criticism. Nicolas Boileau, for instance, satirized them harshly.

Scullin, James Henry (b. Sept. 18, 1876, Trawalla, Victoria—d. Jan. 28, 1953, Melbourne), statesman and leader of the Australian Labor Party who as prime minister guided the country through the early years of the Great Depression but was plagued by dissension within his own party.

After joining the Labor Party in 1903, Scullin served in Parliament (1910–13) and edited a Labor newspaper, the *Echo*, during World War I. Elected to Parliament again in 1922, he became leader of the party in 1928 and helped it become stronger than it had been since its split in 1916. When he became prime minister in 1929, he was immediately confronted with the economic depression, compounded by opposition control of the Senate, noncooperation by the Commonwealth Bank of Australia, and inexperience in his Cabinet.

Scullin's deflationary measures (wage decreases, rationing, limitations on imports, and attempts to balance budgets) initially were successful. But after his treasurer, Edward Granville Theodore, was forced to resign in July 1930 following a mining scandal in Queensland, the Cabinet split on financial policy. Scullin's support of Theodore's return to the Cabinet in 1931 and of a plan to expand credit divided the party and led to his defeat in the 1931 elections.

Scullin led the Labor opposition from 1932 to 1935 and retired from Parliament in 1949.

sculling, in small-craft racing, the use of two oars, one in each hand—in single, double, and quadruple events. *See* rowing.

sculpin, also called BULLHEAD, or SEA SCORPION, any of the numerous, usually small fish of the family Cottidae (order Scorpaeniformes), found in both salt water and freshwater, principally in northern regions of the world. Sculpins are elongated, tapered fish and characteristically have wide, heavy heads. The gill covers are armed with one or more spines, the pectoral fins are large and fanlike, and the skin is either naked or provided with small spines. The dorsal fin contains both a spiny and a soft-rayed section; these may be either separate or united.

Sculpins are bottom-dwelling, inactive fish. Most are found in shallow sea waters, though some live in deeper waters, and others, such as the miller's-thumb (*Cottus gobio*), inhabit freshwater. The sculpins are of little value to man, as they are not generally considered tasty. Some, such as the sea raven (*Hemitripterus americanus*), are of use as bait for lobster pots, and some are of negative importance as consumers of valuable shrimp and young salmon and trout.

There are about 300 species of sculpins, the largest of which grow about 60 centimetres (2 feet) long. Among the freshwater sculpins, the miller's-thumb is a common and familiar species. It is found in European lakes and rivers and is a small, generally mottled brown fish growing about 10 cm long. It is related to various other species of the genus *Cottus* that are found in Asia and North America.

Familiar marine sculpins of the Atlantic include such forms as: the bullrout, or shorthorn sculpin (*Myoxocephalus scorpius*), a large, mottled-brownish sculpin found in Europe, the Arctic, and North America; the longhorn sculpin (*M. octodecemspinosus*), a common North American species, variable in colour and with long cheek spines; and the sea raven, a North American fish distinctively adorned with fleshy tabs on its head and notable for its ability, like certain other sculpins, to inflate itself with air when removed from the water.

In the Pacific, there are such species as the cabezone (*Scorpaenichthys marmoratus*), a large, eastern Pacific fish, edible but often having blue- or green-tinted flesh; the staghorn sculpin (*Leptocottus armatus*), a common North American species; and *Vellitor centropomus*, a long-snouted sculpin common in the Orient.

The name sculpin is also applied to various other small, primarily northern Pacific fish of the family Icelidae. These, the two-horn sculpins, grow to a maximum length of about 25 cm and are characterized by bony plates (scutes) on the back and on the lateral line.

sculpture, a form of aesthetic expression in which designs are created in space. The designs may be embodied in free-standing objects, in reliefs on surfaces, or in environments ranging from tableaux to contexts that envelop the spectator. An enormous variety of media may be used—clay, wax, stone, metal, fabric, wood, plaster, rubber, random "found" objects, even space itself—to develop ideas in form, mass, mood, and relationship. Materials may be carved, modelled, molded, cast, wrought, welded, sewn, assembled, or otherwise shaped and combined. Sculpture may be monumental, religious, representational, symbolic, or purely expressive in intent. It may be meant to last out the ages or to self-destruct almost immediately.

Sculpture is treated in a number of articles in the MACROPAEDIA. For general treatments of sculpture, its history and place among the arts, *see* Aesthetics; Arts, Classification of the; Folk Arts; Sculpture, The Art of; Sculpture, The History of Western. For related art forms, *see* Decorative Arts and Furnishings; Masks. For treatments of sculpture as practiced by non-European peoples, *see* African Arts; American Indians; Central Asian Arts; East Asian Arts; Egyptian Arts and Architecture, Ancient; Islāmic Arts; Oceanian Arts; Prehistoric Peoples and Cultures; South Asian Arts; Southeastern Asian Arts.

sculpture, environmental: *see* environmental sculpture.

Scunthorpe, district (borough), county of Humberside, England, with an area of 13 sq mi (34 sq km). It is an industrial community dominated by steel making. The town sprang up after 1870 with the establishment of ironworks using local low-grade ironstone worked at the neighbouring village of Frodingham (now also within the district). Steel-making operations, now based on imported ore, have expanded, and the community is almost completely dependent on a single highly integrated industrial complex based on steel, though clothing factories have been established to provide some employment for women. Scunthorpe's shops and other central services draw population from the surrounding villages of an extensive, very rural area. Pop. (1983 est.) 65,000.

scup, fish of the western Atlantic, a species of porgy (*q.v.*).

scurfy scale (*Chionaspis furfura*), an important insect pest of fruit and ornamental trees in the United States. This insect (order Homoptera) has gray, pear-shaped females (about three millimetres long) and smaller, white males with three longitudinal ridges. These insects, found on shaded trees, give the bark a scurfy appearance and cause spotting of foliage and fruit. In warm climates, there are two generations a year; in cooler regions there is only one. Control is usually through use of an oil spray.

scurvy, also called VITAMIN C DEFICIENCY, one of the oldest nutritional disorders of mankind, caused by a dietary lack of vitamin C (ascorbic acid), a nutrient found in many fresh fruits and vegetables, particularly the citrus fruits. The disorder is characterized by swollen and bleeding gums with loosened teeth, soreness and stiffness of the joints and lower extremities, bleeding under the skin and in deep tissues, slow wound healing, and anemia.

Although accounts of what was probably scurvy are found in ancient writings, the first clear-cut descriptions appear in the records of the medieval Crusades. Later, toward the end of the 15th century, scurvy became the major cause of disability and mortality among sailors on long sea voyages. Not until 1753 was scurvy recognized as related to diet and the concept of deficiency diseases established for the first time, when the Scottish naval surgeon James Lind showed that scurvy could be cured and prevented by ingestion of the juice of oranges, lemons, or limes. In modern times, full-blown cases of vitamin C deficiency have become relatively rare; in the United States, they may still be seen in isolated elderly adults, usually men whose diet is limited to foods lacking in vitamin C, and in infants fed reconstituted milk or milk substitutes without a vitamin C or orange juice supplement. Symptoms peculiar to infantile scurvy (Barlow's disease) include swelling of the lower extremities, pain upon flexing them, and lesions of the growing bones.

Administration of vitamin C is the specific therapy for scurvy. Even in cases of severe deficiency, a daily dose of 100 milligrams accompanied by a normal diet commonly produces a cure within several days.

scutage (from Latin *scutum,* "shield"), also called SHIELD MONEY, French ÉCUAGE, in feudal law, payment made by a knight to commute the military service he owed his lord. A lord might accept from his vassal a sum of money (or something else of value, often a horse) in lieu of service on some expedition. The system was advantageous to both sides and grew rapidly with the expansion of money economy in Europe in the 12th and 13th centuries.

Scutage existed in various countries, including France and Germany, but was most highly developed in England, where it was first mentioned in 1100. It seems to have been levied, at first, on ecclesiastical tenants in chief, who had difficulty in finding their full quota of knights for the king's army. It soon became a general tax on knights' estates, and by the 13th century the rates were standardized.

Though the crown could demand scutage, tenants could not refuse to perform military service if required to do so. From the time of Richard I (1189–99), however, special fines (payments larger than the routine scutage) were accepted from tenants in chief in lieu of service on a particular campaign. As a result of the frequent and heavy scutages exacted by King John, Magna Carta (1215) forbade the levy of scutage without the consent of a great council. During the 13th century, scutages and fines continued, the latter becoming more general. Scutage, collected from mesne (intermediate) tenants who had not attended a campaign, was divided between the king and those tenants in chief who had served in person. By the 14th century, however, scutage had become obsolete.

Scutari (Albania): *see* Shkodër.

Scutari (Turkey): *see* Üsküdar.

Scutari, Lake, Albanian SHKODËR, Serbo-Croatian SKADARSKO, largest lake in the Balkans, on the frontier between Montenegro (Yugoslavia) and Albania. Its area is 150 square miles (390 square km), but it reaches 205 square miles (530 square km) at its seasonal high water. The lake was formerly an arm of the Adriatic Sea. On its west and northwest are steep mountains; its eastern side has a surrounding plain and marshland extending to Titograd in the north. Six Yugoslav rivers flow into the lake, of which the principal one is the Morača. The Bojana River flows out at the lake's southern end to the Adriatic. Around the lakeshore are many small villages that are noted for their old monasteries and fortresses. The Albanian town of Shkodër (Skadar) is at the southern end of the lake.

Scylax OF CARYANDA (fl. 6th century BC), ancient Greek explorer who was a pioneer in geography and the first Western observer to give an account of India.

It is known from Herodotus that Scylax was sent by the Persian king Darius I (in about 515 BC) to explore the course of the Indus River and that he returned by sea after two and a half years to the Isthmus of Heroonpolis (Suez). References in ancient authorities seem to show that he left a record of his voyages, but none of the references is even nearly contemporary; and it is difficult to say in what manner knowledge of Scylax was transmitted. The few fragments suggest a work in the form of a *Periplus* (mariner's coastal guide), with some geographic and ethnographic description and, in the account of India, some element of the fabulous. The extant *Periplus* that has come down under his name cannot, however, be the work of Scylax of Caryanda. Another work doubtfully attributed to Scylax is a work on the Carian Heraclides of Mylasa, who distinguished himself in the Greek revolt against the Persians (498 BC) and possibly in the second Greco-Persian War (480 BC). That the explorer and geographer was a pioneer also in historical-biographical literature is improbable.

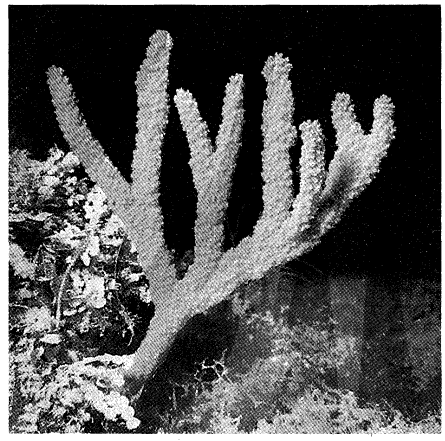
Scylitzes, John (fl. 2nd half of the 11th century), Byzantine historian, the author of a *Synopsis historiarum* dealing with the years 811–1057.

Scylitzes was a high officeholder at the Byzantine court. He may have written a legal work for Alexius I in 1092. In his history he drew on the work of others for the early part and then largely relied on sources no longer extant and on contemporary oral tradition. In some manuscripts the work is extended to cover the years 1057–79; this section is of little independent value and is known as *Scylitzes continuatus.* There is no edition of the Greek text of this important historian, who is known through the almost literal reproduction of his work by George Cedrinus.

Scylla and Charybdis, in Greek mythology, two immortal and irresistible monsters who beset the narrow waters traversed by the hero Odysseus in his wanderings (later localized in the Strait of Messina). Scylla was a supernatural creature, with 12 feet and 6 heads on long, snaky necks, each head having a triple row of sharklike teeth, while her loins were girt with the heads of baying dogs. From her lair in a cave she devoured whatever ventured within reach, including six of Odysseus' companions. She was sometimes said to have been originally human in appearance but transformed out of jealousy through the witchcraft of Circe or Amphitrite into her fearful shape. She was sometimes confused with the Scylla who betrayed her father, King Nisus of Megara, out of love for Minos, king of Crete.

Charybdis, who lurked under a fig tree a bowshot away on the opposite shore, drank down and belched forth the waters thrice a day and was fatal to shipping. Her character was most likely the personification of a whirlpool. The shipwrecked Odysseus barely escaped her clutches by clinging to a tree until the improvised raft that she swallowed floated to the surface again after many hours. Scylla was often rationalized in antiquity as a rock or reef. Both gave poetic expression to the dangers confronting Greek mariners when they first ventured into the uncharted waters of the western Mediterranean.

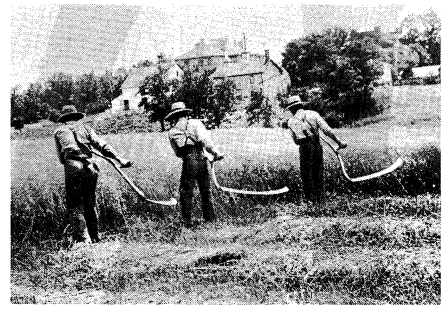
Scypha, also called SYCON, genus of marine sponges of the class Calcispongiae (calcareous sponges), characterized by a fingerlike body shape known as the syconoid type of structure. In the syconoid sponges, each "finger," known as a radial canal, is perforated by many



A syconoid sponge (*Scypha*)
Jack McKenney—Tom Stack and Associates

tiny pores through which water passes into the central cavity. The water exits through an oscule, or larger opening, at the tip. *Scypha* species may grow to about 2 or 3 cm (about 1 inch) in length.

scythe, one of the most important of all agricultural hand tools, consisting of a curved blade fitted at an angle to a long, curved handle and used for cutting grain. In modern scythes the handle has a projecting peg that is grasped by one hand, facilitating control of the swinging motion by which grass and grain are cut. The exact origin of the scythe is unknown, but it was little used in the ancient world. It came into wide use only with agricultural developments of the Carolingian era (8th century AD) in Europe, when the harvesting and storing of hay became important to support livestock through winters.



Farm workers mowing with scythes in the eastern U.S., late 19th century
By courtesy of International Harvester Co.

scythebill, also called SABREBILL, or SICKLEBILL, any of several birds of Central and South American tropical forests, belonging to the genus *Campylorhamphus.* The five species are woodcreepers (family Dendrocolaptidae, order Passeriformes), with long downcurved bills that are as much as one-third of the bird's total length, which is about 23 cm (9 inches).



Red-billed scythebill (*Campylorhamphus trochilirostris*)
Paul Schwartz—Photo Researchers/EB Inc.

Scythian, member of a nomadic people originally of Iranian stock who migrated from Central Asia to southern Russia in the 8th and 7th centuries BC. Centred on what is now the Crimea, the Scythians founded a rich, powerful empire that survived for several centuries before succumbing to the Sarmatians during the 4th century BC to the 2nd century AD.

Much of what is known of the history of the Scythians comes from the account of them by the ancient Greek historian Herodotus, who visited their territory. In modern times this record has been expanded chiefly by the work of Russian anthropologists.

The Scythians were feared and admired for their prowess in war and, in particular, for their horsemanship. They were among the earliest people to master the art of riding, and their mobility astonished their neighbours. The migration of the Scythians from Asia eventually brought them into the territory of the Cimmerians, who had traditionally controlled the Caucasus and the plains north of the Black Sea. In a war that lasted 30 years, the Scythians destroyed the Cimmerians and set themselves up as rulers of an empire stretching from west Persia through Syria and Judaea to the borders of Egypt. The Medes, who ruled Persia, attacked them and drove them out of Anatolia, leaving them finally in control of lands which stretched from the Persian border north through the Kuban and into southern Russia.

The Scythians were remarkable not only for their fighting ability but also for the civilization they produced. They developed a class of wealthy aristocrats who left elaborate graves filled with richly worked articles of gold and other precious materials. This class of chieftains, the Royal Scyths, finally established themselves as rulers of the southern Russian and Crimean territories. It is there that the richest and most numerous relics of Scythian civilization have been found. Their power was sufficient to repel an invasion by the Persian king Darius I in about 513 BC.

The Royal Scyths were headed by a sovereign whose authority was transmitted to his son. Eventually, around the time of Herodotus, the royal family intermarried with Greeks. In 339 the ruler Ateas was killed at the age of 90 while fighting Philip II of Macedonia. The community was eventually destroyed in the 2nd century BC, Palakus being the last sovereign whose name is preserved in history.

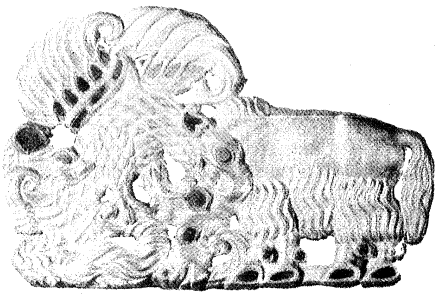
The Scythian army was made up of freemen who received no wage other than food and clothing, but who could share in booty on presentation of the head of a slain enemy.

Many warriors wore Greek-style bronze helmets and chain-mail jerkins. Their principal weapon was a double-curved bow and trefoil-shaped arrows; their swords were of the Persian type. Every Scythian had at least one personal mount, but the wealthy owned large herds of horses, chiefly Mongolian ponies. Burial customs were elaborate and called for the sacrifice of members of the dead man's household, including wife, servants, and a number of horses.

Consult the INDEX *first*

Scythian art, also called STEPPES ART, decorative objects, mainly jewelry and trappings for horse, tent, and wagon, produced by nomadic tribes that roamed Central Asia from slightly east of the Altai Mountains in Inner Mongolia to European Russia. What little is known of these tribes, called Scyths, or Sacae, in the classical sources, indicates that they established control of the plain north of the Black Sea over a period of several centuries, from the 7th–6th century BC until they were gradually supplanted by the Sarmatians during the 4th century BC–2nd century AD. Many of the most impressive pieces of Scythian art (now part of the treasure at the Hermitage, Leningrad) were cast of solid gold and were recovered in the 17th–19th century, before the development of modern archaeological methods that might have shed more light on their origins.

The Scythians worked in a wide variety of materials, including wood, leather, bone, appliqué felts, bronze, iron, silver, gold, and electrum. The tombs of Pazyryk in the Altai yielded many well-preserved articles of clothing that were profusely trimmed with embroidery and appliqué designs; the clothes of the wealthy in southern Russia were covered with tiny gold-embossed plaques, sewn to the garments. At Pazyryk, felt appliqué wall hangings were found, some displaying religious scenes featuring the Great Goddess or anthropomorphic beasts, others with geometric or animal motifs. Felt rugs were also found, as well as a vast number of beautifully made tools and domestic utensils.



Scythian gold belt buckle with turquoise inlay, from Siberia; in the Hermitage, Leningrad
Novosti Press Agency

The art of the period is essentially an animal art. Combat scenes between two or more animals are numerous, as are single animal figures. Many real or mythical beasts are represented, the majority of the types having roots in deep antiquity, but the Scythians fashioned them in a manner that was new and characteristically their own. As is to be expected with nomads who were constantly on the move, the decorative objects they produced are generally small in size, but many are made of precious materials and practically all are of superb workmanship.

The Scythian gold figures of semirecumbent stags, measuring some 12 inches (30.5 centimetres) in length, are outstanding; they were probably used as the central ornaments for the round shields carried by many Scythian fighters. Perhaps the loveliest of the gold stags is the 6th-century-BC example from the burial of Kostromskaya Stanitsa in the Kuban, but versions of the 5th century BC from Tápiószentmárton in Hungary and of the 4th century BC from Kul Oba in the Crimea are scarcely less beautiful. In all three examples the stag is shown in a recumbent position, with its legs tucked beneath its body, but with its head raised and its muscles taut so that it gives an impression of rapid motion.

The Scythian artistic idiom is one of great compression as well as of synthesis; contrasting positions of the body are combined with astonishing skill to depict every possible aspect of the animal when visualized during all its diverse activities. Though the art is basically representational in character, it is at the same time imaginative in spirit, often verging on the abstract in conception. Yet however complex its elements, they are fused in the finished work into a single entity of compelling force and beauty.

SDECE, abbreviation of SERVICE DE DOCUMENTATION EXTÉRIEURE ET DE CONTRE-ESPIONAGE: *see* DGSE.

Sea, Law of the, law codified in a treaty signed Dec. 10, 1983, by 117 nations in Montego Bay, Jamaica. It represented an attempt to codify international law regarding territorial waters, sea lanes, and ocean resources. It was not signed by the United States, the United Kingdom, Japan, West Germany, Italy, and several other industrialized or developing nations, which objected to the provisions for seabed mining, which they claimed would inhibit free enterprise. Among the major signers were the U.S.S.R. and France.

According to the treaty, each nation's sovereign territorial waters were to extend 12 miles (19 kilometres) beyond its coast, but foreign commercial vessels would be granted the right of innocent passage through the 12-mi zone. Beyond 12 mi, all vessels and aircraft, whether commercial or military, might move freely. Every coastal nation was to have exclusive rights to the fish and other marine life in waters extending 200 mi from shore; when nations are separated by less than 400 mi of water, another dividing line must be agreed upon. Every coastal nation having a continental shelf was to have exclusive rights to the oil, gas, and other resources in the shelf up to 200 mi from shore.

With regard to seabed mining, the minerals on the ocean floors beneath the high seas were deemed "the common heritage of mankind," and their exploitation was to be governed by a global authority. Although private and national mining concerns were allowed, a global mining enterprise was to be afforded a site equal in size or value to any site mined by a private or national company. There was also to be a production ceiling aimed at preventing seabed mining from causing economic harm to land-based producers of the same minerals. Private mining companies must sell their technology and technical expertise to the global enterprise.

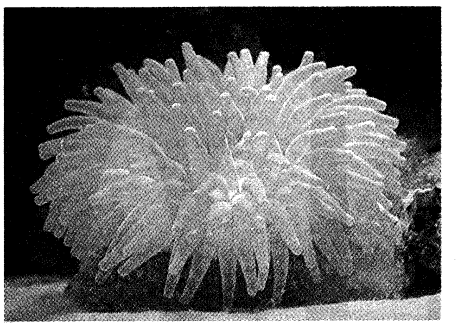
Disputes regarding the treaty and its provisions were to be adjudicated either by a new Tribunal for the Law of the Sea, by arbitration, or by the International Court of Justice.

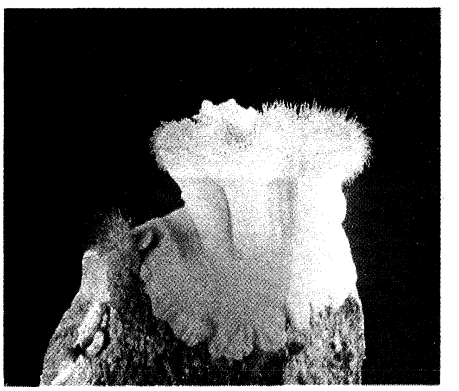
sea–air interface: *see* air–sea interface.

sea anemone, any member of the invertebrate order Actiniaria (class Anthozoa, phylum Cnidaria), primarily sedentary marine animals resembling flowers. They are found from the tidal zone of all oceans to depths of more than 10,000 metres (about 33,000 feet). Some live in brackish water. They are largest, most numerous, and most colourful in warmer seas. The colourful *Tealia* are found in temperate regions.

The more than 1,000 species vary in size from a few millimetres (a fraction of an inch) in diameter and length to about 1.5 m (about 5 ft) in diameter. The largest sea anemones—also the largest cnidarians—are of the genus *Stoichactis.*

Actinaria exhibit great variety in shape and habit. The cylindrical body may be thick and short or long and slender. The oral disk, or mouth, at the upper end of the body is surrounded by petallike, usually colourful tentacles. They may be few or numerous and are often present in multiples of six. Sea anemones are commonly yellow, green, or blue; they are attached by the pedal disk, or base, to a hard surface such as a rock, wharf timber, a seashell, or the back of a crab. Most seldom





Sea anemones
(Top) *Tealia*; (bottom) *Metridium*
(Top) M. Woodbridge Williams; (bottom) George Lower—The National Audubon Society Collection/Photo Researchers

move; some occasionally creep very slowly or move in a slow somersaulting fashion. Certain genera (*e.g., Edwardsia, Halcampa, Peachia*) have no pedal disk but burrow deep into the sand or mud, exposing only the mouth and tentacles. Members of the genus *Minyas* float near the ocean surface, with the mouth hanging downward.

Sea anemones have no skeleton but may secrete a horny covering. Some species have adhesive-secreting structures and cover themselves with grains of sand, bits of shell, or other foreign objects.

Nematocysts, stinging structures in the tentacles, paralyze prey such as fishes and other marine animals. Some species eat only microorganisms. Anemones are eaten by sea slugs, certain starfishes, eels, flounders, and codfish.

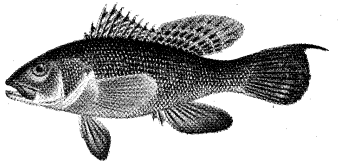
In most species the sexes are separate. Sperm and eggs are usually discharged into the water, where fertilization occurs. Sometimes, as in *Halcampa* and *Actinia,* sperm are drawn into the female's gastrovascular cavity, in which the eggs are fertilized. Reproduction sometimes occurs asexually by longitudinal fission (*e.g.,* in *Anemonia*); that is, the animal splits lengthwise into two equal individuals. In some species (*e.g., Metridium*) the pedal disk breaks into fragments that grow into new individuals.

Sea anemones often live in close association with other organisms. The hermit crab *Pagurus arrosor* carries a single anemone of the genus *Calliactis* on the seashell it uses as a "house." When the crab grows too large for its shell, it moves to a new one, transplanting the anemone to the new shell. The hermit crab *Eupagurus prideauxi* and the sea anemone *Adamsia palliata* are always found living together, never alone. Fishes of the genera *Premnas* and *Amphiprion* often live safely among the poisonous tentacles of an anemone such as a species of *Stoichactis, Radianthus,* or *Discosoma.* Such fish, however, may be stung and eaten by other anemone individuals, even of the same species.

sea bass, any of the numerous fishes of the family Serranidae (order Perciformes), most of which are marine and found in the shallower regions of warm and tropical seas. The family includes about 400 species, many of them well-known food and sport fishes. Although the term sea bass may be used for the family as a whole, the fishes themselves bear a variety of names, such as hamlet, hind, cony, graysby, grouper, and jewfish, as well as sea bass and bass.

Sea bass are rather perchlike fish. The more or less elongated body has small scales; the mouth is large, and the tail is generally straight-edged or rounded. The dorsal fin, a diagnostic feature, consists of a forward, spiny section and a hinder, soft-rayed section; the two portions are usually joined but may be separated by a notch.

Sea bass are carnivorous and feed on fish, crustaceans, mollusks, and other invertebrates. Some are active swimmers; others, such as the groupers, are more sedentary. Certain species, such as the belted sandfish (*Serranellus subligarius*) of Florida, are hermaphroditic (male and female reproductive organs in one animal); others, such as the groupers, may mature as one sex and later change to the other.



Black sea bass (*Centropristis striata*)
Painted especially for *Encyclopaedia Britannica* by Tom Dolan, under the supervision of Loren P. Woods, Chicago Natural History Museum

Sea basses vary widely in size, from a few centimetres to a maximum, in such species as the jewfish (*Epinephelus itajara*) and giant sea bass (*Stereolepis gigas*), of about 2 m (6 feet) and 225 kg (500 pounds) or more. Colour also varies, both among and within species. Some sea basses, for example, are able to change to any of several colour patterns. In other species, the young may be patterned differently from the adults, and in still others, individuals inhabiting deeper waters may be considerably redder than those of the same species living near shore.

The family Moronidae, sometimes considered a subfamily of the Serranidae (and sometimes used as a synonym for Percichthyidae), includes about 12 species of sea basses found in more northern regions. These fishes, distinguished by two separate dorsal fins that are joined at the base, live in the temperate waters of North America, Europe, Asia, Africa, and Australia. A few of these fishes, such as the striped bass (*Morone,* or *Roccus, saxatilis*), enter rivers to spawn. The white perch (*M. americana,* or *R. americanus*), which also enters freshwater to breed, is, in some areas, permanently landlocked in certain streams and ponds.

The better-known moronids include the European bass (*Morone,* or *Dicentrarchus, labrax*), found from Scandinavia to the Mediterranean, often in river mouths; the striped bass, or striper, a renowned American food and sport fish striped with black and growing to about 14 kg (30 pounds); the white bass (*M. chrysops*), a dark-striped river fish of the eastern United States; and the white perch, a North American Atlantic species reaching a maximum of about 38 cm (15 inches) and 1.4 kg (3 pounds).

Among the serranid sea basses valued for food and sport are species known as grouper (*q.v.*); the black sea bass (*Centropristis striata*), a gray, brownish, or blackish species of the western Atlantic; and the graysby (*Petrometopon cruentatus*), of tropical western Atlantic waters.

sea buckthorn, also called SALLOW THORN (*Hippophae rhamnoides,* family Elaeagnaceae), willowlike shrub growing to about



Sea buckthorn (*Hippophae rhamnoides*)
A.J. Huxley—EB Inc.

2.5 m (about 8 feet) high with narrow leaves that are silvery on the underside and globose, orange-yellow fruits about 8 mm (1/3 inch) in diameter. It is common on sand dunes along the eastern and southeastern coasts of Great Britain and is widely distributed in the mountains of Europe and Asia. The sea buckthorn is often cultivated as an ornamental for its fruits and foliage.

sea butterfly (snail): *see* pteropod.

sea cave, cave formed in a cliff by wave action of an ocean or lake. Sea caves occur on almost every cliffed headland or coast where the waves break directly on a rock cliff and are formed by mechanical erosion rather than the chemical solution process that is responsible for the majority of inland caves. Zones of weakness in the cliff give way under the force of the waves and are eroded out; these cavities are enlarged by the hydraulic pressure built up by each wave. Holes, commonly known as blowholes, may eventually be forced through the roof of the cave to allow the pressure created by each wave to be released as a jet of spray.

sea coot (duck): *see* scoter.

sea cow, also called STELLER'S SEA COW (*Hydrodamalis gigas*), large aquatic mammal of the order Sirenia that formerly inhabited the frigid waters around Bering and Copper islands in the Bering Sea. The term sea cow is also sometimes used to refer to other sirenians, the manatee and more often the dugong (*qq.v.*).

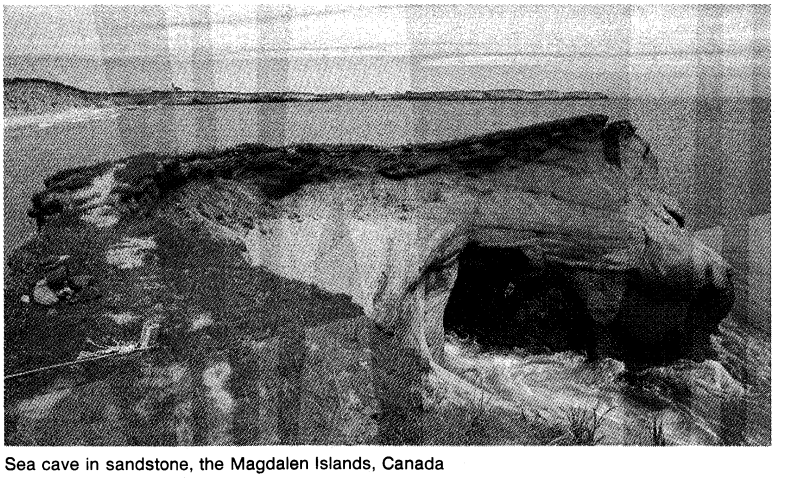
Steller's sea cow was discovered in 1741 and was described by Georg W. Steller, who accompanied Vitus Bering on his voyage of discovery. The sea cow reached a length of at least 7.5 m (24 feet). It had a relatively small head and a broad, horizontal, forked tail fluke. The skin was dark brown, sometimes streaked or spotted with white. It was toothless and browsed on seaweed.

The sea cow was avidly hunted for food and fur by Russian sealers. By 1768 the entire population, estimated to have been about 5,000, had been exterminated.

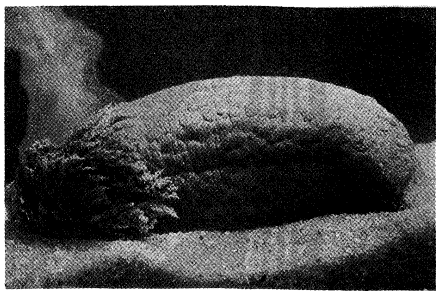
sea crayfish, any of several lobster species of the family Palinuridae. *See* lobster.

sea cucumber, any of the 1,100 species of marine invertebrates constituting the class Holothuroidea (or Holothurioidea) of the phylum Echinodermata. The soft, cylindrical body, 2 to 200 cm (about 3/4 inch to 6 1/2 feet) long and 1 to 20 cm (0.4–8 inches) thick, usually is a dull, dark colour and often warty, thus resembling a cucumber. The internal skeleton is reduced to numerous distinctively shaped, tiny bits in the skin. Most species have five rows of tube feet extending from mouth to anus. The anal opening is used for both respiration and discharging wastes. The 10 or more retractile tentacles surrounding the mouth are used for food-taking (mud containing nutrients or small aquatic animals) or burrowing. Locomotion is sluglike.

Many sea cucumbers can expel their internal organs from the anus and grow new ones; this may be a device for escape from a predator, or it may occur for physiological reasons. Some species also expel sticky filaments that ensnare or confuse an enemy. Cucumbers shelter pearlfish (*Carapus* species) in the anal cavity, with the head of the fish extruding. A number of sea cucumbers exude a toxin that is lethal to small animals but not to humans; South Sea islanders place sea cucumber juices in water to kill or stupefy fish. For the use of sea cucumbers as food, *see* bêche-de-mer.



Sea cave in sandstone, the Magdalen Islands, Canada
Bruce Iverson

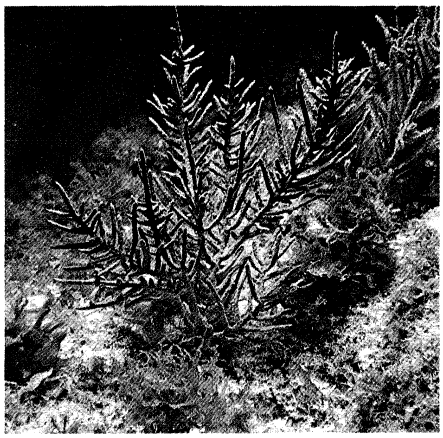


Sea cucumber (*Cucumaria frondosa*)
Grant Heilman—EB Inc.

Sea cucumbers are found in all oceans, mostly in shallow water but sometimes at great depths. They are best represented in the Indian Ocean and the western Pacific. The 80 to 100 species of large, warty cucumbers of the genus *Holothuria* are abundant on coral reefs.

sea elephant (aquatic mammal): *see* elephant seal.

sea fan (*Gorgonia*), any of a genus of invertebrate marine animals of the order Gorgonacea (class Anthozoa, phylum Cnidaria). It is a variety of coral composed of polyps, cylindrical sessile (attached) forms, that grow together in a flat, fanlike pattern; hence, the name sea fan. Each polyp in the colony has some multiple of six tentacles, as opposed to the eightfold symmetry of the similar black coral. A central internal skeleton, composed of a flexible, horny substance called gorgonin, supports all branches of the colony, and the living tissues form a layer over its entire surface. The tissues are often coloured in hues of red, yellow, or orange. The polyps spread out their tentacles to form a plankton-catching net. In most cases the fan-shaped colonies grow across the current, which increases their ability to ensnare prey.



Sea fan
Douglas Faulkner

There are about 500 species of *Gorgonia,* and they differ markedly in their modes of branching. They all, however, grow to approximately 61 cm (2 feet) in height. Sea fans are found in the shallow waters of all oceans, but they are especially abundant along the Atlantic coasts of Florida, Bermuda, and the West Indies.

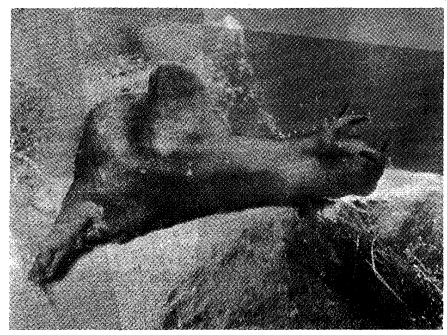
sea fig (plant): *see* ice plant.

sea-floor spreading hypothesis: *see* seafloor spreading hypothesis.

sea gooseberry, either of two cosmopolitan genera of invertebrate marine animals in the phylum Ctenophora: the *Hormiphora* and the *Pleurobrachia.* The genera, widely distributed in all the oceans, are represented by 90 species. Sea gooseberries are wholly planktonic in their life cycle, lacking any sessile (attached) stages. They feed on other small planktonic animals such as arrow worms. Their bluish-white luminescence sometimes colours the waves at night. They constitute an important part of the diet of the European herring.

The body of the sea gooseberry is gelatinous, transparent, and roughly spherical to pear-shaped. Along the sides of its body run eight equally spaced longitudinal rows of comblike plates, each of which consists of thousands of fused cilia. As these tiny hairlike structures beat in sequence, they propel the animal. Their beating is coordinated by a sense organ at one end of the animal's body. A mouth at the opposite end leads into a stomach from which extend eight branches that are visible through the transparent body. Several anal pores are present near the sense organ. Two long extensile, branched tentacles protrude from pouches on the sides. The tentacles are armed with colloblasts, special cells that have sticky heads which serve to ensnare prey.

sea hare, any marine gastropod of the family Aplysiidae (subclass Opisthobranchia) that is characterized by a shell reduced to a flat plate, prominent tentacles (resembling rabbit



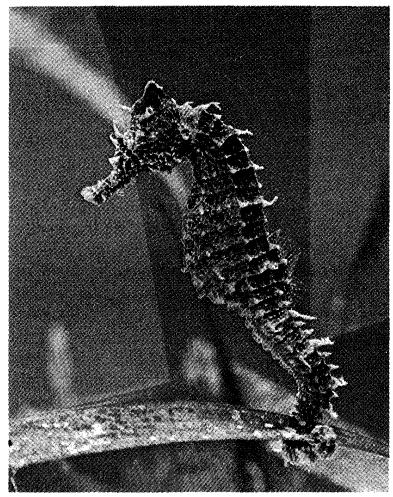
Sea hare (*Aplysia*)
S.C. Bisserot—Bruce Coleman Ltd.

ears), and a smooth or warty body. Sea hares eat large seaweeds. An example is the 10-centimetre (4-inch) spotted sea hare (*Aplysia dactylomela*), a ring-spotted green species living in grassy shallows of the Caribbean.

sea hen, fish, a species of lumpsucker (*q.v.*).

sea holly (algae): *see* Sargassum.

sea horse, any of a number of species of small marine fishes of the family Syngnathidae (order Gasterosteiformes), found in warm seas. Sea horses are familiar animals, with their con-



Sea horse (*Hippocampus erectus*)
Des Bartlett—Bruce Coleman Ltd.

secutive rings of body armour, their forward-curled, prehensile tails, and their "horsey" heads set at an angle to their bodies. They also have long, tubular snouts, small mouths, a single, soft-rayed dorsal fin, and eyes that can move independently of one another. Sea horses vary in size, ranging in length from about 4 to 30 cm (1½ to 12 inches).

Weak swimmers, sea horses usually live along the shore, among seaweed and other plants to which they cling by their tails. When swimming, they maintain an upright position, propelling themselves with their fins and rising or sinking by altering the volume of gas within their swim bladders. They catch and eat small organisms by sucking them quickly into their mouths.

The reproductive behaviour of sea horses is notable in that the male, not the female, carries the fertilized eggs. The eggs, deposited in a brood pouch beneath the male's tail by the female, remain there until they hatch. At that time, the male contorts his body and expels the young through the single opening in the pouch.

Sea horses are of interest as aquarium animals and as curios. They have also been used as heraldic emblems and to treat various ailments. Among the various species are: the dwarf sea horse (*Hippocampus zosterae*), an Atlantic form smaller than any other sea horse; *H. ramulosus* (or *H. guttulatus*), a brown sea horse of Europe; *H. kuda,* a large, brown or blackish Pacific sea horse; and *H. whitei,* a moderate-sized sea horse of Australia.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Sea Islands, low-lying chain of sandy islands off the coasts of South Carolina, Georgia, and Florida, U.S., between the mouths of the Santee and St. Johns rivers and along the Atlantic Intracoastal Waterway. The Spaniards claimed and partly occupied the islands in 1568. By the end of the 17th century, the English had made them part of the Carolina colony. In 1717 they were granted to Sir Robert Montgomery, who included them in his Margravate of Azilia on the mainland; he termed the group Golden Islands in a promotional booklet (1720). The Battle of Bloody Marsh (1742), fought on St. Simons Island, saved the Georgia colony from the Spaniards.

The Sea Islands were early looked upon as private kingdoms. St. Catherines was awarded to Mary Musgrove, an Indian princess, in payment of a debt claimed against James Oglethorpe; it later came into the possession of Button Gwinnett, one of Georgia's three signers of the Declaration of Independence. In the antebellum period, almost all of Sapelo Island became the domain of Thomas Spalding, a prominent Georgia slaveholder, planter, and legislator. In the last half of the 19th century, Jekyll Island was made an exclusive winter playground for members of the Jekyll Island Club; the Carnegie family also secured most of Cumberland Island for the same purpose. Jekyll Island was bought by the state of Georgia and since 1947 has been the site of a state park. Amelia Island, first settled by Oglethorpe in 1735, became part of East Florida; it became Spanish in 1783 and was ceded to the United States with the rest of Florida in 1821.

Rice and cotton were cultivated, especially on St. Helena and Port Royal (the most important of the islands), and the fine, long-stapled Sea Island cotton was developed in the islands. After the American Civil War, abandoned plantations were confiscated, and land was given to freed slaves. The Carolina islands retain a predominantly black population that has developed distinct customs and dialects, notably Gullah (*q.v.*). In the 1920s, because of boll weevil infestation of the cotton, a more diversified agriculture was de-



Interior of Jeckyll Island State Park, Sea Islands
John Hall

veloped, and shrimp, crab, and oysters were harvested. Several wildlife refuges and parks have been established on the islands, the more important of which are linked to the mainland by causeways and bridges. Fort Frederica National Monument, established in 1945, is on St. Simons.

sea kale (*Crambe maritima*), cabbage-like perennial plant of the mustard family (Brassicaceae), native to seashores and cliffs of Eurasia. Young or blanched leaves are cooked and eaten. The waxy, blue-green, coarsely toothed



Sea kale (*Crambe maritima*)
A to Z Botanical Collection—EB Inc.

leaves are 30–90 cm (1–3 feet) long. Honey-fragrant, clustered sprays of white, four-petaled flowers rise from the basal leaves.

Sea Lake, town, Mallee district, northwest Victoria, Australia, on the south shore of Lake Tyrrell (a salt-encrusted depression). Located on the Calder Highway and a rail line running southeast to Melbourne (195 miles [314 km] southeast), the town serves a region of wheat, sheep, and irrigated farming (especially dairying and the fatting of lambs). An extraction plant harvests the salt deposits of Lake Tyrrell. The site was discovered in 1838 and was named by an early settler of the Port Phillip area, Edward Eyre. The lake's sealike impression inspired the town's name. Pop. (1981) 943.

sea leopard (aquatic mammal): *see* leopard seal.

sea lettuce (*Ulva*), any member of a genus of green algae usually found growing between high and low tide marks on rocky shores of seas and oceans. Fragments may be washed ashore by wave action. *Ulva* grows also in brackish water rich in organic matter or sewage. The thallus, which somewhat resembles a lettuce leaf, is a sheet of cells up to 30 cm (12 inches) long and two cells thick and is embedded in a tough gelatinous sheath. The life cycle con-



Sea lettuce (*Ulva lactuca*), exposed at low tide
Alison Wilson

sists of alternation of similar spore-producing (diploid) and gamete-producing (haploid) generations. Asexual reproduction is either by accidental fragmentation or by gametes that act like motile spores.

Sea lettuce is rich in iodine and in vitamins A, B, and C. In some societies it is used in salads and soups.

sea level, position of the air–sea interface, to which all terrestrial elevations and submarine depths are referred. The sea level constantly changes at every locality with the changes in tides, atmospheric pressure, and wind conditions. Longer-term changes in sea level are influenced by the Earth's changing climates. Consequently, the level is better defined as mean sea level, the height of the sea surface averaged over all stages of the tide over a long period of time.

Global mean sea level rose at an average rate of about 1.2 mm (0.05 inch) per year over much of the 20th century, with shorter terms during which the rise was significantly faster (5.5 mm [0.2 inches] per year during the period from 1946 to 1956). This variable rise has been shown to have occurred for a very long time. The sea level appears to have been very close to its present position 35,000 years ago. It dropped 130 m (426 feet) or more during the interval from 30,000 to 15,000 years ago and has been rising ever since. Fluctuations of equivalent magnitude probably have accompanied the alternate growth and melting of continental glaciers during the Pleistocene Epoch (from 2,000,000 to 10,000 years ago) because the ocean's waters are the ultimate source of glacial ice. Slower changes in the shapes and sizes of the ocean basins have less effect.

sea lily, any crinoid marine invertebrate (phylum Echinodermata) in which the adult is fixed to the sea bottom by a stalk. The stalk is surmounted by a bulbous body with frondlike tentacles; *i.e.,* the animal resembles a plant. The stem consists of limy disks, and the body has an internal skeleton of close-fitting limy plates.



Sea lily (*Antedon spinifera*)
Tom Myers

Sea lilies occur chiefly in deep waters, where they feed on detritus. Of 80 living species—none more than 60 cm (24 inches) tall—many belong to the genus *Metacrinus,* distributed from Japan to Australia. A common West Indies species is *Neocrinus decorus.* More than 5,000 extinct species—some 20 m (65 feet) long—are known. They are important index fossils of the Paleozoic Era (from 570,000,000 to 225,000,000 years ago).

sea lion, any of the five species of seals, belonging to the family Otariidae (eared seals), characterized by a coat of short, coarse hair that lacks a distinct undercoat. Sea lions are lithe animals with the small ears typical of the Otariidae (*see* seal); the males, except in the California sea lion, have manes. Like the other otariids, sea lions have longer flippers than do the true, or earless, seals (phocids), and they are able to rotate their hind flippers forward to use all four limbs in moving about on land. Sea lions feed principally on fish and cephalopods (*e.g.,* squid and octopus). Breeding in large herds, the males establish harems of 3 to 20 females. The pups, born after a gestation period of 12 months, are brown. Sea lions are hunted, though not on a large scale, for their meat, hides, and blubber.

The California sea lion (*Zalophus californianus*), found along the coasts of California, the Galápagos Islands, and Japan, is the trained



Southern sea lions (*Otaria byronia*)
George Holton—Photo Researchers

seal commonly seen in circuses and zoos. A large-eyed, playful animal, it is pale to dark brown but appears black when wet. The male reaches a maximum length and weight of about 2.5 metres (8 feet) and 270 kilograms (600 pounds); the female grows to about 1.8 m and 90 kg.

The northern, or Steller, sea lion (*Eumetopias jubata*) is a pale- to golden-brown sea lion of the Bering Sea and both sides of the North Pacific. Length and weight of males are about 3.3 m and 1,000 kg; females, about 2.5 m and 270 kg.

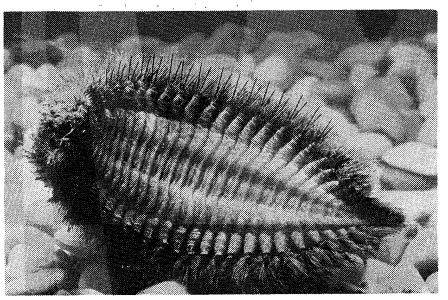
The southern, or South American, sea lion (*Otaria byronia*) is generally brown with a yellowish belly. The male is about 2.5 m in length and 520 kg in weight; the female is about 1.8 m and 135 kg.

Two large brown sea lions are found in the Australasian region: the Australian sea lion (*Neophoca cinerea*) and the New Zealand, or Hooker's sea lion, *Neophoca* (or sometimes *Phocarctos*) *hookeri*. Approximate length and weight are: males, 2.5–3.5 m and 410 kg; females, 1.8–3 m and 230 kg.

sea marigold: *see* ice plant.

sea moth (fish): *see* dragonfish.

sea mouse (*Aphrodita*), any of a genus of marine worms of the class Polychaeta (phylum Annelida), named for their mouselike appearance and behaviour.



Segmentation on the underside of a sea mouse (*Aphrodita*)
Javier Palaus Soler—Ostman Agency

Sea mice are usually 7.5–15 centimetres (3–6 inches) long; however, some attain a length of 30 centimetres (12 inches). The slightly arched back is covered with a dense mat of hairlike setae about 2.5 centimetres (1 inch) long. The sea mouse burrows and creeps in a manner suggestive of a true mouse as it searches for dead and decaying bodies of animals—its main diet.

Near its mouth are two pairs of feeler-like appendages. Eyes are absent. Locomotion is by means of many small, bristly, paddle-like appendages. Sea mice are hermaphroditic; *i.e.*, functional reproductive organs of both sexes occur in the same individual. The eggs of one individual, however, are fertilized by the sperm of another.

Sea mice are found just below the intertidal zone, usually on sandy or muddy bottoms, on both sides of the Atlantic and in the Mediterranean Sea. *Aphrodita hastata* occurs on the North American coast from the Gulf of St. Lawrence to Chesapeake Bay. Specimens are often found washed ashore after storms. A common European species is *A. aculeata.*

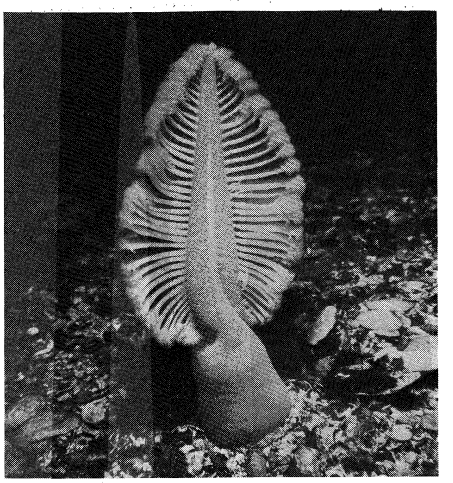
Sea of ———: *see under* substantive word (*e.g.*, Azov, Sea of), except as below.

Sea of Happiness (Japan): *see* Chūzenji-ko.

sea pansy, any of certain marine animals of the sea pen (*q.v.*) group.

sea parrot: *see* puffin.

sea pen, any of the 300 species of the order Pennatulacea, colonial invertebrate marine animals of the class Anthozoa (phylum Cnidaria). The name sea pen derives from



Sea pen (*Leioptilus*)
Douglas Faulkner

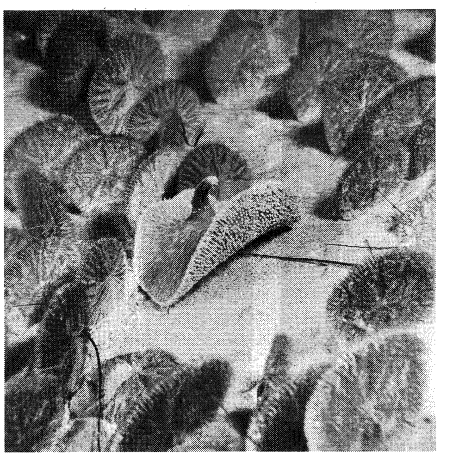
their resemblance to quill pens. They occur in shallow and deep waters from polar seas to the tropics.

The central stalk of the animal consists of a lower part, the peduncle, which anchors the colony in mud or sand, and an upper part, the rachis, which bears polyps (hollow stalks with a mouth and tentacles at the free end) or branches bearing several polyps. The central stalk is known as the primary, or axial, polyp. Those branching from it are the secondary polyps. Colonies of some genera—*e.g., Chunella*—bear few polyps. Others bear as many as 35,000. The mouth and tentacles of the primary polyp are degenerate, consisting of little more than a fleshy stem strengthened by a central horny rod.

Many Pennatulacea, however, do not resemble pens. The sea pansy, *Renilla,* for example, found along the Pacific and Atlantic coasts of North America, is a flattened kidney-shaped plate consisting of two fused halves. All the polyps are on the upper side. The slender rodlike members of the genera *Anthoptilum, Funiculina, Balticina, Stylatula,* and *Virgularia* may grow to a length of 2 metres (about 6½ feet). Shorter forms, growing to no more than 20 centimetres (8 inches), have a few relatively large leaves extending from the central stalk (*e.g., Leioptilus*). Most sea pens are yellow, orange, red, or brown.

Sea pens can deflate or expand by expelling or taking in water through the interconnecting hollow canals of the polyps. They feed on small organisms captured by the tentacles at the end of each polyp. Most sea pens luminesce, or glow, when they are touched or otherwise stimulated.

The secondary polyps are of two types: siphonozooid and autozooid. Siphonozooids



Sea pansy (*Renilla*)
Bud Meese from Root Resources—EB Inc.

draw a current of water through the colony canal system. Autozooids feed and serve a reproductive function by producing eggs and sperm. These products are expelled through the mouth into the open water, where fertilization takes place. The planula, or free-swimming larva, settles to the bottom after about a week and develops into the axial polyp of a new colony.

Sea People, any of the groups of aggressive seafarers who invaded eastern Anatolia, Syria, Palestine, Cyprus, and Egypt toward the end of the Bronze Age, especially in the 13th century BC. They are held responsible for the destruction of old powers such as the Hittite Empire. Because of the abrupt break in ancient Near Eastern records as a result of the invasions, the precise extent and origin of the upheavals remain uncertain. Principal but one-sided evidence for the Sea Peoples is based on Egyptian texts and illustrations; other important information comes from Hittite sources and from archaeological data.

The Egyptians waged two wars against the Sea Peoples: the first, in the fifth year of King Merneptah (1236–23 BC); the second, in the reign of Ramses III (*c.* 1198–66).

Tentative identifications of the Sea Peoples listed in Egyptian documents are as follows: Ekwesh, a group of Bronze Age Greeks (Achaeans; Ahhiyawa in Hittite texts); Teresh, Tyrrhenians (Tyrsenoi), known to later Greeks as sailors and pirates from Anatolia, ancestors of the Etruscans; Luka, a coastal people of western Anatolia, also known from Hittite sources (their name survives in classical Lycia on the southwest coast of Anatolia); Sherden, probably Sardinians (the Sherden acted as mercenaries of the Egyptians in the Battle of Kadesh, 1299 BC); Shekelesh, probably identical with the Sicilian tribe called Siculi; Peleset, generally believed to refer to the Philistines, who perhaps came from Crete and were the only major tribe of the Sea Peoples to settle permanently in Palestine.

Further identifications of other Sea Peoples mentioned in the documents are much more uncertain.

sea poppy (plant): *see* horned poppy.

sea power, means by which a nation extends its military power onto the seas. Measured in terms of a nation's capacity to use the seas in defiance of rivals and competitors, it consists of such diverse elements as combat craft and weapons, auxiliary craft, commercial shipping, bases, and trained personnel. Aircraft used in the control of seaborne transportation function as an instrument of sea power even when they operate from a land base; aircraft operating from carriers represent the extension of sea power even when they are attacking targets deep inland. Except for the great increase in bombardment of shore or inland targets from the sea, the functions of sea power were the same in World War II as they were in the 16th century, when warships specifically designed for fighting (as distinguished from armed merchantmen) first appeared.

The capacity for sea power depends upon such factors as population, character of government, soundness of economy, number and quality of harbours and extent of coastline, and the number and location of a nation's colonies and bases with respect to desired sea traffic.

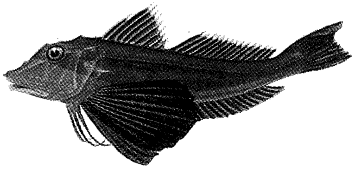
The main purpose of sea power has always been to protect friendly shipping from enemy attack and to destroy or hinder the enemy's shipping—both commercial and military. When one belligerent or the other has virtual control of surface shipping in portions of the seas, he is said to have command of the seas, with the ability both to defend his own

sea communications and to deny communications to the enemy.

Sea power may also be exerted to apply military and economic pressure on an enemy by preventing the import of commodities necessary for prosecution of war. It may also prevent him from obtaining funds through the export of commodities to neutrals, and it may prevent neutrals from trading with the enemy. This use of sea power is known as blockade and has usually been exercised according to specific procedures prescribed by international law.

Naval forces have also been used to bombard land objectives from the sea. In the first half of the 20th century, this function of sea power grew enormously in importance. The development of the aircraft carrier added a new dimension to this bombardment capability, as did the missile-firing nuclear submarine. In the 1960s and '70s, the nuclear submarine was the single most important instrument of sea power; it was scarcely distinguishable in function from strategic air power and land-based missiles in general nuclear warfare. The classic exposition of the role of sea power as the basis of national power and greatness was Alfred Thayer Mahan's *The Influence of Sea Power in History* (1890).

sea robin, also called GURNARD, any of the slim, bottom-dwelling fish of the family Triglidae, found in warm and temperate seas of



Tub gurnard (*Trigla lucerna*)
Painting by Karen Allan

the world. Sea robins are elongated fish with armoured, bony heads and two dorsal fins. Their pectoral fins are fan-shaped, with the bottom few rays each forming separate feelers. These feelers are used by the fishes in "walking" on the bottom and in sensing mollusks, crustaceans, and other bottom-dwelling prey.

Sea robins are usually brightly coloured, and some have ornately patterned pectoral fins. The tub gurnard (*Trigla lucerna*) of Europe, for example, is a reddish fish with pectoral fins brightly edged and spotted with blue and green. Sea robins are also vocal and can produce audible sounds with their swim bladders and certain attached muscles. Along the American Atlantic, the common sea robin (*Prionotus carolinus*) is noted for its sound production. The largest species of sea robins grow about 70 centimetres (28 inches) long.

Some sea robins are scaly; the bodies of others are covered with bony plates. The armoured species are sometimes placed in a separate family, Peristediidae. They are flattened, deepwater fish but are otherwise similar to the scaly sea robins.

sea rocket, any of about 17 species of plants constituting the genus *Cakile*, of the mustard family (Brassicaceae), native to seashore regions of North America, Eurasia, western Asia, and Australia, and to central Arabian deserts. *Cakile maritima,* a European plant, has waxy, thick, lobed green leaves and pale-lavender flower clusters. Its leaf branches, 30 to 60 centimetres (1 to 2 feet) long, rise from a long taproot. *Cakile edentula,* a similar plant, is native to North American seashores and the Great Lakes.

sea scorpion (extinct aquatic invertebrate): *see* giant water scorpion.

sea scorpion (fish): *see* sculpin.

sea serpent, mythological and legendary marine animal that traditionally resembles an enormous snake. The belief in huge creatures that inhabited the deep was widespread throughout the ancient world. In the Old Testament there are several allusions to a primordial combat between God and a monstrous adversary variously named Leviathan or Rahab. Although the references to Leviathan usually indicate a dragon-like creature, the name has also been used to denote a sea monster in general (*see* dragon). Analogies to this combat are found throughout the ancient Middle East. Babylonian literature records a battle between the god Marduk and the multi-headed serpent-dragon Tiamat, and in Hittite myth the weather god is victorious over the dragon Illuyankas. Similarly, a Canaanite poem from Ras Shamra (ancient Ugarit) in northern Syria records a battle between the god Baal and a monster called Leviathan. The story of Marduk's combat with Tiamat is thought to be a precursor of the Christian legend of St. George and the dragon.

Although tales of sea serpents have continued to exist throughout the centuries, no animal has been captured so far that has not proved to belong to a previously well-known group. A large number of the well-authenticated stories of monstrous marine creatures seem to be explicable as incorrect observations of animals already well known. For example, a number of porpoises swimming one behind the other and rising regularly to take air might produce the appearance of a very large serpentlike creature progressing by a series of vertical undulations. Large masses of seaweed half awash often have been mistaken for some gigantic animal. Basking sharks, nemertines (marine worms), ribbonfish or oarfish (*Regalecus*), and sea lions have also been suggested as explanations of some so-called sea serpents.

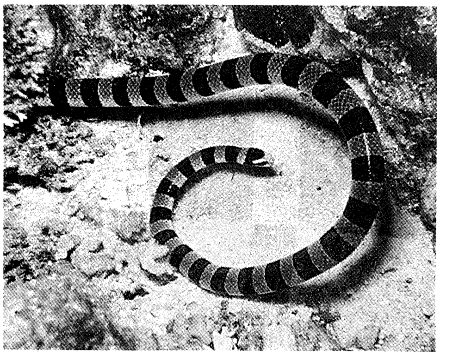
Giant squids (*Architeuthis* species) are presumably the foundation on which many accounts are based; these animals, which may attain a total length of 50 feet (15 metres), occasionally frequent the regions from which many accounts of sea serpents have come—Scandinavia, Denmark, the British Isles, and the eastern coasts of North America. One of these animals swimming at the surface with two enormously elongate arms trailing along through the water would produce almost exactly the picture that many of the strangely consistent independent accounts require: a general cylindrical shape with a flattened head, appendages on the head and neck, a dark colour on top and a lighter shade beneath, progression steady and uniform, body straight but capable of being bent, and spouting water. Further, sperm whales are known to kill and devour *Architeuthis,* and one of the most graphic accounts of the sea serpents speaks of it as in conflict with a whale around which it had thrown two coils and which it ultimately dragged below the surface.

The history of sightings of freshwater "monsters" is lengthy, especially those of Loch Ness in northern Scotland. They have been the object of much investigation, all of it remaining inconclusive.

sea slug (snail): *see* nudibranch.

sea snail (fish): *see* snailfish.

sea snake, any of more than 50 species of venomous marine snakes of the family Hydrophiidae. In adaptation to marine life, sea snakes have oarlike tails and flattened bodies. Their nostrils have valvelike closings and are usually on top of the snout. Several sea snakes have bodies much thicker than their heads and necks affording them greater stability when striking at prey. Some species (subfamily Laticaudinae) have enlarged belly scales like those of terrestrial snakes; the others (Hydrophiinae) have small belly scales and are helpless on land. Most are about 1 to 1.2 metres (3 to 4 feet) long; the largest, such as *Laticauda semifasciata,* an edible delicacy in Japan, may be twice as long.



Black-banded sea snake (*Laticauda colubrina*)
Douglas Faulkner

The majority of sea snakes are found along the coasts and in the estuaries of Australia and Asia, but one, the yellow-bellied, or pelagic, sea snake (*Pelamis platurus*), ranges throughout the Pacific to Madagascar and the New World. This species is about 1 metre long and is dark brown or black with a bright yellow belly.

Sea snakes eat fish and sometimes bask on the surface in large groups. A few of the Laticaudinae lay eggs on land, but all others bear their young alive at sea. Sea snakes are generally slow to strike, but some, such as the annulated and beaked sea snakes (*Hydrophis cyanocinctus* and *Enhydrina schistosa*), possess potentially lethal venom.

sea sparrow: *see* auklet.

sea spider, also called PYCNOGONID, any of the spiderlike marine animals comprising the class Pycnogonida (also called Pantopoda) of the phylum Arthropoda. Sea spiders walk about on the ocean bottom on their slender legs or crawl among plants and animals; some may tread water.

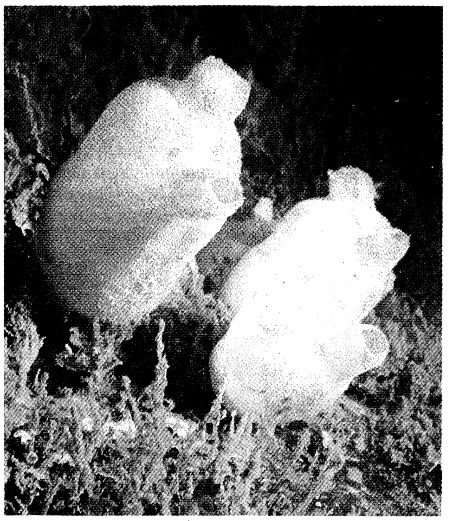
Most pycnogonids have four pairs of long legs attached to four trunk segments. The body size ranges from 3 millimetres (1/8 inch) in tropical shallow-water species to 50 centimetres (20 inches) in deepwater species. The mouth, a triangular opening at the end of an elaborate suctorial appendage (proboscis), is often longer and larger than the body. Adult pycnogonids either suck the juices from soft-bodied invertebrates or browse on hydroids (phylum Cnidaria) and bryozoans. The four simple eyes are often lacking in the deepwater species. The digestive and reproductive systems have branches that go to the legs.

Sexes are separate, and fertilization is apparently external. The males carry the eggs on a special pair of legs until they hatch. Many species have larval or juvenile stages that are parasitic in cnidarians or mollusks, but they are not important economically. Nervous and circulatory systems are simple, and there are apparently no respiratory or excretory systems.

Classification within the group is based on the presence or absence of various anterior appendages. There are no clear ordinal divisions within the living genera, which are grouped in about a dozen families. There are more than 600 described living species and at least one fossil species from the Jurassic Period (about 136,000,000 to 190,000,000 years ago).

Pycnogonids are sometimes also called whip scorpions.

sea squirt, also called ASCIDIAN, any member of the invertebrate class Ascidiacea (subphylum Urochordata, also called Tunicata), marine animals with some primitive vertebrate features. Sea squirts are fixed growing organ-



Sea squirt
Kenneth R.H. Read

isms resembling potatoes more than animals; they are found in all seas, from the intertidal zone to the greatest depths. All adult forms are sessile (permanently fixed to a surface). They are commonly found on pier pilings, ships' hulls, rocks, large seashells, and the backs of large crabs. Some species live individually; others live in groups or colonies.

The body has an outer protective covering, the tunic. There are two large pores, one to take water into the body cavity, the other to expel it. Food and oxygen are taken from the water current. Near the shore, debris from dead plants and animals constitutes an important part of the diet; in deeper water, plankton (microscopic plants and animals) is a more important food.

Although all adults have functional male and female reproductive organs, eggs shed into the water are fertilized by sperm from another individual. The tadpole-like larvae are free-swimming. Behind a sucker on the front of the head is the mouth. A notochord (a flexible, rodlike structure common to all vertebrates) and a nerve cord are in the tail. When the larva finds a place to settle, it attaches itself by the sucker; the tail, with its notochord and nerve cord, is absorbed and disappears.

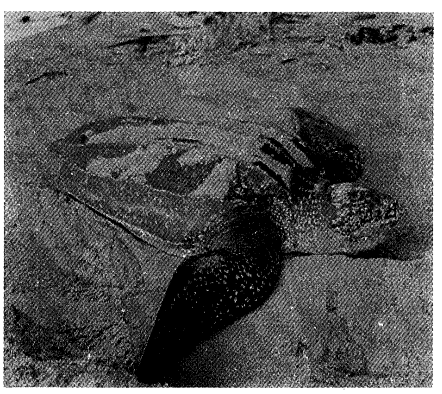
Reproduction also occurs by budding: near the base of the sea squirt fingerlike projections (stolons) break off and settle elsewhere to become new individuals.

sea star: *see* starfish.

sea swallow, any of certain coastal tern species. *See* tern.

sea trout: *see* weakfish.

sea turtle, any of the marine turtles of the families Dermochelyidae (leatherback turtle) and Cheloniidae (green turtle, loggerhead, hawksbill, and ridley). Sea turtles, in adaptation to an aquatic life, have limbs modified into flippers for efficient swimming. They generally leave the water only during the breeding season, when the female emerges to dig a nest on land and deposit her eggs.



Leatherback turtle (*Dermochelys coriacea*)
Jane Burton—Photo Researchers

The leatherback turtle (*Dermochelys coriacea*), largest of living turtles, may attain a total length of about 2.1 metres (7 feet) with a weight of about 540 kilograms (1,200 pounds) and a span of about 2.7 m from the tip of one front flipper to the tip of the other. Maximum reported lengths and weights range up to 3 m and about 900 kg but are poorly authenticated. The leatherback has no visible shell. A shell is present but consists of bones buried in the dark brown or blackish skin. There are seven pronounced longitudinal ridges on the back of the turtle and five on the underside. The leatherback is a strong swimmer and inhabits open seas throughout the world. It apparently is omnivorous and takes both animal and plant material.

The green turtle (*Chelonia mydas*) is named for the greenish colour of its fat. It is a large, heavy reptile, usually about 0.7–1.0 m in shell length and about 90–140 kg in weight. The maximum length and weight are about 1.2 m and 375 kg. The upper shell of the green turtle is wide and smooth, and the overall colouring of the animal is brown or slightly greenish. The green turtle is found in warm, coastal waters around the world. It feeds mainly on marine grasses and, unlike other sea turtles, sometimes emerges onto land to bask in the sun.

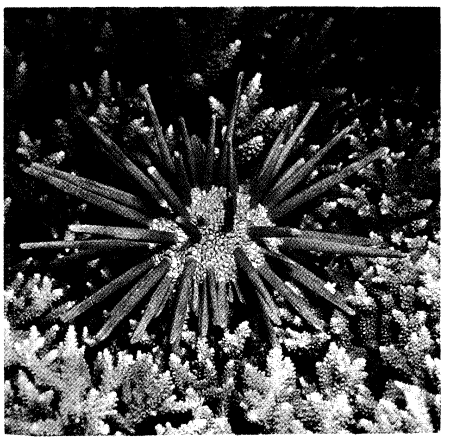
The loggerhead (*Caretta caretta*) is a large turtle similar to the green turtle but with a relatively larger head. It is reddish brown or brown in colour. The loggerhead attains a shell length of about 0.7–2.1 m. A large specimen usually weighs about 135 kg, but weights of almost 400 kg have been recorded. The loggerhead, found in oceans throughout the world, is a carnivorous reptile with a reportedly bad disposition.

The hawksbill (*Eretmochelys imbricata*) is a relatively small sea turtle that takes its common name from the shape of its hooked jaws and its species name (*imbricata*) from the overlapping plates on its upper shell. The hawksbill is found in warm waters throughout the world and is an aggressive reptile that feeds on both plant and animal material. It usually attains a shell length of about 40–55 cm (16–22 in.) and a weight of about 13–45 kg (29–100 lb).

The ridleys (*Lepidochelys*) are small sea turtles with wide, rounded shells. The Atlantic ridley (*L. kempii*) is a gray turtle with a shell about 60–79 cm long. It is found in the Gulf of Mexico and occasionally strays, in the Gulf Stream, north to New England and east to Great Britain and Europe. The Atlantic ridley is widely known as the "bastard turtle," the name stemming from the mistaken belief that it is the offspring of a green turtle and a loggerhead. The Pacific ridley (*L. olivacea*) inhabits warm waters of the Indo-Pacific region. It is distinguished from the Atlantic form by its greenish colour and larger size. It feeds on both animal and vegetable material.

sea urchin, any of about 700 living species of echinoid marine invertebrates (phylum Echinodermata) with a globular body and a radial arrangement of organs, shown by five bands of pores running from mouth to anus over the test (internal skeleton). The pores accommodate tube feet, which are slender, extensible, and often sucker-tipped. From nodules on the test arise long, movable spines and pedicellariae (pincerlike organs); these structures may have poison glands. The mouth, on the underside of the body, has a complex dental apparatus called Aristotle's lantern, which also may be venomous. Teeth are extruded to scrape algae and other food from rocks, and some urchins can excavate hiding places in coral or rock—even in steel. Sea urchins live on the ocean floor, usually on hard surfaces, and use the tube feet or spines to move about.

The largest urchin (known from a single specimen) is *Sperostoma giganteum* of deep waters off Japan. Hatpin urchins, such as *Centrostephanus longispinus* of the Mediterranean and eastern Atlantic, *Diadema* (formerly *Centrechinus*) *setosum* of the Indo-Pacific, and *D. antillarum* of Florida and the West Indies, have toxic spines up to 30 centimetres (12 inches) long. The slate-pencil urchin (*Heterocentrotus mammillatus*) of the Indo-Pacific has 12-cm spines that may be 1 cm thick—stout enough to be used for writing. *Lytechinus variegatus,* a pale-greenish urchin of the southeastern coast of the United States and the Caribbean, and the large, short-spined *Psammechinus* (sometimes *Echinus*) *miliaris* of Iceland, Europe, and western Africa use



Slate-pencil urchin (*Heterocentrotus mammillatus*)
Douglas Faulkner

their tube feet to hold up bits of seaweed or shell as a shield against sunlight in shallow water.

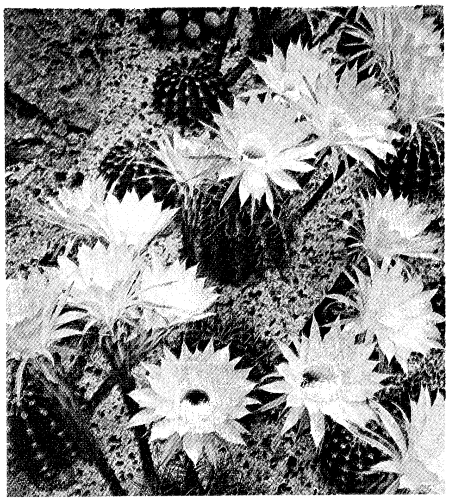
The small, reddish or purplish urchins of the genus *Arbacia,* such as *A. punctulata,* the common urchin from Cape Cod to the West Indies, are familiar subjects in embryology; a female may release several million eggs at a time. In the West Indies, sea eggs—the ovaries of *Tripneustes ventricosus*—are eaten raw or fried; in the Mediterranean region, *frutta di mare* is the egg mass of *Paracentrotus lividus* (the best known rock borer) and other *Paracentrotus* species; and, on the U.S. Pacific coast, the eggs of the giant purple (or red) urchin (*Strongylocentrotus franciscanus*) are similarly considered a delicacy. The slightly smaller *S. purpuratus,* of the same region, is known to excavate holes in steel pilings. *See also* cake urchin; heart urchin.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

sea-urchin cactus, any of the genus *Echinopsis,* family Cactaceae, about 30 species native to South America at medium elevations in desert shrublands or grasslands. Several species, but most especially the Easter lily cactus (*E. multiplex*), are valued for their ease of growth and large flowers on tubes up to 25 centimetres (10 inches) long. Most are hardy outdoors in Mediterranean climates.

The plants are globose to cylindrical, the largest species reaching 1.5 metres (about 5 feet) in height. The stems are strongly ribbed and have short spines.

Flowers, often fragrant, are usually white,

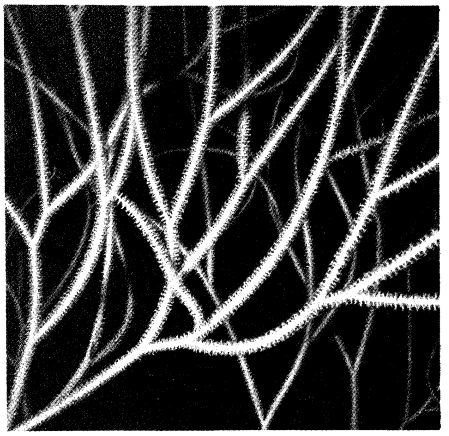


Sea-urchin cactus (*Echinopsis tubiflora*)
Grant Heilman—EB Inc.

sometimes pink. They open after sunset and, depending upon the species, may last for up to 36 hours.

sea walnut (*Mnemiopsis*), any of a common genus of gelatinous, planktonic marine invertebrates of the class tentaculata (phylum Ctenophora). The sea walnut resembles the sea gooseberry morphologically, but as in many ctenophores the body is prolonged into eight lobes. Full-grown individuals are about 70 mm (2.8 inches) long. They lead a wholly planktonic existence and, unlike sea gooseberries, are found in the open seas as well as in coastal waters. There is probably no larger animal that is more numerous. Sea walnuts sometimes form dense swarms. When they do so at night, the bluish-white luminescence produced by comblike organs on the sides of their bodies can colour the sea. They are commonest in warm areas but also occur in the higher latitudes. They are often cast up on the shores of the eastern coast of the United States, where the name sea walnut originated. These jellyfish-like creatures are harmless to humans.

sea whip, any of several genera of corals of the order Gorgonacea, characterized by a long, whiplike growth and a variety of bright colours. The "whip" consists of a colony of tiny polyps (cylindrical, stalklike forms with a mouth and eight tentacles at the upper, or free, end) which grow upon one another in a continuous single stem. Spicules, or needle-



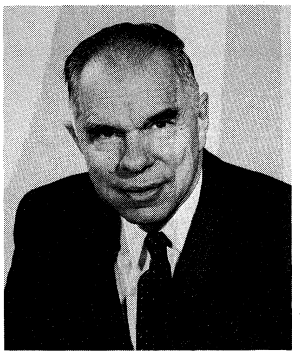
Sea whip (*Ellisella*)
Douglas Faulkner

like structures, of lime embedded in the polyp body provide a firm but flexible support.

Seabiscuit (foaled 1933), U.S. racehorse (Thoroughbred) who in six seasons (1935–40) won 33 of 89 races and a total of $437,730, a U.S. Thoroughbred record (broken 1942). A light bay colt sired by Hard Tack (a son of Man o' War) out of Swing On, he developed slowly as a two- and three-year-old. In 1937, however, he ran 1⅛ miles in a record time of 1:48⅘ (eventually broken), and in a famous match race in 1938 he defeated War Admiral, winner of the 1937 Triple Crown for three-year-old Thoroughbreds. In his last race he won the $100,000 Santa Anita (Calif.) Handicap and then was retired to stud.

Seaborg, Glenn T(heodore) (b. April 19, 1912, Ishpeming, Mich., U.S.), American nuclear chemist best known for his work on isolating and identifying elements heavier than uranium. He was awarded the 1951 Nobel Prize for Chemistry (with Edwin Mattison McMillan).

Seaborg was educated at the University of California at Los Angeles (A.B., 1934) and the University of California at Berkeley (Ph.D., 1937). At Berkeley he was successively research associate, instructor, and assistant professor (1937–45), becoming professor of chemistry in 1946. He served as Berkeley's chancellor, 1958–61.



Seaborg, 1968
By courtesy of the U.S. Atomic Energy Commission; photograph, Westcott

With his coworkers, he added (1940–55) nine new elements encompassing atomic numbers 94–102, of which plutonium (94) is the best known because of its use as a nuclear explosive and for nuclear power. During World War II, which he spent as a section chief at The University of Chicago Metallurgical Laboratory, the first industrial production of plutonium was undertaken in the newly devised uranium reactors, and Seaborg had the primary responsibility for isolating the plutonium from the reaction products. The other new elements were: americium (95), curium (96), berkelium (97), californium (98), einsteinium (99), fermium (100), mendelevium (101), and nobelium (102). The prediction of the chemical properties and placement of these and many heavier elements in the periodic table of the elements was helped greatly by an important organizing principle enunciated by Seaborg in 1944 and known as the actinide concept. According to this concept, the 14 elements heavier than actinium belong in a separate group in the periodic table.

Seaborg was chairman of the Atomic Energy Commission (1961–71), after which he returned to the University of California at Berkeley. His many publications include *Man and Atom* (1971; with W.R. Corliss).

Seabury, Samuel (b. Nov. 30, 1729, Groton, Conn.—d. Feb. 25, 1796, New London, Conn., U.S.), first bishop of the Protestant Episcopal Church in the United States.

Seabury was educated in medicine at Yale and Edinburgh. After he became a priest in 1753, he served parishes in New Brunswick, N.J., in Jamaica, N.Y., and in Westchester, N.Y.; and he also practiced medicine. He became known for his pamphlets urging Americans not to seek independence from the British crown—which evoked pamphlets in reply by the young Alexander Hamilton. Seabury was a Loyalist during the Revolution, moving to British-occupied New York City. In 1783 he was elected bishop of Connecticut and Rhode Island. He went to Scotland to be ordained and then returned to the United States in 1785. In that same year he became rector of St. James' Church in New London, Conn., serving until his death.

seafloor spreading hypothesis, theory that oceanic crust forms along submarine mountain zones, known collectively as the midocean ridge system, and spreads out laterally away from them. This idea played a pivotal role in the development of plate tectonics, a theory that revolutionized geological thought during the last quarter of the 20th century.

A brief treatment of seafloor spreading follows. For full treatment, *see* MACROPAEDIA: Plate Tectonics.

The seafloor spreading hypothesis was proposed by the American geophysicist Harry H. Hess in 1960. On the basis of new discoveries about the deep-ocean floor, Hess postulated that molten material from the Earth's mantle continuously wells up along the crests of the midocean ridges that wind for 60,000 km (37,000 miles) through all the world's oceans. As the magma cools, it is pushed away from the flanks of the ridges. This spreading creates a successively younger ocean floor, and the flow of material is thought to bring about the migration, or drifting apart, of the continents. The continents bordering the Atlantic Ocean, for example, are believed to be moving away from the Mid-Atlantic Ridge at a rate of 1–2 cm (0.4–0.8 inch) per year, thus increasing the breadth of the ocean basin by twice that amount. Wherever continents are bordered by deep-sea trench systems, as in the Pacific Ocean, the ocean floor is plunged downward, underthrusting the continents and ultimately reentering and dissolving in the Earth's mantle from which it originated.

A veritable legion of evidence supports the seafloor spreading hypothesis. Studies conducted with thermal probes, for example, indicate that the heat flow through bottom sediments is generally comparable to that through the continents except over the midocean ridges, where at some sites the heat flow measures three to four times the normal value. The anomalously high values are considered to reflect the intrusion of molten material near the crests of the ridges. Research has also revealed that the ridge crests are characterized by anomalously low seismic-wave velocities, which can be attributed to thermal expansion and microfracturing associated with the upwelling magma.

Investigations of oceanic magnetic anomalies (*i.e.,* local magnetic disturbances) have further corroborated the seafloor spreading hypothesis. Such studies have shown that the strength of the geomagnetic field is alternately anomalously high and low with increasing distance away from the axis of the midocean ridge system. The anomalous features are nearly symmetrically arranged on both sides of the axis and parallel the axis, creating bands of parallel anomalies.

Measurements of the thickness of marine sediments and absolute age determinations of such bottom material have provided additional evidence for seafloor spreading. The oldest sediments so far recovered by a variety of methods, including coring, dredging, and deep-sea drilling, date only to the Jurassic Period—that is, they do not exceed 190,000,000 years in age. Such findings are incompatible with the doctrine of the permanency of the ocean basins that had prevailed among earth scientists for so many years.

seafood, edible aquatic animals, excluding mammals; but including both freshwater and ocean creatures. Most nontoxic aquatic species are exploited for food by humans. Even those with toxic properties, such as certain blowfish, can be prepared so as to circumvent harm to the consumer.

Fish and other seafood may be man's most important food, after cereals, furnishing about 15 percent of the world population's protein intake. Lean fish muscle provides 18–25 percent protein by weight, the equivalent of beef or poultry, but is much lower in calories. In fish one gram of protein is present for 4 to 10 calories, as contrasted with 10–20 calories per protein gram for lean meats and up to 30 for fatty meats.

Seafood comprises all bony fishes and the more primitive sharks, skates, rays, sawfish, sturgeons, and lampreys; crustaceans such as lobsters, crabs, shrimps, prawns, and crayfish; mollusks, including clams, oysters, cockles, mussels, periwinkles, whelks, snails, abalones, scallops, and limpets; the cephalopod mollusks—squids, octopuses, and cuttlefish; edible jellyfish; sea turtles; frogs; and two echinoderms—sea urchins and sea cucumbers.

The most commercially important ocean fish are species of salmon, herring, codfish, flatfish (flounder, sole, halibut, turbot), redfish (ocean perch), jack mackerel, tuna, mackerel, and sardine. Major species of freshwater fish are carp, eel, trout, whitefish, pike, pike perch, and catfish. The catch ranges in size from whitebait and baby eels, both about 2 inches (5 cm) long, to bluefin tuna, up to 14 feet (4.3 m) in length .

The palatability of seafood varies widely with the species and its environment, some types being too oily, coarse, or bony for any gastronomic importance. Saltwater fish are generally considered tastier than freshwater fish. Cold, clear, fast-moving waters produce better tasting fish than do muddy, warm, or stagnant ponds or streams. Mollusks and crustaceans taken from polluted waters may be unhealthful as well as unpalatable.

Because fish spoils quickly and is thus highly perishable, for most of history the majority of the catch has been dried, smoked, salted, pickled, or fermented when not eaten fresh. Even when these practices are no longer strictly necessary for preservation, the distinctive alterations in taste that they produce have cultivated a continuing demand for fish preserved in these ways.

Fish are cooked whole or cut into steaks, fillets, or chunks. Crustaceans are usually cooked whole, alive, as are most mollusks. Larger, tougher mollusks are ground or sliced and pounded to tenderize the tough flesh. Much seafood is eaten uncooked, either completely raw or somewhat modified by marination.

In addition to flesh, the roe of fishes and some shellfish and the eggs of turtles are eaten. Caviar, the roe of sturgeon, is now synonymous with luxury but was relatively cheap and common until the latter part of the 19th century, when worldwide sturgeon stocks began to decline rapidly.

A major consideration in cooking fish or shellfish is to avoid overcooking. The rule of thumb is that fish should be cooked 10 minutes per inch, measured through the thickest part of the fish, with an additional 5 minutes required if the fish is cooked in a sauce. The time should be doubled for frozen fish.

The repertory of fish cookery worldwide is immense. Fish may be poached, sautéed, broiled, baked, deep-fried, steamed, or eaten raw. Seafood, often in combination, forms the basis of many savoury stews, soups, chowders, gumbos, and bisques. In general, the more delicate and lean seafoods are prepared with milder seasonings and sauces, while those that are more robust in flavour, with coarser or fattier flesh, receive more pronounced seasoning.

Seagram Company Ltd., The, corporation that is the largest producer and marketer of distilled spirits in the world. It is headquartered in Montreal.

The company began when Distillers Corp., Ltd., a Montreal distillery owned by Samuel Bronfman, acquired Joseph E. Seagram & Sons in 1928. The new company was named Distillers Corporation–Seagrams Ltd., and it grew rapidly during the later years of the Prohibition era and during the 1930s. By the 1940s the firm had become the largest distiller in both Canada and the United States. Under the leadership of the founder's son, Edgar M. Bronfman, who became head of the company in 1971, the firm diversified during the 1950s and '60s from its original base of blended whiskies into the production and marketing of Scotch, bourbon, rum, vodka, gin, and many different wines. It also expanded into the European, Latin American, East Asian, and African markets with its products. The company adopted its present name in 1975. It produces more than 400 different brands of distilled spirits and wines.

seal, in documentation, an impression made by the impact of a hard engraved surface on a softer material such as wax or clay, producing a device in relief. Seals have been used from remote antiquity to authenticate documents. The study of seals, known as sigillography (*q.v.*), is a major historical discipline.

seal, in zoology, any of numerous species of streamlined aquatic mammals found throughout the world, usually along coastlines. Especially abundant in cold polar seas, seals are carnivorous, primarily marine animals who range in length from 1 to 6.5 m (3 to 21 feet). They breed and molt on land and are excellent swimmers and divers—especially the Weddell seal (*q.v.*). Various seals are able to reach depths of 150–250 m or more and to remain underwater for 20 to more than 30 minutes. Adaptations of seals to an aquatic life include: streamlining of the body; modification of the limbs into short, paddlelike flippers; and possession of a thick, subcutaneous layer of fat (blubber) that insulates the seal, provides a food reserve, and contributes to buoyancy. Seals, some of which make extensive, regular migrations, feed on fish, crustaceans, and other marine animals. The females (cows) normally bear single young (pups) after a gestation period of 8–12 months (including a delay in implantation in many, possibly most, species). The young gain weight rapidly, for the cow's milk is up to about 50 percent fat. Seals are often hunted for their meat, hides, oil, and fur.

Earless, or true, seals lack external ears and are of the family Phocidae (13 genera, 18 species). Depending on species, the males (bulls) are smaller to much larger than the females. Earless seals rely on strokes of their hind flippers in swimming, and because these flippers cannot be moved forward, the seals pull themselves or wriggle about when on land. Most earless seals form pairs during the breeding season. The pups are weaned after two to four weeks. In many species the pups are born with fluffy white coats; these coats, especially those of infant harp seals, have been of value in the fur trade (*see* harp seal).

Eared seals (sea lions and fur seals) possess external ears and are of the family Otariidae (7 genera, 12 species). They have longer flippers than the earless seals, and the males are twice to more than four times the size of the females. Eared seals, when swimming, rely mainly on their fore flippers for propulsion. By rotating their hind flippers forward, they use all four limbs in moving on land. During the breeding season eared seals gather in large herds. The young are suckled for four to six months. Circus seals (*see* sea lion) are members of this family. *See also* carnivore; mammal.

sealing wax, substance formerly in wide use for sealing letters and attaching impressions of seals to documents. In medieval times it consisted of a mixture of beeswax, Venice turpentine, and colouring matter, usually vermillion; later lac from Indonesia supplanted the beeswax. The wax was prepared by melting and stirring, and the molten mixture was poured into stick-shaped molds. The mold was then held over the envelope or document to be sealed, a candle or other flame was applied, and the resulting drop pressed with a die containing the seal.

Sealyham terrier, breed of terrier developed during the latter half of the 19th century by Captain John Edwardes for hunting foxes, otters, and badgers on his estate, Sealyham, in Wales. A small, short-legged, sturdy dog, the Sealyham was bred for courage, stamina, and hunting ability. It has a double coat, soft underneath and wiry on top, and may be solid white or white with darker markings on its head and on its drooping ears. The Sealyham stands about 10 inches (27 cm) and weighs about 20 to 21 pounds (9 to 9.5 kg).

Seamans, Robert C(hanning), Jr. (b. Oct. 30, 1918, Salem, Mass., U.S.), American aeronautical engineer who pioneered in the development of advanced systems of flight control, fire control, and guidance for modern aircraft.

In 1941 Seamans became an instructor of aircraft instrumentation at Massachusetts Institute of Technology (MIT), Cambridge, while still working on his master's degree. Under the instruction and guidance of the American engineer C. Stark Draper, he worked on fire-control systems for naval antiaircraft guns. His doctoral work on the problems of control and guidance of high-speed aircraft proved valuable in the development of automatic flight control, automatic tracking equipment, homing systems for guided missiles, and intercontinental ballistic missile control systems.

At MIT Seamans became assistant professor of aeronautical engineering in 1945 and associate professor in 1949. After working from 1950 to 1955 as chief engineer of Project Meteor, a naval guided-missile program, he became head of the Radio Corporation of America (RCA) Airborne Systems Laboratory, Boston. Three years later he became chief engineer of RCA's Missile Electronics and Control Division. He was associate administrator of the National Aeronautics and Space Administration (1960–65) and deputy administrator (1965–68), a scientific advisor to (1957–67) and then secretary of the Air Force (1969–73), president of the National Academy of Engineering (1973–74), and administrator of the Energy Research and Development Administration (1974–76). He returned to MIT in 1977 as Luce Professor of Environment and Public Policy; the following year he was named dean of the MIT school of engineering, a post he held until 1981. Seamans received the NASA Distinguished Service Medal in 1965 and 1969, and the Thomas D. White National Defense Award in 1980.

Seami Motokiyo: *see* Zeami Motokiyo.

seamount, large submarine volcanic mountain rising at least 1,000 m (3,300 feet) above the surrounding deep-sea floor; smaller submarine volcanoes are called sea knolls, and flat-topped seamounts are called guyots. Great Meteor Tablemount in the northeast Atlantic illustrates the size that such features can attain, standing more than 4,000 m (13,120 feet) above the surrounding terrain, with a basal diameter of up to 110 km (70 miles). The sides of larger seamounts generally are concave upward and rarely slope more than 14°; smaller seamounts lack this concavity and can have sides as steep as 35°. In plan, seamounts tend

to be elliptical or elongate, possibly because the lavas are extruded from linear rifts in the seafloor.

Most material dredged from seamounts is microcrystalline, or glassy, oceanic basalt that probably formed as submarine lava flows. The summits and flanks of seamounts are generally covered with a thin layer of marine sediment.

Seamounts are exceedingly abundant and occur in all major ocean basins. By the late 1970s more than 10,000 seamounts had been reported from the Pacific Ocean basin alone. Virtually every oceanographic expedition discovers new seamounts, and it is estimated that approximately 20,000 exist in the oceans of the world.

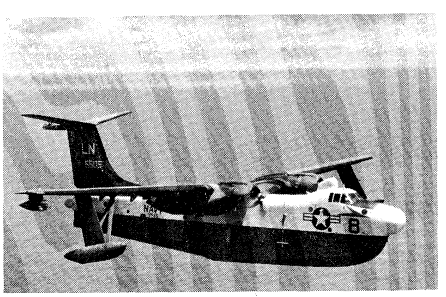
A linear cluster of seamounts may result when several are fed by lava extruded from a single linear rift. Most Pacific seamounts occur in linear clusters or elongate groups of 10 to 100. The individual seamounts in a chain may share a common ridge connecting their bases, as in the Mid-Pacific Mountains. Seamount chains in the Pacific basin tend to be aligned northwesterly, and several chains are intimately associated with fracture zones; the Eltanin Fracture Zone in the southwestern Pacific is an example. At least one seamount chain, the New England Seamounts, lies in the northwestern Atlantic. No seamount chains have been reported from the Indian Ocean, possibly because that basin has been less extensively surveyed.

séance (French: "sitting"), in occultism, meeting centred on a medium (*q.v.*), who seeks to communicate with spirits of the dead. Because strong light is said to hinder communication, a séance usually takes place in darkness or subdued light. It generally involves six or eight persons, who normally form a circle and hold hands.

Believers assert that communication has been established when a disembodied voice is heard, or a voice speaks through the medium, or a ghostly apparition appears. Sometimes music of unknown source seems to fill the room, objects appear to move for unnatural reasons, or a hand, a limb, or an entire body may take shape from ectoplasm (*q.v.*; a peculiar viscous substance said to issue from the medium's body). Other alleged means of communication include automatic writing, trance speaking, or a ouija board or planchette. Many of the seemingly mysterious phenomena manifested during séances are effected by the medium to validate his or her claim to supernatural powers. That some spiritualists actually possess the ability to communicate with spirits, however, remains open to debate.

seaperch (fish): *see* surfperch.

seaplane, any of a class of aircraft that can land, float, and take off on water. Seaplanes with boatlike hulls are also known as flying boats, those with separate pontoons or floats as floatplanes. The first practical seaplanes were built and flown in the United States by Glenn H. Curtiss, in 1911 and 1912. Curtiss' inventions led to the British F-boats of World War I, which originated such naval air missions as over-ocean patrol, antisubmarine warfare, mine laying, and air–sea rescue. After the war, commercial versions of the same seaplanes set the range and endurance records of the time. In 1919 the U.S. Navy's water-based NC-4 made the first crossing of the North Atlantic, via the Azores. By the late 1920s the largest and fastest aircraft in the world were seaplanes. Their utility and versatility were dramatized by a Soviet flight of an ANT-4 fitted with floats from Moscow to New York City in 1929 via Siberia and by fleets of Italian planes that flew from Rome to Rio de Janeiro and from Rome to Chicago in the 1930s. After the outbreak of World War II, the military and commercial significance of seaplanes gradually diminished, partly because of increased range of land-based planes and partly because of the construction of land bases and aircraft carriers. Following World War II, development of water-based aircraft continued, but only on a small scale.



U.S. Navy P5M-2 seaplane
By courtesy of the U.S. Navy

A seaplane must have sufficient buoyancy to float on water and must also have some means for supporting its weight while moving along the water surface at speeds up to flying speeds. It must be able to take off and land with a margin of stability and control on the part of the pilot; its structure must be strong enough to withstand the shock of landing; and its water resistance must be low enough to permit reasonably short takeoff runs.

Ways of meeting these requirements were provided by Curtiss in two forms. He developed the float seaplane, which is essentially a land plane with buoyant floats or pontoons substituted for the landing wheels, and the flying boat, in which the main float and the fuselage are combined in a single boatlike body. In either case float design includes a stepped bottom to facilitate takeoff. As speed and lift increase, the seaplane lifts onto its step so that it is barely skimming the water with friction at a minimum. Single-float seaplanes and single-hull flying boats require side floats or wing-tip floats to keep them upright. Twin-float seaplanes do not require the auxiliary floats, nor do twin hull flying boats and single hull boats with stub wings, or sponsons, located at the waterline.

The addition of a retractable landing wheel gear to a float seaplane or flying boat, also accomplished by Curtiss, created the amphibian aircraft capable of operating from land runways or water. A post-World War II development was the pantobase, or all-base, airplane incorporating devices for operating from water or from a variety of unprepared surfaces such as snow, ice, mud, and sod.

search and seizure, practices engaged in by law enforcement officers in order to gain sufficient evidence to ensure the arrest and conviction of an offender. The latitude allowed police and other law enforcement agents in carrying out searches and seizures varies considerably from country to country. There is considerable variance in the amount of protection given to the individual rights of the accused person.

Most countries require some type of court-authorized warrant for search and seizure to be lawfully carried out, but there is great variance (*see* warrant). In South Africa, for example, police may ignore the need for a warrant if delay would defeat what they were trying to accomplish. In France the police have extensive powers of search and seizure in the case of flagrant offense and when a crime is being committed or has just been committed, but in other instances court authorization is required.

Questions of search and seizure have assumed major importance in the United States, for the drafters of the Constitution provided in the Fourth Amendment that "The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized." Since that time, judicial attention has frequently focussed on what actually constitutes an unreasonable search and seizure. The unauthorized confiscation of physical evidence (such as guns, drugs, documents, and stolen property), the interception of oral communications by electronic eavesdropping, and matters observed through an unauthorized invasion of privacy are now embraced by the concept of an illegal search and seizure. If a search is made with the consent of the person searched, even though the consent may have been effected by police deception, the search is deemed reasonable. Any search pursuant to a regularly issued search warrant issued by the judiciary is also considered reasonable. Searches that are incidental to a valid arrest and that are deemed reasonable in scope are permitted without a search warrant; a valid arrest is defined either as one pursuant to a properly issued arrest warrant or as one under circumstances in which the arresting officer actually witnesses the commission of the crime or has probable cause to believe that the person being arrested committed the crime. "Stop and frisk" cases similarly represent an exception to ordinary guarantees. A police officer has the right to detain a person temporarily and conduct a search for weapons on condition that the officer has reasonable grounds to believe that the person is armed and dangerous.

U.S. courts, both state and federal, are required to exclude from criminal proceedings any evidence obtained in violation of the Fourth Amendment. The so-called exclusionary rule, which previously had been applied in federal courts and those of only about half of the states, was made applicable to all U.S. courts by the 1961 Supreme Court ruling in *Mapp* v. *Ohio.* The exclusionary rule is not recognized by most other legal systems, but in many countries the trial judge may, at his discretion, deny admission of evidence that was obtained by clearly unlawful methods.

searchlight, high-intensity electric light with a reflector shaped to concentrate the beam, used to illuminate or search for distant objects or as a beacon.

Carbon arc lamps have been used from about 1870 and from about 1910 rare-earth fluorides or oxides have been added to the carbon to create exceptional brilliance. About 1877 Col. Alphonse Mangin of the French Army invented a double spherical glass mirror that was widely employed in searchlights until about 1885, when the parabolic reflector came into use. For military use, the reflector is generally metal.

The largest modern searchlights still employ carbon arcs. Smaller searchlights are incandescent and electric discharge lamps.

Searcy, city, seat (1837) of White County, east central Arkansas, U.S., near the Little Red River. It originated as White Sulphur Springs, a spa popular in the 19th century until the springs ran dry. Incorporated in 1835, it was renamed to honour Richard Searcy, an Arkansas circuit judge. Initial development was based on cotton, farm produce, timber, and river traffic. Since the 1930s cotton production has declined (although livestock, poultry, and eggs remain significant), and the economic base has become more diversified to include light manufacturing. The explosion of a Titan II missile at a nearby U.S. Air Force missile base in 1965 claimed more than 50 lives. Searcy is the home of Harding College (1924; Churches of Christ). Pop. (1980) 13,612.

Searle, Ronald (William Fordham) (b. March 3, 1920, Cambridge, Cambridgeshire, Eng.), British graphic satirist, best known for his cartoons of the girls at an imaginary school he called St. Trinian's.

Educated at Cambridge School of Art, Searle published his first humorous work in the late 1930s. During World War II he served with the Royal Engineers and was captured by the Japanese at the fall of Singapore. A book of grim drawings of his experiences was published after the war. From 1946 his work appeared in national magazines. He first contributed to *Punch* in 1949 and joined its staff in 1956. He had created the bizarre schoolgirls of St. Trinian's in 1941 and continued to draw them until 1953; they were the subject of four motion pictures (the first being *The Belles of St. Trinian's* [1954]), several books, and an anthology, *The St. Trinian's Story* (1959). In 1961 he moved to France.

Searle's more than 50 books include *Forty Drawings* (1946), *The Female Approach* (1949), *Modern Types* (1959), and *Searle in the Sixties* (1964). Later works include *Searle's Cats* (1967), *The Rake's Progress* (1968), *Hommage à Toulouse-Lautrec* (1969), *Secret Sketchbook* (1970), *Zoodiac* (1977), and *The Situation Is Hopeless* (1980). *Ronald Searle* (1978) is a collection of his best work, with biographical notes and a bibliography.

Searles Lake, playa in southern California, U.S., that formed part of a Pleistocene drainage network linking a number of now-arid basins. Certain minerals constituting the playa's evaporites are relatively uncommon elsewhere; trona and hanksite are examples. The dry lake was named for the brothers John and Dennis Searles, who discovered borax there in 1863 and began working the rich deposits of minerals in 1873. There is now a historic landmark, recalling the discovery, in the nearby town of Trona.

Sears, Isaac (b. July 1?, 1730, West Brewster, Mass. [U.S.]—d. Oct. 28, 1786, Canton, China), patriot leader in New York City during the years preceding the American War of Independence, who earned the nickname "King Sears" by virtue of his prominent role in inciting and commanding anti-British demonstrations.

A merchant whose shipping activities included privateering, Sears first exhibited his patriot leanings when the Stamp Act crisis erupted in 1765. He became a mob leader during the anti-British riots in New York City, and he belonged to the newly formed patriot organization the Sons of Liberty.

He led the boycott of British goods during colonial protests of the Townshend Acts. Repeal of the Townshend Acts produced a period of calm in the colonies from 1770 to 1773, but imposition of the Tea Act in 1773 gave new life to the Sons of Liberty. In 1774 Sears led a New York version of the Boston Tea Party, and he signed the call for a meeting of representatives from the colonies.

Sears was arrested in April 1775 for his activities, but his admirers rescued him at the jailhouse door. Later that month—after the bloodshed at Lexington and Concord—he and his followers drove the Loyalist officials out of New York City and seized control of the municipal government. His subsequent attacks on Loyalist businessmen elicited official disapproval from patriot committees, but they earned Sears the backing of the New York citizenry.

Based in Boston from 1777 to 1783, Sears spent a good deal of time at sea as a privateer. He did not return to New York City until the War of Independence was over. He resumed his mercantile business upon his return, but he also turned to politics. In 1784 and again in 1786 Sears was elected to the New York State Legislature. He was in China on a trading venture when he died there in 1786.

Sears, R(ichard) W(arren) (b. Dec. 7, 1863, Stewartville, Minn., U.S.—d. Sept. 28, 1914, Waukesha, Wis.), American merchant who developed his mail-order jewelry business into the huge retail company Sears, Roebuck.

Sears's father had been wealthy but had lost his fortune in speculation. After his death, the young Sears, aged 17, went to work for the Minneapolis and St. Louis Railway to support his mother and sisters, working first in Minneapolis and then in Redwood Falls, Minn., as a station agent. When a local Redwood Falls jeweler refused a watch shipment, Sears disposed of the watches, selling them by letter to other station agents at a low price. With his $5,000 profit, Sears started a mail-order watch business in Minneapolis in 1886, under the name of R.W. Sears Watch Company.

Within a year he had hired Alvah Roebuck as a watch repairman and moved his business to Chicago. In 1887 Sears published a mail-order catalog offering watches, diamonds, and jewelry, all with a money-back guarantee. Two years later he sold his business for $100,000 and moved to Iowa, intending to be a rural banker. Restless, however, he returned to Minnesota and established a new mail-order firm selling watches and jewelry, with Roebuck as his partner. This A.C. Roebuck & Company later became Sears, Roebuck and Company and in 1893 moved to Chicago.

By 1893 the company's mail-order catalog had 196 pages advertising a wide variety of goods, including sewing machines, saddles, bicycles, shoes, and musical instruments. By 1894 the catalog had expanded to 507 pages, written almost entirely by Sears. Sears also wrote all the copy for the company's extensive newspaper and magazine advertisements. He had a talent for appealing to the company's predominantly rural, Midwestern customers. He experimented with ideas constantly, first writing the copy, then trying to locate a producer after the orders had started flowing in.

In 1895 Roebuck sold his interest in the firm to Julius Rosenwald, who provided badly needed administrative skills that proved a successful complement to Sears's creative marketing. While Sears's catalogs brought in orders, Rosenwald reorganized the business, speeding up the customer service system. As a result of a disagreement over the advertising budget, Sears resigned as president in 1909. He thereafter lived on his farm, north of Chicago.

Sears, Richard Dudley (b. Oct. 26, 1861, Boston, Mass., U.S.—d. April 8, 1943), the first American men's singles champion in lawn tennis (1881) and winner of that title for each of the six following years. His record has never been equaled by any other amateur player. Sears also won the U.S. men's doubles championship for six straight years (1882–84 and 1886–87, with James Dwight, and 1885, with Joseph Sill Clark). Although he retired from lawn-tennis competition in 1888 because of an injury, he won the first U.S. men's singles championship in court tennis four years later.

Sears, Roebuck and Company, world's largest retailer of general merchandise, with retail stores and mail-order operations in the United States and several countries of Latin America. Headquarters are at Hoffman Estates, near Chicago (where the headquarters resided from 1893 to 1989).

Besides its main retail and mail-order operations, Sears has a Canadian affiliate, Simpson-Sears Limited; has interests in several manufacturing suppliers; owns such subsidiaries as Allstate Insurance Company and Homart Development Company (a developer and operator of shopping centres); and exports merchandise to retailers in Europe, Japan, and Australia. In 1981 Sears acquired Dean Witter Reynolds, a brokerage house, and Coldwell Banker, a real-estate broker (later partially sold off), and inaugurated a wide range of financial services. In 1983 Sears opened financial centres in its stores, encouraging its customers to bank there. In 1986 the company introduced the Discover credit card.

In 1886, after successfully selling gold watches in Redwood Falls, Minn., Richard W. Sears founded the R.W. Sears Watch Company in Minneapolis. He relocated his business to Chicago in 1887, hired Alvah C. Roebuck to repair watches, and established a mail-order business for watches and jewelry. The first catalog was offered the same year. In 1889 Sears sold his business but a few years later founded, with Roebuck, another mail-order operation, which in 1893 came to be known as Sears, Roebuck and Company. In 1895 Julius Rosenwald, a wealthy clothing manufacturer, bought out Roebuck's interest, and he succeeded Sears as president of the company after the latter resigned in 1909.

In 1924 General Robert E. Wood joined the company and became its guiding genius for the next 30 years. He opened the first Sears retail store (in Chicago) in 1925, and the number of stores soon so increased that by 1931 retail sales had topped mail-order sales. By the late 20th century Sears was operating more than 850 retail stores and several catalog-merchandise distribution centres.

Sears, Roebuck owned *Encyclopædia Britannica* between 1920 and 1943, when the company gave the encyclopaedia to the University of Chicago.

Sears Tower, skyscraper office building in Chicago that from its completion in 1973 was the world's tallest building. Built for Sears, Roebuck and Company, the structure reaches 110 floors and a height of 1,454 feet (443 m), excluding broadcast antennas. It was designed by the American engineer Fazlur Khan (*q.v.*).

Welded steel frames form vertical tubes that provide the rigidity needed to limit the lateral sway from wind forces. This system minimizes the amount of structural steel required for the height. The steel is prefabricated, with nearly all welding done off the erection site and bolt connections made at the site.

The building is modular in plan, with nine 75-foot-square, column-free units. These nine square units comprise a 225-foot-square base. At the 50th floor two diagonally opposite units stop, forming the first step back. The second step back is at the 66th floor with the other two diagonal units stopping, and the last at the 90th floor with three units stopping, leaving an upper tower of 20 stories.

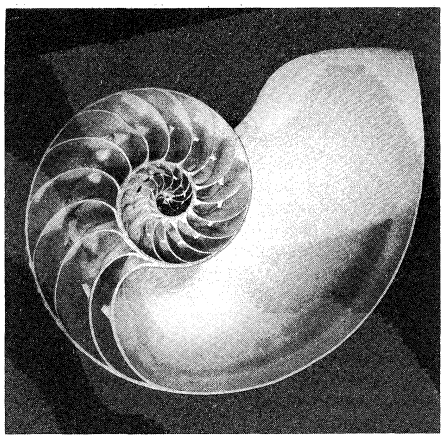
The building's exterior is sheathed in black aluminum and bronze-tinted glass. Black bands appear around the building at the 30th–31st, 48th–49th, 64th–65th, and 106th–108th floors, at which points louvers clad the areas devoted to mechanical operations of the building. In the lobby is a major work by the American sculptor Alexander Calder, an enormous motorized mural named "Universe," which he called a "wallmobile."

seas, high (maritime law): *see* high seas.

Seasat, experimental U.S. ocean surveillance satellite launched June 27, 1978. During its 99 days of operation, Seasat orbited the Earth 14 times daily and monitored nearly 96 percent of its oceanic surface every 36 hours. Instruments of the unmanned spacecraft, engineered to penetrate cloud cover, provided data on a wide array of oceanographic conditions and features, including wave height, water temperature, currents, winds, icebergs, and coastal characteristics. Although Seasat ceased data transmission on Oct. 9, 1978, as a result of a power failure, it achieved its primary purpose: to demonstrate that much useful information about oceanographic phenomena could be obtained by means of satellite surveillance.

Data transmitted by Seasat was made available to scientists representing 23 government and academic organizations. The information was also used to aid the crews of transoceanic vessels and aircraft.

seashell, hard exoskeleton of marine mollusks such as snails, bivalves, and chitons that serves to protect and support their bodies. It is composed largely of calcium carbonate, which is formed from substances secreted by the mantle, a skinlike tissue in the mollusk's body wall. Seashells are usually made up of several layers of distinct microstructures that have differing mechanical properties. The shell layers are secreted by different parts of the mantle, although actual incremental growth can take place only at the shell margin. One of the most distinctive microstructures is nacre, or mother-of-pearl, which occurs as an inner layer in the shells of some gastropods and bivalves and in those of the cephalopods *Nautilus* and *Spirula.*



Section of Pearly, or Chambered, Nautilus (*Nautilus pomphius*)
By courtesy of the American Museum of Natural History, New York

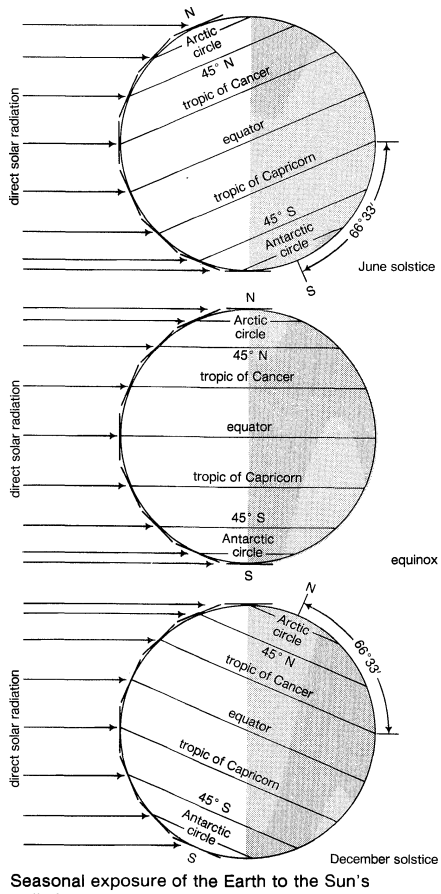
Seashells may be univalved, or they may be composed of a series of plates, as in chitons. They may also be reduced to small internal plates or granules, as in some slugs. In gastropods, bivalves, and shelled cephalopods, the coiled form of the shell approximates an equiangular spiral or variations of it. In some forms, such as the worm shells (family Vermetidae), however, the coiling of the shell is irregular. Shells are frequently ornamented with complex arrangements of spines, folia, ribs, cords, and grooves, which in some species provide protection against predators, give added strength, or assist in burrowing. The aperture of the shell of gastropods is particularly vulnerable to predators and may be protected by complex folds and teeth. Many species close the aperture, using a calcareous or horny operculum (trapdoor) to seal off the aperture. In the cephalopods *Nautilus* and *Spirula,* the planospirally coiled shell consists of multiple chambers joined by a porous tube called the siphuncle. The chambers contain quantities of water and gas that are adjusted by the siphuncle to achieve neutral buoyancy. Many seashells are brightly coloured in complicated designs by a variety of pigments secreted by special cells in the edge of the mantle. In some cases there is an obvious camouflage function, but in most others the significance of the colours is unclear.

Seashells are collected all over the world because of their endless diversity, elegance of form, and bright colours. (*See* shell collecting.) They also have been used to make jewelry, buttons, inlays, and other decorative items throughout history. In ancient times certain varieties, such as tooth shells and cowrie shells, were even used as money. *See also* bivalve; gastropod; nautilus.

season, any of four divisions of the year according to consistent annual changes in the weather. The seasons—winter, spring, summer, and autumn—are commonly regarded in the Northern Hemisphere as beginning on the winter solstice, December 22 or 23; the vernal equinox, March 20 or 21; the summer solstice, June 21 or 22; and the autumnal equinox, September 22 or 23, respectively (at the equinoxes, the days and nights are equal in length; at the winter solstice the day is the year's shortest, and at the summer solstice it is the year's longest). In the Southern Hemisphere, summer and winter are reversed, as are spring and fall.

Outside the tropics and the polar regions, the essential characteristic of the annual cycle is a temperature oscillation between a single maximum and a single minimum. This oscillation results from the annual variation in the angle at which the Sun's rays reach the Earth's surface and from the annual variation in the duration of sunlight on the Earth's surface each day. As the Earth moves in its orbit around the Sun, its axis maintains a nearly constant orientation in space, inclined about 66°33′ to the orbital plane. During the six-month half of each orbit when the North Pole is inclined toward the Sun, a point in the Northern Hemisphere receives the Sun's rays at an angle closer to 90° than does a point in the Southern Hemisphere; this causes greater heating and more hours of daylight in the Northern Hemisphere than in the Southern Hemisphere. During the other six months, these conditions are reversed. (See the Figure.)

In polar latitudes, the seasons consist of a short summer and a long winter; this division is based primarily on sunlight, as there is continuous darkness all winter and continuous daylight or twilight all summer. In low latitudes, where the range of the annual insolation (receipt of solar radiation) and temperature cycle is very small, seasonal weather variations are based largely on rainy and dry periods. These moisture variations result from the movements of the intertropical convergence zone, a narrow belt of abundant precipitation that encircles the Earth near the equator. It shifts north and south seasonally with the Sun and causes the areas it crosses to have alternating wet and dry seasons; those regions very near the equator that are crossed twice each year by this belt have two wet and two dry seasons.



Seasonal exposure of the Earth to the Sun's radiation

In India, a marked seasonal alternation of rainfall and drought, caused by the monsoon, extends northward into latitudes where distinct temperature seasons also exist. The result is a cool, dry season from December through February; a hot, dry season from March through mid-June; and a rainy season from mid-June through November.

seasoning, in lumbering, drying lumber to prepare it for use. Unseasoned (green) wood is subject to attack by fungi and insects, and it also shrinks as it dries. Because it does not shrink evenly in all directions, it is likely to split and warp. The most common seasoning methods are air seasoning and dry-kiln seasoning. In air seasoning, the boards are stacked and divided by narrow pieces of wood called stickers so that the air can circulate freely about each board. The stack is slanted to facilitate drainage of rain. In dry-kiln seasoning, the wood is placed in a structure in which heat, humidity, and air circulation are carefully controlled by fans and steam pipes. As adjuncts to air and kiln seasoning, salt or urea may be impregnated into wood to make it season more easily and quickly.

Seastrom, Victor: *see* Sjöström, Victor.

seat worm: *see* pinworm.

SEATO: *see* Southeast Asia Treaty Organization.

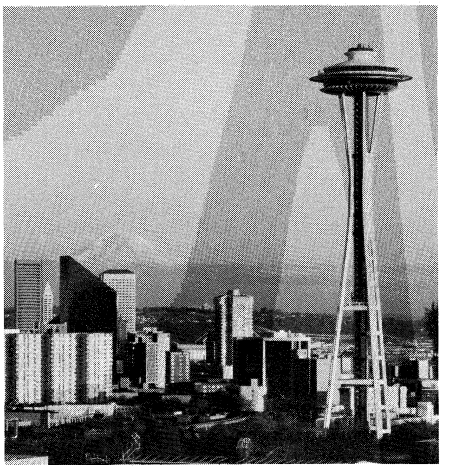
Seaton Valley, locality, within the county of Northumberland and the area of Tyne and Wear, Eng. It lies north-northeast of the metropolitan complex of Newcastle upon Tyne. The economy of Seaton Valley, which is situated in the centre of the now-declining south Northumberland coalfield, was largely dependent on the output of 10 mining villages. One of these settlements, Cramlington, was designated as a new town by British planners and developed to provide alternative, diversified employment. Seaton Delaval, a neighbouring community, had strong links with the landowning Delaval family, for whom the Seaton Delaval Hall was built (1720) in classical style. Pop. (1981 prelim.) 46,140.

Seattle, also spelled SEATHL (b. *c.* 1790, Oregon region [now Seattle, Wash., U.S.]—d. June 7, 1866, Port Madison Reservation, Wash.), chief of the Duwamish, Suquamish, and other Puget Sound tribes who befriended white settlers of the region. Seattle came under the influence of French missionaries, was converted to Roman Catholicism, and instituted morning and evening services among his people—a practice maintained after his death.

In 1855 Seattle signed the Port Elliott treaty, ceding Indian land and establishing a reservation for his people. During the Indian uprising of 1855–58 against whites, he stayed loyal to the settlers. Grateful residents decided to name their growing town after the chief, but Seattle objected on the grounds that his eternal sleep would be interrupted each time a mortal mentioned his name. The conflict was resolved by Seattle's levying a small tax on settlers as advance compensation for the disturbance. In 1890 the city erected a monument over Seattle's grave.

Seattle, chief city of Washington, U.S., on a neck of land between Elliott Bay (Puget Sound) and Lake Washington (a 24-mile

[39-km] stretch of freshwater), seat (1853) of King County and the largest metropolis of the Pacific Northwest. A port of entry and gateway to the Orient and Alaska, it is surrounded by great natural beauty; to the west, the



Space Needle, Seattle, Wash., with Mt. Ranier in the background
David Muench

Olympic Mountains provide protection from heavy winter rains, while the lofty Cascades to the east shield the city from both mid-continental cold and heat. Seattle is headquarters of Mount Baker-Snoqualmie National Forest which extends along the western slopes of the Cascades.

First settlement was made at Alki Point in 1851. The town, laid out in 1853 and named for an Indian chief who had befriended the early settlers, grew as a sawmill centre. It successfully withstood an Indian attack in 1856 (with the aid of the U.S. sloop "Decatur") and survived anti-Chinese riots in the 1880s and a disastrous fire in 1889. Development was slow until the Great Northern Railway arrived in 1893, making it a major rail terminus. With a fine landlocked harbour, Seattle became the main supply depot for the Yukon and Alaskan gold rushes in the 1890s. Its strategic location, close to the "great circle" route to the Orient, and its position as the southern terminus of the Inside Passage to Alaska, helped develop the harbour into one of the world's great seaports, with more than 50 mi of wharves. A grading project was initiated in the early 1900s to remove hills in the downtown area by sluicing methods, using the fill for harbour development. Between 1905 and 1910, 10 surrounding cities and towns were annexed, and Seattle's population grew to 237,194. The opening of the Panama Canal (1914), completion (1916) of the Lake Washington Ship Canal (linking the outer harbour [Elliott Bay] with the inner harbour [Lake Washington]), and development of the city's Smith Cove piers and Duwamish Waterway heralded a new period of commercial growth. World War II brought a great boom, with shipyards and the aircraft industry playing important roles.

Within Seattle's present diversified economic complex are manufacturing (with heavy emphasis on aerospace industries, machinery, and forest products), food processing, banking, insurance, and transportation. Biomedical, ocean science, and electronics-based industries are important as well. Headquarters for the Boeing Company, the city is also the site of Ft. Lawton (established in 1897) and Sand Point Naval Air Base. It is also the home port for a large fishing fleet and the Puget Sound and Olympic Peninsula ferries. Seattle Center (74-ac [30-ha] site of the 1962 World's Fair) contains the 607-ft (185-m) Space Needle, the Opera House, and other public buildings. Parks include Woodland Park and Zoo, Pioneer Square, Volunteer Park (with a memorial to the 1867 Alaska purchase), and Alki Point. The Seattle Art Museum reflects the city's Oriental and Indian influences. Lake Washington, forming the city's eastern boundary, is a course for motorboat (Gold Cup), crew, and yacht races. The city is also home to the Mariners (baseball), Seahawks (football), and Supersonics (basketball). Seattle is the seat of the University of Washington (1861), housed in the former buildings of the 1909 Alaska-Yukon-Pacific Exposition, Seattle University (1892), Seattle Pacific University (1891), and four community colleges. Inc. town, 1865; city, 1869. Pop. (1980) city, 493,846; metropolitan area (SMSA), 1,606,765.

Seattle Slew (foaled 1974), U.S. racehorse (Thoroughbred), the first unbeaten racer ever to win the U.S. Triple Crown.

Foaled by My Charmer and sired by Bold Reasoning, the colt Slew was unbeaten in his racing career when in 1977 he won the Kentucky Derby at Churchill Downs, Ky., the Preakness Stakes at Pimlico, Md., and the Belmont Stakes at Belmont Park, N.Y., sweeping the Triple Crown. He won more money, $641,370, in 1977 than any other horse and was Horse of the Year. In 1978 owners Mickey Taylor and Jim Hill sold Seattle Slew, whom they had bought for $17,500 in 1975, to a syndicate headed by Brownell Combs, for $12,000,000, a record sum later surpassed by Spectacular Bid's $22,000,000 syndication in 1980. He was retired to stud in 1978. In his racing career of 17 races, he won 14, was second twice, and fourth once.

seawater, water that makes up the oceans and seas, covering more than 70 percent of the Earth's surface. It consists of a solution of dissolved salts (derived from rocks broken down by the weathering process) that were carried into the ocean basins over geologic time by streams and rivers draining the continents. Seawater contains approximately 3.5 percent salts principally in the form of sodium chloride, magnesium chloride, sodium sulfate, calcium chloride, and potassium chloride. Chlorine comprises slightly more than 55 percent of the total weight of matter dissolved in seawater. Next is sodium, which constitutes about 30 percent, followed by sulfate, magnesium, potassium, and calcium, which together account for another 14 percent. Trace amounts of carbon, bromine, boron, iodine, strontium, and nearly all other elements that occur in the Earth's crust are present as well. Seawater also contains various dissolved gases of the atmosphere, chiefly nitrogen, oxygen, and carbon dioxide.

The proportions of the dissolved solids and gases are uniform throughout the Earth's oceans and seas, but the salinity of seawater varies measurably at different depths and especially at different geographic locations. In the tropics, where heavy rainfall dilutes seawater, for example, salinity measures only about 33 parts per thousand. In the dry subtropical latitudes a high rate of evaporation increases salinity to more than 37 parts per thousand at the ocean surface.

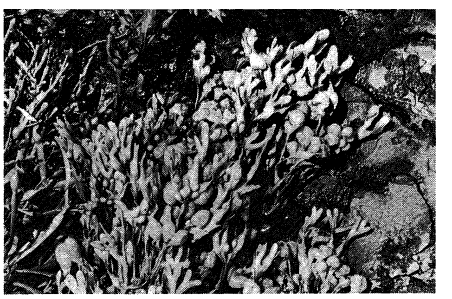
Due to the presence of salts and other solids, seawater has a slightly higher density than fresh water (*i.e.*, seawater has a density of about 1.026 grams per cubic centimetre and pure stream water about 1 gram per cubic centimetre). The density of seawater, however, tends to vary with salinity and temperature in particular. Seawater becomes more dense as salinity increases. Wherever evaporation is high, the water near the surface becomes denser than that below it. Similarly, the density of seawater increases the colder it becomes. For this reason, the densest seawater is found in the polar regions. Seawater of higher density sinks, while that of lower density rises and replaces it. This condition produces a continuous circulation pattern.

The temperature of seawater fluctuates much less than air temperature. The annual average surface temperature of the oceans ranges from about −2° C (28° F) in the polar regions to roughly 30° C in the tropics. In contrast, average air temperature ranges from approximately −46° to 29° C in the corresponding regions. Seawater temperature varies at different depths, but tends to decrease with increasing depth. Water in the deepest parts of the ocean basins is usually near freezing.

Seawater constitutes a rich source of various commercially important chemical elements. Much of the world's magnesium is recovered from seawater, as are large quantities of bromine. In certain parts of the world, sodium chloride (table salt) is still obtained by evaporating seawater. In addition, water from the sea, when desalted, can furnish a limitless supply of drinking water. The construction of large desalination plants in dry areas along seacoasts, such as in Kuwait and Qatar, promises to relieve shortages of fresh water. *See also* ocean.

Articles are alphabetized word by word, not letter by letter

seaweed, any of certain species of red, green, and brown marine algae generally anchored to the sea bottom or to some solid structure by rootlike holdfasts that perform the sole function of attachment and do not extract nutrients as do the roots of higher plants. The



Rockweed (*Fucus*)
Ralph Buchsbaum

most conspicuous seaweeds are brown algae; mosslike carpets of red algae are seen at low tides.

Seaweeds often form dense accumulations in shallow water. They show a well-established zonation along the margins of the seas, where the depth of the water is 50 metres (about 165 feet) or less. The vegetation at the high-water mark, where plants are often exposed to air, differs from that at lower levels, where there is little exposure. Many seaweeds of such genera as *Fucus, Macrocystis, Nereocystis,* and *Laminaria,* which cannot tolerate exposure for long periods of time and so do not usually grow very high up on the shore, are widely distributed in colder waters because they cannot reproduce in temperatures above 18° C (64° F).

Brown algae (*q.v.*) commonly found as seaweeds include kelp, gulfweed, and *Fucus.* Among the kelps are the largest algae; certain species of *Macrocystis* and *Nereocystis* of the Pacific and Antarctic regions exceed 33 metres (100 feet) in length. *Laminaria,* another kelp, is abundant along the Pacific coasts and the British Isles. Gulfweed (*Sargassum*; *q.v.*) is common as free-floating masses in the Gulf Stream and the Sargasso Sea. It is remarkable among seaweeds in its form, which resembles branches bearing leaves and berries. The "berries" are actually pneumatocysts, hollow, gas-filled floats that keep the fronds (leaflike blades) at the surface of the water. *Fucus vesiculosis,* common around the British Isles

between high and low tides, also floats by means of pneumatocysts (*see* Fucus).

Red algae (*q.v.*) commonly found as seaweeds include dulse, *Gelidium, Chondrus,* and laver. Dulse (*q.v.*), the common name for *Rhodymenia palmata* of the North Atlantic, consists of flat, solitary or tufted, purplish fronds, fan-shaped in general outline and divided into numerous segments that are often subdivided in a forked manner. Various species of *Chondrus* (*see* Irish moss) carpet the lower half of the zone exposed at low tide along rocky coasts of the Atlantic. In spring and summer *Porphyra* species (*see* laver) are abundant toward the high-water mark of the intertidal zone in the British Isles, Japan, and elsewhere.

Ulva species, commonly called sea lettuce (*q.v.*), are among the relatively few green algae that occur as seaweed.

Seaweed is of economic importance. Laver, dulse, gulfweed, and sea lettuce, for example, are used as food in various parts of the world, and brown algae are employed in fertilizers. Species of *Gelidium* are used to make the gelatinlike product agar.

Seb (Egyptian god): *see* Geb.

sebaceous gland, small oil-producing gland present in the skin of mammals. Sebaceous glands are usually attached to hair follicles and release a fatty substance, sebum, into the follicular duct and thence to the surface of the skin. The glands are distributed over the entire body with the exception of the palms of the hands and the soles of the feet; they are most abundant on the scalp and face.

The sebaceous gland secretes a mixture of fats (triglycerides, wax esters, squalene, and cholesterol) and cellular debris, which is discharged as sebum through the sebaceous duct connecting the gland to the hair follicle. Sebum helps to form the slightly greasy surface film of the skin; it thus helps keep the skin flexible and prevents the skin's loss of absorption of excessive amounts of water.

Sebaceous glands begin to form from embryonic hair follicles during the fourth month of gestation and are large and well-developed at birth. They shrink during childhood but enlarge again with the onset of puberty; the maturation of the glands seems to be dependent on circulating levels of male hormones, in particular testosterone.

The sebaceous glands are involved in the development of the common adolescent skin disorder known as acne vulgaris. Acne occurs when the outlet from the gland to the surface of the skin is plugged, allowing sebum to accumulate in the follicle and sebaceous duct. The chemical breakdown of triglycerides in the sebum, possibly by bacterial action, releases free fatty acids, which in turn trigger an inflammatory reaction producing the typical lesions (pimples) of acne.

Sebanga Poort (Zimbabwe): *see* Shurugwi.

Sebaste (ancient town, Palestine): *see* Samaria.

Sebasteia (Turkey): *see* Sivas.

Sebastian, Portuguese SEBASTIÃO (b. Jan. 20, 1554, Lisbon—d. Aug. 4, 1578, near Alcazarquivir, Mor.), king of Portugal from 1557, a fanatically religious ruler who lost his life in a crusade against the Muslims in Morocco. After his death, many of his subjects believed that he would return to deliver them from Spanish rule, a messianic faith known as Sebastianism (Sebastianismo).

Sebastian was the posthumous son of John, heir to the Portuguese throne, and succeeded his grandfather, John III, at the age of three. He was austerely educated by Jesuits and, as he grew into manhood, saw himself as Christ's captain, destined to win victories over the Muslims. Neither his grandmother, Queen Catherine, nor his great-uncle, Cardinal Henry, had much influence over him. He took power in 1568 and devoted himself to his overriding ambition, reversing the policy of John III, which had been to withdraw from costly conquests. In 1578 Sebastian led a large force of Portuguese and international adventurers that landed near Larache and was crushed by a greatly superior Moroccan army. The myth that he survived the battle gave rise to the mystical Sebastianism. Four impostors claimed to be Sebastian between 1584 and 1598.

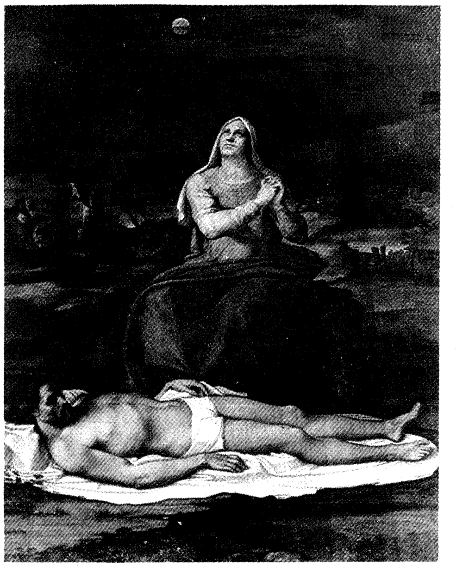
Sebastian, SAINT (d. *c.* 288, Rome; feast day January 20), early Christian popularized by Renaissance painters and believed to have been martyred during the persecution of Christians by the Roman emperor Diocletian.

According to his legend, he was born in Gaul, went to Rome, and joined (*c.* 283) the army of the emperor Carinus, later becoming a captain under Diocletian. When it was discovered that he was a Christian who had converted many soldiers, Sebastian was ordered to be killed by arrows. The archers left him for dead, but a Christian widow nursed him back to health. He then presented himself before Diocletian, who condemned him to death by beating. His body, thrown into a sewer, was found by another pious woman, who dreamed that Sebastian told her to bury his remains near the catacombs. His relics are believed to be in the basilica of San Sebastiano on the Appian Way, to which many pilgrims were attracted in the Middle Ages. Sebastian's martyrdom was a favourite subject of Renaissance artists, and it was depicted by, among others, Gian Lorenzo Bernini, Sandro Botticelli, Andrea Mantegna, Perugino, and El Greco; the saint is usually shown as a handsome youth pierced by arrows.

Sebastián Vizcaíno Bay, Spanish BAHÍA SEBASTIÁN VIZCAÍNO, bay of the Pacific Ocean, western Baja California peninsula, Mexico. The bay is approximately 80 miles (130 km) long from northwest to southeast and 60 miles (100 km) wide from east to west; it has several islands, the largest of which is Cedros. The northeastern and eastern shores, lying in the state of Baja California Norte, are generally sandy and have many small bays. The southern shores, in Baja California Sur, are marked by swamps in the east and by sharply rising hills in the west. Point Eugenia is the southwestern extremity. The bay is of economic importance for the sharks and other fishes in its waters and for the saltworks on its shores.

Sebastiano DEL PIOMBO, byname of SEBASTIANO LUCIANI (*c.* 1485, Venice—d. July 21, 1547, Rome), Italian painter who tried to combine the rich colours of the Venetian school with the monumental form of the Roman school.

While he was in Venice, Sebastiano was a pupil of Giorgione, whose influence is apparent in his work. His works in fact were often confused with Giorgione's—*e.g.,* "Salome" (1510; National Gallery, London). In 1511 Sebastiano went to Rome, where the Sienese banker Agostino Chigi had engaged him to decorate his newly built Villa Farnesina. Shortly after completing this commission, Sebastiano settled permanently in Rome, where he became a member of Raphael's circle of artists and soon showed himself to be a notable portraitist. In about 1515 Sebastiano came under the influence of Michelangelo and began collaborating with that artist. From drawings and cartoons by Michelangelo he executed his best-known work, the "Pietà" (*c.* 1517; Museo Civico, Viterbo), as well as the "Flagellation" (1516–24; Borgherini Chapel, San Pietro in Montorio, Rome) and the "Raising of Lazarus" (1519; National Gallery, London). Michelangelo's opinion of him was so high



"Pietà," panel painting by Sebastiano del Piombo, *c.* 1517; in the Museo Civico, Viterbo, Italy

SCALA—Art Resource/EB Inc.

that he thought by correcting his rather dull draftmanship, he could make Sebastiano the best painter in Rome. In his Roman work Sebastiano combined the warm colouring of the Venetian school with the anatomical clarity and firm sculptural drawing probably resulting from his association with Michelangelo.

From 1519 to 1530 Sebastiano had an unparalleled reputation in Rome as a portraitist. Among the best of his later portraits are those of "Andrea Doria" (1526; Doria Pamphili Gallery, Rome) and of "Clement VII" (1526; Capodimonte Museum, Naples). In 1531 Pope Clement VII bestowed upon Sebastiano the lucrative post of keeper of the papal seal (*piombino* is Italian for "lead seal," hence his nickname). During the last 17 years of his life this economic security seems to have been a significant contributing factor in Sebastiano's limited production of pictures.

Sebek, also spelled SEBEQ, or SOBK, Greek SUCHOS, in ancient Egyptian religion, crocodile god whose chief sanctuary in Fayyum province included a live sacred crocodile, Petsuchos (Greek: "He Who Belongs to Suchos"), in whom the god was believed to be incarnate.

Sebek may have been an early fertility god or associated with death and burial before be-



Sebek, wearing horns, solar disk with uraeus, and plumes, bronze figurine, Upper Egyptian, *c.* 600–100 BC; in the British Museum

By courtesy of the trustees of the British Museum

coming a protector of reptiles and patron of kings (a royal name during the 13th dynasty was Sebekhotep, "Sebek Is Satisfied"). During this period of ascendancy he was even merged with Re, the sun/creator god, to constitute a crocodile form of the sun (Sebek-Re). The worship of Sebek continued into Ptolemaic and Roman times in the Fayyum, at the Upper Egyptian Kawm Umbū (Kom Ombo), and elsewhere.

Sebeknefru, also spelled SOBEKNEFERU, queen who ruled as king of Egypt (1760?–?1756 BC); she was the last ruler of the 12th dynasty.

The end of the long reign of Sebeknefru's father, Amenemhet III, brought her half brother to the throne late in life. When her brother died, the absence of a male heir made Sebeknefru the closest in line of succession; she thus took the royal titles and ruled as king. Hers was not a precedent-setting reign, however, for a similar succession had occurred at the end of the 6th dynasty, and tradition records that officials in the 2nd dynasty decided that a woman could hold the royal title.

Sebeknefru reigned as a full pharaoh; her statues from the northeastern Nile Delta show her with full royal (king's) regalia and in traditional royal poses. Nonetheless, she made no attempt to depict herself as a man, as did Queen Hatshepsut of the 18th dynasty. Sebeknefru continued normal 12th-dynasty policies. Her highest regnal year date—three—is indicated at the Second Nile Cataract, where the annual inundation level was recorded.

Sebenico (Yugoslavia): *see* Šibenik.

Sebert (Anglo-Saxon ruler): *see* Saberht.

Sebeş, town, Alba *judeţ* (district), west-central Romania. It lies in the valley of the Sebeş River, on a major Romanian highway. The site had Neolithic and Daco-Roman settlements before Sebeş was refounded in the 12th century by German settlers. Sebeş was an important town in medieval Transylvania. By the 14th century it had survived a Tatar sacking and had been refortified. In 1438 it fell to the Turks.

The Evangelical church in Sebeş is a monumental work of Romanesque and Gothic architecture completed over a period of two centuries. The Zápolya House, now containing a district museum, is where the Diet of Transylvania was summoned in 1556 and 1600. Modern Sebeş is an industrial town, with leather, textile, and wood industries. Pop. (1985 est.) 29,683.

Sebetwane, also spelled SEBITWANE, or SIBITUANE (d. 1851, Barotseland), Southern African king (reigned from *c.* 1820) who established a large and powerful nation in what is now western Zambia after an arduous migration from his original home in what is now central South Africa.

Driven (*c.* 1820) from the Orange Free State during the Mfecane (the Crushing; a period of Zulu wars and great tribal migration), Sebetwane led his Sotho people (as they were first called) to the northwest in search of safety, on a zigzag route through the Kalahari to the Zambezi River. First settling near Victoria Falls, he moved west in 1838 to Barotseland, conquering the Lozi inhabitants. Winning the loyalty of the Lozi by his fair administration, he was able to repel two attacks by the great Ndebele (Matabele) warrior Mzilikazi.

Distinguished as both a warrior and a statesman, Sebetwane was able to consolidate his military gains by his generous and just treatment of the conquered peoples. An imaginative politician, he maintained a peaceful kingdom in Barotseland, despite the numerical inferiority of his own Kololo people, by preventing them from forming an aristocracy and by the delegation of authority to conquered chiefs.

In 1851 Sebetwane met David Livingstone, the explorer, to whom he recounted his experiences. Livingstone was greatly impressed by the man and his kingdom, and Livingstone's notes of this encounter are the primary source of Kololo history.

Sebha (Libya): *see* Sabhā.

Sebinus, Lacus (Italy): *see* Iseo, Lake.

sebkha (saline flat): *see* sabkhah.

seborrheic dermatitis, also called SEBORRHEIC ECZEMA, or SEBORRHEIC CORPORIS, a type of dermatitis (*q.v.*).

Sebou, Wadi, important river in northern Morocco, draining part of the Atlas Mountains and Rharb plain into the Atlantic Ocean. From its source as the Wadi Guigou in the Moyen (Middle) Atlas, it flows northward to Fès and then eastward to the Atlantic at Mehdiya—a distance of 280 miles (450 km). The Sebou basin is a major olive, rice, wheat, sugar-beet, and vineyard region. Kenitra, 10 miles (16 km) upstream from Mehdiya, is a busy port at the head of navigation for ocean-going vessels. Tributaries of the Sebou include the Wadi Rdom, which is the location of a thermal generating station (at Sidi Kacem), and the Wadi Beth, site of a hydroelectric plant (at el-Kansera). Other tributaries are the Wadis Ouerrha and Inaouene.

Sebring, city, seat (1921) of Highlands County, south-central Florida, U.S. The city encircles Lake Jackson and is situated 70 miles (113 km) southeast of Tampa. It is the site of the annual International Grand Prix Sports Car Race (March). Founded in 1912 by George Sebring, an Ohio pottery manufacturer, the city is now the processing and shipping centre for nearby citrus groves and cattle ranches. An industrial park has been developed on the former site of Hendricks Field Air Force Base. Highlands Hammock State Park is just southwest of the city. Inc. town, 1913; city, 1923. Pop. (1984 est.) 10,143.

Sebta (Spain): *see* Ceuta.

Sebuano language: *see* Cebuano language.

Sebüktigin, in full ABŪ MANṢŪR SEBÜKTIGIN (b. *c.* 942, Barskhan, Afg.—d. August 997, Balkh), founder of the Ghaznavid dynasty, which ruled much of the area of present-day Afghanistan for more than 150 years.

Once a Turkish slave, Sebüktigin married the daughter of the governor of the town of Ghazna (modern Ghaznī), which was under the control of the Sāmānid dynasty. He succeeded the governor in 977 and later rejected Sāmānid control. In the next 20 years Sebüktigin extended his rule over much of what is now Afghanistan. At his own request, he was succeeded in 977 by a younger son, Ismāʿīl. Many of the nobles, however, preferred his eldest son, Maḥmūd, as their sovereign. Maḥmūd was able to defeat his brother in battle (and imprison him for the rest of his life) and to ascend the throne in 998, to become the great Maḥmūd of Ghazna.

SEC: *see* Securities and Exchange Commission.

Secchi, Pietro Angelo (b. June 29, 1818, Reggio nell'Emilia, Italy—d. Feb. 26, 1878, Rome), Italian Jesuit priest and astrophysicist, who made the first survey of the spectra of stars and suggested that stars be classified according to their spectral type.

Secchi entered the Society of Jesus in 1833 and became lecturer in physics and mathematics at the Jesuit College in Loreto, Italy, in 1839. He returned to Rome in 1844, where he completed his theological studies and lectured at the Collegio Romano.

When the Jesuits were expelled from Rome in 1848, Secchi went to Stonyhurst College, Clitheroe, Lancashire, Eng., and then to Georgetown University, Washington, D.C. Because of his reputation as an astronomer he was allowed to return to Rome in 1849, where he became professor of astronomy and director of the observatory at the Collegio Romano. He erected a new observatory in which he carried out his research in stellar spectroscopy, terrestrial magnetism, and meteorology.

From his survey of stellar spectra, Secchi concluded that the stars could be arranged in four classes according to the type of spectra they display. These divisions were later expanded into the Harvard classification system, which is based on a simple temperature sequence. Secchi proved that prominences seen during a solar eclipse are features on the Sun itself, and he discovered many aspects of their behaviour and of that of the finer prominence-like jets of gases now known as spicules.

Secco: *see* John XVII (or XVIII) *under* John (Papacy).

secentismo (literary style): *see* Marinism.

secession, in U.S. history, the withdrawal of 11 slave states (states in which slaveholding was legal) from the Union during 1860–61 following the election of Abraham Lincoln as president. Secession precipitated the American Civil War.

Secession had a long history in the United States—but as a threat rather than as an actual dissolution of the Union. Prosecessionists found philosophical justification for altering or abolishing a government and instituting a new one in the Declaration of Independence. More specifically, those who held that the Union was simply a compact among the states argued that states could secede from that compact just as they had earlier acceded to it.

While never counseling secession, Madison and Jefferson had clearly enunciated the state's rights-compact doctrine in the Virginia and Kentucky Resolutions of 1798. Their political opponents, New England Federalists, briefly considered withdrawing from the Union at the Hartford Convention in 1814. The Mississippi question elicited hints of secession from proslavery states, but the famous Missouri Compromise (1820) temporarily quieted the agitation. South Carolinians, however, went to the very brink of secession in the 1830s over the tariff question.

From the 1840s to 1860, Southerners frequently threatened to withdraw from the Union as antislavery sentiment in the North grew stronger. The Compromise of 1850 eased some of the sectional strife, but the problem of permitting or prohibiting slavery in the western territories continued to inflame opinion on both sides throughout the 1850s.

The Republican Party formed during this decade around the idea that the territories should remain free; *i.e.,* slaveholding should not be permitted in them. Southerners vowed that the election of a Republican president in 1860 would make secession a certainty. When the Democratic Party disintegrated in 1860 over the slavery-extension question, Lincoln was elected as the first Republican president.

On Dec. 20, 1860, a special convention called in South Carolina unanimously passed an ordinance of secession. Mississippi, Florida, Alabama, Georgia, and Louisiana followed in January, while Texas voted to secede on Feb. 1, 1861—still more than a month before Lincoln was actually inaugurated. President James Buchanan denied the right of secession, but he also denied the right of the federal government to use force against the seceded states.

Lincoln waited a month after his inauguration before deciding to send provisions to Fort Sumter in the harbour of Charleston, S.C. On

April 12, 1861, Confederate guns opened fire on the fort, and the Civil War began. Forced now to make a choice between the Union and the Confederacy, the states of the upper South—Virginia, North Carolina, Arkansas, and Tennessee—voted to secede.

Sechten, Ludwig von: *see* Siegen, Ludwig von.

second, fundamental unit of time, now defined in terms of radiation emitted from atoms of the element cesium under specified conditions. The second was formerly defined as 1/86,400 of the mean solar day—*i.e.,* the average period of rotation of the Earth on its axis relative to the Sun. In the mid-20th century this definition became inadequate because of the need for increased precision in timekeeping. In 1956 the second was redefined, by the International Committee on Weights and Measures, as 1/31,556,925.9747 of the length of the tropical (seasonal) year 1900. This definition was ratified by the General Conference on Weights and Measures in 1960. Because the year 1900 was past, however, the definition was nonoperational. In 1964 the International Committee on Weights and Measures provisionally defined the second as 9,192,631,770 cycles of radiation associated with the transition between the two hyperfine levels of the ground state of the cesium-133 atom (*see also* atomic time). In 1967 this definition in terms of a property of the cesium atom became the sole definition of the second in the International System of Units (SI).

The number of cycles of radiation was chosen to make the length of the defined second correspond as closely as possible to that of the astronomically determined second of Ephemeris Time (defined as the fraction of the tropical year given above).

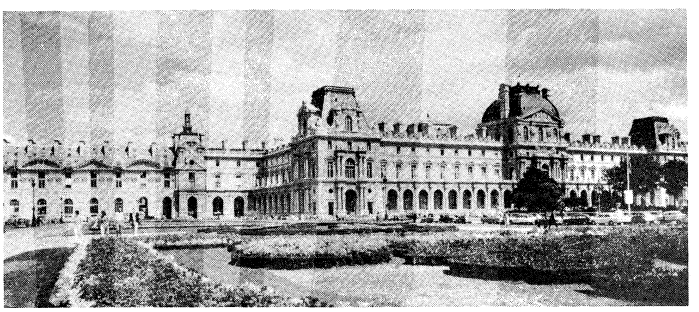
Second Baku (Russian S.F.S.R.): *see* Volga-Ural Petroleum and Gas Region.

Second Coming, also called SECOND ADVENT, or PAROUSIA, in Christianity, the future return of Christ in glory, when it is understood that he will set up his kingdom, judge his enemies, and reward the faithful, living and dead. Early Christians believed the Advent to be imminent (*see* millennium), and those who have later professed what is known as Adventism have believed that the visible appearance of Jesus may occur at any moment and that Christians should be ever ready for it. Such believers find evidence for the Second Coming in the Gospels (Matthew 24,25; Mark 13; Luke 21:5–26; John 14:25–29), in the Book of Revelations, and in other biblical and traditional sources. *See also* Last Judgment.

Second Empire style, also called NAPOLEON III, SECOND EMPIRE BAROQUE, or BEAUX-ARTS STYLE, architectural style that was dominant internationally during the second half of the 19th century. Developing from a tendency of architects of the second quarter of the 19th century to use architectural schemes drawn from the periods of the Italian Renaissance, Louis XIV, and Napoleon I to give dignity to public buildings, the style was solidified into a recognizable compositional and decorative scheme by the extension designed for the Louvre in Paris by Louis-Tullius-Joachim Visconti and Hector Lefuel in the 1850s. Given prestige by this important setting, the classical style rapidly became an "official" one for many of the new public buildings demanded by the expanding cities and their national governments. Although great variations exist, general characteristics can be identified: the building is large and, when possible, stands free; it has a square or nearly square plan with rooms disposed axially; externally, there is a profusion of classicistic detail; usually a high, often concave or convex mansard roof (having two slopes on all sides with the lower slope steeper than the upper one) breaks the profile; pavilions extend forward at the ends and in the centre and usually carry higher mansards; there is generally an overlay of a file of columns standing above a bow-shaped basement or piled one on another in several stories.

Examples of the style abound. In Vienna it was used for many buildings constructed when the Ringstrasse was developed (after 1858), such as the Opera House (designed by van der Nüll and Eduard August Siccard von Siccardsburg, 1861–69). In Italy many of the public buildings constructed after that nation's unification in 1870 followed the Second Empire pattern (*e.g.,* Bank of Italy, Rome, designed by Gaetano Koch, 1885–92). In Germany the style characterizes most of the apartment and public buildings of the period, including the Reichstag building, Berlin (Paul Wollot, 1884–94). In the United States, representative buildings include the Old City Hall, Boston (G.F.J. Bryant and Arthur D. Gilman, 1862–65) and the State, War, and Navy Department Building, Washington, D.C. (Alfred B. Mullett with Gilman, consultant, 1871–75), as well as many mansions and county seats designed by American architects, such as Richard Morris Hunt, who followed the training of the École des Beaux-Arts in Paris. In England the style appeared in hotels, railway stations, and warehouses, and it lingered on to underlie R. Norman Shaw's design for the Piccadilly Hotel, London (1905–08).

An important variation of the Second Empire style was the Napoleon III style, which characterizes buildings constructed during the massive rebuilding of Paris administered by Baron Georges-Eugène Haussmann between 1853 and 1870. In the scale of their conception, these buildings seem designed more on an urban than on an individual architectural plan; thus, the extension to the Louvre (mentioned earlier), the excellent Paris Opera House (Charles Garnier, 1861–74), the railway stations, Tribunal de Commerce, and other such public buildings, by their isolation, greater size, and richer ornamentation, dominate the miles of apartment-house facades with ground-floor shops that line the many streets cutting through the city. The facades of the public buildings have in common a high elevation with mansard roofs; only the most important buildings have pavilions. The designs show a crispness of line and a subdued diversity and richness of decorative detail that sets them apart from Second Empire style elsewhere, as does their tendency to maintain a general urban homogeneity, especially throughout central Paris.



Extension of the Louvre, Paris, designed in the Second Empire style by L.-T.-J. Visconti and Hector Lefuel, 1852–57

By courtesy of the French Government Tourist Office

Second International (Socialist federation): *see* International, Second.

secondary education, the second stage traditionally found in formal education, beginning about age 11 to 13 and ending usually at age 15 to 18. The dichotomy between elementary education (*q.v.*) and secondary education has gradually become less marked, not only in curricula but also in organization. The proliferation of middle schools, junior schools, junior high schools, and other divisions has produced systems with more than two stages.

Because of their wide influence throughout the world, it is appropriate to sketch briefly the educational patterns of a few major European nations and the United States.

The French system. France initiated a number of educational reforms beginning in 1968. Contemporary France has a first cycle of education for all children up to grade 5. The transitional grades 6 and 7 are followed by grades 8 and 9, which comprise the so-called guidance cycle, in which students pursue a certain core curriculum, a second foreign language, and a collection of electives. They must decide by the end of grade 9 whether to pursue the academic tracts in upper secondary school or to pursue vocational options. In principle, parents, students, and school counselors must reach an agreement on this decision, but appeal procedures exist to resolve differences.

Students 15 to 18 years of age enter either of two lycées, or high schools: (1) the lycée of general and technological education (*lycée d'enseignement général et technologique,* or LEGT) is the successor to the traditional academic lycée of the past; (2) the vocational-educational lycée (*lycée d'enseignement professionnel,* or LEP) encompasses a range of vocational-technical studies and training. The curriculum of the LEGT begins in grade 10 with certain tracked basic courses that lead in grades 11 and 12 to specializations in any one of five subject areas: literary-philosophical studies, economics and social sciences, mathematics and physical sciences, earth sciences and biological sciences, and scientific and industrial technology. In grades 10 and 11 there is a common core of subjects plus options, but in grade 12 all subjects, being optional, are oriented toward the student's major area of study. The *baccalauréat* examination taken at the end of these studies qualifies students for university entrance.

Vocational-technical secondary education includes a three-year selection of optional courses leading to one of the 30 or so technical *baccalauréats.* A student may instead opt for a one-year course conferring no particular qualification or may opt for apprenticeship training in the workplace.

The German system. In Germany, schools are the responsibility of the governments of the states, or *Länder,* and the structure of elementary and secondary education is not entirely consistent throughout the nation. In all states, however, the period of elementary education covers eight or nine grades. After this period, three basic options are available to the pupils. They may, after counseling by the elementary school teacher and upon the request of the parents, be placed in a *Realschule,* a *Gymnasium,* or a *Hauptschule,* the last representing a continuation of elementary education.

Those pupils attending the *Hauptschule* pro-

ceed with their study of language, arithmetic, geography, history, science, music, art, and physical education. Industrial arts for boys and home economics for girls are usually offered. After completion of a four- or five-year program of studies at the *Hauptschule,* the pupil typically enters apprenticeship training.

In Germany, the term secondary school refers to institutions offering courses leading to the "Certificate of Maturity" (the *Reifezeugnis*), a qualification for entrance to an institution of higher education. The *Realschule* offers pupils further general education, some prevocational courses, and English-language study. At the age of 16, pupils conclude their program of studies and transfer to a vocational school or enter apprenticeship training.

If academically qualified, the pupil may also transfer to the *Gymnasium.*

The *Gymnasium,* the third alternative for German youth, offers rigorous academic preparation for higher education. Like the lycée in France and the grammar school in England, the *Gymnasium* is designed for those pupils who have shown the most academic promise; and its curriculum, emphasizing languages, mathematics, natural sciences, and social sciences, requires a high degree of diligence throughout all of the nine grades. Unsuccessful pupils in the *Gymnasium* may be transferred to the *Hauptschule.* At the age of 16, moreover, pupils may terminate their academic studies and enter a vocational school.

Students in the *Gymnasium* must pass an examination, the *Abitur,* entitling them to the Certificate of Maturity, if they are to be admitted to a German university. The content of the *Abitur* is adjusted to the focus of studies, such as classical languages, modern language, or mathematics-science, chosen earlier by the student.

The British system. In Britain the first stage of education is called primary education and includes pupils from ages 5 through 11. Since World War II, Britain, like most other European nations, has increased the variety of secondary-school programs available to adolescents. The allocation of pupils completing their primary education to different types of secondary schools takes place largely by means of an examination given at the age of 11 or shortly thereafter. The majority of students attend the secondary modern school, which offers a broad, general education until the age of 15. On the basis of their scores on the "eleven-plus" examinations, pupils may enter secondary technical schools and prepare to become skilled technicians.

The third school in the British tripartite system of secondary education is the grammar school, traditionally the most prestigious of the secondary institutions and the one most associated with university preparation.

Some attempts have been made to incorporate the programs associated with modern, technical, and grammar schools in multilateral, or comprehensive, schools. (Indeed, the structure of secondary education has become both a pedagogical and a political issue of some magnitude in England.) This reform of educational structure is sometimes viewed as a move in the direction of the American-style comprehensive education. It should be noted, however, that a single comprehensive school for adolescents is not merely an American phenomenon; it is also well-developed in Sweden and is under consideration in a number of other nations.

The students seeking university entrance must successfully complete a series of examinations that result in the General Certificate of Education. These examinations have two levels: ordinary and advanced. Entry to a university requires a prescribed combination of passes on the ordinary and advanced level in such subjects as English, foreign language, science, and mathematics. The sixth-form curriculum is largely oriented toward preparation for the advanced-level examination and provides intense specialization.

In Britain a separate and highly significant group of independent schools exists. These primary and secondary schools are financially self-supporting. The best-known of the independent schools are the "public schools," some of which, notably Eton and Harrow, have long maintained a distinguished international reputation. These schools for centuries have prepared students academically for higher education, typically at the universities of Oxford or Cambridge, and ultimately for leadership in British life. Although a controversial element in British education and frequently accused of reinforcing invidious social distinctions, these institutions remain popular.

The Soviet system. The contemporary U.S.S.R. has an educational pattern that differs distinctively from that just described. The first stage of education takes place in an eight-year general-education school. After graduating from the eight-year school, Soviet youth, if qualified, have a number of secondary schools open to them, including polytechnical or general secondary schools and various vocational or technical schools. Although in previous times there existed in the U.S.S.R. the same sharp division between the first (universal) and second (highly selective) stages of education common in other parts of Europe, in recent years the selection process has been extended over a number of years. The object now is to provide prolonged guidance for the pupils and place them into increasingly differentiated programs of study throughout the last few years of the elementary school and the first two or three years of secondary school. Many of those leaving the elementary school go directly into an occupation. Most critical for students wishing to continue their education is the selection at 17 or 18 years of age for higher education. The universities and higher institutes admit only 15 to 20 percent of the graduates of the secondary-level institutions. Most graduates of the polytechnical or general secondary schools are required to take jobs for two or three years, after which those qualified may proceed to higher education.

The U.S. system. The United States also offers a distinctive educational pattern. Without the heritage of a sharp distinction between primary education and elementary education, the United States historically has had a single system of elementary and secondary education for the great majority of its students.

In the United States, education is the responsibility of the individual states; therefore, some variation in structure exists. Typically, however, children at the age of six enter a neighbourhood school. Depending on the preference of the community, elementary education may extend from six to eight years.

In the United States, more than 80 percent of the secondary-age groups attend secondary school. The American goal for decades has been to provide secondary education for all within a single type of institution popularly referred to as the comprehensive high school. Although the precise meaning of this term is frequently not clear, comprehensive schools usually include a broad program of general and specialized curricula and accommodate a wide range in the academic abilities of the pupils. Thus in the same American secondary school some students plan to pursue university study and others seek terminal secondary education. At times, however, this distinction is more apparent than real, for American schools are strongly influenced by residential patterns, which in some communities make for a high degree of homogeneity in the aspirations of parents and students.

American students, at least those anticipating a university education, in the future may expect more stringent requirements in the basic disciplines. In spite of continuing controversy, however, there appears to be little possibility that a substitute will be created for the comprehensive school.

For international statistical data on secondary education, *see* BRITANNICA WORLD DATA ANNUAL.

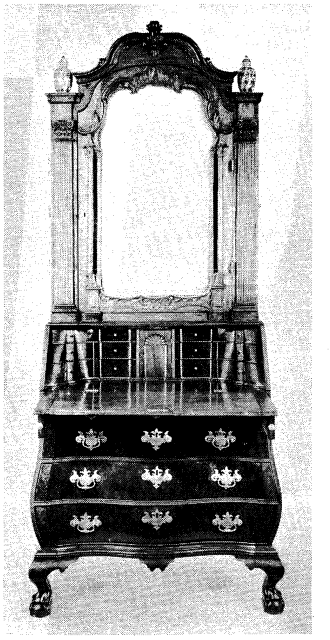
secondary parathyroid hyperplasia: *see* renal osteodystrophy.

secret ballot: *see* Australian Ballot.

Secretariat, international civil service of the United Nations, headed by the secretary general.

The secretary general is appointed by the General Assembly, on the recommendation of the Security Council, for a renewable five-year term. He is chief administrative officer at all meetings of the General Assembly, the Security Council, the Economic and Social Council, and the Trusteeship Council and may carry out any functions that these organs entrust to him and his staff. He submits an annual report to the General Assembly on the work of the UN and may bring to the Security Council's attention any matter he deems a threat to maintaining international peace and security. Headquartered at the UN building in New York City, he also oversees the office of the UN at Geneva.

secretary, also called SECRETAIRE, or ESCRITOIRE, a small writing desk fitted with drawers, one of which can be pulled out and the front lowered to provide a flat writing surface. There are many variations to this basic design. Early versions, which appeared in France in the first half of the 18th century, were made in one piece divided into two sections. The lower section consisted of a cupboard compartment closed in by solid or sliding doors that sometimes concealed a set of drawers; in some cases, however, the drawers were open to view. The upper section included a drop front that, when lowered, provided the writing surface and revealed an inner section fitted with various receptacles (such as pigeonholes, drawers, and recesses) for ink, paper, documents, and the like. Although this type persisted, a number of variations occurred, such as the addition of mirror



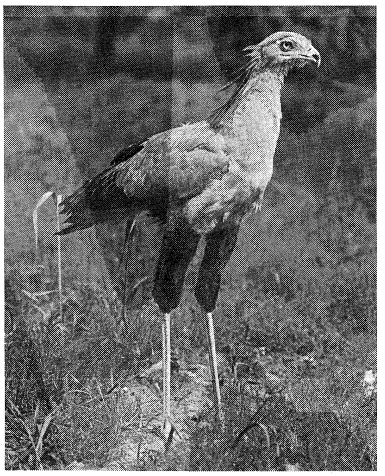
Mahogany secretary with a mirror-door, Boston, 1765–75; in the Henry Francis du Pont Winterthur Museum, Delaware

By courtesy of the Henry Francis du Pont Winterthur Museum, Delaware

doors above the upper, drop-front section and, later, the insertion of a space in the lower part of the secretary to accommodate the knees of the writer, the drawers being divided into two sections on either side of the arched recess. In *The Cabinet Dictionary* (1803), Thomas Sheraton illustrates one such secretary and says about the cupboards that flank the kneehole recess: "The door on the right includes a cupboard for a pot and slippers, and on the left side contains a place for a day book, ledger and journal, for a gentleman's own accounts."

Although the secretary was designed to satisfy a variety of needs, by this time the designs were becoming lighter and more elegant. The solid lower section was now frequently replaced by legs—sometimes, in the more fanciful flights of Regency designers, carved to simulate those of animals—and the unit took on the appearance of a table rather than a chest. The upper portion of these secretaries was often provided with a tambour top, which concealed drawers and pigeonholes. A tendency to use elaborate decorations of ormolu and other metals emphasizes a concept of the secretary that was to dominate in the 19th century: that it was essentially a feminine article of furniture, intended for the boudoir rather than the library. The result of this concept, especially in the period of the Second Empire in France, was that the secretary became a luxury object. In the 20th century the form tends to survive only in reproduction form, though some of its principles have been incorporated into fitted furniture units of various kinds.

secretary bird (*Sagittarius serpentarius*), bird of prey (family Sagittaridae) of the dry uplands of Africa, the only living bird of prey of terrestrial habits. It is a long-legged bird, with



Secretary bird (*Sagittarius serpentarius*)
By courtesy of the New York Zoological Society

a body slender but powerful, 1.2 metres (3.9 feet) long with a 2.1-m (6.9-ft) wingspread. Twenty black crest feathers make it appear to be carrying quill pens behind its ears, as secretaries once did. It has a light gray body, black thighs and flight feathers, and white wing linings. Its head and beak resemble those of the caracara. Its tail has a pair of long central streamers. Its legs are long and have thick scales to protect the bird from snakebite.

Snakes are the main food of secretary birds, a diet supplemented by lizards, grasshoppers, mice, and birds' eggs. Secretary birds hunt on foot, in pairs or small groups that keep in contact by hooting. They kill snakes by stamping or flailing them against the ground, sometimes dropping them from aloft.

Secretary birds are protected in most African nations (sometimes tamed around farms as snake-catchers), but they have become uncommon. The nest is large, usually built of sticks in a thorn tree. The offspring, usually two, hatch in seven weeks and are fed by both parents by regurgitation.

secretin, a digestive hormone secreted by the wall of the upper part of the small intestine (the duodenum). Its secretion is stimulated when acid from the stomach or digested protein bathes the mucous tissue of the duodenum. Secretin, a protein of low molecular weight, evokes the discharge of fluid and bicarbonate ions from the pancreas; it also promotes the secretion of bile from the liver.

secretion, in biology, production and release of a substance by a gland or cell; also, the substance produced. In addition to the enzymes and hormones that facilitate and regulate complex biochemical processes, body tissues also secrete a variety of substances that provide lubrication and moisture. Within an individual cell the Golgi apparatus and its associated secretory granules are thought to be the structures responsible for the production and release of secretory substances.

Most secretions are internal, but some are both external and obvious, *e.g.,* tears and sweat. The gastric cells lining the stomach include four different types that secrete substances necessary to digestion. Endocrine glands secrete hormones directly into the bloodstream to be carried to their sites of action.

Sect Shintō, (religion): *see* Kyōha Shintō.

sectile, opus (mosaic): *see* opus sectile.

Section d'Or (French: Golden Section), group of Cubist painters concerned with the proportion and rhythm of geometric forms. Headed by Jacques Villon, the principal members included Robert Delaunay, Marcel Duchamp, Raymond Duchamp-Villon, Albert Gleizes, Juan Gris, Roger de La Fresnaye, Fernand Léger, André Lhote, Louis Marcoussis, Jean Metzinger, Francis Picabia, and Andre Dunoyer de Segonzac. The group first exhibited together at the Galerie La Boétie in Paris in 1912, the same year in which Gleizes and Metzinger published the first book on Cubist aesthetics, *Du Cubisme.*

Secular Games, Latin LUDI SAECULARES, celebrations held in ancient Rome to mark the commencement of a new *saeculum,* or generation. The games originated with the Etruscans, who, at the end of a mean period of 100 years (as representing the longest human life in a generation), presented the underworld deities an expiatory offering on behalf of the coming generation. As practiced by the Romans the festival lasted three days and three nights, during which sacrifices were made to various deities. Originally the gods of the underworld were worshipped in the ceremony, but later Apollo, Diana, and Leto were introduced, probably by the emperor Augustus (reigned 27 BC–AD 14).

The first definitely attested Roman celebration of the games took place in 249 BC, the second was in 146, and the third, under Augustus, in 17 BC. Other celebrations, also commemorating the founding of Rome, took place in AD 47, 88, 147, 204, 248, and 262. In 1300 they were revived by Pope Boniface VIII and called the papal jubilees.

secular institute, in the Roman Catholic Church, a society whose members attempt to attain Christian perfection through the practice of poverty, chastity (celibacy), and obedience and to carry out the work of the church while "living in and of the world," attending privately to their business or professional duties. Secular institutes do not require public vows, life in common, or distinctive garb. They may be clerical, lay, or both, and they may adopt a diocesan or interdiocesan form. Approved by Pope Pius XII in 1947, they are a comparatively recent form of the religious state, alongside religious orders and congregations, in which the members take public vows and live in community. The second Vatican Council, in its "Decree on the Adapted Renovation of the Life of Religious" (1965), called for secular institutes to remain constantly in touch with their original inspiration and yet adapt to the changing times.

Consult the INDEX *first*

secularism, a movement in society directed away from otherworldliness to life on earth. In the medieval period there was a strong tendency for religious persons to despise human affairs and to meditate on God and the afterlife. As a reaction to this medieval tendency, secularism, at the time of the Renaissance, exhibited itself in the development of humanism, when man began to show more interest in human cultural achievements and the possibilities of his fulfillment in this world. The movement toward secularism has been in progress during the entire course of modern history and has often been viewed as being anti-Christian and anti-religious. In the latter half of the 20th century, however, some theologians began advocating secular Christianity. They suggested that Christianity should not be concerned only with the sacred and the otherworldly, but that man should find in the world the opportunity to promote Christian values. These theologians maintain that the real meaning of the message of Jesus can be discovered and fulfilled in the everyday affairs of secular urban living.

Secunda, modern company town (built after 1974), Transvaal, South Africa. It is located about 80 mi (130 km) east of Johannesburg in a region of extensive coal reserves and adequate water supplies, at the site of South Africa's second and third oil-from-coal extraction plants. Like the world's first such plant at Sasolburg (*q.v.*), the Secunda plants produce commercial quantities of oil. Built by Sasol Ltd. (called the South African Coal, Oil, and Gas Corporation Ltd. before 1979), the second plant achieved full production in 1982. The plants also produce a great variety of chemicals as well as gasoline; ancillary industries produce fertilizers, plastics, man-made fibres, and detergents.

Secunderābād, division and cantonment, Hyderābād district, northern Andhra Pradesh state, southern India. The division is a part of Hyderābād town, and the cantonment is a part of the Hyderābād urban agglomeration. Founded in the name of Sikander Jāh (Āsaf Jāh III) of the Nizām dynasty of Hyderābād in 1806, the cantonment was one of the largest in India during British rule. It is a junction on the Central Railway and a centre for wholesale trade and commerce. Notable buildings include St. John's Church and St. Mary's Cathedral (1847), and the area is still a stronghold of Christian missionary endeavour and education. Pop. (1981) division, 311,720; cantonment, 135,994.

Securities and Exchange Commission (SEC), U.S. regulatory commission established by Congress in 1934 after the Senate Committee on Banking and Currency investigated New York Stock Exchange operations. The commission's purpose was to restore investor confidence by ending misleading sales practices and stock manipulations that led to the collapse of the stock market in 1929. It prohibited the buying of stock without adequate funds to pay for it, provided for the registration and supervision of securities markets and stockbrokers, established rules for solicitation

of proxies, and prevented unfair use of nonpublic information in stock trading. It also stipulated that a company offering securities make full public disclosure of all relevant information. The commission acts as adviser to the court in corporate bankruptcy cases.

security, a written evidence of ownership conferring the right to receive property not currently in possession of the holder. The most common forms of securities are stocks (or shares) and bonds.

A brief treatment of securities follows. For full treatment, *see* MACROPAEDIA: Markets.

Securities are created when institutions, which may be governments, commercial companies, or financial institutions, need to raise money. Securities may be issued in the form of equity ownership: common stocks (called ordinary shares in Great Britain), which convey an owner's interest and certain rights, as to share in dividends, vote for directors, and inspect the books, and represent a residual interest in the case of liquidation; and preferred stocks, which convey a priority claim to dividends and to proceeds of liquidation but may be otherwise restricted. Alternatively, securities may take the form of debt. Bonds are promises to pay a specified amount at a specified date and interest at a specified rate in the interim. Bonds may be secured by particular assets, such as real property (a mortgage bond), or by the general credit of the issuer (debenture bond).

Both types of security are traded publicly on organized exchanges. Exchanges provide a marketplace where buyers and sellers come together and where new security issues can be placed. New York, Tokyo, and London possess the world's principal exchanges, and each has developed its own strict regulatory framework that is binding upon members and that provides protection to the buying public against malpractice.

Normally, members of the public can buy or sell stock only through licensed dealers or stockbrokers, who, with others, set the market in corporate stock. On some exchanges, transactions take place through auction, with high bidders buying from sellers offering at low prices; on others, transactions are negotiated as dealers quote an offer price at which they are prepared to sell and a lower price (bid price) at which they are ready to buy. Security prices are influenced by a wide range of factors. External forces such as international uncertainty, changes in government policies, balance of payments problems, and trends in foreign stock markets may all have an effect. For individual stocks, the company's current and prospective financial performance play an important role, as do overall trends within its business sector.

A fundamental change in the pattern of security purchases and sales that has taken place since 1970 is a decline in the role played by the smaller investor in almost all countries with active stock exchanges, with a concomitant increasing role played by institutional investors controlling very large funds. Government and other regulatory bodies have shown growing concern about a large proportion of their countries' economic and industrial bases coming under the effective control of a relatively small number of professional institutional investors. Because the large institutions tend to manage their securities portfolios by similar criteria and to move into and out of the markets together, they have been a factor in increasingly sharp fluctuations in the trend of prices.

Government securities, which are usually bonds that pay a fixed amount of interest each year, have, unlike most commercial securities, a guaranteed safety factor concerning their ultimate repayment. Nevertheless, these securities are traded in the market, and their prices fluctuate in value depending on trends and conditions in the economy and according to the relative balance between buyers and sellers. For this reason, these securities over the short term carry some of the same risks as their commercial counterparts. The principal cause of variations in market prices for government securities is the trend in interest rates. Inflation expectations and changes in government borrowing requirements also have their effect on the market.

Investors, both private and institutional, use essentially the same criteria in comparing different types of securities: the degree of security against defaults, the expected rate of return, the convenience and cost of dealing in the security, and the ease of realizing the investment and at what price. Taken together, these reflect the fact that securities and the stock exchanges on which they are traded have developed in order to bring together investors seeking to place their capital and entrepreneurs in search of capital to use profitably.

Security and Cooperation in Europe, Conference on (1973–75), series of international meetings that culminated in the signing of a nonbinding Final Act (*see* Helsinki Accords) recognizing the inviolability of the post-World War II frontiers in Europe and committing the signatories to respect human rights and fundamental freedoms and to cooperate in scientific, cultural, and other fields. Participants in the conference included all the countries of Europe except Albania, as well as the U.S. and Canada.

From the 1950s the Soviet Union had sought a European security conference as a means of legitimizing the postwar arrangements that had made it predominant in eastern Europe. However, no concrete steps were taken until the early 1970s, during the period of East-West détente. Preparatory talks to draw up an agenda were held at the ambassadorial level from November 1972 to June 1973 in Helsinki.

The conference itself took place in three stages. The first, in Helsinki, July 3–7, 1973, was a meeting of foreign ministers. The second, in which expert committees drafted the conference document, was held in Geneva and lasted from Sept. 18, 1973, to July 7, 1975. Finally, at a summit meeting in Helsinki, July 31–Aug. 1, 1975, the heads of state of the 35 participating nations signed the Final Act.

As provided in the Final Act, a follow-up conference to review implementation of the agreement met in Belgrade in 1977–78. A second review conference opened in Madrid in November 1980.

security and protection system, any of various means or devices designed to guard persons and property against a broad range of hazards, including crime, fire, accidents, espionage, sabotage, subversion, and attack. Most security and protection systems emphasize certain hazards more than others. In a retail store, for example, the principal security concerns are shoplifting and employee dishonesty (*e.g.,* pilferage, embezzlement, and fraud). A typical set of categories to be protected includes the personal safety of people in the organization, such as employees, customers, or residents; tangible property, such as the plant, equipment, finished products, cash, and securities; and intangible property, such as highly classified national security information or "proprietary" information (*e.g.,* trade secrets) of private organizations. An important distinction between a security and protection system and public services such as police and fire departments is that the former employs means that emphasize passive and preventive measures.

Security systems are found in a wide variety of organizations, ranging from government agencies and industrial plants to apartment buildings and schools. Sufficiently large organizations may have their own proprietary security systems or may purchase security services by contract from specialized security organizations.

Development of security systems. The origins of security systems are obscure, but techniques for protecting the household, such as the use of locks and barred windows, are very ancient. As civilizations developed, the distinction between passive and active security was recognized, and responsibility for active security measures was vested in police and fire-fighting agencies. The inability of such community agencies to provide all of the security desired by some individuals and organizations led to supplemental efforts by private groups.

By the mid-19th century, private organizations such as those of Philip Sorensen in Sweden and Allan Pinkerton in the United States had begun to build efficient large-scale security services. Pinkerton's organization offered intelligence, counterintelligence, internal security, investigative, and law enforcement services to private business and government. Until the advent of collective bargaining, strikebreaking was a prime concern. The Sorensen organization, in contrast, moved toward a loss-control service for industry. It provided personnel trained to prevent and deal with losses from crime, fire, accident, and flood and established the pattern for security services in the United Kingdom and western Europe.

World Wars I and II brought an increased awareness of security systems as a means of protection against military espionage, sabotage, and subversion; such programs in effect became part of a country's national security system. After World War II much of this apparatus was retained as a result of international tensions and defense-production programs and became part of an increasingly professionalized complex of security functions.

Since the 1960s, crime-related security systems have grown especially rapidly in most countries. Among contributing factors have been the increase in number of security-sensitive businesses; development of new security functions, such as protection of proprietary information; increasing computerization of sensitive information subject to unique vulnerabilities; improved reporting of crime and consequent wider awareness; the need for security of enlarged or new governmental programs (*e.g.,* nuclear research and space exploration); and the need in many countries for security against violent demonstrations, bombings, and hijackings.

Security systems are becoming increasingly automated, particularly with respect to sensing and communicating hazards and vulnerabilities and, to a lesser but still considerable extent, with respect to response and action. This situation is true in both crime-related applications, such as intrusion-detection devices, and fire-protection alarm and response (extinguishing) systems. Advances in miniaturization and electronics are reflected in security equipment that is smaller, more reliable, and more easily installed and maintained.

Types of security systems. Security systems can be classified by type of production enterprise—*e.g.,* industrial, retail (commercial), governmental, government contractor, hospital; by type of organization—contract security or proprietary; by type of security process—*e.g.,* personnel or physical security; by type of security function or emphasis—for example, plant protection (variously defined), theft control, fire protection, accident prevention, protection of sensitive (national security or business proprietary) information. Some of these categories obviously overlap.

Security for small businesses constitutes a special situation. Because small firms cannot afford specialized proprietary security staffs, measures must be incorporated into regular

routines and staff training or be purchased from outside organizations. Theft, both internal and external, is a prime concern.

Residential security constitutes another special category. Sizable housing or apartment complexes, especially if under one management, can employ sophisticated security measures, including, for example, closed-circuit television monitoring of elevators and hallways, and trained security guards. Relatively simple equipment for houses or small apartment buildings, as, for example, exterior lighting and alarms, is increasingly used. Some neighbourhoods of large cities cooperatively employ patrol services or organize resident volunteer patrols.

Physical security. Some of the most effective advances in security technologies during the past few decades have been in the area of physical security—*i.e.,* protection by tangible means. Physical security has two main components: building architecture and appurtenances, and equipment and devices.

A building can be designed for security by such means as planning and limiting the number and location of entrances and by careful attention to exits, traffic patterns, and loading docks.

Equipment and devices may be classified in various categories depending on the criteria used. If the criterion is purpose, some of the principal categories are record containers, including safes and files; communications, such as two-way radios and scrambler telephones; identification, including badges and automatic access-control systems requiring the use of a code; investigation and detection (*e.g.,* lie detectors) and intrusion-detection devices, such as photoelectric cells and ultrasonic-wave-propagating equipment; observation and surveillance, including listening and recording devices, cameras, closed-circuit television, and one-way mirrors; countermeasures for observation and surveillance, such as equipment designed to detect electronic surveillance devices; and fire protection. A classification system based on process results in another set of categories. Examples include perimeter barriers (*e.g.,* fences, walls) and locks to prevent or control access, and lighting systems to aid surveillance and to deter illegal entry.

Advances in security equipment technology have been numerous. Some of the more noteworthy examples include sensor devices that report unauthorized removal of items; personal-identification and access-control systems that directly "read" unique personal characteristics such as voice quality and hand geometry; surveillance devices that can scan premises at night; and devices that permit surveillance at considerable distances, making entry to the premises unnecessary.

An important component of security programs consists of measures designed to recruit and effectively use trustworthy personnel. "Personnel security" is a term frequently used to include measures designed to select only those people for whom there is a good prognosis for trustworthiness, on the premise that losses from employee untrustworthiness are more frequent and usually larger than losses from outside the system (*e.g.,* burglary, robbery, shoplifting, espionage) and that one of the best predictors of future behaviour is past behaviour.

Common synonyms are "screening" and (in Britain) "vetting." The most common technique is the background investigation, which involves obtaining all relevant available data about a person's past education, employment, and personal behaviour and making judgments concerning the individual's likely future loyalty and honesty. Thus, the dossier and computerized national data banks exemplify a response by a society in which great geographic mobility necessitates record keeping as a basis for judgments. Another technique is the polygraph, or lie detector, examination. Research has also been directed to the possible capabilities and limitations of pencil-and-paper psychological tests and stress interviews. In addition to selection techniques there are other measures designed to keep personnel trustworthy after they have been brought into the system—for example, employee indoctrination programs and vulnerability testing.

Systems and procedures constitute another area of the personnel-administration approach to security. It is possible to devise work methods and management controls in such a way that security is one of the values sought along with maximizing productivity and minimizing cost. Examples include the use of automated record-keeping systems; forms and reports periodically checked against physical inventories; and the principle of dual responsibility, whereby work is so subdivided that the work of one employee checks the accuracy of the work of another.

Because control systems are not self-administering, they must be periodically tested and policed. A typical procedure is the vulnerability test, or "created-error" check, in which an error or breach, such as an erroneous invoice, is deliberately planted in the system to see if it is detected and reported. Undercover investigators, such as hired "shoppers" who check on the honesty of sales personnel, also play a role in monitoring the operation of control systems.

Guard force training, supervision, and motivation are other important aspects of the personnel-administration approach to security. The use of operational personnel to attain security objectives is still another. Examples include engineers, production workers, and clerical staff applying government security regulations for the safeguarding of classified information, and sales people cooperating with security staff in the detection of shoplifters. The cooperation of operational personnel to attain security objectives along with production objectives demands an interplay between knowledgeable training and communication programs, supervision, employee motivation, and management example.

The personnel-relations approach implicit in much of the above recognizes that the attitudes of rank-and-file employees and the social climate they create can either be conducive to security or constitute its greatest enemy. Therefore, if security programs are to be successful they must be carried out in a context of considerable understanding and cooperation of virtually the entire work force. The security program is apt to be only as good as the overall pattern and climate of social relations and loyalties of workers and executives of all ranks.

Security Council, executive organ of the United Nations, with responsibility for maintaining world peace and security.

Five of its 15 members are permanent (France, People's Republic of China, United Kingdom, United States, and the U.S.S.R.) and have veto power. Of the other 10, 5 are elected each year by the General Assembly for 2-year terms; 5 retire each year. Each member has one vote. On all "procedural" matters (the definitions of which are sometimes in dispute), approval requires nine votes. On all other matters, the nine votes must include the votes of all five permanent members. A party to a dispute, however, is supposed to abstain from voting.

Any state, even if it is not a member of the United Nations, may bring a dispute to which it is a party to the notice of the Security Council. If the council finds that there is a real threat to the peace or an actual act of aggression, it may call upon the members of the United Nations to cut communications with the countries concerned or apply economic sanctions. If these methods prove inadequate, the charter states that the council may take military action against the offending nation by air, sea, and land forces of the United Nations.

Security Pacific Corporation, U.S. bank holding company that provides banking, trust, and other financial services. It was incorporated in 1971 to control Security Pacific National Bank, its commercial bank subsidiary. Headquarters are in Los Angeles.

The bank was established in 1929 as Security-First National Bank of Los Angeles in a merger of Los Angeles First National Trust and Savings Bank (established in 1875) and Security Trust and Savings Bank (1889). It assumed its present name in 1968 when it absorbed Pacific National Bank of San Francisco.

The bank conducts commercial banking, trust, and savings activities in California and abroad. The bank's services include retail, wholesale, international, and fiduciary services.

The corporation also provides a number of non-bank financial services including leasing, consumer finance, mortgage banking, and venture capital through subsidiaries.

Secyon (ancient Greek city): *see* Sicyon.

Sed festival (Egyptian religion): *see* Heb-Sed festival.

Sedaine, Michel-Jean (b. June 2, 1719, Paris—d. May 17, 1797, Paris), French drama-



Sedaine, engraving by P.-C. Lévesque after a portrait by J.-L. David

H. Roger-Viollet

tist who is best known as the author of a fine domestic comedy, *Le Philosophe sans le savoir* (1765; *The Duel,* 1772).

The son of a master builder, Sedaine began his career as a stonemason. In 1752 he published a volume of poetry, and his theatrical career began in 1756, when he wrote libretti for some light operas. He was made destitute by the Revolution and in 1795 was deprived of his membership in the Académie Française, to which he had been elected in 1786.

Although he had a number of successes during his career, *Le Philosophe sans le savoir* is the only one of his plays to have endured. It was censored when it first appeared, because of its treatment of duelling, and was not played in the original version until 1875. It is less a play of ideas, however, than a textbook example of the new "bourgeois" drama called for by the philosopher Denis Diderot; mixing tragic and comic situations, it presents a charming, sentimental, and idealized picture of life in the family of a wealthy merchant. Sedaine defends middle-class values not only in his criticism of aristocratic prejudice but also in the illustration of the virtues of commerce and of a rational concept of honour. The play enjoyed some popularity during the 19th century, but it is now considered to be of chiefly historical interest.

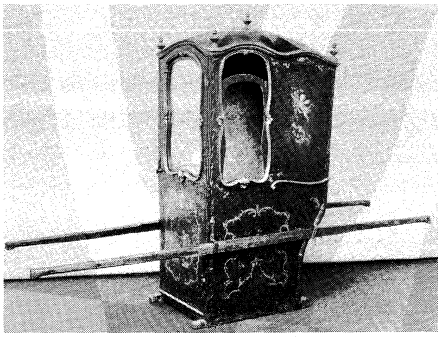
Sedalia, city, seat of Pettis County, west central Missouri, U.S., 75 mi (121 km) east-

southeast of Kansas City. Established in 1857 by George R. Smith and originally named Sedville for his daughter Sarah (nicknamed Sed), it developed along the Missouri Pacific Railroad right-of-way. It became a Federal military post during the Civil War and was raided by the Confederate general Sterling Price. Generals Nathaniel Lyon and John C. Frémont outfitted Federal forces there in 1861. Renamed Sedalia, it was an important railhead for the Texas cattle drive of 1866. With the arrival of the Missouri–Kansas–Texas Railroad, large railroad shops were built. The city is an agricultural shipping and distributing point and has diversified manufactures, including shoes, clothing, tools, and home appliances. Because composer Scott Joplin wrote and played the "Maple Leaf Rag" at the town's Maple Leaf Saloon, the ragtime craze is supposed to have begun here. Sedalia is the site of the Missouri State Fair and the State Fair Community College (1966). Whiteman Air Force Base is nearby. Inc. 1864. Pop. (1980) 20,927.

Sedan, town, Ardennes *département,* Champagne-Ardenne region, northeastern France, 9 mi (14 km) southwest of the Belgian frontier. It lies on the right bank of the Meuse around a loop in the river in a depression between two ridges. Most of the 17th- and 18th-century houses in the centre of the town were destroyed during the German invasion in World War II. The 15th-century castle is locally claimed to be the largest in Europe. A statue has been erected in the centre of the town to Marshal Henri de la Tour d'Auvergne, vicomte de Turenne, the famous 17th-century French soldier, who was born in the château of the stronghold.

Sedan flourished as a cloth-manufacturing centre in the 16th and 17th centuries, first under its princes and later under the French king Louis XIV. Textiles continue to be manufactured in Sedan and the vicinity. Other industries include metalworks, the manufacture of medical appliances, chemicals, and food processing. Sedan was the scene of a French military disaster in 1870 during the Franco-German War and of a German breakthrough in the invasion of France in 1940 in World War II. Pop. (1982) 23,357.

sedan, also called SEDAN CHAIR, portable, enclosed chair mounted on horizontally placed parallel poles and carried by men or animals. In Italy, France, and England, in the 17th and 18th centuries, sedans became highly luxurious and were often elaborately carved



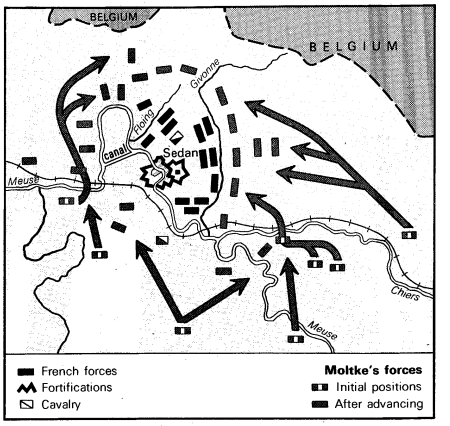
Sedan, 18th century; in the Science Museum, London

By courtesy of the Science Museum, London, Crown copyright reserved

and upholstered and painted with mythological scenes or heraldic devices. In England, in 1634, Sir Sanders Duncombe received a royal patent to be the sole supplier of rental, or hackney, sedans for 14 years, a reward for having imported the sedan chair, probably from Naples. Sedan chairs were welcomed in England as a relief from the swarm of coaches then clogging London streets.

In colonial America, sedan chairs were used by the wealthy, mostly in New York City and Philadelphia. Benjamin Franklin still was using sedans in 1789.

Sedan, Battle of (Sept. 1, 1870), decisive defeat of the French Army in the Franco-German War, which led to the fall of the Second French Empire; it was fought at the French border fortress of Sedan on the Meuse River, between



The Battle of Sedan, Sept. 1, 1870

From *A Military History of the Western World*, vol. III, Copyright © 1956 by J.F.C. Fuller; with permission of the publisher, Funk and Wagnalls Publishing Company, Inc.

120,000 French troops under Marshal Mac-Mahon and over 200,000 German troops under Gen. Helmuth von Moltke. Mac-Mahon had intended to march his army, accompanied by Napoleon III, from Châlons-sur-Marne northeast toward Metz, to relieve the French Army of the Rhine, which was trapped at Metz. Moltke learned of Mac-Mahon's movements through newspaper reports and rapidly moved the newly formed Army of the Meuse, under Crown Prince Albert of Saxony, north to intercept Mac-Mahon. In three small engagements on the Meuse River (August 29 to 31), the Germans forced Mac-Mahon to fall back to the fortress at Sedan. While Mac-Mahon tried to consider whether to try again to smash through eastward toward Metz or instead to retreat west to Paris, Moltke moved up the 3rd Prussian Army, under Crown Prince Frederick William, to complete the encirclement of Sedan.

The wounding of Mac-Mahon early on September 1 caused extreme confusion in the French command, allowing the Germans to carry on their encirclement without serious opposition. Thereafter, the desperate French efforts to break out, including massive cavalry charges, led to nothing but high casualties. After the German artillery had pounded the French position in an all-day bombardment, the Germans launched their main attack in the afternoon. Emperor Napoleon III realized that the position was hopeless. He surrendered, and the next morning he and 83,000 French soldiers became prisoners of war. The French had lost 3,000 men killed, 14,000 wounded, and 21,000 missing or captured. German losses totalled 9,000 men killed and wounded. As the victorious Germans marched toward Paris, a popular uprising there on September 4 toppled the government of the Second Empire and set up a provisional republican government.

Sedang language, also called RÒTEA, HADANG, HÒTEA, or HÒTEANG, language spoken by a population of approximately 45,000 people living in Kontum Province, Vietnam. It is the second largest (Bahnar is the largest) of the North Bahnaric category of the Bahnaric languages, of the Mon-Khmer subgroup of the Austro-Asiatic language family. The Tòdrah language, spoken south of Sedang in Kontum Province, may be a dialect but is generally considered a separate language.

sedarim, the major orders, or divisions, of the Mishna, the oldest codification of Jewish oral laws. *See* Mishna.

sedative-hypnotic drug, chemical substance used to relax and reduce tension (sedative effect) or to induce sleep (hypnotic effect), depending on the dosage.

A brief treatment of sedative-hypnotic drugs follows. For full treatment, *see* MACROPAEDIA: Drugs and Drug Action.

A commonly used group of sedatives is the benzadiazepine group, used to relieve anxiety. This includes such tranquilizers as chlordiazepoxide, diazepam, and nitrazepam. These drugs have many fewer side effects than other sedative-hypnotic drugs, owing mostly to the fact that they require a much smaller dosage in order to be effective.

The half-life of a drug refers to the time it takes for half of the drug to be removed from the bloodstream and eliminated from the body. The half-life of a drug is an important consideration when prescribing a sedative-hypnotic drug, as a short-term problem may require a drug with a short half-life.

The most commonly prescribed barbiturates are barbital, phenobarbital, amobarbital, butabarbital, pentobarbital, secobarbital, thiopental, and thiamylal. Barbital and phenobarbital have long half-lives, amobarbital and butabarbital have intermediate half-lives, pentobarbital and secobarbital have short half-lives, and thiopental and thiamylal have ultrashort half-lives.

The ultrashort-acting compounds are never administered orally or intramuscularly but are used principally as intravenous anesthetic agents.

Barbital and phenobarbital, because of their anticonvulsive properties, have been used in the treatment of epilepsy. Secobarbital and pentobarbital are common ingredients of sleeping pills.

The incidence of barbiturate poisoning resulting from accidental or intentional overdosage has increased markedly. Overdosage may be fatal because of brain damage caused by lack of oxygen (barbiturates depress the respiration centre in the brain) and on the basis of other complications (pneumonia) incident to a prolonged, inactive, depressed state.

Prolonged use of the barbiturates for relief of anxiety and insomnia may in time progress to a point at which the user requires amounts of the drug much in excess of the initial therapeutic dose. This represents a state known as tolerance (ability to withstand amounts larger than the usually effective dose). Denial of the barbiturate to the habitual user may precipitate withdrawal, indicative of physiological dependence on the drug (addiction). Symptoms observed vary among users but may include restlessness, anxiety, weakness, insomnia, nausea, convulsions, and delirium tremens. Severe reactions may be ultimately fatal.

Sedbergh, parish in South Lakeland district, county of Cumbria, England, in the basin formed by the junction of Dentdale and Garsdale (valleys) with Lundedale. Formerly a staging post on roads across the Pennines, the hilly backbone of northern England, it is now a tourist centre in the Yorkshire Dales National Park. Sedbergh School, founded as a chantry school (a school in which masses were regularly sung for the patron) in 1525, was refounded as a grammar school in 1552 and had its constitution revised in 1874. Pop. (1971) 2,741.

Seddon, Richard John, byname KING DICK (b. June 22, 1845, Eccleston, Lancashire, Eng.—d. June 10, 1906, at sea, between Aus-

tralia and New Zealand), New Zealand statesman who as prime minister (1893–1906) led a Liberal Party ministry that sponsored innovating legislation for land settlement, labour protection, and old age pensions.

After working in iron foundries in England, Seddon went to Australia in 1863 to work at the Bendigo goldfields in Victoria. He moved to Hokitika, N.Z., in 1866, again for gold mining, and in 1869 he became an advocate for miners in goldfield disputes. His prominence in local politics gained him a seat in Parliament in 1879. Serving as minister of mines and public works in the Liberal ministry of John Ballance (1891–93), he abolished subletting of government contracts for public works. He succeeded Ballance in 1893, inheriting a bill for woman suffrage, which was passed the same year, and also a talented Cabinet, including William Pember Reeves and John McKenzie.

Under Seddon's leadership, Reeves's influential Industrial Conciliation and Arbitration



Seddon
BBC Hulton Picture Library

Act (1894) and McKenzie's land act to assist small farmers (1894) were enacted. The Old Age Pensions Act of 1898 is considered Seddon's greatest legislative achievement. An imperialist in foreign policy, his attempt to incorporate Fiji into New Zealand failed, but he successfully annexed the Cook Islands (1901). He also bought vast amounts of land from the native Maoris and was opposed to Oriental immigration. Ardently pro-British, he supported England with troops in the South African War (1899–1902) and sponsored preferential tariffs for trade with the mother country.

Seddon assumed many of the Cabinet positions himself after Reeves (1896) and McKenzie (1899) resigned. He died suddenly while returning from Australia shortly after his fifth consecutive national electoral victory.

seder, plural SEDARIM, any of the major orders, or divisions, of the Mishna, the oldest codification of Jewish oral laws. *See* Mishna.

seder (Hebrew: "order"), a religious meal served in Jewish homes on the 15th and 16th of the month of Nisan to commence the festival of Passover (Pesaḥ). Though Passover commemorates the Exodus, the historical deliverance of the Jewish people from Egyptian bondage in the days of Moses (13th century BC), Jews are ever mindful that this event was a prelude to God's revelation on Mt. Sinai. For each participant, therefore, the seder is an occasion to relive the Exodus as a personal spiritual event. The religious nature of the seder with its carefully prescribed ritual makes the dinner quite unlike family dinners held on civil holidays. Reform Jews and Jews in Israel omit the second seder because they limit Passover to seven days.

The head of the family, having usually donned a white ritual gown (*kittel*), begins the ceremony by sanctifying the holiday with a benediction (Qiddush) over a cup of wine. In all, four cups of wine (*arbaʿ kosot*) will be drunk at certain intervals.

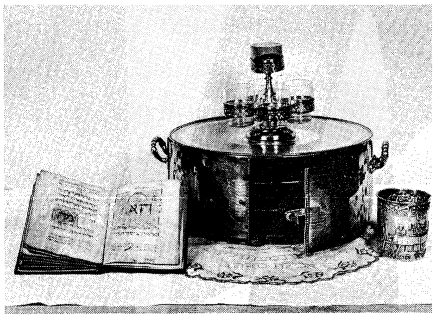
After all have washed their hands, the master of the seder presents celery or another raw vegetable (*karpas*) dipped in vinegar or salt water to all participants. Then a shank bone, symbolic of the Paschal lamb eaten in ancient times, and (commonly) a hard-boiled egg, symbolic of God's loving kindness (or, according to some, a mournful reminder of the destruction of the Temple of Jerusalem), are removed from the seder plate, while all recite a prayer.

After a second cup of wine is poured, the youngest child asks four standard questions about the unusual ceremonies: "Why does this night differ from all other nights? For on all other nights we eat either leavened or unleavened bread; why on this night only unleavened bread? On all other nights we eat all kinds of herbs; why on this night only bitter herbs? On all other nights we need not dip our herbs even once; why on this night must we dip them twice? On all other nights we eat either sitting up or reclining; why on this night do we all recline?"

The prepared answers, recited by all in unison, give a spiritual interpretation to the customs, even though some aspects of the feast were doubtless copied from Greco-Roman banquets. In essence, the narration (Haggada) is the story of the Exodus. This unique element of the seder celebration keeps alive sacred Jewish traditions that are repeated by succeeding generations at every seder meal.

All participants again wash their hands, then consume unleavened bread (*matza*) and bitter herbs (*maror*) dipped into a mixture of crushed fruits and wine, signifying that freedom and spiritual progress are the reward of suffering and sacrifice. At this point the meal itself is eaten.

When all have eaten and recited grace, a third cup of wine is poured to express thanksgiving to God. As the ritual moves toward its conclusion, psalms of praise (Hallel, previously read in part) are recited in unison and a fourth cup of wine is poured to acknowledge



Seder articles
(Left) A 15th-century Spanish *Haggada*, (centre) wineglasses atop 19th-century German seder plates, and (right) 19th-century Polish silver cup for Elijah; in the Jewish Museum, New York
Jewish Museum, New York City—Art Resource/EB Inc.

God's loving Providence. Some add a fifth cup of wine (which is not drunk) in honour of Elijah, whose appearance at some future seder will signify the advent of the Messiah. Often folk songs are sung after the meal. *See also* Haggada; Passover.

Sederholm, Jakob Johannes (b. July 20, 1863, Helsinki—d. June 26, 1934, Helsinki), Finnish geologist who pioneered in the investigation of the Precambrian (more than 570,000,000 years old) rocks of Finland. He was appointed geologist to the Geological Commission of Finland in 1888, and from 1893 to 1933 he was its director.



Sederholm
By courtesy of the National Museum of Finland, Helsinki

Sederholm vigorously promoted and directed the commission in producing excellent maps, reports, and scientific treatises. His studies concentrated on the origin of granites and the stratigraphy, age, and correlation of the rocks. His *Om granit och gneis* (1907; "On Granite and Gneiss") includes an English summary. Other translated works include *On Migmatites and Associated Pre-Cambrian Rocks of Southwestern Finland,* 3 vol. (1923–24), and *On the Geology of Fennoscandia with Special Reference to the Pre-Cambrian* (1932).

sedge, any plant of the order Cyperales (*q.v.*).

Sedgefield, district, county of Durham, northeastern England, occupying an area of 85 sq mi (220 sq km). The district occupies a limestone plateau generally 300 to 400 ft (90 to 120 m) high between the Pennine uplands on the west and an inland extension of the North Sea coastal plain on the southeast. It was historically associated with the southern limits of both the West Durham Coalfield, with its open-pit mines, and the East Durham Coalfield, where deep shaft mines were opened later. There are no operating coal mines left in Sedgefield. Aycliffe, also called Newton Aycliffe, is the site of the first official new town in the north of England, designated in 1947 in conjunction with a revamped World War II ordnance factory. The industrial estate established there had expanded by the early 1980s to provide employment for 12,000 people manufacturing various products including axles, gears, and components for radar and television. The nearby light industrial centres of Shildon, Ferryhill, and Spennymoor all are former coal-mining towns.

The thick glacial drift soils of the district support cash-crop farming well suited to this generally urbanized area, and dairy cattle are intensively raised. Limestone quarried in the district is used for road stone, cement, and as a fluxing agent for the Teesside iron and steel industries. The parish (town) of Sedgefield in the east is known for its horse races and fox hunts. Spennymoor is the district seat. Pop. (1983 est.) 91,200.

Sedgemoor, district, county of Somerset, southwest England, occupying an area of 219 sq mi (567 sq km) in the north central part of the county. Sedgemoor district is generally a low-lying basin with rich alluvial soils. It is bordered by the Quantock Hills on the southwest, the Bristol Channel on the northwest, the Mendip Hills on the northeast, and the more elevated extensions of the Sedgemoor Basin on the south and east. There are sandy beaches at the estuary of the Brue and Parrett rivers, which merge near Burnham-on-Sea on the Bristol Channel. The Sedgemoor, for which the district is named, is a former marshy tract drained and protected from the sea by numerous dikes; it comprises most of the southeastern part of the district. It was in the Sedgemoor in 1685 that James Scott, duke of

Monmouth and pretender to the throne, was routed by the forces of James II.

Many dairy cattle graze the moor, and assorted cereals are grown; local pollard willows provide the raw material for the cottage industry of basketmaking. The town of Cheddar in the northeast, long associated with its famous cheese (now produced locally only in limited volume), is a market-gardening centre, especially for strawberries. Burnham-on-Sea is a small but growing resort area. Bridgwater, the district seat on the River Parrett in the southwest, is a former port for its now-moribund cloth industry; its mixed industrial base produces bricks and tiles, footwear, and furniture. Pop. (1986 est.) 94,100.

Sedgemoor, Battle of (July 16 [July 6, Old Style], 1685), in English history, battle fought about 3 miles (5 km) southeast of Bridgwater, Somerset, Eng. It was a massacre of the mainly peasant supporters of James Scott, Duke of Monmouth, by troops of King James II led by Louis de Ourfort, 2nd Earl of Feversham, and John Churchill (afterward Duke of Marlborough).

The Duke of Monmouth, illegitimate son of Charles II, had taken advantage of the popularity of his Protestantism to attempt to wrest the throne from his Roman Catholic uncle, James II. Landing at Lyme Regis in Dorset on June 11, he was proclaimed king at Taunton, failed to take Bristol, and fell back on Bridgwater. His path was then blocked by the royal army encamped on Sedgemoor. Monmouth decided on a hazardous night attack and very nearly succeeded; but his small force of cavalry fled, his foot soldiers failed to cross the ditch separating them from the royalist front, and, once the element of surprise was lost, Monmouth's untrained and unofficered followers were cut down.

Monmouth was captured soon afterward and executed; many of his followers were condemned to death or transportation in the Bloody Assizes, a series of trials conducted by Lord Chief Justice George Jeffreys in the ensuing months.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Sedgwick, Adam (b. March 22, 1785, Dent, Yorkshire, Eng.—d. Jan. 27, 1873, Cambridge, Cambridgeshire), English geologist who first applied the name Cambrian to the geologic period of time, now dated at 570 to 505 million years ago.

Sedgwick was educated at the grammar schools of Dent and Sedbergh and at Trinity College, Cambridge, where in 1810 he was elected a fellow. Although he was a mathematician and knew little about geology, he was appointed Woodwardian professor of geology at Trinity College in 1818. (At that time, university appointments were often based upon a man's general merits rather than his special training.) Sedgwick immediately set about establishing the importance of geology in university studies. He also began the numerous geologic expeditions characteristic of his career. In 1827 he joined Roderick I. Murchison in cooperative investigations in western and northern Scotland, the first of many joint efforts throughout Britain and the European continent.

Sedgwick was made president of the Geological Society of London in 1829, and two years later he began fieldwork in northern Wales. There he established the order of local rocks and gave the name Cambrian (after Cambria, the ancient name for Wales) to the oldest fossiliferous strata. Murchison and Sedgwick made a joint study of the shales and sandstones of Devonshire and named the Devonian period (now dated at 408 to 360 million years ago). Their findings were presented to the Geological Society in the paper "On the Physical Structure of Devonshire" (1839).

An unfortunate disagreement over priorities of discovery and naming of certain Early Paleozoic rocks, later to be named Ordovician, broke up the partnership of Murchison and Sedgwick. Sedgwick's works include *A Synopsis of the Classification of the British Paleozoic Rocks* (1855). The Sedgwick Museum at Cambridge, opened in 1903, was built as a memorial to him.



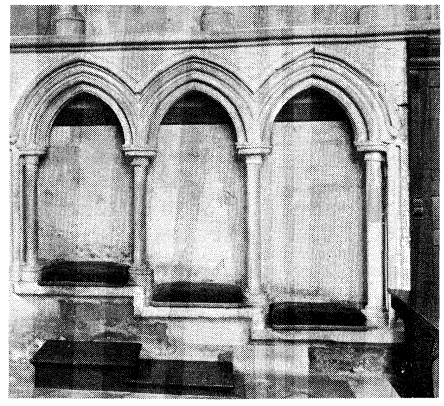
Adam Sedgwick, engraving by C. Butterworth and Heath, 19th century

BBC Hulton Picture Library

Sedgwick, Adam (b. Sept. 28, 1854, Norwich, Norfolk, Eng.—d. Feb. 27, 1913, London), English zoologist who is best known for his researches on the wormlike organism *Peripatus*, which he recognized as the zoologically important connecting link between the Annelida, or segmented worms, and the Arthropoda, such as crabs, spiders, and insects.

A grandnephew of the geologist Adam Sedgwick, he was educated at King's College, London, and Trinity College, Cambridge. In 1878 he became a lecturer in the school for zoological research directed by Francis Maitland Balfour, who was a leader of research in comparative anatomy and embryology. After Balfour's death in 1882 Sedgwick took charge of the school. In 1897 Sedgwick received a fellowship and tutorship at Trinity College, and two years later succeeded Alfred Newton as professor of zoology at Cambridge. He became professor of zoology at the Imperial College of Science and Technology, South Kensington, in 1909. He was the author, and subsequently the editor, of *A Student's Text-Book of Zoology*, 3 vol. (1898, 1905, 1909).

sedilia, in architecture, group of seats for the clergy in a Christian church of Gothic style. Usually consisting of three separate stone seats—for the priest, the deacon, and the subdeacon—the sedilia is located on the south side of the chancel, or choir, in a cruciform church (one that is built in the shape of a cross). The earliest sedilia were freestanding stone benches, but late in the 12th century church architects began to recess the sedilia into the chancel wall. Often these recessed seats are on three different levels, descending like steps from east to west. The niches they occupy are frequently decorated with rich canopies, elegantly carved arches, and pinnacles.



Sedilia in the parish church of Cherry Hinton, Cambridgeshire, England, second quarter of the 13th century

A.F. Kersting

sedimentary facies, physical, chemical, and biological aspects of a sedimentary bed and the lateral change within sequences of beds of the same geologic age. Sedimentary rocks can be formed only where sediments are deposited long enough to become compacted and cemented into hard beds or strata. Sedimentation commonly occurs in areas where the sediment lies undisturbed for many years in sedimentary basins. Whereas some such basins are small, others occupy thousands of square kilometres and usually have within them several different local depositional environments. Physical, chemical, and biological factors influence these environments, and the conditions that they produce largely determine the nature of the sediments that accumulate. Several different local (sedimentary) environments may thus exist side by side within a basin as conditions change laterally; the sedimentary rocks that ultimately are produced there can be related to these depositional environments. These different but contemporaneous and juxtaposed sedimentary rocks are known as sedimentary facies, a term that was first used by the Swiss geologist Amanz Gressly in 1838.

Sedimentary facies are either terrigenous, resulting from the accumulation of particles eroded from older rocks and transported to the depositional site; biogenic, representing accumulations of whole or fragmented shells and other hard parts of organisms; or chemical, representing inorganic precipitation of material from solution. As conditions change with time, so different depositional sites may change their shapes and characteristics. Each facies thus has a three-dimensional configuration and may in time shift its position.

There are several ways of describing or designating sedimentary facies. By noting the prime physical (or lithological) characteristics, one is able to recognize lithofacies. The biological (or more correctly, paleontological) attributes—the fossils—define biofacies. Both are the direct result of the depositional history of the basin. By ascribing modes of origin to different facies (*i.e.,* interpreting the lithofacies or biofacies) one can visualize a genetic system of facies. It is also common to speak of alluvial facies, bar facies, or reef facies, using the environment as a criterion. This may lead to confusion when revisions of interpretation have to be made because of new or more accurate information about the rocks themselves.

Just as there are regular associations of different local environments in modern sedimentary basins, associations of facies also are known to follow similar patterns in the stratigraphic column. A common example of the latter is that of regular lithofacies and biofacies successions being formed between the edge, or shoreline, of a water-filled basin and the deeper water at its middle. Coarse sediment gives way to finer sediment in the deepening water. Changes in sea level as time passes are a common cause of successive changes in the stratigraphic column. As sea level rises and the sea spreads across what was land, shallow-water sediments are laid down in the newest area to receive such material while areas that were shallow are now deeper and receive finer, or otherwise different, sediments. As the sea advances inland, the belts of sedimentation

follow and the retreat of the sea causes the belts to move back offshore.

Johannes Walther, a German geologist, noted in 1894 that the vertical facies sequence in a sedimentary basin undergoing expansion and deepening so that the sea transgresses the land surface (or the reverse, a regression) is the same as the horizontal sequence. This has enabled geologists, knowing the pattern of facies at the surface, to predict accurately what may also be found at depth within a sedimentary basin. It is clear, however, that Walther's observation only applies where there is no major break (*i.e.*, an erosional interval) in the continuity of the succession.

From studies of facies relationships to one another it has become recognized that the gradational, sharp, or eroded contacts between these rock bodies are also of significance in finding the mode of origin. It is also apparent that many facies follow one another in time and space in a repetitive way. A vertical pattern, for example, may be found in a borehole sunk vertically through a sequence of facies. This has been observed in many alluvial sequences and in the coal-bearing series of Carboniferous, Permian, and other systems. Facies under clay, coal, shale, and sandstone may be repeated many times and are called cyclothems. Cyclic or rhythmic sedimentation has been recorded in different rocks in many parts of the world and may arise in many ways; however, re-examination of many successions originally described as cyclic shows that this phenomenon is not as common or as constant as had been believed.

Today it is recognized that facies associations and distribution depend upon interrelated controls. The most important include sedimentary processes, sediment supply, climate, tectonics (earth movements), sea level changes, biological activity, water chemistry, and volcanic activity. Of these the environment of deposition (climate) and tectonic activity are paramount as they may ultimately regulate the other factors.

In industries that exploit earth resources such as fossil fuels, facies (or sedimentary basin) analysis is important in research. It may lead to predictions about where coal, petroleum, natural gas, or other sedimentary materials may be found. Apart from examination of rock specimens, this kind of analysis may also rely heavily upon the geophysical properties of the rocks, such as their densities and electrical magnetic and radioactive properties. Using information about these obtained in boreholes, rapid facies recognition and correlation may be made and the economically important resources may be located.

sedimentary rock, rock formed at or near the Earth's surface by the accumulation and lithification of sediment (detrital rock) or by the precipitation from solution at normal surface temperatures (chemical rock). Sedimentary rocks are the most common rocks exposed on the Earth's surface but are only a minor constituent of the entire crust, which is dominated by igneous and metamorphic rocks.

A brief treatment of sedimentary rocks follows. For full treatment, *see* MACROPAEDIA: Minerals and Rocks.

An important characteristic of sedimentary rocks is that they are formed in layers, each of which has features that reflect the conditions during deposition, the nature of the source material, means of transport, and in many cases a record of the organisms present during past geological time. Repeated or continuous formation provides a long-term record, though some modifications may have occurred and deposition may not be continuous at any one location.

Detrital (or clastic) rocks are the most common sedimentary rocks, and are formed from material released by the weathering and breakdown of igneous, metamorphic, and preexisting sedimentary rocks. This debris is transported by water, wind, or ice, deposited, and then cemented to form a coherent rock. Shale, breccia, conglomerate, clastic limestone, loess, and the sandstones quartzite, arkose, and graywacke are examples of detrital sedimentary rocks. Certain physical and chemical properties such as grain size, mineralogy, and cementation material provide a basis for their classification. For example, detrital rocks with grains less than 0.06 millimetre (0.002 inch) are classified as shales, those with grains from 0.06 to 2 mm (0.002 to 0.08 in) as sandstones, and those with grains larger than 2 mm as conglomerates. The constitutent minerals of a detrital rock are those of the source rock except in the case of unstable mineral varieties that readily break down, dissolve, or become altered. Whereas clay minerals, feldspars, and quartz will remain as transport distance or time of weathering increases, olivines, pyroxenes, and micas will be removed or altered. Detrital rocks are coherent because of the precipitation of cementing material—principally carbonate or quartz. Other distinctive features of detrital rocks are relatively large-scale sedimentary structures such as graded bedding, ripple marks, mud cracks, dune bedding, cross bedding, and swash marks. Each of these structures is characteristic of a particular depositional environment.

The second major group of sedimentary rocks, the chemical rocks, are formed by precipitation from solution at the site of deposition as a result of supersaturation or biogenic activity. Variable amounts of detrital material, especially clays and silt, may be present. By far the most common chemical rocks are limestones composed of calcite and aragonite, and dolomite (also known as dolostone) composed of the mineral dolomite. The mineralogy of the chemical rocks indicates depositional conditions; acidity (pH), oxidation-reduction potential Eh, salinity, and temperature, in particular, can be correlated with certain chemical deposits based on present-day observations or laboratory experiments. In addition to these physical factors, many invertebrates precipitate carbonates. Other chemical rocks include evaporites, such as halite, gypsum, and anhydrite, and organic rocks (*e.g.*, peat and coal).

The structure of chemical sedimentary rocks results from the segregation of originally dispersed substances, which include oolites, concretions, geodes, nodules, and septaria. These are round to irregular objects formed during or soon after sedimentation. Common nodules that are segregations of material different from the rock are chert, phosphates, and clay ironstones. Fossil remains are particularly common in limestones and dolomites either as original hard parts or as casts. Dolomites are usually recrystallized limestones in which magnesium has replaced calcium during or after deposition; grain size is generally coarse and structures are less apparent.

sedimentation, in the geological sciences, process of deposition of a solid material from a state of suspension or solution in a fluid (usually air or water). Broadly defined it also includes deposits from glacial ice and those materials collected under the impetus of gravity alone, as in talus deposits, or accumulations of rock debris at the base of cliffs. The term is commonly used as a synonym for sedimentary petrology and sedimentology.

The physics of the most common sedimentation process, the settling of solid particles from fluids, has long been known. The settling velocity equation formulated in 1851 by G.G. Stokes is the classic starting point for any discussion of the sedimentation process. Stokes showed that the terminal settling velocity of spheres in a fluid was inversely proportional to the fluid's viscosity and directly proportional to the density difference of fluid and solid, the radius of the spheres involved, and the force of gravity. Stokes' equation is valid, however, only for very small spheres (under 0.04 millimetre [0.0015 inch] in diameter) and hence various modifications of Stokes' law have been proposed for nonspherical particles and particles of larger size.

No settling velocity equation, however valid, provides a sufficient explanation of even the basic physical properties of natural sediments. The grain size of the clastic elements and their sorting, shape, roundness, fabric, and packing are the results of complex processes related not only to the density and viscosity of the fluid medium but also to the translational velocity of the depositing fluid, the turbulence resulting from this motion, and the roughness of the beds over which it moves. These processes also are related to various mechanical properties of the solid materials propelled, to the duration of sediment transport, and to other little-understood factors.

Sedimentation is generally considered by geologists in terms of the textures, structures, and fossil content of the deposits laid down in different geographic and geomorphic environments. Great efforts have been made to differentiate between continental, near-shore, marine, and other deposits in the geologic record. The classification of environments and criteria for their recognition is still a subject of lively debate. The analysis and interpretation of ancient deposits has been advanced by the study of modern sedimentation. Oceanographic and limnologic expeditions have shed much light on sedimentation in the Gulf of Mexico, the Black Sea, and the Baltic Sea, and in various estuaries, lakes, and fluvial basins in all parts of the world.

Chemical sedimentation is understood in terms of chemical principles and laws. Although the famous physical chemist J.H. van't Hoff applied the principles of phase equilibria to the problem of crystallizing brines and the origin of salt deposits as early as 1905, little effort was made to apply physical chemistry to the problems of chemical sedimentation. More recently, however, there has been investigation of the role of the redox (mutual reduction and oxidation) potential and pH (acidity–alkalinity) in the precipitation of many chemical sediments, and a renewed effort has been made to apply known thermodynamic principles to the origin of anhydrite and gypsum deposits, to the chemistry of dolomite formation, and to the problem of the ironstones and related sediments.

The geochemist also considers the sedimentation process in terms of the chemical end products. To him sedimentation is like a gigantic chemical analysis in which the primary constituents of the Earth's silicate crust are separated from one another in a manner similar to that achieved in the course of a quantitative analysis of rock material in the laboratory. The results of this chemical fractionation are not always perfect, but by and large the results are remarkably good. Geochemical fractionation, which began in Precambrian time, has resulted in an enormous accumulation of sodium in the sea, calcium and magnesium in the limestones and dolomites, silicon in the bedded cherts and orthoquartzitic sandstones, carbon in the carbonates and carbonaceous deposits, sulfur in the bedded sulfates, iron in the ironstones, and so on. Although magmatic segregation has, in some instances, produced monomineralic rocks such as dunite and pyroxenite, no igneous or metamorphic process can match the sedimentation process in effective isolation and concentration of these and other elements.

sedimentation tank, also called SETTLING TANK, component of a modern sewage-treatment system. In a large metropolitan system,

waste water is passed through a series of tanks following coarse screening to remove large objects. Grit chambers settle out sand and cinders; primary settling tanks remove heavy organic solids; and aeration tanks mix the incoming sewage with activated, bacteria-rich sludge and fine air bubbles, causing the rapid oxidation of organic matter. Final settling tanks remove the remaining suspended solids from the mixture.

The German engineer Karl Imhoff developed a two-layer tank that collects sediments in its upper layer and permits the accumulated solids to slide down to the lower compartment, where bacterial action takes place. Newer tanks have pumping mechanisms that permit more rapid treatment, though Imhoff tanks continue to be widely used for settling prior to filtration through sand beds. *See also* activated-sludge method.

sedimentology, scientific discipline that is concerned with the physical and chemical properties of sedimentary rocks and the processes involved in their formation, including the transportation, deposition, and lithification (transformation to rock) of sediments. The objective of much sedimentological research is the interpretation of ancient environmental conditions in sediment source areas and depositional sites. Sedimentologists study the constituents, textures, structures, and fossil content of the deposits laid down in different geographic environments. By these means they can differentiate between continental, littoral, and marine deposits of the geologic record.

sedition, crime against the state. Though sedition may have the same ultimate effect as treason, it is generally limited to the offense of organizing or encouraging opposition to government in a manner (such as in speech or writing) that falls short of the more dangerous offenses constituting treason.

The publication of seditious writing ("seditious libel") or the utterance of seditious speech ("seditious words") was made a crime in English common law. Modern statutes have been more specific. The display of a certain flag or the advocacy of a particular movement such as criminal syndicalism or anarchy have been declared from time to time to be seditious. In the United States after World War II, loyalty oaths were imposed for some government officials, and investigations and dismissals of certain public employees were made on the basis of their associations with suspect causes and groups. *See also* treason.

Sedition Act (U.S., 1798): *see* Alien and Sedition Acts.

Sedley, Sir Charles, 4TH BARONET (b. March 1639, Aylesford, Kent, Eng.—d. Aug. 20, 1701, Hampstead, London), English Restoration poet, dramatist, wit, and courtier.

Sedley attended the University of Oxford but left without taking a degree. He inherited the baronetcy on the death of his elder brother. After the Restoration (1660) he was a prominent member of the group of court wits. Charles II delighted in his conversation. The dramatists John Dryden and Thomas Shadwell were among his friends, and Dryden introduced him into his essay *Of Dramatick Poesie* under the name of Lisideius. Sedley was an active supporter of William and Mary at the time of the 1688 revolution. In later life he seems to have become a serious legislator. He sat in all the parliaments of William III as member for New Romney, and his speeches were considered to be thoughtful and sensible.

Sedley's plays span the period 1668–87; notable among them is *Bellamira* (1687), a racy, amusing rehandling of the theme of the *Eunuchus* of the Roman playwright Terence. Sedley's literary reputation, however, rests on his lyrics and verse translations. His best lyrics, such as the well-known "Phillis is my only Joy," have grace and charm. His verse translations of the eighth ode of Book II of Horace and the fourth *Georgic* of Virgil have been highly praised. The first collected edition of his works was published in 1702; a later one, edited by Vivian de Sola Pinto, in two volumes, was published in 1928 with a study of the author.

Sedley's son predeceased him, and the baronetcy became extinct upon Sedley's death.

Sedom, also spelled SODOM, industrial site in southeastern Israel, near the southern end of the Dead Sea. It is the site of the Dead Sea Works Ltd., an Israeli national company chartered by the Knesset (parliament) in 1961. The biblical cities of Sodom and Gomorrah (*q.v.*) are believed to have been located in the vicinity; modern Sedom takes its name from the Hebrew form of the first of these.

Sedom was established in 1937, when potash works were built there as a branch of the Palestine Potash Company at Kalīyā, at the northern end of the Dead Sea. There was no road connection to Sedom; communication was by small boats on the Dead Sea. Early in the Arab-Israeli War of 1948–49, isolated Kalīyā fell to Transjordan's Arab Legion, and Sedom was cut off from Israel. It was supplied by air for more than six months, after which a relief column of the Israel Defense Forces reached it overland from Beersheba through the Negev. Early in 1952 the all-weather road from Beersheba to Sedom was completed, and in 1954 the Dead Sea Works there resumed operation.

Much of the shallow southwestern corner of the Dead Sea has been enclosed by a dike; from there, the waters are pumped into evaporating pans. The residue, after solar evaporation, is an impure form of the mineral carnallite. It is refined at the site to produce 97 percent pure potassium chloride (potash muriate). Further processing of the carnallite produces bromine and ethylene bromide. The operations at Sedom are one of the few sources of potash fertilizer in all Asia and Africa. Because of high humidity and summer temperatures (August average 94° F [34° C]), the workers do not live at the site year-round but commute from ʿArad and Dimona.

sedra (Judaism): *see* sidra.

seduction, in law, the act of a man enticing (without the use of physical force) a previously chaste woman to consent to sexual intercourse. In broader usage, the term refers to any act of persuasion, between heterosexual or homosexual individuals, and excluding the issue of chastity, that leads to sexual intercourse.

Seduction has not as a rule been a criminal offense in most Western countries, but in the United States statutes in most states imposed criminal liability upon the seducing male. The elements of the crime varied, consisting of one or more of the following: intercourse with a female by trickery or under a promise of marriage; a requirement that the female be previously chaste; a requirement that the female be under a certain age, ranging from 18 to 25; and a requirement that the defendant be over a certain age. A seduction prosecution was barred in most states by marriage with the seducer and in others by an offer of marriage. Several states refused to allow a conviction for seduction without corroboration of the testimony of the seduced female. *See also* rape.

sedum, also called STONECROP, or ORPINE (genus *Sedum*), any of about 600 species of succulent plants in the family Crassulaceae, native to the temperate zone and to mountains in the tropics. Some species are grown in greenhouses for their unusual foliage and sometimes showy flowers, of white, yellow, pink, or red.

The low-growing kinds are popular in rock gardens and rock walls and as edging in garden borders. Golden stonecrop, or wall-pepper (*S. acre*), white stonecrop (*S. album*), and *S. spurium* are mosslike mat formers often found on rocks and walls. Useful garden ornamentals include the somewhat larger *S. maximum,* with greenish flowers; the orpine, or livelong (*S. telephium*), with red-purple flowers; and October plant (*S. Sieboldii*), with pink flowers and blue-green leaves.

Mexican stonecrop (*S. mexicanum*), with yellow flowers, makes a handsome hanging basket, as do several related sedums, such as burro's-tail, also called donkey's-tail (*S. Morganianum*), and carpet sedum (*S. lineare*).

Seebeck, Thomas Johann (b. Apr. 9, 1770, Tallinn, Estonia, Russian Empire—d. Dec. 10, 1831, Berlin, Prussia [Germany]), German physicist who discovered (1821) that an electric current flows between different conductive materials that are kept at different temperatures, known as the Seebeck effect.

Seebeck studied medicine at Berlin and at the University of Gottingen, where he acquired an M.D. in 1802. However, he abandoned medical practice for scientific research. He was chosen (1814) as a member of the Berlin Academy and was awarded (1816) the academy's annual prize for his investigation of polarization in stressed glass.

In numerous experiments on the magnetizability of various metals, he observed the anomalous reaction of magnetized red-hot iron, which eventually resulted in the phenomenon now known as hysteresis. Continued experiments with different metal pairs and a variety of conductors revealed that it was possible to place the many conducting materials in a thermoelectric series.

His most important contribution, however, was the Seebeck effect. He discovered that if a copper strip was joined to a strip of bismuth to form a closed circuit, heating one junction induced a current of electricity to flow around the circuit as long as the difference in temperature existed. This remained true of any pair of metals, and his original experiment revealed that merely holding one junction by hand was adequate to produce a measurable current.

Seebeck effect, production of an electromotive force (emf) and consequently an electric current in a loop of material consisting of at least two dissimilar conductors when two junctions are maintained at different temperatures. The conductors are commonly metals, though they need not even be solids. The German physicist Thomas Johann Seebeck discovered (1821) the effect. The Seebeck effect is used to measure temperature with great sensitivity and accuracy (*see* thermocouple) and to generate electric power for special applications.

Consult the INDEX *first*

Seeberg, Peter (b. June 22, 1925, Skrydstrup, Den.), Danish novelist influenced by French existentialism.

Seeberg's first book appeared in 1956, *Bipersonerne* ("Secondary Characters"), a novel about a collective of foreign workers in Berlin toward the end of World War II. These workers inhabit an unreal world, a film studio, at an unreal time, and their alienation gradually becomes symbolic of the human condition in general. Seeberg's style is one of utmost objectivity, and he consciously refrains from all commentary. A similar theme runs through *Fugls Føde* (1957; "Bird Pickings"), but, in this novel, reality is perceived exclusively through the consciousness of the main character, a nihilistic writer who vainly attempts to create something "real" with his literature. The work is a merciless portrayal of alienation in Western culture. The same loss of identity afflicts

the depersonalized figures in Seeberg's collection of short stories, *Eftersøgningen* (1962; "The Search"). These characters act but lack all awareness of the motives of their actions.

Seeckt, Hans von (b. April 22, 1866, Schleswig, Prussia—d. Dec. 27, 1936, Berlin), German general and head of the Reichswehr (army) from 1920 to 1926, who was responsible for successfully remodelling the army under the Weimar Republic.

Seeckt entered the German Army in 1885. By 1889 he was a member of to the general staff, where he remained for the next two decades. During World War I he became chief of staff of the 11th Army (February 1915) and later served as chief of staff of the Turkish Army.



Seeckt

By courtesy of Bildarchiv Preussischer Kulturbesitz BPK, West Berlin

Appointed in November 1919 head of the Truppenamt (Troops Bureau), the republican successor of the German imperial general staff, which had been proscribed by the Versailles treaty, Seeckt clandestinely became the creator of a small but remarkably efficient army. He recognized that a Russo-German alliance would be an almost unbeatable combination in any general war, and he encouraged the Treaty of Rapallo (1922) normalizing relations between the two powers and promoted other, secret agreements. In return for German training of the Soviet Army and aid in the construction of heavy industry, the Reichswehr was able to train tank and air crews in the Soviet Union and experiment with the latest weapons, thereby effectively circumventing the Versailles treaty.

The heart of Seeckt's policy was to maintain the power and prestige of the army by avoiding internal dissension. In 1926, however, he made two crucial mistakes in regularizing duelling between officers and approving the participation of a Hohenzollern prince in Reichswehr manoeuvres. The resulting public and parliamentary outcry forced his resignation on Oct. 8, 1926. Thereafter, Seeckt served as a conservative member of the Reichstag (parliament) in 1930–32 and, in 1934–35, as an adviser to the Chinese Nationalist Army. His memoirs, *Aus meinem Leben* ("From My Life") and *Aus seinem Leben* ("From His Life"), appeared in 1938 and 1940.

seed, reproductive structure in plants that consists of a miniature plant, or embryo, usually accompanied with a supply of food and enclosed in a protective coat.

A brief treatment of seeds follows. For full treatment, *see* MACROPAEDIA: Reproduction and Reproductive Systems.

In typical flowering plants, seed production follows pollination and fertilization. Grains of pollen that fall on a flower's pistil germinate and form pollen tubes that grow downward to reach the ovules at the base of the pistil. There fertilization is accomplished as a sperm cell from a pollen tube unites with the egg cell of an ovule; the fertilized egg divides and gives rise to the plant embryo. In a process of double fertilization, another sperm cell unites with two nuclei in the ovule to produce a nutrient tissue called the endosperm. A protective coat grows around the embryo and endosperm, and the seed is formed. As the seeds mature, the ovary that enclosed the ovules develops into a fruit containing the seeds. In many plants, seed and fruit become fused into one entity and are dispersed together as a so-called diaspore; in other plants, the seeds are discrete units.

Gymnosperms have ovules that are exposed rather than being enclosed in an ovary. This group of plants is characterized by a long time span between pollination and fertilization, and the ovules begin to develop into seeds long before fertilization takes place. In one species of pine, for example, the cones containing the ovules start to develop in the winter and are pollinated in the spring. The egg cells are not fertilized until the second growing season, and the mature seeds are not ready for release until the third year.

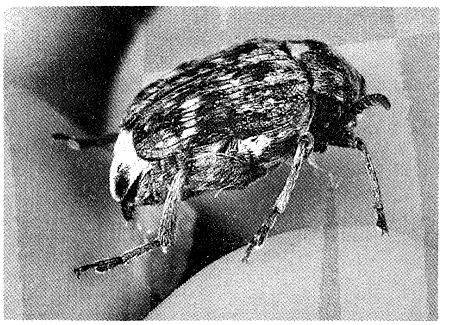
Most seeds are small in size, weighing less than a gram. The smallest are those that contain no food reserve, belonging to orchids and other plants that obtain their nutrients from other organisms. At the opposite extreme is the seed of the double coconut palm, which may weigh up to 27 kilograms (about 60 pounds). Because seeds constitute the chief food of many animals, the survival of plant species is enhanced by the production of many small seeds rather than a few large ones. Both the size and the shape of seeds and diaspores are important to their mode of dispersal. The roundness or flatness of seeds helps determine whether they will roll or germinate where they land. Some species produce seeds that differ in lengths of dormancy and means of dispersal, providing an insurance against environmental disasters.

Seeds are highly adapted to transportation by animals, wind, and water. Fleshy fruits and berries attract birds and animals by their inviting odours, colours, and tastes and contain seeds with a tough covering that resists digestion. Mammals ranging in size from mice to elephants feed on seeds and excrete undigested seeds in another spot. Furry mammals are the most frequent carriers of burrlike diaspores that cling to them with spines, hooks, barbs, or bristles. Many birds carry fruits, nuts, and seeds in their beaks. Some of these are eaten; others are dropped or cached and left behind.

Wind is the major dispersal agent for plants with tiny seeds or with diaspores that have special structures to catch air currents. Some seeds travel in the wind by means of tufts, plumes, or hairs; others have wings for gliding or are inflated to resemble tiny balloons. With tumbleweeds, the whole plant breaks off and blows across the country, scattering seeds as it goes. Many beach, pond, and swamp plants have seeds enclosed in corky or air-containing fruits that float on water currents to a new site for germination. A number of plants are characterized by self-dispersal. Some of these use mechanisms to forcibly eject their seeds; others have creeping diaspores with appendages capable of coiling and flexing.

Seeds require different amounts of moisture, light, and temperature before germination can take place. When the circumstances are favourable, water and oxygen penetrate the seed coat, and the new plant begins to grow. The longevity of seeds varies widely; some seeds remain viable for only about a week, while others have been known to germinate after hundreds or even thousands of years.

seed beetle, any member of the more than 900 species of the insect family Bruchidae (order Coleoptera). Seed beetles are oval or egg shaped, 1 to 10 millimetres (up to 2/5 inch) in length, and black or brown in colour. The



Pea weevil (*Bruchus pisorum*)

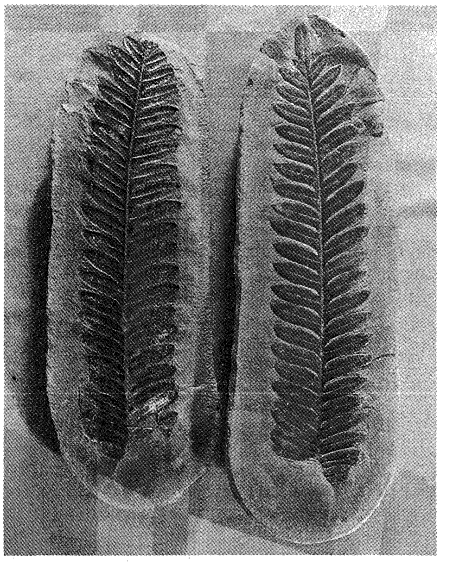
Jacques Six

abdomen extends beyond the short forewings (elytra). The best known species are the pea weevil (*Bruchus pisorum*) and the bean weevil (*Acanthoscelides obtectus*). They occur throughout the world; their larvae live in and feed on dried seeds.

The pea weevil is dark brown, about 5 mm (1/5 in.) long, and has white markings on its elytra. The female deposits her eggs on young pea pods; the larvae bore through the pod and into the peas. Pea seeds that float when placed in a bowl of water are infested.

The bean weevil, unlike the pea weevil, deposits eggs on dry seeds and will breed many times. It resembles the pea weevil but lacks the white markings on the elytra.

seed fern, any plant of the extinct order Pteridospermales, class (sometimes division) Cycadophyta, abundant during the Carboniferous and Permian periods (from 345,000,000 to 225,000,000 years ago). They had large fernlike fronds. Some species looked much like certain tree ferns of today; however, there is little evidence that they originated from



Seed fern (*Alethopteris serli*) from McLuckie Collection

John Gerard—EB Inc.

true ferns. Although seed ferns are regarded by some as possible ancestors of angiosperms (flowering plants), certain anatomical difficulties seem to preclude such a close relationship.

Three Paleozoic families are represented from Paleozoic times (ending 225,000,000 years ago): Lyginopteridaceae, Medullosaceae, and Calamopityaceae. *Lyginopteris,* a Late Carboniferous genus, is the most primitive known member of the order; it had stems up to 3 centimetres (1 1/4 inches) across and fronds up to 50 centimetres (20 inches) long. *Medullosa* species had complex stems with several bundles of conducting vessels, a condition with-

out exact parallel in modern plants; *M. noei* was up to 5 metres (16 feet) tall. The family Calamopityaceae is a catch-all group for Paleozoic stem types that do not fit into either of the other families.

Mesozoic seed ferns (from 65,000,000 to 225,000,000 years old) include the families Peltaspermaceae, an early group with a stalked seed-bearing organ resembling roughly a sunflower head; Corystospermaceae, with a variety of protected reproductive structures; and Caytoniaceae (sometimes given as an order, Caytoniales), the most highly specialized gymnosperm (naked-seeded plant) closely approximating the flowers and fruits of the angiosperms.

seed plant: *see* spermatophyte.

seed shrimp: *see* mussel shrimp.

seedeater, broadly, any songbird that lives chiefly on seeds and typically has a more or less strong conical bill for crushing them. In this sense, the term includes the sparrows, buntings, finches, grosbeaks, canaries, weavers, and waxbills.

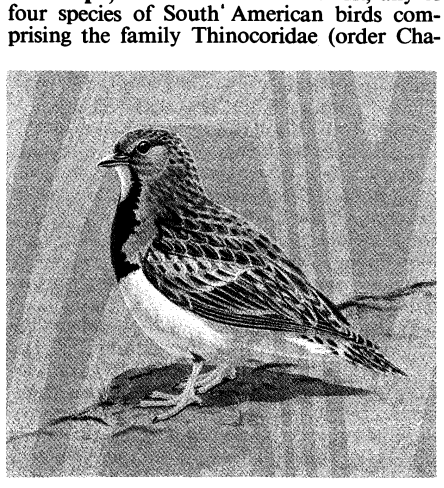
Seedeater also is the particular name of about 30 species of the genus *Sporophila,* of the subfamily Emberizinae, family Fringillidae. Common in the warmer parts of the New



Streaky seedeater (*Serinus striolatus*)
A.J. Deane—Bruce Coleman Ltd.

World, these little birds flock to feed on grass seeds and, at night, roost close together. A widespread example is the variable seedeater (*S. aurita*); the male's black-and-white or black-and-brown markings show much individual and geographic variation. In Cardueliidae (considered by many authors to be a subfamily of the Fringillidae) are species of *Serinus* (canaries) that are called seedeaters in eastern and southern Africa; the yellow-rumped seedeater, or black-throated canary (*S. atrogularis*), is a familiar form.

seedsnipe, also called LARK PLOVER, any of four species of South American birds comprising the family Thinocoridae (order Charadriiformes). The seedsnipe, related to such shorebirds as the gulls and terns, is adapted to a diet of seeds and greens. Seedsnipes are streaked birds with short, rounded tail and long wings. They are the only charadriiform birds with covered nostrils and the only ones that eat predominantly vegetable matter. Seedsnipes flock on tundra and pampas from the Falkland Islands to southern Argentina and Ecuador. The smallest (15 centimetres or 6 inches) and most widely distributed species is the least, pygmy, or Patagonian seedsnipe (*Thinocorus rumicivorus*). It covers its eggs with sand when it leaves the nest. The largest (about 30 cm, or 12 in.) is Gay's seedsnipe (*Attagis gayi*), which nests high in the Andes.



Least seedsnipe (*Thinocorus rumicivorus*)
Painting by John P. O'Neill

Consult the INDEX *first*

Seeger, Pete, byname of PETER SEEGER (b. May 3, 1919, New York City), singer who sustained the folk music tradition and who was the principal inspiration for younger performers in the folk revival of the 1960s.

Leaving Harvard after two years in 1938, Seeger hitchhiked and rode freight trains around the country, gathering country ballads, work songs, and hymns and developing a remarkable virtuosity on the five-string banjo. In 1940 he organized the Almanac Singers, a quartet that also featured the folk singer and composer Woody Guthrie, and appeared at union halls, farm meetings, and wherever his populist political sentiments were welcome. The group disbanded soon after World War II.

In 1948 he formed another group, the Weavers—with Lee Hays, Ronnie Gilbert, and Fred Hellerman—that achieved considerable success on college campuses, in concert, and on several records. Shortly after the group had achieved national fame, however, a great deal of controversy was stirred up concerning Seeger's previous activities in left-wing and labour politics, and the Weavers suddenly found themselves blacklisted by much of the entertainment industry. Finding it increasingly difficult to make concert bookings or to sell records, the group broke up in 1952 but reunited three years later when a Christmas concert at Carnegie Hall sparked new interest in their music and message. Seeger left the group in 1958, and it disbanded in 1963. (The Weavers gave two reunion concerts in 1980, and a motion picture documentary about the group, *Wasn't That A Time!,* was released in 1982.) After the 1950s Seeger usually worked alone or with his family. As a solo performer he was still a victim of blacklisting, especially after his 1961 conviction for contempt of Congress stemming from his refusal in 1955 to answer questions posed to him by the House Committee on Un-American Activities concerning his political activities. Although Seeger's conviction was overturned the following year in an appeal, for several years afterwards the major networks refused to allow him to make television appearances. In later years the controversy surrounding the performer gradually subsided.

A beloved fixture at folk festivals, Seeger was given major credit for fostering the growth of the hootenanny (a gathering of performers playing and singing for each other, often with audience participation) as a characteristically informal and personal style of entertainment. Among the many songs that he wrote himself or in collaboration with others were "Where Have All the Flowers Gone," "If I Had a Hammer," "Kisses Sweeter Than Wine," and "Turn, Turn, Turn." His *The Incompleat Folksinger* (1972) is a collection of his writings on the history of folk songs, civil rights, and performers in his lifetime.

In the 1970s and '80s he was active in a program to remove pollution from the Hudson River, building the Hudson River sloop Clearwater, promoting festivals for its maintenance,



Seeger, 1971
David Gahr

and engaging in environmental demonstrations, particularly antinuclear ones. His father was the influential musicologist Charles Seeger, and his uncle the poet Alan Seeger.

Seegers, Hercules Pietersz(oon) (Dutch painter): *see* Seghers, Hercules Pietersz(oon).

seeing, in astronomy, sharpness of a telescopic image. Seeing is dependent upon the degree of turbulence in the Earth's atmosphere for a given telescope. Scintillation, the "twinkling" of stars to the unaided eye, is a commonly known result of turbulence in the higher reaches of the atmosphere. Poor seeing in telescopes is more a result of turbulence in the lower atmosphere.

Turbulence, whether in the upper or lower atmosphere, generates unstable regions of varying densities, diminishing the atmosphere's ability to allow a beam of light to pass straight through with unchanging intensity. When the light from a celestial object is moved about in a rapid and random fashion by atmospheric turbulence, the image formed by a small telescope flutters and dances about. In a larger telescope, the distortions are magnified and the image becomes more diffuse.

Seeing Eye dog: *see* guide dog.

Seeker, member of any of numerous small groups of separatist Puritans in 17th-century England seeking and waiting for new prophets revealing God's true church. They subscribed to the principles enunciated by such reformers as Kaspar Schwenckfeld of Lower Silesia, Sebastian Franck of Swabia, and Dirck Coornhert of the Netherlands, who denied the effectiveness of the sacraments, Baptism, and the Scriptures as a means of salvation. Their services were silent meetings at which one spoke only when inspired to do so. The Seekers gave rise to the Society of Friends (Quakers). Persecuted in Europe, many settled in Rhode Island, whose founder, Roger Williams, professed Seeker ideas and advocated absolute religious freedom for all.

Seekonk River, navigable stream about 5 mi (8 km) long, formed by the widened Blackstone River at Pawtucket, Rhode Island, U.S. The Seekonk joins the Providence River at Providence city; it is the most northerly point of Narragansett Bay tidewater. Seekonk is an Indian name probably meaning "at the outlet."

seepage, in soil engineering, movement of water in soils, often a critical problem in building foundations. Seepage depends on several factors, including permeability of the soil and the pressure gradient, essentially the combination of forces acting on water through gravity and other factors. Permeability can vary over a wide range, depending on soil structure and composition, making possible the safe design of such structures as earth dams and reservoirs with negligible leakage loss, and other structures such as roadbeds and filtration beds in which rapid drainage is desirable.

Seers, Eugène, pseudonym LOUIS DANTIN (b. 1865, Beauharnois, Que. [Canada]—d. Jan. 17, 1945, Boston, Mass., U.S.), French-Canadian poet and critic who is regarded as the first major literary critic of Quebec.

While a member of the religious order Congrégation de Très Saint-Sacrement, he wrote religious poetry, short stories, and critical articles, especially on the poetry of the French-Canadian Émile Nelligan. He left the order in 1903 and became a typographer in Boston and later worked for the Harvard University Press. His criticism, at first in the form of correspondence with French-Canadian authors, achieved recognition in Montreal in the 1920s. In his *Poètes de l'Amérique française* (1928; "Poets of French America") and *Gloses critiques* (2 series, 1931 and 1935; "Critical Comments"), Seers insisted on judging a work solely on artistic merit. He was also the author of *Le Coffret de Crusoé* (1932; "Crusoe's Chest"), a volume of poems dealing with his loss of faith, and *Les Enfances de Fanny* (1951), a semiautobiographical novel.

Sefardi (Judaism): *see* Sephardi.

Sefardic language: *see* Ladino language.

Sefer ha-bahir (Hebrew: "Book of Brightness"), largely symbolic commentary on the Old Testament, the basic motif of which is the mystical significance of the shapes and sounds of the Hebrew alphabet. The influence of the *Bahir* on the development of Kabbala (esoteric Jewish mysticism) was profound and lasting.

The book seems to have first appeared in Provence, Fr., in the latter half of the 12th century. Kabbalists themselves considered the book to be much older, falsely attributing its oldest traditions to Rabbi Nehunya ben Haqana (about 1st century AD) and crediting many of the book's sayings to early Jewish scholars called tannaim (1st to 3rd century) and amoraim (3rd to 6th century). An objective assessment of the medieval text seems to indicate that the author of the *Bahir* merely incorporated into his work certain mystical texts and concepts that had earlier made their way to Europe from the East.

Though the *Bahir* is unsystematic, generally enigmatic, and written in a mixture of Hebrew and Aramaic, it successfully introduced into Kabbala—and through Kabbala, into Judaism—an extensive mystical symbolism; Gershom Gerhard Scholem, a 20th-century Jewish scholar, sees this as its most significant influence on Jewish religious thought. The *Bahir,* for example, contains the earliest-known explanation of the 10 "divine emanations," which, in a mysterious way, are said to symbolize and explain the creation and continued existence of the universe. These 10 *ma'amarot* ("sayings"), divided into 3 upper and 7 lower manifestations, became widely known in Kabbala as *sefirot* ("numbers").

The *Bahir* also introduced into Kabbalistic speculations the concept of the transmigration of souls (*gilgul*) and the notion of a cosmic, or spiritual, tree to symbolize the flow of divine creative power. In addition, evil was said to be a principle found within God himself. The last part of the book draws heavily on an ancient mystical text called *Raza rabba* ("The Great Mystery"). Whereas Kabbalists viewed the *Bahir* as authoritative, others rejected it as heretical.

Sefer ha-temuna (Hebrew: "Book of the Image"), anonymous work in Hebrew that imbues the letters of the Hebrew alphabet with a mystical significance and claims that there are invisible parts of the Torah. The book first appeared in Spain in the 13th century.

The *Sefer ha-temuna* advances the notion of cosmic cycles (*shemiṭṭot*), each of which provides an interpretation of the Torah according to a corresponding divine attribute. Its primary treatment is of the first three *shemiṭṭot,* governed respectively by "grace," "judgment," and "mercy." Each eon, consequently, has its own Torah. Mankind, currently living under "judgment," reads the Torah as a series of prohibitions and commandments. This relativistic interpretation of the Torah strongly influenced the 17th-century messianic movement in Turkey known as Shabbetaianism by helping to shape its theory that the Torah can be fulfilled only by its seeming annulment.

Sefer ha-zohar (Hebrew: "Book of Splendour"), 13th-century book, mostly in Aramaic, that is the classic text of esoteric Jewish mysticism, or Kabbala. Though esoteric mysticism was taught by Jews as early as the 1st century AD, the *Zohar* gave new life and impetus to mystical speculations through the 14th and subsequent centuries. Many Kabbalists, in fact, invested the *Zohar* with a sanctity that is normally accorded only to the Torah and the Talmud.

The *Zohar* consists of several units, the largest of which—usually called the *Zohar* proper—deals with the "inner" (mystical, symbolic) meaning of biblical texts, especially those taken from the first five books of the Bible (Torah), from the Book of Ruth, and from the Song of Solomon. The lengthy homilies of the *Zohar* are mixed with short discourses and parables, all centred on Simeon ben Yoḥai (2nd century AD) and his disciples. Though the text names Simeon as the author, modern scholars are convinced that the major portion of the *Zohar* should be credited to Moses de León (1250–1305) of Spain. They do not rule out the possibility, however, that earlier mystic materials were used or incorporated into the present text.

Because the mystery of creation is a recurrent theme in the *Zohar,* there are extensive discussions of the 10 divine emanations (*sefirot,* literally "numbers") of God the Creator, which reputedly explain the creation and continued existence of the universe. Other major topics are the problem of evil and the cosmic significance of prayer and good deeds.

After their expulsion from Spain in 1492, the Jews were much taken up with thoughts of the Messiah and eschatology and turned to the *Zohar* as a guide for mystical speculations. The greatest influence of the *Zohar,* especially among the masses, did not occur, therefore, until several centuries after the book was composed.

Sefer Ḥasidim, also spelled SEPHER ḤASIDIM (Hebrew: "Book of the Pious"), a highly valuable account of the day-to-day religious life of medieval German Jews known as Ḥasidim ("Pious Ones"). The authentic Ḥasid is described in terms of asceticism, humility, serenity, altruism, and strict ethical behaviour. Though the work is nonsystematic, it presents the combined teachings of the three leaders of German Ḥasidism during the 12th and 13th centuries: Samuel the Ḥasid, Judah the Ḥasid of Regensburg (his son), and Eleazar ben Judah of Worms. The book was intended as a religious guide.

Sefer Torah, also spelled SEPHER TORAH (Hebrew: "Book of the Law"), in Judaism, the first five books of the Old Testament written in Hebrew by a qualified calligrapher (*sofer*) on vellum or parchment and enshrined in the ark of the Law (*aron ha-qodesh*) in synagogues. The Sefer Torah is used for public readings during services on Sabbaths, Mondays, Thursdays, and religious festivals. While Sephardic (Spanish-rite) Jews often enclose the Sefer Torah in a case of wood or metal, Ashkenazi (German-rite) Jews generally cover it with an ornate mantle of cloth, with ritual ornaments attached. In Sephardic congregations the Sefer Torah is displayed to the congregation before the reading of the Law, but among Ashkenazim this occurs only after the daily reading has been completed. Torah scrolls are removed and returned to the ark with a solemnity that reflects deep reverence for the Word of God.

Sefer Yetzira (Hebrew: "Book of Creation"), oldest known Hebrew text on white magic and cosmology; it contends that the cosmos derived from the 22 letters of the Hebrew alphabet and from the 10 divine numbers (*sefirot*). Taken together, they were said to comprise the "32 paths of secret wisdom" by which God created the universe. The book, falsely attributed to Abraham and thus sometimes called *Otiyyot de Avraham Avinu* ("Alphabet of Our Father Abraham"), appeared anonymously between the 3rd and 6th century AD, but interpolations were later added.

The *Yetzira* developed the pivotal concept of the 10 *sefirot,* which profoundly influenced subsequent Judaism. The first group of four represented universal elements (the spirit of God, air, water, and fire), whereas the last group represented the six spatial directions. The *sefirot* and the letters of the alphabet were likewise correlated to parts of the human body, thereby making man a microcosm of creation.

Medieval German pietistic Ḥasidism associated formulas of the *Yetzira* with the golem, a creature created by magic. Among the more important commentaries on the *Yetzira* were those of Sa'adia ben Joseph (882–942) and Isaac ben Solomon Luria (1534–72).

Seferis, George, pseudonym of GIŌRGIOS STYLIANOU SEFERIADĒS, also spelled YEORYIOS STILIANOU SEPHERIADES (b. March 13, 1900, Smyrna, Anatolia, Ottoman Empire [now İzmir, Tur.]—d. Sept. 20, 1971, Athens, Greece), Greek poet, essayist, and diplomat who won the Nobel Prize for Literature in 1963.

After studying law in Paris, Seferis joined the Greek diplomatic service and served in London and Albania prior to World War II, during which time he was in exile with the free Greek government. Following the war he held posts in Lebanon, Syria, Jordan, and Iraq and served as Greek ambassador in London (1957–62).

Seferis was at once acclaimed as "the poet of the future" on the publication of *I strofí* (1931; "The Turning Point"), his first collection of poems. It was followed by *I stérna* (1932; "The Cistern"), *Mithistórima* (1935; "Myth-History"), *Imerolóyion katastrómatos I* (1940; "Log Book I"), *Tetrádhio yimnasmáton* (1940; "Exercise Book"), *Poiímata* (1940; "Poems"), *Imerolóyion katastrómatos II* (1945), the long poem *Kíkhli* (1947; "Thrush"), *Poiímata 1924–46* (1950), and *Imerolóyion katastrómatos III* (1955). Selections of his poetry have been widely translated, the fullest English version being that by Edmund Keeley and Philip Sherrard (*George Seferis: Collected Poems 1924–1955* [1969]). Seferis also translated poetry into Greek and wrote essays, of which the chief are *Dhokimés* (1944) and *Erotókritos* (1946). He was honoured by the Academy of Athens in 1947. He is the most distinguished Greek poet of "the generation of the '30s," which introduced symbolism to modern Greek literature. His refined lyricism

and the freshness of his diction brought a new breath of life to Greek poetry. His work is permeated by a deep feeling for the tragic predicament of the Greeks, as indeed of modern man in general.

sefira, also spelled SEPHIRA (Hebrew: "number"), plural SEFIROT, or SEPHIROTH, in the speculations of esoteric Jewish mysticism (Kabbala), any of the 10 emanations, or powers, by which God the Creator was said to become manifest. The concept first appeared in the Sefer Yetzira ("Book of Creation"), as the 10 ideal numbers.

In the development of Kabbalistic literature, the idea was expanded and elaborated to denote the 10 stages of emanation from *En Sof* (the Infinite; the unknowable God), by which God the Creator can be discerned. Each *sefira* refers to an aspect of God as Creator; the rhythm by which one *sefira* unfolds to another was believed to represent the rhythm of creation. The mystical nature of the *sefirot* and the precise way in which they function were often disputed. Kabbalists used them as one of their principal subjects of mystical contemplation, despite vigorous criticism that such speculations were implicitly heretical.

The individual *sefirot* are *keter 'elyon* ("supreme crown"), *ḥalhma* ("wisdom"), *bina* ("intelligence"), *ḥesed* ("love"), *gevura* ("might"), *tif'eret* ("beauty"), *netzah* ("eternity"), *hod* ("majesty"), *yesod* ("foundation"), and *malkhut* ("kingship"). The *sefirot* have also been called by other names, the most popular being "crowns," "attributes," "principles," and "steps." Though often arranged in triads to form a right, left, and middle pillar, arrangements varied.

Sefrioui, Ahmed (b. 1915, Fès, Mor.), Moroccan novelist and short-story writer whose works record the everyday lives of the common people in Fès.

Sefrioui, the son of a Berber miller and educated in Fès, ultimately became director of the Bureau of Tourism there. He was one of the few French-speaking Maghribian writers to give sympathetic treatment to traditional Muslim life and values.

His first volume, *Le Chapelet d'ambre* (1949; "The Amber Rosary"), consists of 14 short pieces dealing with the lives of those unassimilated into French colonial culture. He wrote of Qur'ānic students (he had been one in his youth), of donkey drivers, pilgrims, artisans, shopkeepers, vagabonds, and mystics. A tone of melancholy pervades this world. In his first novel, *La Boîte à merveilles* (1954; "The Box of Wonders"), Sefrioui recalls his youth in this older, picturesque culture, "embalming" his past rather than glorifying it. A second novel, *La Maison de servitude* (1973; "The House of Servitude"), deals with the conflict raised by the demands of the Islāmic faith and of poetry, love, and revolution.

Sefton, district (borough), metropolitan county of Merseyside, England, extending along the Irish Sea coast from the Ribble Estuary in the north to the Mersey Estuary in the south. It includes industrial, residential, and agricultural sections within its 58 sq mi (150 sq km) area. It is named for the ancient parish of Sefton, seat of the Molyneux family (later earls of Sefton), who were important landowners in the region from 1100 onward.

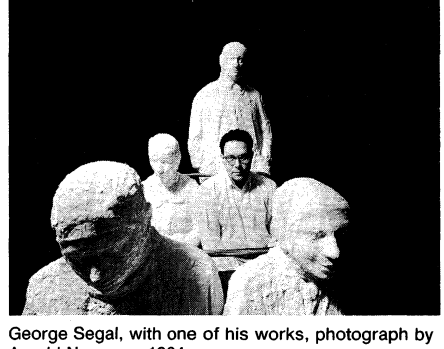
The growth of Liverpool brought new development to the area beginning in the late 18th century. The Liverpool docks gradually extended north toward Bootle, which today has the main docks of Merseyside, including the Royal Seaforth Dock and Container Base. There are many associated dock industries, including grain milling and edible oil refining, and new industrial estates have been developed. Bootle has also become important for office development and houses government departments and banking computer centres.

The building of the Liverpool–Southport railway in 1850 affected the whole coastal region. Liverpool merchants built their homes in Crosby, Formby, and Southport, and this coastal tract has remained a popular Merseyside residential area. Southport also grew as a holiday resort in the 19th century, and the tourist industry is important to the Sefton economy.

The Grand National Steeplechase is run at the Aintree racecourse in the southeast of the borough. Crosby is the home of a boys' school founded by the Merchant Taylors' Company in 1620 and a girls' school founded in 1888. The coastal dunes are used for golf courses such as Royal Birkdale at Southport. Pop. (1983 est.) 299,800.

Segal, George (b. Nov. 26, 1924, New York City), American sculptor of monochromatic, cast plaster figures often situated in environments of mundane furnishings and objects.

Segal was educated at the Cooper Union, Pratt Institute of Design, New York University (B.S., 1950), and Rutgers University (M.F.A., 1963) and began his artistic career as an abstract painter. In the late 1950s he was associated with members of the burgeoning Pop art movement; Segal's sculptures, however, cast from living models and outfitted with the bland commercial props of the Pop idiom, are distinguished from that characteristically ironic movement by a mute, ghostly anguish. His casting technique, in which the live model is wrapped in strips of plaster-soaked cheesecloth, imparts a rough texture and a minimum of surface detail to the figures, thus heightening the sense of anonymity and isolation.



George Segal, with one of his works, photograph by Arnold Newman, 1964

© Arnold Newman

Notable works include "The Truck" (1966), "The Laundromat" (1966–67), and "Hot Dog Stand" (1978).

Segamat, town, northwestern Johor state, West Malaysia (Malaya), on the Sungai (River) Segamat and the Kuala Lumpur–Singapore railway. Surrounded by oil-palm and rubber estates, the town is on the central Johor plains and has a small airfield. Granite and limestone quarries are nearby. Pop. (1980) 34,008.

Segantini, Giovanni (b. Jan. 15, 1858, Arco, Tyrol, Austrian Empire—d. Sept. 28, 1899, near Pontresina, Switz.), Italian painter known for his Alpine landscapes and allegorical pictures, which blended Symbolist content with the technique of Neo-Impressionism.

Brought up by peasants in the Italian Alps as a herdsman, Segantini spent long hours of solitude in drawing. His work was noticed by the local authorities, who sent him to art school in Milan. In 1894 he settled in the Engadin region of the Swiss Alps, where he remained for the rest of his life. While living in virtual isolation in Switzerland, he experimented with optical mixtures, a technique similar to that of the Pointillists. Possibly inspired by literary sources, he also evolved a Symbolist subject matter seen in such paintings as "The Punishment of Luxury" (1891; Walker Art Gallery, Liverpool), "The Unnatural Mothers," and "Love at the Fountain of Life" (1896; State Russian Museum, Leningrad). A pantheist by nature, he felt himself to be in mystic communion with his mountain environment. Segantini usually employed an Alpine background in his works and left unfinished a great triptych entitled "Life, Nature, and Death," which is exhibited in the Segantini Museum in Sankt Moritz, Switz.



"The Unnatural Mothers," oil painting by Giovanni Segantini, 1894; in the Kunsthistorisches Museum, Vienna

By courtesy of the Kunsthistorisches Museum, Vienna

Segar, Elzie (Crisler) (b. Dec. 8, 1894, Chester, Ill., U.S.—d. Oct. 13, 1938, Santa Monica, Calif.), U.S. cartoonist and creator of "Popeye," a comic strip in which the main character, a roughhewn sailor whose immense strength was derived from eating spinach, became a folk hero of international renown.

As a young man Segar worked as a house painter, sign painter, and motion-picture projectionist. After having many of his cartoons rejected, he took a correspondence course in cartooning, then went to Chicago, where the cartoonist Richard F. Outcault used his influence to get him a job on the *Herald,* drawing "Charlie Chaplin's Comic Capers." The paper ceased publication in 1917, and Segar went to New York, where he persuaded the King Features Syndicate to accept his ideas for a new strip, which appeared in 1919 as "Thimble Theatre." Initially the strip dealt largely with the fantastic adventures of Olive Oyl, a gawky old maid; Caster Oyl, her foolish brother; and Ham Gravy, her boyfriend. Popeye, the dominating character of the strip, did not appear until January 1929. A long-term romance ensued between Popeye and Olive Oyl, with Popeye overpowering his rivals with the help of spinach. A variety of characters entered the scene, perhaps the most notable being J. Wellington Wimpy, an artful sponger with a mania for hamburgers. The characters also appeared in hundreds of animated

cartoons produced by Max Fleischer. Popeye was so popular and so closely associated with spinach that, within six years of his appearance, a statue of him was erected in the central square of Crystal City, Texas, an important spinach-growing centre.

Segesta, Greek EGESTA, ancient city of Sicily, located about two miles (three kilometres) northwest of modern Calatafimi. It was the chief city of the Elymi, a people for whom Thucydides claimed a Trojan origin; they are archaeologically indistinguishable in the Early Iron Age (*c.* 1000–*c.* 500 BC) from their Sicanian neighbours. Culturally Segesta was Greek, but it generally took the Carthaginian side against its Greek neighbours; boundary disputes with Selinus, for instance, were frequent from 580 BC onward. When in 409 Hannibal, son of Gisgo, sacked Selinus, Segesta became a Carthaginian ally. Early in the First Punic War, however, the inhabitants massacred the Carthaginian garrison and allied themselves with Rome. Segesta was favourably treated under Roman rule; it became a free city, and the territory of Eryx may have been assigned to it.

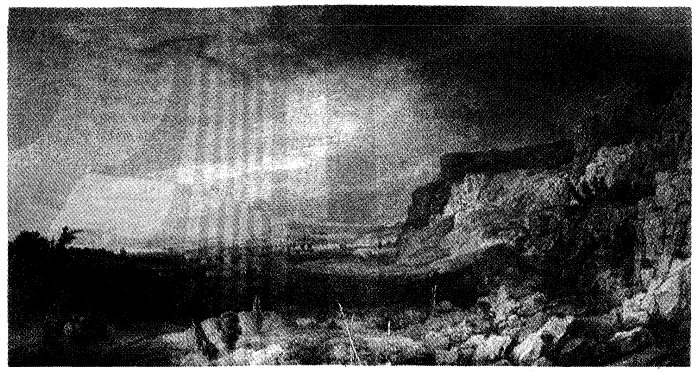
Seghers, Charles Jean (b. Dec. 26, 1839, Ghent—d. Nov. 28, 1886, Alaska), twice bishop of Vancouver Island, B.C., whose missionary activity in northwestern North America earned him the title Apostle of Alaska.

Seghers prepared for his missions at the American College of Louvain, Belg., was ordained in 1863, and soon embarked for the diocese of Vancouver Island. He interrupted his work there to attend the first Vatican Council (1869–70) as theologian to his bishop, Modeste Demers, whom he succeeded in 1873. Seghers in 1878 was appointed assistant to the archbishop of Oregon City, Ore., whose diocese included Oregon, Idaho, Montana, and northern California.

Three years later he became archbishop. His immediate task was to strengthen the Catholic school system there. In 1883 he journeyed to Rome with other U.S. archbishops to plan the proposed third Plenary Council of Baltimore, which helped develop the parochial school system in the United States. While he was in Rome, the see of Vancouver Island became vacant, and Seghers' offer to return there was accepted in 1885. During a visit to Alaska the following year, he was murdered by a demented companion. Sister Mary Mildred's English translation of Maurice de Baets' *Apostle of Alaska: Life of the Most Reverend Charles John Seghers* appeared in 1943.

Seghers, Hercules Pietersz(oon), Seghers also spelled SEGERS, SEEGERS, or ZEGERS, Hercules also spelled HERKULES (b. *c.* 1590, Haarlem?, Neth.—d. *c.* 1638, Amsterdam), Dutch painter and etcher of stark, fantastic landscapes.

Seghers studied with Gillis van Coninxloo in Amsterdam and was influenced by the work of Adam Elsheimer. Seghers' style contrasts strongly with the main aspects of the Dutch output of that period; most of his works would have been difficult to understand prior to their rediscovery in the 20th century. Early reports indicate that he was lonely and poor, though several contemporary artists, including Rembrandt, expressed admiration for his work. The majority of Seghers' works represent forbidding mountain scenes with jagged cliffs, desolate valleys, broken tree trunks, and scant traces of human habitation. His etchings belong to the most original and impressive experiments in the history of printmaking. He used different-coloured inks and often printed on coloured or dyed paper and even on canvas; the diversity of individual prints was increased by his adding accents by hand. Seghers' paintings are rare; few are documented, and many forgeries exist. Rembrandt owned several of his paintings and was obviously influenced by his landscapes.



"Mountainous Landscape with a Distant Panorama," oil on wood by Hercules Seghers; in the Uffizi, Florence

SCALA—Art Resource/EB Inc.

segmentation, also called METAMERISM, or METAMERIC SEGMENTATION, in zoology, the condition of being constructed of a linear series of similar parts, each being a metamere (body segment, or somite) and each being formed in sequence in the embryo, from anterior to posterior. All members of three large animal phyla are metameric: Annelida, Arthropoda, and Chordata. The first two exhibit conspicuous segmentation in the adult. In the Chordata, the repetitive metamerical pattern is evident in muscles, vertebrae, and ribs of the adult (*e.g.*, fishes), but even when less obvious (*e.g.*, mammals), the development of each individual is based firmly on formation of segments, the embryological somites (*q.v.*). Segments of the tapeworm (proglottids; *q.v.*) are formed so differently from the segments of the other three groups that most zoologists do not admit tapeworms to be metamerically segmented animals. Since the metamerism of Annelida and Arthropoda and that of Chordata probably arose independently, metamerism does not itself imply relationships between the groups; however, the particular metamerism within each group clearly demonstrates the derivative relationship of its members. In Acanthocephala and some members of Aschelminthes, external ringlike formations, called annulations, occur in the covering tissues, sometimes so marked as to suggest segmentations; these formations prove to be only superficial, however, and are not true segmentation.

segmented worm: *see* annelid.

Segner, Johann Andreas von (b. Oct. 9, 1704, Pressburg, Hung.—d. Oct. 5, 1777, Halle, Ger.), German physicist and mathematician who in 1751 introduced the concept of the surface tension of liquids, likening it to a stretched membrane. His view that minute and imperceptible attractive forces maintain surface tension laid the foundation for the subsequent development of surface tension theory.

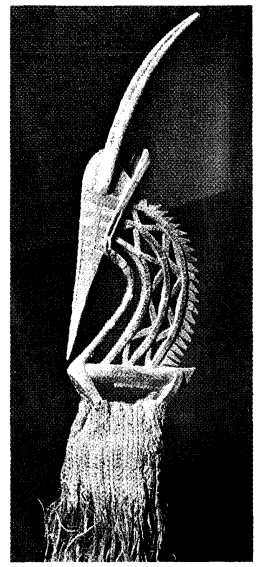
He taught physics and mathematics at Jena, Göttingen, and Halle and in 1750 developed a simple-reaction waterwheel. The study of this machine by the mathematician Leonhard Euler led to the development of a crude turbine. Segner also studied the theory of the spinning top and published *Elements of Arithmetic and Geometry* as well as *Nature of Liquid Surfaces.*

Segni, Antonio (b. Feb. 2, 1891, Sassari, Sardinia—d. Dec. 1, 1972, Rome), Italian statesman, twice premier (1955–57, 1959–60), and 14th president of the Italian Republic (1962–64).

A lawyer with a degree in agricultural and commercial law, he joined the Christian Democrat Party in 1919 (then called Partito Populare Italiano) and worked as an organizer in the provinces. In 1924 he was a member of the party's national council, but two years later all political organizations were dissolved by Mussolini. Segni taught agrarian law for 17 years at the universities of Pavia, Perugia, and Cagliari; he was also rector of Sassari University.

At the beginning of 1943 he was one of the organizers of the revived Christian Democrat Party in Sardinia and held ministerial portfolios in almost all the Christian Democrat governments from 1944 onward. As a principal representative of the right wing of the party and as a militant Roman Catholic, he became known as a "white Bolshevik" for his post-World War II introduction of agrarian reform while minister of agriculture (1946–51). His first premiership, as head of a coalition government, lasted almost two years; his second, which included only Christian Democrats, lasted only a year—not unusual in an Italy of shifting governments. After serving as president for two and a half years, he retired in 1965.

segoni-kun, mask derived from the antelope form, worn by a member of the *tyiwara* society of the Bambara tribe in West Africa. Believed to have great power over agricultural fertility, the spirit of the *tyi-wara* (work animal) was thought to be embodied in the stylized *segoni-kun* masks, which were worn by *tyiwara* dancers—on top of the head, affixed to a woven raffia cap—who impersonated the graceful movements of the antelope at cultivation ceremonies.



Bambara *segoni-kun,* wood and fibre, Mali; in the Pierre Verité Collection, Paris

A. Held—J.P. Ziolo

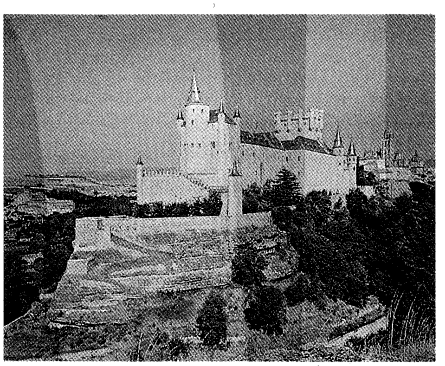
The varieties of the mask are numerous; while none is exactly alike, all are stylistically similar. Each is highly sculptural and dramatic in motion. The head, neck, and horns of the antelope are emphasized, the animal's body being treated in a less-expressive way. The repetition of decorative patterns, characteristic of the Bambara style, is found on even the most highly abstracted *segoni-kun* mask.

Ségou, town, south-central Mali, western Africa. It extends for more than 4 miles (6 km) along the right bank of the Niger River. A historic town, it was the first capital of the Bambara kingdom, which flourished in the 17th and 18th centuries. In 1861 the kingdom collapsed when the leader of the Tukulor jihad (holy war), al-Hājj 'Umar, seized Ségou. Ségou is in a densely populated region and has always been an important trading centre. It is the headquarters of the Office du Niger, an extensive irrigation system begun in 1932. A textile factory at Ségou, built by the Chinese, has proved to be one of Mali's most successful industrial undertakings.

The region in which Ségou is situated is important agriculturally because of the efforts of the Office du Niger. Irrigated rice cultivation in the region has been expanded, and other crops include cotton, sugar, millet, peanuts (groundnuts), cassava, and beans. Livestock raising is also important. Pop. (1987 prelim.) town, 88,877.

Segovia, *provincia,* in the *comunidad autónoma* ("autonomous community") of Castile-León, north-central Spain. It is bounded north and northeast by the *provincias* of Burgos and Soria, southeast by Guadalajara and Madrid, southwest by Ávila, and northwest by Valladolid. It has an area of 2,683 square miles (6,949 square km) and is primarily an agricultural tableland, 2,500 feet (762 m) above sea level. Produce includes wheat, rye, barley, hemp, flax, and vegetables; sheep, cattle, mules, and pigs are raised. The northern watershed of the Sierra de Guadarrama spreads from east to west across the remainder of the *provincia* and is quarried for granite, marble, and limestone. Summer upland resorts are found at El Espinar and San Rafael, but both tourism and industry are largely concentrated in the provincial capital, Segovia (*q.v.*) city. Pop. (1986 est.) 150,015.

Segovia, capital of Segovia *provincia,* in the *comunidad autónoma* ("autonomous community") of Castile-León, Spain, northwest of Madrid. An Iberian settlement from about 700 BC, it was taken in about 80 BC by the Romans. It was occupied at the beginning of the 8th century by the Moors, from whom Alfonso VI recaptured it in 1079. Thereafter the city enjoyed prosperity and a position of some importance in medieval Castile, serving as a royal residence during the reign of Alfonso X the Wise (*c.* 1284) and as the site of the Spanish mint from 1586 until 1730. An outbreak of plague at the end of the 16th century ushered in a long period of decline, but the city's fortunes revived with the railway-building era of the 19th century.



The Alcázar (fortified palace) in Segovia city, Spain
C.I.R.I.—EDISTUDIO

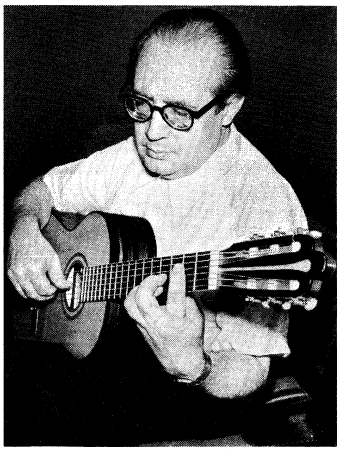
There are two well-differentiated areas in Segovia: an upper town encircled by ancient walls situated on the narrow limestone ridge between the two rivers, and a lower part outside the walls. The centre of the old town is the Plaza Mayor, site of the 16th-century Gothic cathedral, from which streets lead into the outer suburbs. Crossing the Plaza del Azoguejo, the focal point of traffic, is the Roman Segovia aqueduct known as El Puente, one of the finest and best-preserved examples of its kind.

Notable churches include those of San Esteban (with a superb tower), San Martín, La Trinidad, San Lorenzo, and San Millán, all Romanesque and from the 12th century; and Vera Cruz (13th century), the former church of the Knights Templars. The Romanesque Church of San Justo is notable for its valuable 12th-century paintings. The Alcázar, mentioned as early as the 12th century, was the fortified palace of the kings of Castile; the original building was mostly destroyed by fire in 1862 but has since been extensively restored. Segovia also has an artillery academy in the former Convent of San Francisco and has several museums.

In the late Middle Ages Segovia was the centre of a flourishing textile industry, which declined; agriculture took its place. The city now has many factories. Pop. (1986 est.) 53,526.

Segovia, Andrés (b. Feb. 21, 1893, Linares, Spain—d. June 2, 1987, Madrid), Spanish musician acclaimed as the foremost guitarist of his time. He was the most important force in reestablishing the guitar as a concert instrument in the 20th century, chiefly through demonstrating its expressive and technical potential. He continued giving concert performances past the age of 90.

Segovia studied the piano and cello as a child but could not be diverted from his interest in the guitar, which was held in low repute at the time as an instrument fit only for playing



Segovia
AP/Wide World Photos

in cafés. No competent teacher of the guitar was easily available, so Segovia taught himself, basing his technique largely on his own intuitions.

He gave his first public concert in 1909 while a student at the Granada Musical Institute. By 1916 he was performing in Barcelona and later in Madrid. In 1919–23 he toured South America. By 1924, when he first performed in Paris, his reputation was international.

Segovia enlarged the guitar's repertory with more than 150 transcriptions of works originally written for lute, vihuela (Spanish guitar-shaped lute), and harpsichord by such composers as François Couperin, Jean-Philippe Rameau, and Johann Sebastian Bach. He also encouraged the writing of works for the guitar by many 20th-century composers, including Mario Castelnuovo-Tedesco, Alfredo Casella, Heitor Villa-Lobos, Joaquín Turina, Manuel M. Ponce, and Albert Roussel. *An Autobiography of the Years 1893–1920* was published in 1976 and *Andrés Segovia, My Book of the Guitar* in 1979.

Segovia aqueduct, byname EL PUENTE (Spanish: "The Bridge"), water-conveyance structure built under the Roman emperor Trajan (AD 53–117) and still in use; it carries water 10 miles (16 km) from the Frío River to the city of Segovia, Spain. One of the best-preserved Roman engineering works, it was built of dark-coloured Guadarrama granite without the use of mortar. The aboveground portion is 900 feet (275 m) long and consists of 148 arches more than 30 feet (9 m) high. In the centre, a dip in the terrain necessitated two tiers of arches; there the structure stands 93.5 feet (28.5 m) above ground level.

Segrave, Sir Henry (O'Neal de Hane) (b. Sept. 22, 1896, Baltimore, Md., U.S.—d. June 13, 1930, Lake Windermere, Westmorland, Eng.), American-born English automobile and motorboat racer who set three world land speed records.

Educated at Eton and Sandhurst, Segrave served with the Royal Air Force in World War I. During the war he became interested in automobile racing by a visit to the Sheepshead Bay, Long Island, N.Y., course. He won the French Grand Prix (1923) and the San Sebastian Grand Prix (1924) in Spain, in which he was the first racer to wear a crash helmet. He also won the 200-mile (322-kilometre) race at Brooklands in England (1921, 1925, and 1926) and competed in many hill climbs and speed trials from 1914 to 1927.

In 1926 he first broke the land speed record, driving a Sunbeam at 152.33 mile/h (miles per hour [245.15 km/h]). On March 29, 1927, at Daytona, Fla., driving a 1,000-horsepower Sunbeam with a World War I aero-engine, he became the first driver to exceed 200 mile/h (320 km/h) and established a new record of 203.79 mile/h (327.97 km/h). He set a third record of 231.44 mile/h (372.48 km/h) in March 1929.

Segrave began racing motorboats in 1927, winning the International Championship at Miami, Fla., in 1928. Immediately after setting a water speed record of 85.8 knots, he was fatally injured when his boat—traveling at a speed of more than 86 knots—broke apart, presumably after hitting a floating tree limb. His book, *The Lure of Speed,* was published in 1928. He was knighted in 1929.

Segrè, Emilio (Gino) (b. Feb. 1, 1905, Tivoli, Italy—d. April 22, 1989, Lafayette, Calif., U.S.), Italian-born American physicist who was cowinner, with Owen Chamberlain of the United States, of the Nobel Prize for Physics in 1959 for the discovery of the antiproton, an antiparticle having the same mass as a proton but opposite in electrical charge.

Segrè initially began studies in engineering at the University of Rome in 1922 but later studied under Enrico Fermi and received his doctorate in physics in 1928. In 1932 Segrè was appointed assistant professor of physics at the University of Rome, and two years later he participated in neutron experiments directed by Fermi, in which many elements, including uranium, were bombarded with neutrons, and elements heavier than uranium were created. In 1935 they discovered slow neutrons, which have properties important to the operation of nuclear reactors. Segrè left Rome in 1936 to become director of the physics laboratory at the University of Palermo. One year later he discovered technetium, the first man-made

element not found in nature. While visiting California in 1938, Segrè was dismissed from the University of Palermo by the Fascist government, so he remained in the United States as a research associate at the University of California, Berkeley. Continuing his research, he and his associates discovered the element astatine in 1940, and later, with another group, he discovered plutonium-239, which he found to be fissionable, much like uranium-235. Plutonium-239 was used in the first atomic bomb and in the bomb dropped on Nagasaki.

From 1943 to 1946 Segrè was a group leader at the Los Alamos Scientific Laboratory, Los Alamos, N.M. He was naturalized as a U.S. citizen in 1944 and was professor of physics at Berkeley (1946–72). In 1955, using the new bevatron particle accelerator, Segrè and Chamberlain produced and identified antiprotons and thus set the stage for the discovery of many additional antiparticles. He was appointed professor of nuclear physics at the University of Rome in 1974. He wrote several books, including *Experimental Nuclear Physics* (1953), *Nuclei and Particles* (1964), *Enrico Fermi: Physicist* (1970), and two books on the history of physics, *From X-rays to Quarks: Modern Physicists and Their Discoveries* (1980) and *From Falling Bodies to Radio Waves* (1984).

segregation, racial: *see* racial segregation.

Séguéla, town, west-central Côte d'Ivoire (Ivory Coast), at the intersection of the Man–Bouaké and Boundiali–Daloa roads. It has a rice-processing plant and is the chief trade centre (rice, cassava, maize [corn], yams, and cattle) of a savanna region mainly inhabited by the Muslim Malinké people. Diamond prospecting in the area has increased the town's importance. Pop. (1975) 12,587.

seguidilla, Spanish folk dance with many regional variants; also, a verse form widely used in Spanish folk song. The dance is a courtship dance of proud demeanour, with small springing steps, light foot stamps, and varied ground patterns. The song consists of *coplas*—improvised verses of love or satire—in quatrains with the syllabic pattern 7–5–7–5 and assonantal rhyme on the second and fourth lines. A *copla* is frequently followed by an *estribillo,* a tercet with the syllabic pattern 5–7–5, rhyming assonantally on the first and third lines.

Particularly prominent among the regional variants of the dance is the *seguidillas sevillanas,* or *sevillanas.* Most typically the dance is preceded by an instrumental introduction and a sung section. In the *sevillanas,* and in some other seguidillas, the dancers stop suddenly (*bien parado*) at the end of each *copla,* resuming dancing only after an instrumental interlude. The steps of each *copla* usually increase in intricacy. The music is in $\frac{3}{4}$ or $\frac{3}{8}$ time, and the dancers' castanets create complex counterrhythms to their foot movements.



Seguidilla, detail of an engraving by C. Llobet, 1929
By courtesy of the Biblioteca Nacional, Madrid

The seguidilla verse form occurs also in other dances and folk songs and has variant forms. In written poetry it appears as early as the 15th century. The basic verse form became established during the 16th century and appeared often in the dramas of this period, Spain's Golden Age.

Séguier, Pierre (b. May 28, 1588, Paris—d. Jan. 28, 1672, Saint-Germain-en-Laye, Fr.), chancellor of France under kings Louis XIII and Louis XIV, in the critical period during which monarchical power was consolidated.



Séguier, engraving by Robert Nanteuil, 1657, after a painting by Charles Le Brun
By courtesy of the Bibliotheque Nationale, Paris

Séguier was born into a family that had held many legal posts, and he followed the same career. In 1612 he purchased the office of counselor in the Parlement of Paris and in 1618 became a *maître des requêtes* at the king's court. He was appointed intendant (administrator) of justice in Guyenne in 1621 and then intendant to the army in Aunis and Saintonge. In 1624 his uncle resigned as one of the presidents in the Parlement of Paris in his favour. He was chosen to replace the Marquis de Châteauneuf as keeper of the seals in 1633.

In 1635 Séguier became chancellor of France, the supreme legal officer, with tenure of that dignity for life. His adherence to the powerful cardinals Richelieu and Mazarin kept him in uninterrupted exercise of his functions until 1650. He was sent in 1637 to Val-de-Grâce to examine the papers of the queen of France, Anne of Austria, who was suspected of secretly corresponding with Spain. Some historians say he saved her by warning her of the investigation. In 1639 he was sent to supervise the repression of a revolt in Normandy. He presided in 1642 over the trial of the Marquis de Cinq-Mars, who was condemned to death for conspiring against Richelieu.

During the revolt of the Fronde, Séguier, like many others, vacillated, and in the last phase of the Fronde in Paris he was aligned with the rebel princes until August 1652. During those troubles, he was twice relieved of his functions (1650–51 and 1651–56). Early in the personal reign of Louis XIV, in December 1662, he was put in charge of the trial of the finance minister, Nicolas Fouquet, who had been accused of embezzlement, and he conducted it brutally enough to secure a verdict against Fouquet. From 1665 he presided over the new Council of Justice for the reform of the legal system.

Séguier was a patron of the arts; his library was one of the most valuable of the time. He succeeded Richelieu as protector of the French Academy, which from that time until his death held its sessions in his house.

Séguin, Edouard (b. Jan. 20, 1812, Clamecy, Fr.—d. Oct. 28, 1880, New York City), French-born American psychiatrist who pioneered modern educational methods for teaching the severely retarded.

Born into a family of prominent physicians in Burgundy, Séguin was educated at the Collège d'Auxerre and at the Lycée St. Louis in Paris before studying medicine and surgery. From the start he was interested in mental diseases, and as a young doctor he worked with psychologists Jean-Marc Itard and Jean-Etienne Esquirol.

In 1839 Séguin opened a school for the severely retarded, where he developed a method of treatment, later widely accepted, based on the revolutionary premise that idiots had neither diseased nor abnormal brains but simply suffered arrested mental development before, during, or after birth. Treatment, therefore, consisted of sensory training designed to permit the patient to function as well as possible in society.

Séguin's school became internationally renowned and spawned similar institutions throughout Europe. In 1846 he published *Traitment Moral, hygiene et education des idiots* ("Mental Treatment, Hygiene, and Education of Idiots"), which was quickly recognized as a classic work in psychology.

Unhappy with the political atmosphere in France, Séguin immigrated to the United States, settling first (1851) in Ohio but later (1854) moving to New York. He established several teaching institutions for retarded children, and in 1860 he set up his own medical practice at Mt. Vernon, N.Y. He received an M.D. degree from New York University. In 1863 he moved to New York City and began work with retarded children in the asylum at Randall's Island.

In 1866 Séguin published his second book, *Idiocy and Its Treatment by the Psychological Method,* and he instituted his ideas at the Séguin Psychological School in Orange, N.J., stressing sense and motor training. He wrote or collaborated in several books popularizing the use of the clinical thermometer. His son, Edward Constant Séguin, became an eminent American neurologist.

Séguin, Marc, THE ELDER, French MARC SÉGUIN, AÎNÉ (b. April 20, 1786, Annonay, Fr.—d. Feb. 24, 1875, Annonay), French engineer and inventor of the wire-cable suspension bridge and the tubular steam-engine boiler.

A nephew of Joseph Montgolfier, the pioneer balloonist, Séguin developed an early interest in machinery, pursuing his studies informally but so successfully that by 1822 he was carrying out promising experiments on the strength of wire cables. With his brother Camille he studied the principles of the suspension bridge, at that time built with chain cables. Over the Rhône River at Tournon in 1824 the two brothers erected a bridge suspended from cables made of parallel wire strands, the first of a succession of such modern bridges all over the world. Séguin was also one of the first to suggest the solution to the problem of deflection under load by the addition of web trusses on either side of the roadway.

The advent of the railroad drew Séguin's attention to the problem of locomotive power. His invention of the multiple-fire-tube boiler, in place of the water-tube boiler used by the earlier steam engines, marked a decisive advance; George Stephenson used the Séguin-type boiler in his *Rocket* locomotive that won the competition of 1829 on the Liverpool and Manchester Railway. Séguin was also responsible for further improvements in locomotive efficiency and played a leading role, again in collaboration with his brother Camille, in

the construction of the first French railroad, between Saint-Étienne and Lyon (1824–33). He also made contributions to theoretical physics and wrote engineering treatises on the suspension bridge, the railroad, steam navigation, and steam power.

Segura River, Spanish RÍO SEGURA, river in southeastern Spain. It rises in the Segura Mountains in Jaén province and flows east through the driest region of the Iberian Peninsula to enter the Mediterranean Sea south of Alicante, after a course of 212 miles (341 km). Much water is drawn off the Segura and its major tributary, the Guadalentín (Sangonera), to irrigate adjacent huertas (market gardens), especially on the Murcia Plain. Winter floods are notorious on both rivers, but during the summer the streambeds are almost dry. A number of dams have been built on the Segura and its tributaries to control the winter runoff, the largest at Fuensanta. More than 300,000 acres (120,000 hectares) are irrigated or under development.

To make the best use of the Britannica, consult the INDEX *first*

Sehested, Hannibal (b. 1609, Ösel, Swedish Estonia [now Saaremaa, Estonian S.S.R.]—d. Sept. 23, 1666, Paris), statesman who achieved partial autonomy for Norway under Denmark and who laid the basis for the modernization of Denmark's administrative system.

After foreign travels in 1629–32, Sehested was attached to the court of King Christian IV of Denmark and Norway. He was given charge of the unsuccessful 1635 negotiations with Sweden. He became a member of the state council in 1640 and was named stadholder (governor) of Norway in 1642, the year of his marriage to Christian IV's sister Christiane.

In Christian IV's second war with Sweden (1643–45), Sehested invaded Sweden several times and ably defended Norway from Swedish attack. He steadily improved Norway's resources and capacity for self-government, and in 1646–47 he won for Norway partial control of its finances, the revenues being used for military expenses and war debts.

Accused by his state council rivals of embezzlement after the king's death in 1648, Sehested was forced to surrender his estates to the crown. He retired from the council in 1651 and lived abroad in 1651–58. His offers of service were spurned by Frederick III at the start of a new war with Sweden (1657–60), and Sehested then went to Sweden, in an



Sehested, detail of an oil painting by Karel van Mander; in Frederiksborg Castle, Denmark

By courtesy of the Nationalhistoriske Museum paa Frederiksborg

action approaching treason. Later he was allowed to return to Denmark and negotiate the Treaty of Copenhagen with the Swedes (1660), a treaty that was advantageous to Denmark.

Back in royal favour, Sehested became lord high treasurer and again a state councillor. He dramatically modernized Denmark's state administration, establishing, for example, boards for the various branches of government.

Sehna rug: *see* Senna rug.

Sehore, also spelled SIHOR, town, western Madhya Pradesh state, central India. A former British cantonment, the town served as the headquarters of the British Bhopāl Agency. The town is located near the confluence of the Siwān and Latia rivers and is a major rail junction and agricultural trade centre. Sugar milling, cotton ginning, and handloom weaving are the chief industries. There is a government college affiliated with Bhopāl University. Wheat, jowar (sorghum), linseed, and corn (maize) are the major crops of the surrounding agricultural area, which is watered by the Betwa, Pārbati, and Narmada rivers. Pop. (1981) 52,190.

Sehul, Mikael (Ethiopian ruler): *see* Mikael Sehul.

Sei Shōnagon (b. 966/67—d. 1013?), diarist and poet, a witty, learned lady of the court, whose *Pillow Book* (*Makura no sōshi*), apart from its brilliant and original Japanese prose style, is the best modern source on Japanese court life in the Heian period (784–1185).

Sei Shōnagon was the daughter of the poet Kiyohara Motosuke and was in the service of the empress Sadako from about 991 to 1000. Her *Pillow Book,* which covers the period of her life at court, consists in part of vividly recounted memoirs of her impressions and observations and in part of categories such as "Annoying Things," or "Things Which Distract in Moments of Boredom" within which she lists and classifies the people, events, and objects around her. The work is notable for Sei Shōnagon's sensitive descriptions of nature and everyday life and for its mingling of appreciative sentiments and the detached, even caustic, value judgments typical of a sophisticated court lady.

Sei Shōnagon was apparently not a beauty, but her ready wit and intelligence secured her place at court. These qualities, according to the diary of her contemporary Murasaki Shikibu, also won her numerous enemies. Though capable of great tenderness, Sei Shōnagon was often merciless in the display of her wit, and she showed little sympathy for those unfortunates whose ignorance or poverty rendered them ridiculous in her eyes. Her ability to catch allusions or to compose in an instant a verse exactly suited to each occasion is evident in the bedside jottings that are contained in her *Pillow Book.* Legend states that Sei Shōnagon spent her old age in misery and loneliness. English translations of the *Pillow Book* were prepared by Arthur Waley (1929) and Ivan Morris (1967).

sei whale, also called RUDOLPHI'S RORQUAL (*Balaenoptera borealis*), swift baleen whale of the family Balaenopteridae. The sei whale is usually about 13 to 15 m (40 to 50 feet) long and is bluish gray or blackish above and paler below. It has small flippers, about 50 short lengthwise grooves on its chest, and dark baleen with paler, silky, inner fringes. The sei inhabits oceans from the Arctic to the Antarctic, migrating between cold and temperate summer waters and winter breeding grounds in warmer regions.

seiche, rhythmic oscillation of water in a lake or a partially enclosed coastal inlet, such as a bay, gulf, or harbour. A seiche may last from a few minutes to several hours or for as long as two days. The phenomenon was first observed and studied in Lake Geneva (Lac Léman), Switzerland, in the 18th century.

Seiches may be induced by local changes in atmospheric pressure. They also may be initiated by the motions of earthquakes and by tsunamis, in the case of coastal inlets. Seismic surface waves from the Alaska earthquake of 1964, for example, triggered seiche surges in Texas in the southwestern United States when they passed through the area. Studies of seiche behaviour have shown that once the surface of the water is disturbed, gravity seeks to restore the horizontal surface, and simple vertical harmonic motion ensues. The impulse travels the length of the basin at a velocity dependent on the water depth and is reflected back from the basin's end, generating interference. Repeated reflections generate standing waves with one or more nodes, or points, that experience no vertical motion. The length of the lake is an exact multiple of the distance between nodes.

Seiches may disturb shipping by generating strong reversible currents at the entrances to harbours or by causing moored vessels to oscillate against their mooring cables and break free. Seiches also may drown unwarned persons on piers and shores.

Seiemon (Japanese potter): *see* Ninsei.

seif, a long, narrow sand dune or chain of dunes, generally oriented in a direction parallel to the prevailing wind or in a direction resulting from two or more winds blowing at acute angles to each other. The dune crest consists of a series of peaks and gaps, and the steep, or slip, face may change sides of the dune according to changes in wind direction. Most seif dunes occur in the open desert and rest on a coarse sand sheet. Seifs, common in Libya and southern Iran, may range up to 90 m (300 feet) in height, with a width of six times their height and a length of up to 100 km (60 miles). They grow in height and width by the action of crosswinds and in length by the action of winds parallel to their axis.

Seifert, Jaroslav (b. Sept. 23, 1901, Prague—d. Jan. 10, 1986, Prague), Czech poet and journalist who in 1984 became the first Czech to win the Nobel Prize for Literature.

Seifert made a living as a journalist until 1950, but his first book of poetry, *Město v slzách* ("City in Tears"), was published in 1920. His early proletarian poetry reflects his youthful expectations for the future of Communism in the Soviet Union. As he matured, however, Seifert became less enchanted with that system of government, and his poetic themes began to evolve. In *Na vlnách T.S.F.* (1925; "On Wireless Waves") and *Slavík zpívá špatně* (1926; "The Nightingale Sings Wrong"), more lyrical elements of so-called pure poetry were evident. In 1929 Seifert broke with the Communist Party.

The events and aspects of Czechoslovakia were the most common subjects of his poetry. In *Zhasněte světla* (1938; "Switch Off the Lights") he wrote about the Munich agreement by which part of Czechoslovakia was annexed to Germany. Prague was the subject



Seifert, 1984

Czechoslovak News Agency

of *Světlena oděná* (1940; "Clothed in Light"), and the Prague uprising of 1945 provided the focus of *Přilba hlíny* (1945; "The Helmet of Clay"). In addition to writing about 30 volumes of poetry, Seifert contributed to several journals and wrote children's literature. In 1966 he was named Poet of the Nation, and he was one of several writers, later silenced, who condemned the Soviet invasion of Czechoslovakia in 1968. His memoirs, written in Czech, were published in 1981.

Seiffert, Ernst (singer): *see* Tauber, Richard.

Seignelay, Jean-Baptiste Colbert, marquis de: *see* Colbert, Jean-Baptiste.

seigneur, droit du (French: "right of the lord"), a feudal right said to have existed in medieval Europe giving the lord to whom it belonged the right to sleep the first night with the bride of any one of his vassals. The custom is paralleled in various primitive societies, but the evidence of its existence in Europe is almost all indirect, involving records of redemption dues paid by the vassal to avoid enforcement, not of actual enforcement. Many intellectual investigations have been devoted to the problem, but, although it seems possible that such a custom may have existed for a short time at a very early date in parts of France and Italy, it certainly never existed elsewhere. A considerable number of feudal rights were related to the vassal's marriage, particularly the lord's right to select a bride for his vassal, but these were almost invariably redeemed by a money payment, or "avail"; and it seems likely that the droit du seigneur amounted, in effect, only to another tax of this sort.

seigniorage, the charge over and above the expenses of coinage (making into coins) that is deducted from the bullion brought to a mint to be coined. From early times, coinage was the prerogative of kings, who prescribed the total charge and the part they were to receive as seigniorage. The deduction was sometimes supplemented by replacing part of the bullion with base metal, resulting in debased coinage. Because the seigniorage and coinage charges were collected by withholding part of the bullion brought for coinage, the currency value of the coins received in exchange was often less than the bullion's market value. Eventually, merchants stopped providing bullion for the mint, and the supply of coins became inadequate. In England all charges for coinage were abolished in 1666.

Because coins are now issued only as token money for domestic purposes, they no longer need possess a high intrinsic value, and low-standard silver or certain base-metal alloys provide all the qualities required. A substantial margin usually exists between the cost of producing a coin and its statutory currency value; this margin, or profit, is known as seigniorage.

seignorialism, also called SEIGNORIAL SYSTEM: *see* manorialism.

Seikan Tunnel, Japanese SEIKAN TONNERU, undersea tunnel linking Japan's main island of Honshu with the northern neighbouring island of Hokkaido. The Seikan Tunnel is the longest tunnel in the world; it is 33.4 miles (53.8 km) in length, 14.3 miles (23.3 km) of which lie under the Tsugaru Strait that separates Honshu from Hokkaido. The tunnel contains a rail line, and the building of the tunnel was sponsored by the Japanese National Railways. Construction of the tunnel began in 1964 and was completed in 1988; the digging employed as many as 3,000 workers at one time and took 34 lives in all because of cave-ins, flooding, and other mishaps.

Despite the tremendous engineering, construction, and financial efforts that it involved, the Seikan Tunnel is only of limited use, since air travel between Honshu and Hokkaido is quicker and is now almost as cheap as rail travel through the tunnel itself. When the tunnel was first planned in the 1950s, ferries were the chief means of transport between the main island and Hokkaido, and the sinking of a ferry boat in the Tsugaru Strait during a typhoon in 1954 with a loss of more than 1,400 lives galvanized plans for the tunnel's construction. Since then, air transport has become much more practicable, and the Seikan Tunnel seems fated to carry significantly fewer passengers between the two islands than aircraft do. The tunnel remains one of the most formidable engineeering feats of the 20th century, however.

Seine-et-Marne, *département,* Île-de-France *région,* northern France, extending east and south from the outer suburbs of Paris. Created from parts of the historic provinces of Île-de-France and Champagne, it has an area of 2,284 square miles (5,915 square km). The Marne River, flowing toward Paris, crosses the northern part of the *département* east-west through Meaux; it is joined from the north by the Ourcq River and from the south by the Grand Morin River. The Seine River, before flowing northwest toward Paris, traverses the south in a sweeping arch, passing through Montereau, skirting the Fontainebleau Forest, and flowing through Melun, the *département's* capital.

The fertile river valleys provide vegetables, fruit, and dairy products for the Paris markets. Between the Marne and the Seine, the plateau of Brie—in which large, highly mechanized farms produce cereals, fodder, potatoes, livestock, and sugar beets—covers more than half the *département.* The climate is generally mild. Industrial centres in Seine-et-Marne include Melun, Montereau, Nemours, and Nangis. Food processing, chemicals, and the manufacture of electrical equipment are the main industries. The western part of the *département,* which has been affected by the urban spread of Paris, is still a popular area for weekend excursions. The châteaus of Fontainebleau, Vaux-le-Vicomte, and Champs, surrounded by parks and open to the public, are among the historic buildings. The region was the scene of fierce fighting during World War I, when the German advance in 1914 was repulsed on the Marne and the Ourcq. The *département* has three *arrondissements,* Melun, Meaux, and Provins, and is in the educational division of Paris. Pop. (1987 est.) 975,400.

Seine-Maritime, *département,* Haute-Normandie *région,* northern France, on the English Channel. Created as Seine-Inférieure in 1790 from the eastern part of the historic province of Normandy, it was renamed in 1955. Its 2,424 square miles (6,278 square km) extend over a vast chalk plateau (the Pays de Caux) that is bounded on the northwest by a coastline of more than 80 miles (130 km). Its southern border runs east from the Channel port of Le Havre, the *département's* biggest town, below the sweeping meanders of the Seine River, through pasture and forestland past the ancient city of Rouen, the departmental capital, and Elbeuf to the west of Beauvais. The coastline of chalk cliffs about 300 feet (90 m) in height is cut by valleys sheltering small towns and seaside resorts, including the harbour town of Dieppe, Saint-Valéry-en-Caux, Fécamp, Étretat, and Le Tréport. The plateau is cut by a number of tributaries of the Seine and by smaller rivers flowing through woods and pastures directly into the Channel. The highest ground is in the northeast, in the hills near Neufchâtel, with an elevation of 810 feet (247 m). The *département* has a maritime climate, with mild winters and cool summers. The Seine valley is frequently shrouded in mist, while the Rouen area is one of the wettest in France, with an average of about 120 rainy days a year.

Agriculture is divided between dairy farming and the cultivation of cereals, sugar beets, potatoes, flax, and fruit. Parts of the Seine valley, including the regions of Rouen and Le Havre, are highly industrialized. Petroleum refineries in the Seine estuary are connected by pipeline with Paris. The manufacture of cloth is concentrated in the Elbeuf area but has been declining in recent years. The construction of one of the longest suspension bridges in Europe across the upper estuary of the Seine at Tancarville has greatly improved road communications. The *département* has good facilities for tourism, particularly along the coast and in the Seine valley. Much reconstruction has been done to restore Rouen, which was severely damaged by bombing during World War II. The ruins of Jumièges Abbey, Saint-Wandrille-Rançon Abbey, and the church at Saint-Martin-de-Boscherville are much-visited historic sites. The *département* is divided into three *arrondissements,* Rouen, Dieppe, and Le Havre, and is in the educational division of Rouen. Pop. (1987 est.) 1,209,400.

Seine River, river of France, its second longest after the Loire. The Seine rises on the Langres Plateau, 18 miles (30 km) northwest of Dijon, and flows through Paris in a northwesterly direction before emptying into the English Channel at Le Havre. It has a total length of 485 miles (780 km).

A brief treatment of the Seine River follows. For full treatment, *see* MACROPAEDIA: Europe.

The Seine drains an area of about 30,400 square miles (78,700 square km) in northern France. Its drainage network carries most of France's inland waterway traffic. Several major tributaries, including the Aube, Yonne, Marne, and Oise rivers, have developed within a series of escarpments and vales, thus dissecting the Seine's basin into three distinct regions. In its upper course on the Langres Plateau, the Seine rises at 1,545 feet (471 m) above sea level on Mount Tasselot in the Côte d'Or region of Burgundy and flows 90 miles (145 km) northwestward to the small town of Romilly. Joined by the Aube River near Romilly, the middle course of the Seine bears west to skirt the Île-de-France in a wide valley to Montereau, where it receives the Yonne River on its left bank. Turning northwest again, the Seine crosses the Île-de-France toward Paris. The river continues northwestward across the limestone plateau in a broad trench, receiving the Marne and the Oise rivers above and below Paris, respectively. The lower course of the Seine, below Paris, is directed in a general northwesterly direction toward its estuary in the English Channel. Rouen, although some 75 miles (120 km) from the sea, was once France's main seaport, but it has been superseded by Le Havre on the northern shore of the Seine's broad estuary, which opens rapidly and extends 16 miles (26 km) below Tancarville.

Most of the river basin is formed of permeable rocks whose absorptive capacity mitigates the risk of river floods. Precipitation throughout the basin is evenly distributed (generally 25 to 30 inches [650 to 750 mm]), with some snow on the higher southern and eastern margins. The Seine, especially below Paris, is one of France's major waterways, carrying primarily building materials and petroleum products.

Seine-Saint-Denis, *département,* Île-de-France *région,* northern France, bordering the city limits of Paris on the north and east. Occupying an area of 91 square miles (236 square km), it was created as part of the administrative reorganization of greater Paris in 1964; it was mainly formed from the northeast section of the former Seine *département,* with additional parts of the former Seine-et-Oise *département.*

The western boundary includes both

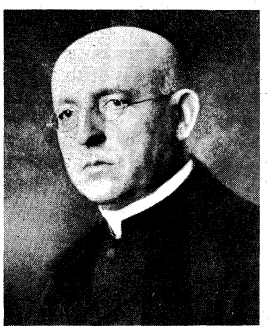
branches of the Seine River as it loops toward the northwest and the long crescent-shaped Île-Saint-Denis. Within the northern boundary are the southern parts of Le Bourget airport, which is being replaced by the Charles de Gaulle airport at Roissy (opened in 1974). The Forêt de Bondy, the suburb of Gournay-sur-Marne, and part of the wood of Saint-Martin are within the eastern boundary. Montreuil is just within the southern boundary.

The Marne River cuts across the southeastern tip of the *département.* The Autoroute du Nord—the motorway from Paris to Lille—passes through Saint-Denis, and is connected to both airports. The *département* is heavily industrialized, and a great number of factories are intermingled with the workers' houses in the densely populated areas. Seine-Saint-Denis has two *arrondissements,* those of Bobigny, the capital, and Le Raincy; it is in the educational division of Paris. Pop. (1982) 1,324,301.

Seine Series, division of Precambrian rocks that occur in Ontario and northern Minnesota (the Precambrian began about 4,600,000,000 years ago when the Earth's crust formed and ended 570,000,000 years ago). The Seine Series, named for prominent exposures studied along the Seine River, Ontario, forms a thick sequence of sedimentary rocks that overlie the Keewatin Series and are separated from it by an unconformity, a surface representing a major period of erosion before sediments of the Seine Series were deposited. The series begins with a prominent conglomerate that includes large boulders of granite within its matrix. It is thought that this conglomerate represents a long period of erosion during which the granitic cores of Keewatin mountains were exposed. Granitic intrusions occur in the Seine Series and have been dated at about 1,100,000,000 years old, and the granites that formed the mountain cores have been dated at about twice that. The Seine Series may be equivalent to the Knife Lake Series; if so, the term Knife Lake Series would have priority over Seine Series.

Seingalt, Giovanni Giacomo Casanova, chevalier de: *see* Casanova, Giovanni Giacomo.

Seipel, Ignaz (b. July 19, 1876, Vienna—d. Aug. 2, 1932, Pernitz, Austria), Roman Catholic priest, twice chancellor of Austria (1922–24 and 1926–29), whose use of the Fascist paramilitary Heimwehr in his struggle



Seipel

By courtesy of the Bild-Archiv, Osterreichische Nationalbibliothek, Vienna

against Austria's Social Democrats led to a strengthening of Fascism in his country.

Ordained in 1899, Seipel taught moral philosophy at the universities of Salzburg and Vienna before the Austrian revolution of 1918. After the collapse of the Austro-Hungarian Empire, Seipel, by then one of the leaders of the Christian Social Party, prevented a party split into monarchist and republican elements.

In May 1922 Seipel formed his first government, a coalition with the Greater German Party. From the League of Nations he obtained a loan of $100,000,000 for Austria in return for financial and administrative reforms to be carried out under Allied supervision. Though he curbed deflation, his efforts met with hostility from provincial governments and his own party, while conservative elements disliked Allied interference in Austria's internal affairs. Wounded in an assassination attempt (June 1, 1924), he resigned the following November.

During his second term (1926–29) Seipel proved unable to obtain a majority in Parliament. His use of the paramilitary Heimwehr against Austria's Socialists (1927) foreshadowed the events of 1934, when his disciple Engelbert Dollfuss destroyed Austrian democracy and established a clerical-Fascist dictatorship. Toward the end of his life Seipel became increasingly authoritarian, advocating a corporate state with strong presidential powers. After serving as foreign minister from September to November 1930, he resigned in ill health and died two years later.

Seis de Septiembre (Argentina): *see* Morón.

seisin, in European feudal society, a type of possession that gained credibility with the passage of time. Seisin was not ownership nor was it mere possession that could be established by the seizure of land. Seisin belonged to someone who used the land or exercised rights over it.

In a dispute over seisin the winner would be the one who proved he had tilled the land or administered justice in the period prior to the suit. His case was strengthened if his ancestors had held the land and if he could prove it by the testimony of witnesses.

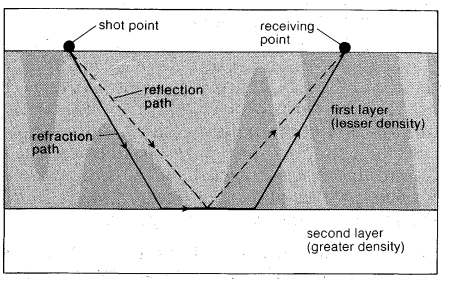
Actual seisin existed when a freeholder was in possession of the land or if someone else was holding it for him. Seisin in law was the right of an heir to seisin over the land even if he had not actually taken possession of it.

seismic belt, narrow zone on the Earth's surface along which most of the world's seismic activity occurs. If the lithosphere is thought of as made up of several large plates, the edges where these plates move against one another would represent the world's seismic belts. Island arcs, mountain belts, volcanism, deep ocean troughs, and seismic activity are features of seismic belts. The two major seismic belts are the Circum-Pacific Belt, which surrounds the Pacific Ocean, and the Alpide Belt, which stretches from the Azores through the Mediterranean and Middle East to northern India, Sumatra, and Indonesia, where it joins the Circum-Pacific Belt.

seismic sea wave: *see* tsunami.

seismic survey, method of investigating subterranean structure, particularly as related to exploration for oil, gas, and ore deposits. The technique is based on determinations of the time interval that elapses between the initiation of a sound wave and the arrival of reflected or refracted impulses at one or more seismic detectors. Though dynamite exploded underground is most commonly used to initiate such sound waves, an electric vibrator or falling weight (thumper) may also be employed at sites where an underground explosion might cause damage; *e.g.,* where caverns are present. Upon arrival at the detectors, the amplitude and timing of waves are recorded to give a seismogram (record of Earth vibrations).

The illustration depicts seismic survey methods in simplified form. Generally, the density of rocks near the surface of the Earth increases with depth. Thus, the second layer in the diagram is denser than the first. Sound waves initiated at the shot point may reach the receiving point by reflection, refraction, or both. When the shot point is close to the receiving point, reflected waves usually reach the receiving point first. At greater distances, however, the pulse travels faster by the refraction path because its velocity is greater along the top of the second layer than it is through the first; in this case, the refracted wave arrives first.



Seismic survey method

Interpretation of the depths and media reached by seismic waves thus depends on the distance between shot points and receiving points and the densities of the strata. The results of a seismic survey may be presented in the form of a cross-sectional drawing of the subsurface structures as if cut by a plane through the shot point, the detector, and the centre of the Earth. Such drawings are called seismic profiles.

seismic wave, vibration generated by an earthquake, explosion, or similar phenomenon and propagated within the Earth or along its surface. Earthquakes generate four principal types of waves; two, known as body waves, travel within the Earth, whereas the other two, called surface waves, travel along its surface. Interpretation of seismograms (recorded traces of the amplitude and frequency of seismic waves) yields information about the Earth and its subsurface structure; artificially generated seismic waves are used in oil and gas prospecting.

Of the body waves, the primary, or P, wave has the higher speed and would thus reach a seismic recording station faster than the secondary, or S, wave. P waves, also called compressional or longitudinal waves, give rock particles a back-and-forth motion along the path of propagation, thus stretching or compressing the rock as the wave passes any one point; these waves are like sound waves in air (*see also* wave, longitudinal). P waves travel at speeds from about 6 kilometres (3.7 miles) per second in surface rock to about 10.4 km/sec near the Earth's core 2,900 km below the surface; as the waves enter the core, the velocity drops to about 8 km/sec, increasing to about 11 km/sec near the centre of the Earth. The speed increase with depth results from increased hydrostatic pressure as well as from changes in rock composition and phase; in general, the increase causes P waves to travel in curved paths, concave upward.

S waves, also called transverse or shear waves, cause rock particles to move back and forth perpendicular to the direction of propagation; as the wave passes, the rock is distorted first in one direction and then in another. The speed of S waves increases from about 3.4 km/sec at the surface to 7.2 km/sec near the boundary of the liquid core, within which they cannot be propagated; indeed, their absence is a compelling argument for the liquid nature of the outer core. Like P waves, S waves travel in curved paths, concave upward; they vibrate at a slower rate but with greater amplitude.

Of the two surface waves, Love waves—named after A.E. Love, who first predicted their existence—travel faster. They are propagated in a surface layer that overlies a solid rock layer with different elastic properties. Displacement of a rock particle by the wave is entirely perpendicular to the direction of propagation and has no vertical or longitudinal components. The energy of Love waves,

like that of other surface waves, spreads from the source in two directions rather than in three, and so these waves produce a strong record at seismic stations even when originating from distant earthquakes.

The other principal surface waves are called Rayleigh waves after Lord Rayleigh, who first theorized their existence. Rayleigh waves travel on the free surface of an elastic solid. Their motion is a combination of longitudinal and vertical vibration that gives an elliptical motion to the rock particles. Of all seismic waves, Rayleigh waves and other surface waves have the strongest effect on seismographs.

seismograph, instrument that makes a record of the ground oscillations caused by an earthquake, explosion, or other Earth-shaking phenomenon. Although originally designed to record natural earthquakes, it has many other uses.

An earlier seismic instrument called the seismoscope made no record of the ground oscillations but simply indicated that shaking had occurred. The term seismometer originally referred to an instrument that measures the amount of ground motion. Some seismographs are equipped with an electromagnetic device called a sensor that translates ground motions into electrical changes. A seismogram is a record made by a seismograph.

Development of the seismograph. A Chinese scholar, Chang Heng, invented a seismoscope that registered the occurrence of an earthquake as early as AD 132. Judging from the available descriptions of this device, it was cylindrical in shape with eight dragon heads arranged around its upper circumference, each with a ball in its mouth. Around the lower circumference were eight frogs, each directly under a dragon head. When an earthquake occurred, one of the balls dropped from the dragon's mouth and was caught by the frog's mouth, generating a sound. A device involving water spillage was developed in 17th-century Italy. Later, a water-filled bowl and still later a cup filled with mercury were used for detecting earthquakes and tremors. In 1855 Luigi Palmieri of Italy designed a seismometer that consisted of several U-shaped tubes filled with mercury and oriented toward the different points of the compass. When the ground shook, the motion of the mercury made an electrical contact that stopped a clock and simultaneously started a recording drum on which the motion of a float on the surface of mercury was registered. This device thus indicated time of occurrence and the relative intensity and duration of the ground motion.

The basic problem in measuring ground motions is to attain a steady point that remains steady when the ground moves. Various types of pendulums have been used for this purpose. The simplest type is a common pendulum in which a heavy mass is suspended by a wire or rod from a fixed point (as in a clock). Other forms are the inverted pendulum, in which a heavy mass is fixed to the upper end of a vertical rod pointed at its lower end, and the horizontal pendulum, in which a rod with a mass on its end is suspended at two points so as to swing in a nearly horizontal plane instead of a vertical plane. In 1840 a seismometer based on the common pendulum was installed near Comrie in Perthshire, Scotland. In 1841 a seismometer based on the inverted pendulum was installed at six places near Comrie to register local shocks.

Seismograph developments occurred rapidly in 1880 when Sir James Alfred Ewing, Thomas Gray, and John Milne, British scientists working in Japan, began to study earthquakes. Following a severe earthquake that occurred at Yokohama near Tokyo in that year, they organized the Seismological Society of Japan. Under its auspices various devices, forerunners of today's seismograph, were invented. Among the instruments constructed in this period was Milne's now famous horizontal pendulum seismograph (Figure 1). A boom (B), to

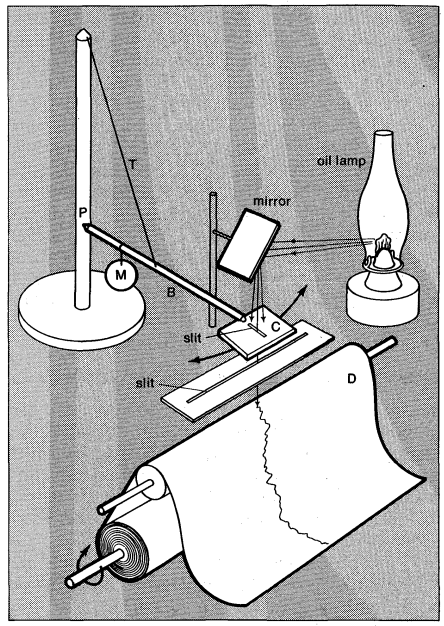


Figure 1: Milne horizontal pendulum seismograph
From *Bulletin of the Seismological Society of America* (1969), vol. 59, No. 1, p. 212

which the mass (M) is attached, is suspended horizontally by the pivot (P) and a silk thread (T) fixed to a point above the pivot. A thin plate (C), in which a narrow slit is cut parallel to the boom, is attached to the end of the boom (B). A similar plate with a slit at right angles to the upper plate is fixed on the top of the box containing a recording drum (D). A ray of light from an oil lamp passes through both slits and forms a small spot of light on a sheet of light-sensitive graph paper (bromide paper) wrapped on the recording drum. Milne successfully used this seismograph to record several earthquakes in Japan; then in England he established a small seismographic network using such instruments.

The horizontal pendulum seismograph was improved greatly after World War II. The Press-Ewing seismograph, developed in the United States for recording long-period waves, is widely used throughout the world. This device employs a Milne-type pendulum, but the pivot supporting the pendulum is replaced by an elastic wire to avoid friction.

Basic principles of the modern seismograph. If a common pendulum is free to swing in one direction and if the ground moves rapidly in the direction of freedom of the pendulum while the pendulum is motionless, the pendulum will remain in place through inertia. The same phenomenon will occur if the ground moves back and forth (oscillates). If the period of oscillation of the ground (the time necessary for one complete oscillation) is sufficiently shorter than the period of free oscillation of the pendulum, the pendulum will again remain motionless, and the movement of the ground relative to the pendulum can be recorded. The magnitude of this movement is commonly amplified in some way. This is the basic principle of the seismograph.

In actual practice, it often works out that the period of the pendulum is comparable to that of the ground oscillation; under these circumstances, the seismograph will not correctly record the Earth's movement. The error, however, can readily be computed mathematically.

In general, then, the seismograph is an instrument in which the relative motion of pendulum and ground is recorded. It is equally possible to take the ratio between the deflection of the pendulum and the velocity (or acceleration) of the ground. This ratio is called the velocity (or acceleration) sensitivity of the seismograph.

If free oscillation of the pendulum is not minimized, it will mask the proper recording of Earth movements. The simplest way to reduce (damp out) the free oscillation of a pendulum is to suspend it in a viscous (thick) liquid of which the resisting force is proportional to the velocity of the pendulum. In practice, the required resisting force is exerted by a special device called a damper. An air damper produces its resisting force by the use of a piston moving in a cylinder. In an electromagnetic damper, the resisting force is created by electrical currents induced in a copper plate moving in a strong magnetic field.

The ground can move in any of three directions, two horizontal and one vertical. Since each kind of movement must be separately recorded, three pendulums, one for each direction, are needed for a complete seismograph.

Various methods of recording pendulum motion have been developed. In the mechanical method, a sheet of smoked paper is wrapped around a rotating drum, so mounted as to move with the Earth. A moving pen connected to the pendulum presses lightly on the paper. The rotating drum shifts slightly with each revolution so that recorded lines are not superimposed on each other. The drum rotates without interruption; one sheet of paper usually lasts 24 hours. Deflection of the pendulum is commonly magnified mechanically by single or double multiplying levers. Though this lever method is simple and economical the seismograph must have a heavy mass to overcome the friction between pen and paper. In consequence, some mechanical seismographs weigh one ton or more. In the optical lever method, pendulum motion causes a mirror to move; light is reflected by this mirror onto photosensitive paper wrapped on a drum. Thus, there is no friction to affect the pendulum.

In the electromagnetic method, widely used today, a coil fixed to the mass of the pendulum moves in a magnetic field; the electric current generated in the coil operates a galvanometer exactly as a dynamo operates a motor. A mechanical damper is not needed, for damping force can be conveniently produced by electromagnetic action between the current in the coil of the pendulum and the magnetic field. If the current produced in the coil of the pendulum is amplified electronically, high magnification is obtainable. Certain short-period seismographs of this type used for the observation of micro-earthquakes attain a magnification as high as 1,000,000 or more. In ordinary seismographic observation, the time of initiation of ground oscillations is recorded. Marks are placed on the seismogram paper once a minute; an extra one identifies the hour.

All of the seismographs described so far measure oscillatory motions of the ground at a given point. The strain seismograph, in contrast, employs no pendulum, and its operation depends on oscillation in the distance between two points on the ground. In Figure 2, (A)

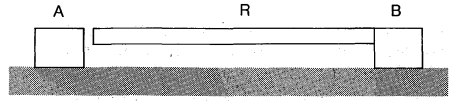


Figure 2: Strain seismograph
From *Bulletin of the Seismological Society of America* (1935)

and (B) are two piers separated by a distance, which may be 20 metres (65.6 feet) or more. One end of the rod (R) is fixed to the pier (B), and the other placed near the pier (A). Earth strains resulting from seismic waves produce

variations in the separation of the two piers; these variations are observable as changes in the distance between the free end of the rod and pier (A). This type of seismograph was devised in 1935.

Applications of the seismograph. A seismograph records oscillation of the ground caused by seismic waves that travel from their point of origin through the Earth or along its surface. The seismogram of a nearby earthquake is of simple pattern, showing the arrival of P waves, waves that vibrate in the direction of propagation; S waves, waves that vibrate at right angles to the direction of propagation; and surface waves. In the case of distant earthquakes, the seismogram pattern is more complicated because it shows various sorts of seismic waves that originate from one point but then may be reflected or refracted within the Earth's crust before reaching the seismograph. The relation between the arrival time of these seismic waves and the epicentral distance—*i.e.,* the distance from the point of origin—is expressed by a time–distance curve, in which the arrival time is read on the vertical axis and the epicentral distance on the horizontal axis. If the arrival times of various seismic waves are read on the seismogram at a station and compared with the standard time–distance curves, the epicentral distance from that station (the distance of the centre of the earthquake from the recording station) can be determined. If the epicentral distance from at least three stations is known, the origin of the earthquake can be calculated by simple trigonometric methods.

The eruption of a volcano is commonly accompanied by many small earthquakes, especially when a volcano resumes activity after a long dormant period. Observation with sensitive seismographs therefore plays an important role in the prediction of volcanic activity. Often a strong earthquake is preceded by small earthquakes. Observation of very small tremors with sensitive seismographs is helpful in predicting disastrous earthquakes.

Seismographs sometimes detect small and long-continuing oscillations of the ground, called microseisms, that do not originate in earthquakes. The occurrence of some microseisms is related to storms at sea.

Seismographs can be used for detecting remote nuclear underground tests. In this activity, the relatively faint seismic waves generated by an underground explosion must be distinguished from natural tremors. In one American installation, the Large Aperture Seismic Array, established in Montana in 1965, 525 seismometers were spread over an area of 30,000 square km (11,600 square miles). Their signals are combined to attain a high degree of sensitivity to seismic events.

If the seismic waves generated by an explosive charge are recorded by sensitive seismographs installed at various points in the neighbourhood of the explosion, the underground structure of the site can be determined by analyzing the time–distance curves of P waves, both direct waves and those reflected or refracted at the boundaries of underground layers. Depths of underground layers, their angle of inclination, and the speed of seismic waves in each layer can be determined. Since the discovery of a large oil field in the United States by this method in 1923, seismic prospecting has made rapid progress and is now used for oil and gas exploration. The improvement in the instruments and techniques achieved after World War II made it possible to determine the structure of the Earth's crust to a depth of 40 to 50 km (about 25 to 31 miles) by detonation of a small amount of explosive.

Ground shocks caused by dynamite blasts in mines, quarries, and public works also can be measured by the seismograph. Preliminary examinations based on seismographic measurements make it possible to estimate the intensity of shocks and, thus, evaluate the possibilities of damage caused by a given amount of dynamite. Rock bursts, in which rocks are ejected suddenly in deep pits or tunnels, are caused by increase of stress in the surrounding rocks. Experience in mines shows that an increase of small shocks detectable by highly sensitive Geophones—portable seismometers for field use—generally indicates a rock burst hazard.

A strong motion seismograph is designed particularly to register intense movements of the ground for engineering purposes—*i.e.,* antiseismic construction in earthquake-prone areas such as Japan.

Detection of vibrations on the lunar surface by use of seismographs is of fundamental importance in determining the internal structure, physical state, tectonic (crustal) activity, and composition of the Moon. The first Moon seismograph was installed and operated at Tranquility Base by Apollo 11 astronauts in 1969. It contained three long-period seismometers and a single-component, short-period, vertical seismometer. Similar instruments were placed on Mars by the Viking 1 and 2 landers in 1976 to determine the extent of seismic activity on that planet.

seismology, scientific discipline that is concerned with the study of earthquakes and of the propagation of seismic (elastic) waves within the Earth. A branch of geophysics (*q.v.*), it has provided much information about the composition and state of the planet's interior.

The goals of seismological investigations may be local or regional, as in the attempt to determine subsurface faults and other structures in petroleum or mineral exploration, or they may be of global significance, as in attempts to determine phase discontinuities in the Earth's interior, the geophysical characteristics of island arcs, oceanic trenches, or mid-oceanic ridges, or the elastic properties of Earth materials generally.

In recent years, increasing attention has been devoted to earthquake prediction and to assessing seismic risks at different geographic sites in an effort to reduce the hazards of earthquakes. Moreover, seismologists have studied quakes induced by human activities, such as impounding water behind high dams, injecting fluids into deep wells, and detonating underground nuclear explosions. The objective of this research is to find ways of controlling natural earthquakes.

Seistan (Iran): *see* Sīstān.

To make the best use of the Britannica, consult the INDEX *first*

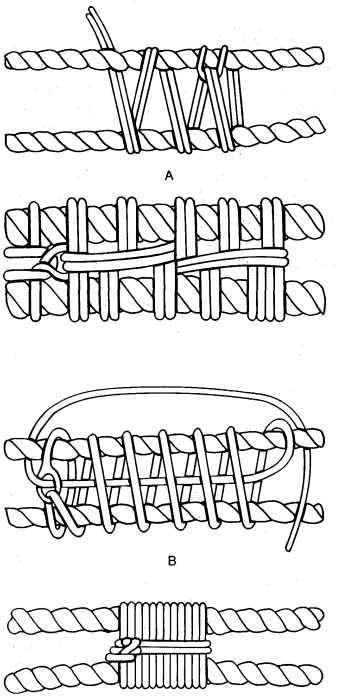
Seitz, Karl (b. Sept. 4, 1869, Vienna—d. Feb. 3, 1950, Vienna), politician, acting head of Austria (1919–20) after the dissolution of the Austro-Hungarian Empire, and longtime Socialist mayor of Vienna (1923–34).

He served as a Social Democrat member of the Austrian Reichsrat (national assembly) through the last years of the empire, and after World War I he presided over the provisional national assembly of republican Austria (1918–19). Seitz served as speaker of the constituent assembly (May 1919–October 1920) and later as president of the Nationalrat (lower house of parliament) and as acting president of the republic (October–November 1920).

Elected mayor of Vienna in 1923, he inaugurated a vigorous and revolutionary program for the rapid extension of social services in that city. Following the Socialist rising of February 1934, he was removed from office and for a short period was imprisoned. In July 1944 he was arrested by the Nazis and was interned at Ravensbrück and Plauen concentration camps. After liberation (March 1945), Seitz was named honorary president of the Austrian Socialist Party.

Seixal, town in Setúbal *distrito* ("district"), southeast of central Lisbon, Portugal. The town lies across the *mar de palha* ("straw sea") of the Tagus (Tejo) River and is connected to Lisbon by a modern highway through nearby Almada. Originally a fishing village, Seixal grew into an important fishing port and received town status in 1836. The establishment there of Portugal's first primary steelmaking plant (built after World War II) effected the development in the area of the country's most important industrial complex, which now includes machine-tool and engineering factories as well as shipbuilding and repair facilities. Pop. (1981) town, 2,956; *concelho* (municipality), 87,344.

seizing, means of fastening together two spars, two ropes, or two parts of the same rope by means of a third rope. Two parts of the same rope may be thus joined to make an eye, or closed circle.



(A) Racking seizing; (B) round seizing

When two ropes are joined and the strain on one is to be greater than that on the other, racking seizing is preferred. A simpler and more common method is round seizing.

seizure (law): *see* search and seizure.

Sejanus, Lucius Aelius (d. Oct. 18, AD 31), chief administrator of the Roman Empire for the emperor Tiberius, alleged murderer of Tiberius' only son, Drusus Caesar, and suspect in a plot to overthrow Tiberius and become emperor himself.

Sejanus was related through his mother to the distinguished senatorial family Cornelii Lentuli. In AD 14, upon the accession of Tiberius, he joined his father, Seius Strabo, as prefect of the Emperor's household troops, the Praetorian Guard, and became sole prefect a year or two later. As prefect he gained the complete confidence of the Emperor.

After the death of Drusus (AD 23), he began systematically to attack the position of Drusus' mother, Agrippina the Elder, whose sons were Tiberius' probable heirs. In 25, Sejanus was refused Tiberius' permission to marry Drusus' widow, Livilla, who may have been Sejanus' accomplice in the poisoning of her husband. In 27, however, Sejanus persuaded the Emperor to take up residence on

Capreae (modern Capri) and in 29 succeeded in having Agrippina and her son Nero exiled.

As consul (31), with the prospect of attaining the great administrative prerogatives of tribunician power, Sejanus fell under the suspicion of the emperor. Tiberius, repeatedly warned by his sister-in-law Antonia of Sejanus' designs, had him arrested and executed. The Senate and the populace rejoiced as his body was dragged through the streets, and a long reign of terror ensued against his adherents.

Sejarah Melayu, English MALAY ANNALS, one of the finest literary and historical works in the Malay language. Concerning the Malaccan sultanate, it was composed sometime in the 15th or 16th century. The original text, written prior to 1536, underwent changes in 1612, ordered by Sultan Abdullah Maayah Shah. Only manuscripts of this modified version survive.

The main theme of this work was to laud the greatness and superiority of the Malaccan state, founded in about 1400. Although the *Sejarah Malayu* mentions only one date, events described in it can be verified by other historical sources. The *Sejarah Melayu* consists of a collection of stories, not historically connected, focusing on the activities of the Malaccan sultans, their courts, and government officials. In addition, foreign rulers were also described, as were Malacca's foreign relations and its importance as a regional trading centre. A noteworthy omission was the absence of any mention of peasant life. The *Sejarah Melayu* is significant for its well-written narrative and characterization of personalities as well as for being an important historical source about Malacca and the Malay world prior to Malacca's defeat by the Portuguese in 1511.

Sejong (b. 1397—d. 1450), monarch of the Yi dynasty during whose reign (1419–50) cultural achievements in Korea reached their highest point. Sejong is best-known for his development of Han'gŭl, a phonetic system for writing the Korean language, considered one of the most scientific alphabets in use in any country. He is also known for his action in banning all Buddhist monks from Seoul, drastically reducing the power and wealth of the Buddhist hierarchy.

Sekani, a nearly extinct Athabascan-speaking Indian tribe living mostly in river valleys on both the western and the eastern slopes of the Rocky Mountains in what is now British Columbia and Alberta. They were often harassed and driven off by neighbouring Cree, Beaver, Carrier, and Shuswap and, finally, by white trappers and miners. Disease and malnutrition resulting from the depletion of game added to their toll.

The Sekani were divided into several independent bands, loosely organized and with only nominal leaders. (The name Sekani, meaning "Dwellers on the Rocks," originally denoted only one particular band, there being no name for the tribe as a whole.) Nomadic, they lived in crude temporary huts or leantos framed by poles and covered with spruce bark or brush; and they hunted moose, caribou, bear, mountain goats, beaver, and other game, using chiefly snares but also bows and arrows, spears, and clubs. They scorned fish and usually ate it only when faced by dire food shortage; in fact, their derisive name for their neighbours, the Carrier, was Fisheaters.

The Sekani believed in animism, finding spirits or powers among animals, winds, and thunder. Each male had one or more guardian spirits associated with birds or beasts, from which he might elicit power on occasions of great need. There were also shamans considered able to cause and cure illness.

Sekhmet, also spelled SEKHET, in Egyptian religion, a fierce goddess of war and the destroyer of the enemies of the sun god Re. Sekhmet was considered the Eye of Re and was placed as the uraeus serpent (a stylized



Sekhmet, diorite statue from Karnak, New Empire; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York, gift of Henry Walters, 1915

representation of the sacred asp) on Re's head. She was the consort of the god Ptah and, as such, was the second member of the Memphite triad of divinities. She was usually depicted as a lioness or as a woman with a lion's head, on which was placed the solar disk and the uraeus serpent. Sekhmet was occasionally identified with two other Egyptian goddesses, Bast and Mut.

Šeki (Azerbaijan S.S.R.): *see* Sheki.

Seki Kōwa, also called TAKAKAZU (b. 1642, Fujioka, Japan—d. 1708, Japan), generally considered the founder of Japanese mathematics.

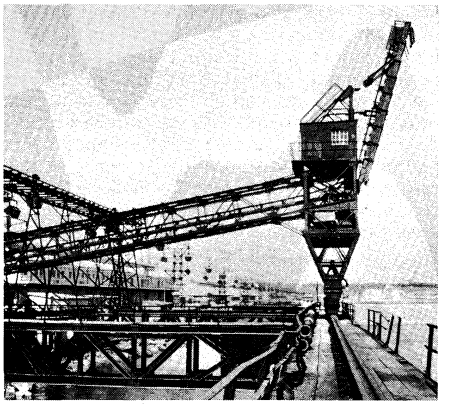
Born into a samurai warrior family, Seki was a child prodigy in mathematics. He developed a mathematical theory of determinants that was more general than that of the 18th-century German mathematician Gottfried Leibniz and predated it. Seki is also credited with having made major discoveries in calculus, many of which were passed on to and used by Takebe, one of his disciples. A comprehensive and accurate account of Seki's contributions is difficult because of the secrecy that surrounded rival schools in Japan at that time and the modesty that was demanded of him by the samurai code.

Sekigahara, Battle of (Oct. 20, 1600), in Japanese history, conflict that established the hegemony of the Tokugawa family, a hegemony that lasted until 1868.

The chief contenders were Tokugawa Ieyasu and Ishida Mitsunari, both of whom were members of a delicately balanced oligarchy that had been established by the former national leader Toyotomi Hideyoshi to keep Japan united under his descendants. When Toyotomi died leaving only an infant son, Toyotomi Hideyori, to succeed him, Ieyasu, as head of the regency council for Hideyori, began to assume power. Ishida, another member of the council, challenged him, and two great armies of feudal lords faced each other at Sekigahara, a strategically located narrow pass between the two plains at Lake Biwa and Nagoya. Ishida and his allies were defeated; he was executed; and most of the lords who had supported him were either banished or deprived of their domains.

Immediately after his triumph, Ieyasu began a redistribution of fiefs to consolidate his rule, establishing the machinery for the 265-year Tokugawa shogunate, or military dictatorship, of Japan.

Sekondi-Takoradi, port city on the Gulf of Guinea (Atlantic Ocean), southern Ghana, western Africa. Both the Dutch and British built forts at Sekondi in the 17th century that were destroyed by the Ahanta. Fort Orange, rebuilt by the Dutch and bought by the British in 1872, still survives as a lighthouse. Sekondi flourished in the 1900s after construction of the railroad to the interior goldfields. Its surf port became commercially obsolete, however, with the opening of the artificial harbour at Takoradi in 1928. Sekondi and Takoradi, a single municipality since 1946, became one city in 1963. Sekondi is a mixture of old and new buildings on a hilly site, extending to the seashore. The old port is used by fishing and pleasure craft, and a naval station is nearby. Takoradi is well-planned, with modern buildings and tree-shaded residential areas. Two breakwaters enclose 220 acres (90 hectares) of sea with quay berths and lee facilities for loading bauxite and discharging oil. The harbour is the terminus of several Ghana railways and is served by road and air. The city also has light industrial, agricultural, and fishing enterprises. The busy market and street vending are conducted by women. Pop. (1988 est.) 103,653.



Bauxite loaders at Takoradi Harbour, Ghana

Photo Research International—Camera Press

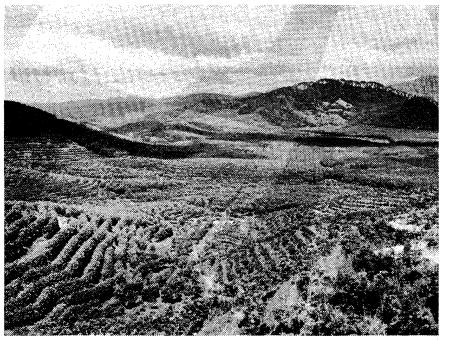
Seku Ahmadu Lobbo: *see* Shehu Ahmadu Lobbo.

Selachii (fish class): *see* chondrichthian.

seladang, Malayan wild cattle, a species of gaur (*q.v.*).

Selaginella, genus of plants that are commonly known as spike moss (*q.v.*).

Selangor, region of western West Malaysia (Malaya), occupying part of a coastal alluvial plain on the Strait of Malacca. In 1974, a 94-square-mile (243-square-kilometre) portion of Selangor, centring on Kuala Lumpur, was designated a *wilayapersekutuan* (federal territory). Selangor's history and economic development have been closely linked with two rivers, the Kelang and the Langat, which were the main



A rubber estate in Selangor state, West Malaysia

Shostal—EB Inc.

settlement routes for Malays and immigrant Chinese.

One of the original Negeri Sembilan ("Nine States") under the rule of old Malacca, Selangor became an independent state (18th century) ruled by Buginese from Makasar in the Celebes. In the late 19th century Chinese tin miners, mainly from Singapore, arrived, and an ensuing civil war in their jungle camps led to British intervention, culminating in protectorate status (1874) and membership in the Federated Malay States (1896) and the Federation of Malaya (1948). Although Chinese and Indians outnumber Malays, Selangor has been the focus of Malay nationalist politics and attendant communal rivalries.

A 20-mile (32-kilometre) railway built between Kuala Lumpur and Klang (the sultan's residence) about 1890 was the beginning of an extensive series of rail and road links with Singapore and Pinang that were constructed to handle the increasing output of rubber and tin. Port Swettenham, now Port Kelang (*q.v.*), was developed beside a broad channel on the delta below Klang (now Kelang) to handle bulky commodities. Other important towns include Kuala Selangor, Kuala Kubu Baharu, and Kajang.

The region's modern economy is broad-based, with tin, coconuts, and rubber as major products. Subsistence paddy (rice) is grown in the upland valleys and at Tanjung Karang, a swampy northern coastal strip. Pineapples, coffee, rice, tea, cocoa, and palm products are significant crops. Coal is mined at Batu Arang. Industrial and commercial development is concentrated in a sector between Kuala Lumpur-Petaling Jaya and Port Kelang.

Selangor Civil War (1867–73), series of conflicts initially between Malay chiefs but later involving Chinese secret societies for control of tin-rich districts in Selangor.

Following the disputed recognition of Abdul Samad as sultan in 1860, Malay chiefs gradually became polarized into two camps—generally the lower-river versus the upper-river chiefs. The main issue concerned the lucrative collection of duties on tin exports. Raja Mahdi, the dispossessed son of the previous ruler in Klang (now Kelang), seized and held the prosperous town of Klang for two years with tacit approval of dissident upper-river chiefs. When the sultan granted favours to his son-in-law Zia-ud-din, brother of the sultan of Kedah, he further alienated the dissident chiefs, and intermittent fighting commenced.

At this point Chinese tin miners in the Selangor and Klang valleys began feuding over control of the mines. The miners predominantly belonged to the Ghee Hin and Hai San secret societies, which increasingly sought allies among the Malay chiefs. Thus, by 1870 the Chinese had joined opposing sides in the civil war: the Ghee Hin had joined Raja Mahdi's forces, and the Hai San had sided with Zia-ud-din. By late 1873 Zia-ud-din, with British aid, a Pahang army, and his Chinese allies, reversed several years of setbacks and defeated Mahdi and his supporters.

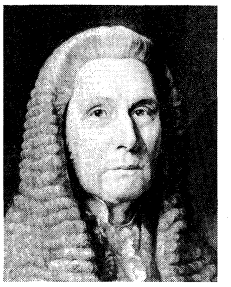
The war caused economic dislocation and loss of mining investments and paved the way for expansion of British control in 1874.

Selassie, Haile (Ethiopian emperor): *see* Haile Selassie.

Selassie, Sahle (ruler of Shewa): *see* Sahle Selassie.

Selayar, also spelled SALAYAR, or SELAJAR, also called KABIA, largest of an island group off the southwestern tip of Celebes (Sulawesi), constituting Selayar *kabupaten* (regency), administered from Makasar as part of Sulawesi Selatan *provinsi* ("province"), Indonesia. The other islands are Pasi, Bahuluang, Pulasi, and Tambulongang. The islands are mountainous, but fertile lowlands exist on Selayar and cover 259 square miles (671 square km) of the island's total area of 347 square miles (899 square km). The population is mainly a mixture of Makasarese and Buginese. The area produces coconuts, corn (maize), pepper, salt, and sea cucumbers. On the western coast are Benteng, the main port, and Padang (*q.v.*). Pop. (1980) 95,484.

Selborne, Roundell Palmer, 1st Earl of, VISCOUNT WOLMER OF BLACKMOOR, BARON SELBORNE OF SELBORNE (b. Nov. 27, 1812, Mixbury, Oxfordshire, Eng.—d. May 4, 1895, near Petersfield, Hampshire), British lord high chancellor (1872–74, 1880–85) who almost singlehandedly drafted a comprehensive judicial-reform measure, the Supreme Court of Judicature Act of 1873. Under this statute, the complex duality of English court systems—common law and chancery (equity)—was largely abolished in favour of a single hierarchy of courts. All divisions of the new supreme court were empowered to apply equitable as well as common-law remedies, with the principles of equity prevailing in the event of conflict.



Roundell Palmer, 1st Earl of Selborne, detail of an oil painting by J.M. Stewart after E.M. Busk; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

A successful equity lawyer and a member of the House of Commons (1847–52, 1853–57, 1861–72), Palmer served as solicitor general (1861–63) and attorney general (1863–65). In April 1868 he voted with a Commons minority against resolutions for disestablishing the Church of Ireland, introduced by William Ewart Gladstone, then chancellor of the Exchequer and leader of the House of Commons. Later that year, Gladstone, the newly appointed prime minister, offered Palmer the lord chancellorship, which he declined. Four years later, however, he accepted the office from Gladstone and was created Baron Selborne. In 1882, when Queen Victoria formally turned over to him the new law court building in London, he received an earldom. He was one of the few ministers to urge the relief of General Charles George ("Chinese") Gordon's garrison at Khartoum, the Sudan, besieged (1884–85) by the Mahdist revolutionaries. In 1885 he finally broke with Gladstone over the prime minister's conversion to the principle of Irish Home Rule.

Selborne, William Waldegrave Palmer, 2nd Earl of, VISCOUNT WOLMER OF BLACKMOOR, BARON SELBORNE OF SELBORNE (b. Oct. 17, 1859, London—d. Feb. 26, 1942, London), first lord of the Admiralty (1900–05) in Great Britain and high commissioner for South Africa (1905–10), who helped initiate the rebuilding of the fleet into a force strong enough to oppose a greatly expanded German navy in World War I and who successfully proposed the formation of the Union of South Africa.

A son of the lawyer and statesman Roundell Palmer, 1st Earl of Selborne, he was also a son-in-law of Britain's prime minister Lord Salisbury, who appointed him first lord of the Admiralty. Selborne and Admiral Sir John Fisher modernized the navy's training system and initiated the building of "all-big-gun" battleships of the Dreadnought type.

In December 1905, seven months after Selborne's appointment as high commissioner for South Africa and governor of the Transvaal and Orange River Colony, a new British government under Prime Minister Sir Henry Campbell-Bannerman came to power and initiated a policy of self-government for the South African colonies. They originally intended to remain separate, but Selborne advocated (1907) that the Transvaal and Orange River Colony be united with Natal and the Cape Colony to form the Union of South Africa. He returned to England shortly before the South Africa Act, establishing the union, became effective (May 31, 1910).

To make the best use of the Britannica, consult the INDEX *first*

Selby, district, county of North Yorkshire, England, south of York. It lies mainly in the floodplain of the Rivers Aire and Ouse and covers 280 square miles (725 square km).

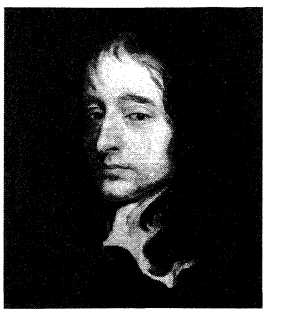
Settlement in earlier centuries followed two historic transportation routes. Pre-Norman settlements along the right bank of the River Ouse, the main waterway, became significant medieval religious centres; they include the Norman abbey at Selby and the palace of the archbishop of York at Bishopthorpe. Further west an old land route, following a limestone outcrop traversed by Ermine Street in Roman times, links York with the brewing town of Tadcaster on the River Wharfe.

The district was extensively drained in the 18th century, and today it is intensively cultivated. Its farms are served by the markets of Tadcaster and Selby, an inland port on the River Ouse, as well as neighbouring York. Selby town processes agricultural products at large flour mills and a sugar beet factory. Other industry in the district is based on local minerals. The limestone used in the construction of York Minster (cathedral) was quarried in the district; limestone is still quarried, and south of Tadcaster gypsum is mined for use in making plasterboard. A major contribution to the district economy was the development, in the 1970s, of shaft mines and a drift mine in the previously undeveloped Selby coalfield, an eastward extension of the coalfield of West Yorkshire. Heslington, near the eastern edge of the district, is the site of the University of York. Pop. (1986 est.) 86,900.

Selby, Norman: *see* McCoy, (Charles) Kid.

Selcraig, Alexander: *see* Selkirk, Alexander.

Selden, John (b. Dec. 16, 1584, Salvington, Sussex, Eng.—d. Nov. 30, 1654, London), legal antiquarian, Orientalist, and politician who was the leading figure in the Antiquarian Society, the centre of English historical research during the 17th century.



Selden, oil painting by an unknown artist; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Called to the bar in 1612, Selden practiced as a conveyancer, rarely appearing in court. His first major book, *Titles of Honour* (1614), has remained a useful reference. *Analecton Anglo-Britannicon* (1615) was a history of civil government in Britain before the Norman Conquest (1066). His reputation as an Orientalist was based on *De diis Syris Syntagmata* (1617), which was chiefly concerned with Middle Eastern polytheism, and on later works dealing with the calendar, marriage law, and judicial administration of the ancient Jews. With Patrick Young and Richard James he compiled (1628) a catalog of the sculpture collection known as the Arundel marbles. In 1647 he published the first printed edition of the old English lawbook *Fleta.*

Selden's *History of Tythes* (1618), although conceding the legal right of the Church of England to collect tithes, denied divine authority for the practice. The book was suppressed, and the Privy Council forced the author to recant. Twice he was imprisoned for taking the side of the House of Commons (to which he was elected in 1623) against King Charles I. Later becoming a Royalist, however, he dedicated to the king *Mare clausum* (1635), a justification of a single nation's rule over the high seas, in rebuttal to Hugo Grotius' *Mare liberum* (1609). From 1640, having reversed his political position once more, he took part in the Commons' proceedings against William Laud, archbishop of Canterbury, and against Charles I himself.

Selebi-Pikwe, also spelled SELEBI-PHIKWE, mining town, eastern Botswana, southern Africa, located 62 miles (100 km) southeast of Francistown. Situated in the centre of a big copper–nickel mine and a smelter complex, it was one of the fastest-growing towns in the country in the late 20th century. The copper and nickel operation, in which the government of Botswana had a 15 percent share, began production in 1974. Laid out as a fully integrated township with modern housing, electricity, and water facilities, Selebi-Pikwe was built for the mining community by the Botswana Roan Selection Trust. Funding in part was provided by the World Bank and other international development agencies. Roads, a railway, and an airport were built to link the town with Botswana's main lines of communication. Pop. (1986 est.) 41,382.

selection, in biology, preferential reproduction and survival or preferential elimination of individuals with certain genetic compositions, by either natural or artificial means.

The theory of evolution by natural selection was proposed by Charles Darwin and Alfred Russel Wallace. It notes that, even though organisms of a species produce excessive numbers of young, population size remains relatively constant over time. In the competition for food, space, and mates that must therefore occur (the "struggle for existence"), the weaker or less fit must die, and the more fit survive.

Natural selection in the modern sense emphasizes more efficient reproduction of better-adapted organisms rather than competition or the elimination of the "unfit." If natural selection operates in favour of those organisms best fitted for a relatively constant environment over a period of time, it is called stabilizing selection; if selective pressure results from change in environmental conditions away from the norm, it is termed dynamic selection.

Artificial selection (or selective breeding) differs from natural selection in that heritable variations are manipulated by man through controlled breeding, because they are economically or aesthetically desirable rather than useful to the organisms in their natural environments. Artificial selection in the negative sense is exemplified by elimination of undesirable forms such as weeds, predators, or inferior progeny. In mass selection, a number of individuals chosen on the basis of appearance are mated; their progeny are further selected for the preferred characteristics, and the process is continued for as many generations as is desired. The choosing of breeding stock on the basis of ancestral reproductive ability and quality is known as pedigree selection. Progeny selection indicates choice of breeding stock on the basis of the performance or testing of their offspring or descendants. Family selection refers to mating of organisms from the same ancestral stock that are not directly related to each other. Pure-line selection involves selection of and breeding of progeny from superior organisms for a number of generations until a pure line of organisms with only the desired characteristics has been established.

Darwin also proposed a theory of sexual selection, in which females chose as mates the most attractive males; outstanding males thus helped generate more young than mediocre males. Species-recognition signals, such as odours and sounds and patterns of courtship behaviour, may have evolved through sexual selection.

selection coefficient, in genetics, a measure of the intensity of selection on a specific genotype (genetic constitution) within a population of similar organisms. It expresses the relative advantage or disadvantage of specific traits with respect to survival and reproductive success. The selection coefficient (s) against a given genotype as related to the fitness or adaptive value (W) of that genotype is expressed as follows: $s = 1 - W$. A genotype that is lethal has a selection coefficient of 1. If a particular genotype produces only 65 percent viable young, its selection coefficient is: $s = 1 - 0.65 = 0.35$. The selection coefficient is used by researchers to calculate the rate at which gene frequencies change from generation to generation within a population.

selection rule, in quantum mechanics, any of a set of restrictions governing the likelihood that a physical system will change from one state to another or will be unable to make such a transition. Selection rules, accordingly, may specify "allowed transitions," those that have a high probability of occurring, or "forbidden transitions," those that have minimal or no probability of occurring. Selection rules usually are stated as sets of changes in one or more quantum numbers that characterize properties changed by the transition in question.

Atoms, for example, radiate light or other electromagnetic energy whenever they make a transition from a higher to a lower energy state. The only allowed transitions are those in which the orbital quantum number of an electron changes by one and its magnetic quantum number remains the same or changes by one. Radiations not meeting these selection rules are rarely observed.

In subatomic physics, unstable particles spontaneously change into other particles in numerous different processes, called decays. Neutrons decay into protons and electrons; muons decay into electrons and neutrinos; and so on. Selection rules, however, prevent certain decays. Electrons, for instance, never decay. The selection rule in this and other forbidden transitions is a specific case of a conservation law, such as the conservation of electric charge. Selection rules are, in fact, particular manifestations of fundamental physical laws.

Selene (Greek: "Moon"), in Greek religion, the personification of the moon as a goddess. She was worshiped at the new and full moons. Her parents were the Titans Hyperion and Theia; her brother was Helios, the sun god (sometimes called her father); her sister Eos (Dawn); her husband Zeus, the chief god; her daughter Pandia; and her lover Endymion. By the 5th century BC Selene was sometimes identified with Artemis, or Phoebe, "the bright one." She was usually represented as a woman with the moon (often in crescent form) on her head and driving a two-horse chariot. Selene was called Luna in Latin; she had temples at Rome on the Aventine and Palatine hills.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Selenga-Orhon river system, river system comprising the Selenga River (Mongolian: Selenge Mörön), formed by the confluence of the Ider River and Mörön River, which rise in the Mongolian People's Republic south of Lake Hövsgöl, and the Orhon River, which rises farther south on the slopes of the Hangayn Mountains. Both streams flow northeast to join at Sühbaatar; the river, from that point called the Selenga, continues north into the Russian Soviet Federated Socialist Republic, and bends eastward to Ulan-Ude, capital of the Buryat Autonomous Soviet Socialist Republic. From there it flows north to Tataurovo, where it swings westward and flows across a delta into Lake Baikal. From Sühbaatar to its mouth the Selenga flows down a gentle slope, giving access from Mongolia to the plains of Asiatic U.S.S.R. The Trans-Siberian Railroad follows the valley upstream to Ulan-Ude, where a branch continues to Sühbaatar, and then up the Orhon to Ulaanbaatar, capital of the Mongolian People's Republic.

The Selenga is 920 miles (1,480 km) long and is navigable from its mouth to beyond Sühbaatar in May–October, when it is ice-free. Its 173,000-square-mile (448,000-square-kilometre) basin includes the Mongolian tributaries of the Orhon, Hanuy, and Egiyn and the Soviet Chikoy, Khilok, Uda, Dzhida, and Temnik rivers. The 698-mile (1,123-kilometre) Orhon, fed by the Yöröö, Haraq, and Tuul rivers, drains a 51,280-square-mile (132,815-square-kilometre) basin. It is navigable upstream to the Yöröö from July to August. Karakorum, ancient capital of the Mongol Empire, was situated near the upper Orhon.

selenite, a crystalline variety of the mineral gypsum (*q.v.*).

selenium (Se), a chemical element in the oxygen family (Group VIa) of the periodic table, closely allied in chemical and physical properties with the elements sulfur and tellurium.

Occurrence, characteristics, and uses. Recognized as an element in 1818 by Jöns Jacob Berzelius, a Swedish chemist, selenium is a metalloid (an element intermediate in properties between the metals and the nonmetals) that is widely distributed throughout the world, but only in small quantities.

Selenium occasionally occurs uncombined, usually in conjunction with free sulfur; it is more commonly found together with the sulfides as the selenides in ores of such metals as iron, lead, silver, and copper. When any of the selenium-containing sulfide minerals is roasted, selenium appears as a by-product in the flue dusts. It is also extracted from the slime deposited at the anode (the positive electrical terminal) in the electrolytic refining of copper.

Selenium exists in several different forms, the three most important being the amorphous (noncrystalline), which is red when in powder form and black when in vitreous (glassy) form; the red crystalline; and the gray metallic, which is also crystalline. Of the three, the metallic form is the most stable under ordinary conditions; the other forms very slowly convert to the metallic form at room temperature.

Because the electrical conductivity of metal-

lic selenium increases when light strikes it and because it can convert light directly into electricity, the element is used in photoelectric cells, solar cells, and photographic exposure meters. It is also used extensively in rectifiers because of its ability to convert alternating electric current to direct current. When incorporated in small amounts into glass, selenium serves as a decolorizer; in larger quantities it imparts to glass a clear red colour that is useful in signal lights. The element is also employed in making red enamels for ceramics and steel ware, as well as for the vulcanization of rubber to increase resistance to abrasion.

Compounds. In its compounds selenium exists in the odixation states of −2, +4, and +6. It manifests a distinct tendency to form acids in the higher valences. Although the element itself is not poisonous, many of its compounds are exceedingly toxic.

Selenium combines directly with hydrogen, resulting in hydrogen selenide, H_2Se, a colourless, evil-smelling gas that is a cumulative poison. It also forms selenides with most metals (*e.g.,* aluminum selenide, cadmium selenide, and sodium selenide).

In combination with oxygen, it occurs as selenium dioxide, SeO_2, a white, solid, chain-like polymeric substance that is an important reagent in organic chemistry. The reaction of this oxide with water produces selenious acid, H_2SeO_3.

Selenium forms a variety of compounds in which the selenium atom is bonded to both an oxygen and a halogen atom. A notable example is selenium(VI) oxychloride, SeO_2Cl_2, an extremely powerful solvent. The most important acid of selenium is selenic acid, H_2SeO_4, which is as strong as sulfuric acid and more easily reduced.

atomic number	34
atomic weight	78.96
masses of stable isotopes	74, 76, 77, 78, 80, 82
melting point	
amorphous	50° C (122° F)
gray	217° C (423° F)
boiling point	685° C (1,265° F)
density	
amorphous	4.28 g/cm³
gray	4.79 g/cm³
oxidation states	−2, +4, +6
electron config.	2-8-18-6 or $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^4$

selenium cell, photoelectric device used to generate or control an electric current. Selenium photocells are commonly used in photographic-exposure meters, burglar alarms, electronic-door opening and counting devices, electronic control systems in factory assembly lines, and industrial colour perceptors. In some ways, such as colour perception and sensitivity, the performance of selenium photocells is superior to that of vacuum-tube photocells, but response is slower, making selenium cells unsuitable for high-fidelity sound reproduction from an optical sound track on motion-picture film.

Seleucia (Turkey): *see* Silifke.

Seleucia on the Tigris, Greek SELEUKEIA, Hellenistic city founded by Seleucus I Nicator (reigned 312–281 BC) as his eastern capital; it replaced Babylon as Mesopotamia's leading city and was closely associated with the spread of Hellenistic culture in Mesopotamia. The city lay along the Tigris River about 20 miles (32 km) southeast of modern Baghdad. Seleucia was a cosmopolitan city whose population was composed largely of Macedonians and Greeks and also included Jews and Syrians. Pliny the Elder gives the population as 600,000. During the Parthian domination of the Tigris–Euphrates valley that began in the 2nd century BC, Seleucia continued to be the foremost city of the east in position and trade. Preserving its Greek sympathies, it was at times in open rebellion against the Parthian kings, who favoured the neighbouring city of Ctesiphon and founded Vologesias, or Vologesocerta, as a rival canal port. Seleucia eventually was burned by the Roman commander Gaius Avidius Cassius in AD 165, at which time it is said to have had at least 300,000 inhabitants. The destruction of the city marks the end of Hellenism in Mesopotamia. The Roman emperor Septimius Severus, in his Parthian campaign of 197, found the site completely abandoned. Nothing of the city remains above ground; the excavation of the site (then called Tel Umar) during 1927–32 yielded interesting but unspectacular results.

Seleucia Pieria, Greek SELEUKEIA, in ancient Syria, port of Antioch and frontier fortress on the Cilician border (near modern Samandağ, Tur.), 4 miles (6 km) north of the mouth of the Orontes River. With Antioch, Apamea, and Laodicea it formed the Syrian tetrapolis. The town occupied the rocky slopes of Musa Dağı, and its natural fortifications and good harbour soon made it the port for the important city of Antioch. The city was of considerable military importance during the wars between the Ptolemies and the Seleucids and was later recognized as an independent city by the Romans. It was used by them as a naval base but was later abandoned.

Seleucia Tracheotis, Greek SELEUKEIA, city in Cilicia (in present-day southern Turkey), on the Calycadnus River (modern Goksu Nehri), a few miles from that stream's mouth; the site was doubtless selected as a protection against attacks from the sea. There are ruins of a castle on the acropolis, and the city fortifications, a large rock-cut tank, and an extensive necropolis are all well preserved. The city was at one time a port serving Isauria and was entitled to strike its own coinage. It was built near an old site by Seleucus I, the founder of the Seleucid kingdom. During the Third Crusade, the Holy Roman emperor Frederick Barbarossa was drowned in crossing the river at this point (AD 1190). The city was captured by the Turks in the 13th century. The site is now occupied by the town of Silifke, Tur.

Seleucid kingdom (312–64 BC), an ancient empire that at its greatest extent stretched from Thrace in Europe to the border of India. It was carved out of the remains of Alexander the Great's Macedonian empire by its founder, Seleucus I Nicator. (*See also* Hellenistic Age.)

Seleucus, one of Alexander's leading generals, became satrap (governor) of Babylonia in 321, two years after the death of Alexander. In the prolonged power struggle between the former generals of Alexander for control of the disintegrating empire, Seleucus sided with Ptolemy I of Egypt against Antigonus I, Alexander's successor on the Macedonian throne, who had forced Seleucus out of Babylonia. In 312 Seleucus defeated Demetrius at Gaza using troops supplied by Ptolemy, and with a smaller force he seized Babylonia that same year, thereby founding the Seleucid kingdom, or empire. By 305, having consolidated his power over the kingdom, he began gradually to extend his domain eastward to the Indus River and westward to Syria and Anatolia, where he decisively defeated Antigonus at Ipsus in 301. In 281 he annexed the Thracian Chersonesus. That same year, he was assassinated by Ptolemy Ceraunus, the disgruntled son of Ptolemy I.

Seleucus was succeeded by his eldest son, Antiochus I Soter, who reigned until 261 and was followed by Antiochus II (reigned 246–225), Seleucus III (225–223), and Antiochus III the Great (223–187), whose reign was marked by sweeping administrative reforms in which many of the features of the ancient Persian imperial administration, adopted initially by Alexander, were modernized to eliminate a dual power structure strained by rivalry between military and political figures. The empire was administered by provincial *stratēgoi,* who combined military and civil power. Administrative centres were located at Sardis in the west and at Seleucia on the Tigris in the east. By controlling Anatolia and its Greek cities, the Seleucids exerted enormous political, economic, and cultural power throughout the Middle East. Their control over the strategic Taurus Mountain passes between Anatolia and Syria, as well as the Hellespont between Thrace and Anatolia, allowed them to dominate commerce and trade in the region. Seleucid settlements in Syria, primarily Antioch, were regional centres by which the Seleucid kingdom projected its military, economic, and cultural influence.

The Seleucid kingdom was a major centre of Hellenistic culture, which maintained the preeminence of Greek customs and manners over the indigenous cultures of the Middle East. A Greek-speaking Macedonian aristocratic class dominated the Seleucid state throughout its history, although this dominance was most strongly felt in the urban areas. Resistance to Greek cultural hegemony peaked during the reign of Antiochus IV (175–163), whose promotion of Greek culture culminated in his raising a statue to Zeus in the temple at Jerusalem. This act sparked the Maccabean uprising beginning in 165. A quarter-century of Maccabean resistance ended with the final wresting of control over Judea from the Seleucids and the creation of an independent Judea in Palestine.

The Seleucid kingdom began losing control over large territories in the 3rd century BC. An inexorable decline followed the first defeat of the Seleucids by the Romans in 190. By that time the Aegean Greek cities had thrown off the Seleucid yoke, Cappadocia and Attalid Pergamum had achieved independence, and other territories had been lost to the Celts and to Pontus and Bythnia. By the middle of the 3rd century, Parthia, Bactria, and Sogdiana had gained their independence; the conquest of Coele Syria (Lebanon) and Palestine by Antiochus III (200) and a brief occupation of Armenia made up to some extent for the loss of much of Anatolia to the Romans. The decline accelerated after the death of Antiochus IV (164) with the loss of Commagene in Syria and of Judea in Palestine. By 141 all lands east of the Euphrates were gone, and attempts by Demetrius II (141) and Antiochus VII (130) could not halt the rapid disintegration of the kingdom. When it was finally conquered by the Romans in 64 BC, the formerly mighty Seleucid empire was confined to the provinces of Syria and eastern Cilicia, and even those were under tenuous control.

Seleucus, also spelled SELEUKOS, name of kings of the Seleucid dynasty, grouped below chronologically and indicated by the symbol •.

• **Seleucus I** NICATOR (b. 358/354 BC, Europus, Macedonia—d. August/September 281, near Lysimachia, Thrace), Macedonian army officer, founder of the Seleucid kingdom. In the struggles following the death of Alexander the Great, he rose from governor of Babylon to king of an empire centring on Syria and Iran.

Early life and ascent to power. Seleucus was the son of Antiochus, a general of Philip II of Macedonia, the father of Alexander the Great. Seleucus participated in the conquest of the Persian empire as one of Alexander's officers, and in 326 he commanded the Macedonian infantry against King Porus of India in battle on the Hydaspes River. In 324 Alexander ordered a mass wedding ceremony at Susa (in Persia) to put into practice his ideal of uniting the peoples of Macedonia and Persia. On this occasion Seleucus married Apama, the daugh-

ter of Spitamenes, the ruler of Bactria. Of all the Macedonian nobles, he was the only one who did not repudiate his wife after Alexander's death.



Seleucus I Nicator, coin, late 4th–early 3rd century BC; in the British Museum

Reproduced by courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

After Alexander died (323), Seleucus was given the command of the *hetairoi* (companions) cavalry and took part in the regent Perdiccas' campaign to oust Ptolemy, the governor (satrap) of Egypt. In Egypt, however, he joined with others in the assassination of Perdiccas. When the empire was divided in 321, he was given the governorship (satrapy) of Babylon. At the same time Antigonus Monophthalmus (the One-Eyed) had been placed in command of a campaign against Eumenes of Cardia, a supporter of Perdiccas. In 317 Seleucus aided Antigonus but, after Eumenes' execution in 316, Antigonus demanded that Seleucus give an accounting of the income from his satrapy. Seleucus refused to give the accounting and escaped capture by fleeing to Ptolemy in Egypt.

From 316 to 312 Seleucus remained in Ptolemy's service. He took the initiative in forging a coalition among Ptolemy, Lysimachus (the ruler of Thrace), and Cassander (who laid claim to Macedonia) against Antigonus, whose desire to become the ruler of the whole of Alexander's empire was a threat to them all. In the resulting coalition war (315–311), Seleucus was made one of Ptolemy's generals and jointly with him commanded the Ptolemaic troops that defeated the force of Demetrius, the son of Antigonus, at the Battle of Gaza in southern Syria (312).

Seleucus once again turned his attention to returning to Babylonia, and in August 312 he was able to reconquer Babylon with only a small army. This conquest marked the beginning of the Seleucid era, which is dated Dios 1 (Oct. 7), 312, in the Macedonian calendar and Nisan 1 (April 3), 311, in the Babylonian calendar. Antigonus ordered Nicanor, one of his generals, to invade Babylonia from the east and his son Demetrius to attack it from the west, but they failed to oust Seleucus. When Antigonus made peace with his enemies in 311, Seleucus was not included.

Consolidation of gains. Little is known about the next few years of Seleucus' reign; he presumably used them to consolidate his gains. In the year 305 he followed the example of the other successors and assumed the title of king (*basileus*). He embarked on an expansion of his kingdom throughout the Iranian east (the upper satrapies) as far as India, but his advance was eventually halted by Candragupta, the founder of the Maurya dynasty of India. In a pact concluded by the two potentates, Seleucus agreed to territorial concessions in exchange for 500 elephants.

Developments in the west also caused Seleucus to end his campaign in India (303). He had joined a coalition that Ptolemy, Cassander, and Lysimachus had once again formed against Antigonus and Demetrius. In the winter of 302 Seleucus was back in Asia Minor and, together with Cassander and Lysimachus, defeated Antigonus in the Battle of Ipsus (301). The victors divided the lands of their enemy among them, with Seleucus being given Syria. The southern part of Syria, Coele Syria, had in the meantime been occupied by Ptolemy, who had not taken part in the war. This gave rise to the long series of Syrian wars between the Seleucids and Ptolemies. For the time being, however, Seleucus declined to enforce his claim; he merely transferred his capital from Seleucia on the Tigris to the newly founded city of Antioch on the Orontes (301–300).

Ptolemy, anxious to improve relations with Lysimachus, had given him his daughter Arsinoe in marriage. To provide a counterbalance, Seleucus asked for the hand of Stratonice, the daughter of Demetrius, and in 298 the wedding was held with much pomp at Rhosus in Syria. Soon, however, Seleucus' territorial demands (*e.g.*, the surrender of Cilicia and the cities of Tyre and Sidon) ruptured the previously harmonious relationship with Demetrius.

In 294 a sensational scandal occurred at the court of Seleucus. Antiochus, his son by Apama, fell in love with his beautiful stepmother, Stratonice, and his unrequited passion affected his health. Seleucus gave him Stratonice, assigned him as commander in chief to the upper satrapies, and appointed him co-regent.

In 285 Seleucus took Demetrius prisoner, thus foiling his attempt to conquer Asia, and interned him in Apamea, where he died in 283. Subsequently, Seleucus intervened in dissensions in the house of Lysimachus, who had had his son Agathocles assassinated. In February 281 Lysimachus fell in a battle against Seleucus at Corupedium, and Seleucus gained control of Lysimachus' kingdom. He was now near his goal of reestablishing Alexander's empire. He crossed over to Europe to enter Macedonia, but at the end of August or beginning of September 281, he was murdered by Ptolemy Ceraunus, who had been passed over by his father, Ptolemy, as successor to the Egyptian throne. Seleucus' son and successor, Antiochus I, entombed his father's ashes in Seleucia, initiated (probably) the posthumous cult of his father, and ordered his veneration as Zeus Nicator.

Seleucus was an energetic ruler, creating the Seleucid Empire, which gained its greatest expansion under his rule. He took great interest in the administration of his territories and founded many new cities. He also encouraged scientific research: Patrocles explored the Caspian Sea and Megasthenes the Ganges River. A bronze bust—a very impressive likeness of him, conveying his imposing personality—was found in Herculaneum (in Italy) and is now in Naples. (J.Se.)

Articles are alphabetized word by word, not letter by letter

• Seleucus II CALLINICUS (d. 225 BC), fourth king (reigned 246–225) of the Seleucid dynasty, son of Antiochus II Theos.

Antiochus II repudiated his wife Laodice (Seleucus' mother) and married Ptolemy's daughter Berenice, but by 246 BC Antiochus had left Berenice in order to live again with Laodice and Seleucus in Asia Minor. Laodice poisoned him and proclaimed her son as King Seleucus II, while her partisans at Antioch made away with Berenice. Berenice's brother, Ptolemy III, who had just succeeded to the Egyptian throne, at once invaded the Seleucid realm and annexed the eastern provinces, while his fleets swept the coasts of Asia Minor. In the interior of Asia Minor Seleucus maintained himself, and when Ptolemy returned to Egypt he recovered northern Syria and the nearer provinces of Iran. At Ancyra (about 235?) Seleucus was defeated by his younger brother Antiochus Hierax, supported by Laodice, and left the country beyond the Taurus to his brother and the other powers of the peninsula. Of these Pergamum rose to greatness under Attalus I, and Antiochus Hierax perished as a fugitive in Thrace in 228 or 227. A year later Seleucus was killed by a fall from his horse.

• Seleucus III, SOTER (d. 223 BC), fifth king (reigned 225–223 BC) of the Seleucid dynasty, elder son of Seleucus II Callinicus.

Seleucus took up the task of reconquering Pergamum in Asia Minor from a cousin, Attalus I. The first general whom he sent, Andromachus, was decisively defeated by Attalus and captured. Seleucus III then led an army across the Taurus himself. In Phrygia, however, he was assassinated. He was succeeded by his younger brother, Antiochus III the Great.

• Seleucus IV PHILOPATOR (b. *c.* 217 BC—d. 175 BC), seventh king (reigned 187–175 BC) of the Seleucid dynasty, son of Antiochus III the Great.

Although the empire that Seleucus inherited was not so great as the one over which his father had ruled before the war with Rome (190–189), it was still large, consisting of Syria (including Cilicia and Palestine), Mesopotamia, Babylonia, and nearer Iran (Media and Persia). Because of financial difficulties, created in part by the heavy war indemnity exacted by Rome, Seleucus was compelled to pursue a policy devoid of expensive adventures. His unambitious policy and care were also dictated by the fact that his son and heir, Demetrius, had been sent to Rome as a hostage for his father. When Seleucus was assassinated in 175 by his chief minister Heliodorus, his brother Antiochus seized the throne.

Seleukeia ——— (ancient cities): *see* Seleucia ———.

Selevin's mouse, also called DZHALMAN, or DESERT DORMOUSE (*Selevinia betpakdalaensis*), desert-dwelling Russian rodent, the only member of the family Seleviniidae (order Rodentia). Selevin's mouse was discovered in



Selevin's mouse (*Selevinia betpakdalaensis*)

Painting by Donald C. Meighan

1939. It may be a relative of the dormice (Gliridae). A stout animal with long, thick, gray fur, it is about eight centimetres (three inches) long without the long tail. It is primarily nocturnal and apparently is unable to withstand more than a few minutes' exposure to the sun without becoming ill. It eats mainly spiders and insects, climbs well, and progresses in a series of short leaps. In winter it hibernates.

self, the "I" as experienced by an individual. In modern psychology the notion of the self has replaced earlier conceptions of the soul.

The concept of the self has been a central feature of many personality theories, including those of Sigmund Freud, Alfred Adler, Carl Jung, Gordon W. Allport, Karen Horney, Carl Rogers, Rollo May, and Abraham H. Maslow.

According to Carl Jung the self is a totality

consisting of conscious and unconscious contents that dwarfs the ego (*q.v.*) in scope and intensity. The maturation of the self is the individuation process, which is the goal of the healthy personality.

Rogers theorized that a person's self-concept determines his behaviour and his relation to the world, and that true therapeutic improvement occurs only when the individual changes his own self-concept. May's approach was similarly existential; he conceived the self as a dynamic entity, alive with potentiality. Maslow's theory of self-actualization was based on a hierarchy of needs and emphasized the highest capacities or gratifications of a person. *See also* humanistic psychology.

self-amputation: *see* autotomy.

self-defense, in criminal law, justification for inflicting serious harm on another person on the ground that the harm was inflicted as a means of protecting oneself.

In general, killing is not a criminal act when the killer reasonably believes that he is in imminent danger of losing his life from an assailant or of suffering serious bodily injury and that killing the assailant is necessary to avoid the peril.

The doctrines of self-defense are qualified by the requirements of retreat. An unoffending party subjected to a felonious assault by another may stand his ground and kill when the conditions necessary to lawful self-defense are otherwise satisfied. Some countries, however, require that even in this case the party claiming exculpation must avoid danger by retreat when this can be done without increasing his peril.

When the party has contributed in some measure to the altercation, he is required to make every possible effort to retreat. If he initiated the quarrel by launching a felonious assault, he must wholly withdraw from the altercation and clearly communicate to the other party a purpose to desist from further attack before he can claim the right of self-defense.

The rules relating to the use of deadly force to save a third person from death or serious injury bear an obvious relation to the doctrines of self-defense. In cases in which the party defended is a member of the killer's household to whom he owes special obligations of protection, homicide is generally excused if the killer reasonably believed the deceased to be an aggressor and the killing to be necessary to save the third person's life. In some states of the United States and in some European countries, a person can use such force only if the third party would have been privileged to use such force in his own defense.

A person may generally kill to prevent the commission of a violent felony if he reasonably believes that such force is necessary to prevent the felony. And lethal force may sometimes be used to subdue an individual who is escaping from a valid arrest. *See also* homicide.

self-determination, the process by which a group of people, usually possessing a certain degree of national consciousness, form their own state and choose their own government. As a political principle, the idea of self-determination evolved at first as a by-product of the doctrine of nationalism, to which early expression was given by the French and American revolutions. In World War I the Allies accepted self-determination as a peace aim. In his Fourteen Points—the essential terms for peace—U.S. president Woodrow Wilson listed self-determination as an important objective for the postwar world; the result was the fragmentation of the old Austro-Hungarian and Ottoman empires and Russia's former Baltic territories into a number of new states.

After World War II, promotion of self-determination among subject peoples became one of the chief goals of the United Nations. The UN's predecessor, the League of Nations, had also recognized the principle; but it was in the UN that the idea received its clearest statement and affirmation.

The UN Charter clarifies two meanings of the term self-determination. First, a state is said to have the right of self-determination in the sense of having the right to choose freely its political, economic, social, and cultural systems. Second, the right to self-determination is defined as the right of a people to constitute itself in a state or otherwise freely determine the form of its association with an existing state. Both meanings have their basis in the charter (Article 1, paragraph 2; and Article 55, paragraph 1). With respect to dependent territories, the charter asserts that administering authorities should undertake to ensure political advancement and the development of self-government (Article 73, paragraphs a and b; and Article 76, paragraph b).

self-fertilization, fusion of male and female gametes (sex cells) produced by the same individual. Self-fertilization occurs in bisexual organisms, including most flowering plants, numerous protozoans, and many invertebrates. Autogamy, the production of gametes by the division of a single parent cell, is frequently found in unicellular organisms such as the protozoan *Paramecium*. These organisms, however, may also reproduce by means of conjugation, in which cross-fertilization is achieved by the exchange of genetic material across a cytoplasmic bridge between two individuals. Likewise, among higher plants, most of which are monoecious (*i.e.*, bisexual—male and female gametes being produced by the same individual), most self-pollinating species are also capable of cross-fertilization, and even those that are obligate self-fertilizers are occasionally cross-pollinated by accident. Hermaphroditic animals (those in which both male and female gonads are borne on one individual) are rarely capable of self-fertilization, since many such species have adaptations encouraging cross-fertilization.

As an evolutionary and reproductive mechanism, self-fertilization allows an isolated individual to create a local population and stabilizes desirable genetic strains, but it fails to provide a significant degree of variability within a population and thereby limits the possibilities for adaptation to environmental change.

self-incrimination, in law, the giving of evidence that might tend to expose the witness to punishment for crime. The term is generally used in relation to the privilege of refusing to give such evidence. In some continental European countries (Germany, for example, but not France), a person fearing self-incrimination may make his own decision as to whether or not he will testify. In Anglo-American practice, on the other hand, a person other than an accused cannot refuse to testify; he may only cite his privilege against self-incrimination, and the judge decides whether he must testify. If required to testify, he must answer all questions except those he considers to be self-incriminating.

self-propelled artillery: *see* tank destroyer.

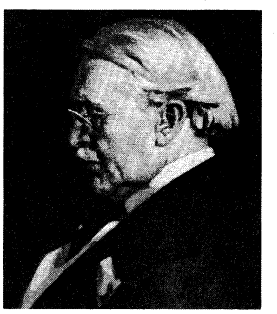
Self-Realization Fellowship, spiritual society founded in the United States by Paramahansa Yogananda (1893–1952), a teacher of yoga, who was one of the first Indian spiritual teachers to reside permanently in the West. Yogananda's lecturing and teaching led to the chartering of the fellowship in 1935, with headquarters in Los Angeles; there are now centres throughout the world, as well as several independent groups influenced by his teachings. His *Autobiography of a Yogi* (1946) and other works became highly popular and influential.

Yogananda's teaching was based on the *Yoga-sūtras* of Patañjali (2nd century BC). He also taught a specific method, *kriyā* yoga, combining deep meditation with techniques to control the movement of "life energy" and to withdraw energy and attention from "outer" to "inner" concerns. Self-Realization Fellowship centres emphasize classes in *kriyā* yoga and also offer Churches of All Religions, with services that combine elements of Hinduism and Christianity and include meditation, lectures, and music. The Self-Realization Fellowship consists of lay members and of those who have taken monastic vows and who generally play the role of clergy in the movement.

Selfoss, village, southwestern Iceland, 30 miles (48 km) east-southeast of Reykjavík. It lies on the Ölfusá River, about 5 miles (8 km) from the Atlantic Ocean. An agricultural market and dairying centre on the western edge of the country's most extensive agricultural region, it supplies most of the milk for the capital. Selfoss is also a popular resort. Pop. (1983 est.) 3,602.

Selfridge, Harry Gordon (b. Jan. 11, 1864?, Ripon, Wis., U.S.—d. May 8, 1947, London, Eng.), founder of Selfridge's department store in London.

The son of a small storekeeper in Wisconsin, at age 17 he joined the wholesale-retail firm of Field, Leiter and Company (later Marshall Field and Company) in Chicago, where he worked for 25 years and became a junior partner. In 1906 Selfridge went to England with a fortune and began to build a large department store in Oxford Street, London. When his partner withdrew, Selfridge obtained support from a wealthy tea broker, and in 1908 Selfridge and Company, Ltd., was registered (with £900,000 capital) to complete the project. The store opened in 1909 with a floor area of 42,000 square feet, which later was doubled.



Selfridge, detail of an oil painting
By courtesy of Selfridges Ltd., London

Imaginative advertising, ingenious publicity, and novel interior arrangements immediately made Selfridge's a household word, and in 1937 its owner became a British citizen. By 1939, however, he had lost his touch, and because of his personal extravagance the banks caused him to be replaced.

Seli River (Sierra Leone): *see* Rokel River.

selichot (Judaism): *see* selihot.

Šelichov, Gulf of (Russian S.F.S.R.): *see* Shelikhov, Gulf of.

Seligman, C(harles) G(abriel) (b. Dec. 24, 1873, London, Eng.—d. Sept. 19, 1940, Oxford), a pioneer in British anthropology who conducted significant field research in Melanesia, Ceylon (now Sri Lanka), and, most importantly, the Nilotic Sudan.

Although educated as a physician, in 1898 Seligman joined the Cambridge University expedition to the Torres Strait (between New Guinea and Australia). After returning to England, he resumed medical research, but

drawn to anthropology, he went again to New Guinea in 1904. Attempting to distinguish the characteristic racial, cultural, and social traits of the peoples of the region, with the aim of classifying them, he established the pattern of his subsequent field efforts. His work *The Melanesians of British New Guinea* (1910) remains a basic source. Covering every important aspect of tribal life, it formed the basis for later work by the eminent British anthropologist Bronisław Malinowski.

In 1904 Seligman married Brenda Z. Salaman, who collaborated with him on his later expeditions and writings. Their field trip to Ceylon (1907–08) to examine the vestiges of remaining aboriginal culture resulted in the publication of a standard work, *The Veddas* (1911). Their first ventures into the Sudan (1909–10 and 1911–12) opened up new vistas of study. While serving in the Royal Army Medical Corps during World War I, Seligman became a convert to the theories of Sigmund Freud. Examining the universality of certain dreams among many varied cultures, he concluded that the psychology of the unconscious could provide an approach to some basic anthropological problems. He and his wife returned to the Sudan in 1921–22 and offered a summation of their years of work in *Pagan Tribes of the Nilotic Sudan* (1932).

In 1910 Seligman was appointed university lecturer in ethnology at the London School of Economics and Political Science. From 1913 to 1934 he was part-time professor there, and in 1938 he was visiting professor at Yale University. Among his later writings are *Races of Africa* (1930), a basic reference source for many years, and *Egypt and Negro Africa* (1934).

Seligman, Edwin Robert Anderson (b. April 25, 1861, New York City—d. July 8, 1939, Lake Placid, N.Y.), U.S. economist and educator.

Seligman was the son of a New York banker and had the distinction of being tutored by Horatio Alger. He was educated at Columbia University (where he obtained his Ph.D. in 1885) and in Germany and France. He was accomplished in languages as well as economics, and qualified as a lawyer. Seligman served as professor of political economy at Columbia for 40 years (1891–1931). On his retirement he worked on the daunting task of editing the *Encyclopaedia of the Social Sciences*, the 15 volumes of which were published between 1930 and 1935.

Seligman was known as a staunch defender of academic freedom. He was a public finance specialist and an authority on the history of economic thought; his "On Some Neglected British Economists" (1903) is considered a classic in this field. He was one of the founders of the American Economic Association. Of his public finance work, which also led him into the field of policy advice, his best known works are *Shifting and Incidence of Taxation* (1892) and *Progressive Taxation in Theory and Practice* (1894 and 1908). In 1931 he completed a famous study of the tax laws of Cuba. His main contributions to taxation theory were the discussion of the final burden of taxation, extension of the analysis of progressive taxation, and clarification of the distinction between the benefit and ability to pay approaches.

seliḥot, also spelled SELIḤOTH, or SELICHOT (Hebrew: "pardons"), in Jewish liturgy, penitential prayers originally composed for Yom Kippur (Day of Atonement) and for fast days but subsequently incorporated into other services. *Seliḥot* have become an indispensable part of the Jewish liturgical services that precede Rosh Hashana (New Year), continue through the Ten Days of Penitence (*'aseret yeme teshuva*), and terminate on Yom Kippur.

The theme of all *seliḥot* is the thirteen attributes (*q.v.*) of divine mercy that God taught to Moses (Ex. 34:6–7). *Seliḥot* vary in form and emphasis, for each must be appropriate to the occasion on which it is recited. Typical *seliḥot* dwell on God's special relationship with Israel, on the sufferings of Jewish martyrs, or on the weakness of human nature. The phrasing may include, for example, a confession of sins and a petition to God for mercy; or it may beg God to accept prayer in place of the ancient Temple sacrifices.

Selim, name of three sultans of the Ottoman Empire, grouped below chronologically and indicated by the symbol •.

• **Selim I,** byname YAVUZ (The Grim) (b. 1470, Amasya, Ottoman Empire—d. Sept. 22, 1520, Çorlu), Ottoman sultan (1512–20) who extended the empire to Syria, the Hejaz, and Egypt and raised the Ottomans to leadership of the Muslim world.



Selim I, detail of a miniature, 16th century; in the Topkapı Palace Museum, Istanbul
Sonia Halliday

Selim came to the throne in the wake of civil strife in which he, his brother, and their father, Bayezid II, had been involved. Selim eliminated all potential claimants to the sultanate, leaving only his ablest son, Süleyman, as his heir. He then turned eastward where Esmāʿīl I, founder of the Ṣafavī dynasty in Iran, posed a political and ideological threat by espousing Shīʿism (the second largest branch of Islām) as opposed to the Sunnī Islām of the Ottomans. In addition, the Kizilbash (Turkmen followers of Esmāʿīl) were in open revolt in Anatolia. Selim subdued the Kizilbash and then launched a major campaign against Esmāʿīl, who was severely defeated at the Battle of Chāldirān, on the eastern side of the Euphrates (Aug. 23, 1514). Selim then turned toward the Anatolian Kurdish and Turkmen principalities, which he incorporated into the Ottoman Empire.

Selim's subjugation of the Dulkadir (Dhū al-Qadr) principality of Elbistan (now in Turkey) brought the Ottomans into conflict with the Mamlūk rulers of Syria and Egypt, who regarded Dulkadir as their protégé. Selim defeated the Mamlūk armies at the battles of Marj Dābiq (north of Aleppo; Aug. 24, 1516) and Raydānīyah (near Cairo; Jan. 22, 1517), thus bringing Syria, Egypt, and Palestine under Ottoman rule. In Cairo, the *sharīf* of Mecca presented Selim with the keys to that holy city, a symbolic gesture acknowledging Selim as the leader of the Islāmic world.

• **Selim II,** byname SARI (The Blond) (b. May 1524—d. December 1574, Constantinople), Ottoman sultan from 1566, whose reign saw peace in Europe and Asia and the rise of the Ottomans to dominance in the Mediterranean but marked the beginning of the decline in the power of the sultans. He was unable to impose his authority over the Janissaries and was overruled by the women of his harem.

Selim, the son of Süleyman I the Magnificent, came to the throne in the wake of palace intrigues and bitter civil strife with his brothers. He was more inclined to a life of pleasure than to the difficult task of governing, and he entrusted the affairs of state to his able grand vizier (chief minister) and son-in-law, Mehmed Sokollu.



Selim II, seated, discharging arrows held by an attendant, miniature watercolour by Haydar, mid-16th century; in the Topkapı Saray Museum, Istanbul
By courtesy of the Topkapi Saray Museum, Istanbul

As a result of the signing of a peace treaty with Austria in 1568, the Ottomans strengthened their rule in Moldavia and Walachia. In the East, amicable relations existed between Selim II and Ṭahmāsp I, Ṣafavid ruler of Persia, and a revolt in Yemen was successfully suppressed (1569–70). In the Mediterranean the Ottoman capture of Cyprus from the Venetians (1570–71) led to the formation of an anti-Ottoman alliance of the pope, the Italian states, and Spain. The alliance, although successful in destroying the Ottoman navy at Lepanto (Oct. 7, 1571), was unable to confront a new navy formed the following year. Consequently Venice recognized Ottoman hegemony in the Mediterranean (1573), and the Ottomans recaptured Tunisia (August 1574) from the Spanish, who had taken it in 1572.

• **Selim III** (b. Dec. 24, 1761, Constantinople—d. July 29, 1808, Constantinople), Ottoman sultan from 1789 to 1807, who undertook a program of westernization and whose reign felt the intellectual and political ferment created by the French Revolution.



Selim III, detail of a portrait by H. Berteaux, early 19th century; in the Topkapı Museum, Istanbul
Sonia Halliday

A poet and an accomplished composer of Ottoman classical music, Selim had enjoyed greater freedom prior to his accession than the Ottoman princes before him. Influenced by his father, Mustafa III (reigned 1757–74), Selim had acquired a zeal for reform.

When Selim succeeded his uncle Abdülhamid I (April 7, 1789), he attempted to end

the social, economic, and administrative chaos facing the empire. He set up a committee of reformers (1792–93) and promulgated a series of new regulations collectively known as the Nizam-ı Cedid (New Order). These included reforms of provincial governorships, taxation, and land tenure. More significant were his military reforms: in addition to new military and naval schools, he founded new corps of infantry trained and equipped along European lines and financed by revenues from forfeited and escheated fiefs and by taxes on liquor, tobacco, and coffee. Finally, to provide for direct contact with the West, Ottoman embassies were opened in the major European capitals.

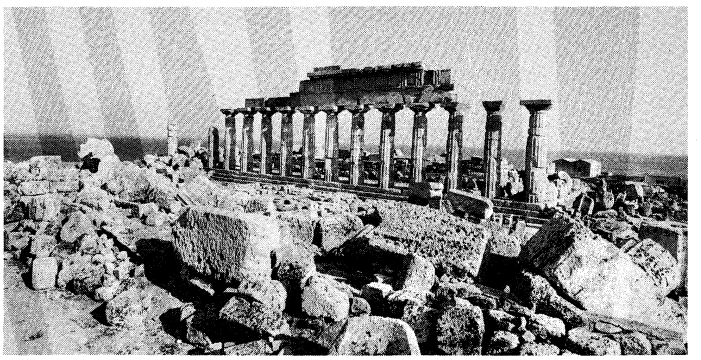
Selim, who came to the throne during a war (1787–92) with Austria and Russia, was compelled to conclude the treaties of Sistova (Svishtov; 1791) with Austria and of Jassy (1792) with Russia. In 1798 Napoleon's invasion of Egypt drove Selim into alliance with Great Britain and Russia. After the French evacuated Egypt (1801), Selim, dazzled by Napoleon's successes in Europe, not only recognized him as emperor (1804) but also, under the influence of General Sébastiani, Napoleon's ambassador in Constantinople, declared war (1806) on Russia and Great Britain.

Selim's reorganizations and the increasing influence of France evoked a strong reaction from the conservative coalition of the Janissaries, the ulama (men of religious learning), and others adversely affected by the reforms. Selim, on the other hand, lacked the determination to enforce the measures. In 1805, when he ordered the reorganization of troops in the Balkan provinces, the Janissaries mutinied in Edirne (in Thracian Turkey) and were joined by the *ayan* (local notables), who hitherto had supported the sultan. Selim halted the reorganization and dismissed his reformist advisers. Finally, in 1807, a mutiny of the *yamaks* (auxiliary levies) compelled Selim to abolish the Nizam-ı Cedid reforms and culminated in his imprisonment. In the ensuing months of confusion, the reformists rallied around Bayrakdar Mustafa, pasha of Rusçuk (now Ruse, Bulg.), who marched to Constantinople to restore Selim. Bayrakdar took the city, but in the meantime Selim had been strangled on orders from his successor, Mustafa IV.

Selimiye (Turkey): *see* Side.

Selinus, Greek SELINOUS, ancient Greek city on the southern coast of Sicily, 8 miles (13 km) southeast of modern Castelvetrano. It is famous for its ruined Doric temples. Selinus was founded in 651 or 628 BC by colonists from Megara Hyblaea and from Megara in Greece. The city got its name from the wild celery (Greek: *selinon*) that still grows in the locality. Selinus achieved great prosperity in the 5th century BC, when its great temples were built. By extending its territory, however, Selinus became embroiled in border disputes with the rival city of Segesta (*q.v.*). After the Carthaginians lost the Battle of Himera in 480 BC, Selinus allied itself with Syracuse against Carthage. The Segestans then appealed to Carthage for help in their struggle against Selinus, and consequently a Carthaginian army of 100,000 men took and destroyed Selinus in 409; the city's walls were razed, and only 2,600 of its inhabitants escaped. The city never truly recovered, though it became a Carthaginian tributary and was repopulated. In 250 BC Carthage razed the town and transferred its inhabitants to Lilybaeum (modern Marsala).

Excavations have uncovered Selinus' extensive ruins. History notwithstanding, it is surmised that Selinus' monuments were toppled by earthquakes rather than by the hand of man. The remains of five temples litter the city's fortified acropolis, while the remains of three more ruined temples bearing massive Doric columns lie on a hill east of Selinus. The modern Italian town of Selinunte lies near the site.



Ruins of a Doric temple at Selinus, Sicily
Hirmer Fotoarchiv, Munchen

Seljuq, also spelled SELJUK, ruling military family of the Oğuz (Ghuzz) Turkmen tribes that invaded southwestern Asia in the 11th century and eventually founded an empire that included Mesopotamia, Syria, Palestine, and most of Iran. Their advance marked the beginning of Turkish power in the Middle East.

A brief treatment of the Seljuqs follows. For full treatment, *see* MACROPAEDIA: Turkey and Ancient Anatolia.

During the 10th-century migrations of the Turkish peoples from Central Asia and southeast Russia, one group of nomadic tribes led by a chief named Seljuq settled in the lower reaches of the Syr Darya (Jaxartes) River and later converted to the Sunnite form of Islām. They played a part in the frontier defense forces of the Sāmānids and later of Mahmud of Ghanza. Seljuq's two grandsons, Chaghri (Chagri) Beg and Toghrïl (Ṭugril) Beg, enlisted Persian support to win realms of their own, Chaghri controlling the greater part of Khorāsān and Toghrïl, at his death in 1063, heading an empire that included western Iran and Mesopotamia.

Under the sultans Alp-Arslan and Malik-Shāh, the Seljuq empire was extended to include all of Iran and Mesopotamia and Syria, including Palestine. In 1071 Alp-Arslan defeated an immense Byzantine army at Manzikert and captured the Byzantine emperor Romanus IV Diogenes. The way was open for Turkmen tribesmen to settle in Asia Minor.

Because of Toghrïl Beg's victory over the Būyids in Baghdad in 1055, the Seljuqs came to be seen as the restorers of Muslim unity under the Sunnite caliphate. While Alp-Arslan and Malik-Shāh expanded the empire to the frontier of Egypt, the Seljuq vizier Niẓām al-Mulk oversaw the empire's organization during both their reigns. The Seljuq empire, political as well as religious in character, left a strong legacy to Islām. During the Seljuq period a network of madrasahs (Islāmic colleges) was founded, capable of giving uniform training to the state's administrators and religious scholars. Among the many mosques built by the sultans was the Great Mosque of Eṣfahān (the Masjed-e Jāmeʿ). Persian cultural autonomy flourished in the Seljuq empire. Because the Turkish Seljuqs had no Islāmic tradition or strong literary heritage of their own, they adopted the cultural language of their Persian instructors in Islām. Literary Persian thus spread to the whole of Iran, and the Arabic language disappeared in that country except in works of religious scholarship.

The Seljuq empire was unable to prevent the rise of the Islāmic terrorist sect known as the Assassins and its murder of vizier Niẓām al-Mulk in 1092. More importantly, the empire was undermined by the Seljuqs' practice of dividing provinces among a deceased ruler's sons, thus creating numerous independent and unstable principalities. Internecine struggles for power followed.

The last of the Iranian Seljuqs died on the battlefield in 1194, and by 1200 Seljuq power was at an end everywhere except in Anatolia.

Alp-Arslan's victory at Manzikert in 1071 had opened the Byzantine frontier to Oğuz tribesmen, and they soon established themselves as mercenaries in the Byzantines' local struggles. Their employment by rival Byzantine generals vying for the throne of Constantinople gained them increasing influence, and gradually they assumed control of Anatolia as allies of the Byzantine emperor. They were driven to the interior of Anatolia by crusaders in 1097; hemmed in between the Byzantine Greeks on the west and by the crusader states in Syria on the east, the Seljuq Turks organized their Anatolian domain as the sultanate of Rūm. Though its population included Christians, Armenians, Greeks, Syrians, and Iranian Muslims, Rūm was considered to be "Turkey" by its contemporaries. Commerce, agriculture, and art thrived in the kingdom, where a tolerance of races and religions contributed to order and stability.

A war against the Khwārezm-Shāh dynasty of Iran instigated in 1230 by the Rūm sultan 'Ala' ad-Dīn Kay-Qubādh (Kaikobad) I led ultimately to the disintegration of Rūm and of Seljuq power. The loss of the Khorezmian buffer state meant that when the invading Mongols reached Turkey's eastern frontiers, the Seljuqs could not fend them off. At the Battle of Köse Dagh in 1243, Seljuq autonomy was lost forever. For a time the Seljuq sultanate continued as a Mongol province, although some Turkmen emirs maintained small principalities of their own in distant mountainous districts. The Seljuq dynasty died out at last early in the 13th century.

Selkirk, town, southeastern Manitoba, Canada. It lies just northeast of Winnipeg, on the Red River near its influx into Lake Winnipeg, at the head of deepwater navigation. It is the lake's chief port serving central and northern Manitoba and is thus a transshipping point for fish and lumber. The town is also a haven for pleasure boats. The site, settled in 1812, was named for Thomas Douglas, 5th Earl of Selkirk, who founded the Red River Settlement in the area in 1811–20. The town has become a service centre for a farming area and has been a steel producer since 1917. Boatbuilding and ship repair are major industries. Other products include cattle feed and concrete blocks. Selkirk is the site of a provincial mental-health centre. The massive stone Lower Fort Garry (1831), just to the south, was once the headquarters of the Hudson's Bay Company and is the only fort of the Canadian fur-trading period to survive intact. Inc. 1882. Pop. (1986) 10,013.

Selkirk, also called SELKIRKSHIRE, former county in southeastern Scotland. Since the re-

organization of 1975 its territory has been a part of Ettrick and Lauderdale (*q.v.*) district of Borders (*q.v.*) region.

In ancient times Selkirk was occupied by the Romans, who maintained camps in the Ettrick valley and at Newstead. The history of the area for six centuries after the retreat of the Romans is that of southeastern Scotland as a whole. The county formed part first of the British kingdom of Strathclyde and then of the Saxon kingdom of Northumbria, and finally, about 1020, it was annexed to Scotland. The region subsequently suffered centuries of border warfare between the Scots and the English to the south. By the 16th century the area was called Ettrick Forest and was a hunting ground for the Scottish kings. During the English Civil Wars, the dwindling forces of the Royalist general James Graham, Earl of Montrose, were routed by the Covenanter troops of David Leslie at Philiphaugh in September 1645. The novelist Sir Walter Scott was sheriff of Selkirk from 1799 until his death. Selkirk was bypassed by the Industrial Revolution and remains essentially rural in character. Galashiels was the largest town of the county, and Selkirk was the county town.

Selkirk, Alexander, Selkirk also spelled SELCRAIG (b. 1676, Largo, Fife, Scot.—d. Dec. 12, 1721, at sea), Scottish sailor who was the prototype of the marooned traveler in Daniel Defoe's novel *Robinson Crusoe* (1719).

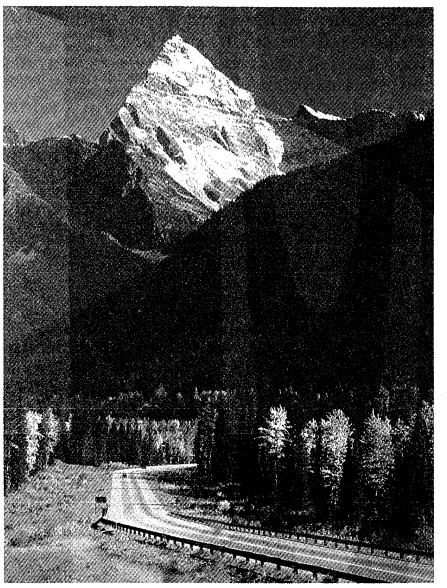
The son of a shoemaker, Selkirk ran away to sea in 1695; he joined a band of buccaneers in the Pacific and by 1703 was sailing master of a galley on a privateering expedition. In September 1704, after a quarrel with his captain, he was put ashore at his own request on the uninhabited Más a Tierra Island in the Juan Fernández cluster, 400 miles (640 km) west of Valparaíso, Chile. He remained there alone until February 1709, when he was discovered and taken aboard an English ship commanded by Woodes Rogers. They arrived in England in October 1711, and Rogers' *Cruising Voyage Round the World,* which includes a description of Selkirk's life on the island, was published the following year. Selkirk was a master's mate on a British ship when he died.

Selkirk's story was also narrated by the essayist Richard Steele in *The Englishman* of Dec. 3, 1713. Defoe evidently drew inspiration from these accounts for his *Robinson Crusoe,* as did the poet William Cowper in his "Lines on Solitude," beginning "I am monarch of all I survey."

Selkirk, Thomas Douglas, 5th Earl of, LORD DAER AND SHORTCLEUCH (b. June 20, 1771, St. Mary's Isle, Kirkcudbright, Scot.—d. April 8, 1820, Pau, Fr.), Scottish philanthropist who in 1812 founded the Red River Settlement (Assiniboia) in Canada, which grew into the city of Winnipeg, Man.

Selkirk succeeded to the Scottish earldom on the death of his father in 1799, all of his elder brothers having died previously. Believing that the hardships of the Scottish Highland peasantry could be alleviated only by emigration, he went to Canada in 1803 and established a large settlement on Prince Edward Island. In 1810 he gained control of the Hudson's Bay Company, from which, in May 1811, he acquired title to a vast tract of land in the Red River valley, near present-day Winnipeg, where he founded a settlement of Scotsmen. Shortly thereafter, he helped to establish a similar community at Baldoon, Upper Canada. The progress of the Red River colony was impeded by Selkirk's commercial rival, the Northwest Fur Company, which in January 1818 won heavy damages in a legal action against him. In poor health and having lost a fortune, he returned to Great Britain in November of that year and died two years later.

Selkirk Mountains, major subdivision of the Columbia Mountains, extending for 200 miles (320 km) in a southeasterly arc, mostly in British Columbia, Canada, and just across the U.S. border into northern Idaho and Montana. Bounded by the Purcell Mountains (east) and the Columbia River (west and north), they are sometimes considered part of the Rocky Mountain system. The summits are lowest in the south, where they average 7,500 feet (2,300 m), but many northern peaks exceed 10,000 feet (3,000 m), with Mount Sir Sanford (11,590 feet [3,530 m]) being the highest. In many places the Selkirks rise abruptly more than 8,000 feet (2,400 m) above adjacent valley floors, affording wild and magnificent scenery. Glacier and Mount Revelstoke national parks, in the northern part of the range, are served by the Trans-Canada Highway, which crosses the mountains at Rogers Pass (4,354 feet [1,327 m]). The 5-mile- (8-kilometre-) long



Mount Sir Donald in the Selkirk Mountains, British Columbia, and a segment of the Trans-Canada Highway

Bob and Ira Spring—EB Inc.

Connaught Tunnel, just northeast of Glacier, was built under Mount Macdonald for the Canadian Pacific Railway. The mountains were named after Thomas Douglas, 5th Earl of Selkirk, philanthropic sponsor of Canadian settlements.

Sella, Quintino (b. July 7, 1827, Mosso, near Biella, Piedmont [Italy]—d. March 14, 1884, Biella), statesman who helped place the new national government on a firm financial footing after the unification of Italy.

Educated for the engineering profession, Sella taught at Turin for several years before entering politics. In 1860 he was elected to the Piedmontese Chamber of Deputies, and in 1862 he briefly served as finance minister of the newly unified Italy. Reappointed finance minister two years later, he found himself forced to deal with a critical budget deficit. His solution, a tax on the milling of grain, was at first resisted, and he himself was forced to resign in 1866, but the grist tax was ultimately adopted by the government in 1868, and, during his third term as finance minister (1869–73), Sella was able to use the tax and other measures to restore the Italian government's finances.

In 1870, after the French garrison had been withdrawn from Rome on account of the demands of the Franco-German War, it was Sella who persuaded King Victor Emmanuel II to seize the city as the national capital.

Selma, city, seat (1865) of Dallas county, central Alabama, U.S., on the Alabama River. Settled in 1815 as Moore's Bluff or Landing, it was renamed at its incorporation (1820) from Ossian's poem "The Song of Selma." A Confederate supply depot during the American Civil War, it was burned by Union troops after a battle on its outskirts (April 2, 1865). Located in a dairy, livestock, grain, and cotton region, Selma now supports diversified industries. In 1965 it was the centre of a black voter-registration drive led by Martin Luther King, Jr. Local violence against civil-rights activists, culminating in the murder of James J. Reeb, a Boston clergyman, led to a massive, nonviolent protest march from Selma to Montgomery, the state capital. The city is the seat of Selma University and Alabama Lutheran Academy and Junior College (1922). Pop. (1988 est.) 26,191.

Selmi, Francesco (b. April 7, 1817, Vignola, duchy of Modena [Italy]—d. Aug. 13, 1881, Bologna, Italy), Italian chemist and toxicologist who is considered one of the founders of colloid chemistry.

Selmi held several teaching positions in Turin and Modena before accepting the post of professor of chemical pharmacology and toxicology at the University of Bologna in 1867. He published (1845–50) the first systematic study of inorganic colloids, in particular silver chloride, Prussian blue, and sulfur. His work in toxicology was mainly in the study of putrefaction and poisoning. In 1870 he coined the term "ptomaine poisoning." Selmi's *Enciclopedia di chimica scientifica e industriale,* 11 vol. (1868–81), was the first encyclopaedia of chemistry published in Italian.

Selong language: *see* Halăng language.

Selormey, Francis (b. April 15, 1927, Dzelukofe, Gold Coast [now in Ghana]), Ghanaian writer and teacher whose semiautobiographical novel, *The Narrow Path: An African Childhood* (1966), was hailed as a distinguished addition to African literature.

Selormey began his career as a physical-education teacher and administrator. His first published work was "The Witch," a story published in *Okyeame* in 1965. *The Narrow Path,* written with freshness, simplicity, and disarming honesty, tells of the vain search for love of a young man raised by an overly strict father. It has been praised for its humour and pathos and its study of the parent–child relationship. Selormey later was a feature and script writer for the Ghana Film Corporation.

Selous, Frederick Courteney (b. Dec. 31, 1851, London, Eng.—d. Jan. 4, 1917, near Kisaki, Tanganyika [now in Tanzania]), hunter and explorer whose south-central African travels added substantially to knowledge of the country later known as Rhodesia.

In 1871–72 he traveled from Cape Town to Matabeleland, where he was given permission to hunt freely. For 18 years Selous explored and hunted over the country between the Transvaal of South Africa and the Congo



Selous, pastel by O.M. Bryden; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Basin, collected natural history specimens for museums and private collections, and made valuable ethnological investigations. In 1890 he entered the service of the British South Africa Company and was active in bringing the border district of Manicaland under British control. He summarized his travels in "Twenty Years in Zambesia," *Geographical Journal* (vol. 1, 1893). He also published several books, including an account of the Matabele War, *Sunshine and Storm in Rhodesia* (1896), and *African Nature Notes and Reminiscences* (1908).

Selous Game Reserve, game reserve, the largest in the world, southeastern Tanzania, East Africa. It is named after Frederick Selous, a naturalist, explorer, and soldier. It covers an area of about 16,000 square miles (41,400 square km) and bestrides a complex of rivers including the Kilombeso, Ruaha, and Rufiji. Vegetation is woodland, with patches of dense hardwood forest and some of the finest virgin bush left in Africa. The reserve holds one of the largest remaining concentrations of big-tusked elephants and large-maned lions, as well as such other mammals as buffalo, leopard, rhinoceros, zebra, and various antelopes, and numerous bird species. This virtually inaccessible reserve was opened to visitors in 1963 when hunting tracks were constructed.

Selukwe (town, Zimbabwe): *see* Shurugwi.

selva (marsupial): *see* rat opossum.

Selvon, Samuel (Dickson) (b. May 20, 1923, Trinidad), Caribbean novelist and short-story writer of East Indian descent, known for his vivid evocation of the life of East Indians living in the West Indies and elsewhere. He came to public attention during the 1950s with a number of other Caribbean writers, including V.S. Naipaul.

Selvon worked as a wireless operator for a local branch of the Royal Navy during World War II on minesweepers and torpedo boats that patrolled the Caribbean. During a slack period he began to write poetry; then in 1946 he went to work at the *Trinidad Guardian.* In 1950 he went to London, where he worked as a clerk for the Indian Embassy and wrote in his spare time.

His first novel, *A Brighter Sun* (1952), describes East Indians and Creoles in Trinidad, their prejudices and mutual distrusts, and this effect of animosity on a young man, Tiger. It was the first time that an East Indian author had written with such quiet authority and simple charm about the life of these people. *The Lonely Londoners* (1956) describes apparently naive immigrants living by their wits in a hostile city. The novel makes extensive use of dialect—something at which Selvon, who draws heavily on oral tradition, excels.

His later works include a collection of short stories, *Ways of Sunlight* (1958), and the novels *I Hear Thunder* (1963), *The Plains of Caroni* (1970), which is set in Trinidad, and *Moses Ascending* (1975), a sequel to *The Lonely Londoners.*

Selwyn-Lloyd, John Selwyn Brooke Lloyd, Baron: *see* Lloyd, (John) Selwyn (Brooke).

Selznick, David O(liver) (b. May 10, 1902, Pittsburgh, Pa., U.S.—d. June 22, 1965, Hollywood), American motion-picture producer who earned a reputation for commercially successful films of high artistic quality before and after World War II.

Selznick received his early training in motion pictures from his father, Lewis J. Selznick, a Ukrainian-Jewish immigrant and a producer of silent films in New York City. The young Selznick moved to Hollywood in 1926; and, in the next 10 years at Metro-Goldwyn-Mayer, Paramount, and RKO studios, he advanced from script reader and assistant story editor to producer. Many of his outstanding pictures of the 1930s were extravagant melodramas, such as *Dinner at Eight* (1933) and *A Star Is Born* (1937), or meticulous adaptations of literary classics, such as *David Copperfield* (1935), *Anna Karenina* (1935), *A Tale of Two Cities* (1935), and *The Adventures of Tom Sawyer* (1938). He is best remembered for *Gone with the Wind* (1939), which won 10 Academy Awards in 1940 and was one of the greatest box-office successes in film history.

Other successful Selznick productions included *Rebecca* (1940), which was directed by Alfred Hitchcock and won four major Academy Awards; *Spellbound* (1945), also directed by Hitchcock; *The Third Man,* a highly acclaimed thriller coproduced by Alexander Korda and directed by Carol Reed; and *Since You Went Away* (1944), *Duel in the Sun* (1946), *Portrait of Jennie* (1948), and *A Farewell to Arms* (1957), all of which starred actress Jennifer Jones, whom Selznick married in 1949.

Consult the INDEX *first*

Šemacha (Azerbaijan S.S.R.): *see* Shemakha.

Semang, Negrito people of the Malay Peninsula who speak an Austro-Asiatic language. In the late 20th century their population was estimated to be less than 4,000, with only about 100 in Thailand (where they are known as Ngok, or Ngo ["Frizzy Ones"]). They are traditional nomadic hunters, using blowguns to hunt small game, and gatherers of wild roots and fruits. Most groups also now practice some agriculture. For shelter they use caves or rock overhangs or build leaf-covered windscreens. Trade with neighbouring groups is important.

The Semang live in autonomous local bands consisting of an elder male (usually the leader of the group), his wife, their sons, and the sons' wives and children. Their religious beliefs are complex and include numerous deities. Shaman-priests practice magic, foresee the future, cure illness, and perform ceremonies for the community welfare.

Semang languages: *see* Jahaic languages.

semantics, also called SEMOLOGY, or SEMASIOLOGY, the study of meaning. Semantics may be approached from a philosophical, or logical, point of view or regarded from a linguistic point of view.

A brief treatment of semantics follows. For full treatment, *see* MACROPAEDIA: Linguistics.

In the disciplines of philosophy and linguistics, semantics is the study of the relationship between signs of a language and their meaning. Although they approach semantics in different ways and for different purposes, both disciplines propose to explain how persons derive meaning from linguistic expression.

Semantics in philosophy. Philosophers of the 20th century have written a great deal about the ways in which linguistic signs (words, sentences, etc.) carry meaning. In the 1920s and '30s, logicians of the positivist school tried to bring to language the same exactness and clarity found in the systems of mathematics and logic. They felt that "natural" languages (languages that actually exist) were imprecise and sought to elaborate a theory of semantics based on an "ideal" language free of vagueness and ambiguity.

Logicians basically relied on the notions of reference and verification to develop a theory of how words relate to the world. The referential model explained that a linguistic symbol, such as a word, is understood when it has a referent that is encountered either by direct observation or by perception, or both. For example, *Boston* means the city of Boston, and *George Washington* means a certain U.S. president. However, the idea of reference could not take into account abstract words, such as *right* and *wrong,* or words that do not have clear-cut referents, such as verbs and prepositions. In addition, as the philosopher Gottlob Frege pointed out in his example of *the morning star* and *the evening star,* two expressions might have the same referent but not the same meaning. Therefore, the idea of reference was deemed inadequate to explain what linguistic signs mean.

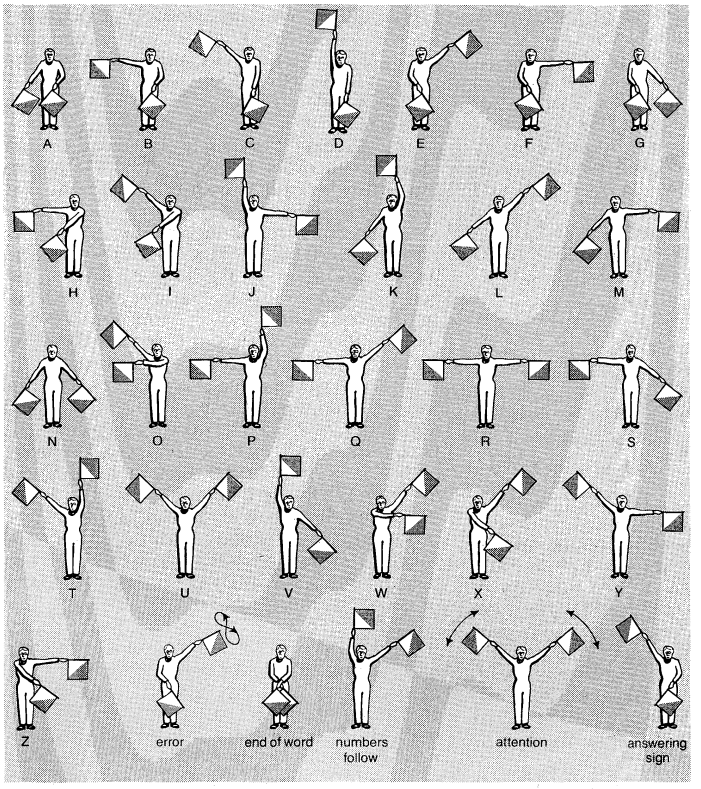
The verification principle was based on the idea that in order to understand a sentence, one must be familiar with the conditions that make that sentence true or false. According to this principle, all meaningful statements are either analytic truths (*i.e.,* they are true by definition) or empirical truths (*i.e.,* they can be verified through sensory experiences). In the equation $1 + x = 3$, one knows that the number 2 satisfies the conditions of x, making the equation true. Similarly, the statement "x is wet" is true if one replaces x with *water.* And, the meaning of "... is wet" is understood when any word is inserted that makes that sentence true (*orange juice, milk,* etc.). Furthermore, these alternative sentences are empirically verifiable. Critics of the verification principle pointed out, among other problems, that it cannot account for the multitude of expressions that are neither true nor false (such as, "Wash your hands!") but are, nonetheless, meaningful.

The failure of both reference and verifiability theories to provide a complete understanding of meaning led to the development of "use theory." Unlike the positivists, who considered linguistic signs apart from the intentions and actions of speakers or hearers, the proponents of use theory insisted that the meaning of a word is dependent on the use that one makes of it. Use theory is an important step in the philosophy of language because it provides linguistic signs with a context and shows how dependent meaning is on the conventions (customs) of language. Some philosophers of language go so far as to say that words do not have meanings; people do.

Semantics in linguistics. Linguistic theories attempt to describe features common to all natural languages. Linguists today study three levels of language: the phonetic (relating to sound), the syntactic (relating to the ways in which words combine grammatically to make sentences), and the semantic. In comparison with the work done in the first two areas, linguists have accomplished little in the area of semantics. This controversial subject has split the ranks of linguists into several camps. Members of the school of interpretive semantics study structures of language independent of the conditions of use. In contrast, the proponents of generative semantics insist that the communicative power of language must be acknowledged and that the meaning of sentences is a function of their use. Yet another group goes further by maintaining that the science of meaning will not advance until theorists take into account the psychological questions of how people attain concepts and how these relate to word meanings.

semaphore, method of visual signaling, usually by means of flags or lights. Before the invention of the telegraph, semaphore signaling from high towers was used to transmit messages between distant points. The first such system was developed by Claude Chappe in France in 1794, employing a set of arms that pivoted on a post; the arms were mounted on towers spaced 5 to 10 miles (8 to 16 km) apart. Messages were read by telescopic sightings. Modern semaphores included movable arms or rows of lights simulating arms, displayed from towers and used to signal railroad

trains. Semaphore signaling between ships, now largely abandoned, was accomplished by persons who held a small flag in each hand and, with arms extended, moved them to different angles to indicate letters of the alphabet or numbers.



Semaphore flag signals
The numbers from one to nine are the same as the first nine letters of the alphabet and are sent after the "numbers follow" signal. Zero is the same as the letter J

Semarang, city, *kabupaten* (regency), and capital, Jawa Tengah (Central Java) *provinsi* (province), Java, Indonesia, on the northern coast. The city, divided into the old and new sections, is just inland from the port and on the banks of the Semarang River, which is canalized for traffic to and from the sea. Candi Baru, a picturesque residential suburb, lies 500 feet (150 m) above the sea. Despite being one of the largest ports in Java, Semarang's harbour is unprotected against the northwest monsoon, which can cause suspension of port operations since vessels must anchor 3 miles (5 km) out and unload by lighter. Industries include fishing and the manufacture of glass, shoes, electrical equipment, textiles, and small boats; rubber, coffee, sugar, copra, tobacco, cacao, teak, and cassava are exported. The city has rail connections to all major cities on Java, and there is an airport. Pop. (1984 est.) city, 1,269,000; (1980) regency, 706,257.

semasiology: *see* semantics.

Sembène Ousmane (Senegalese author and filmmaker): *see* Ousmane, Sembène.

Sembrich, Marcella, original name PRAKSEDA MARCELINA KOCHAŃSKA (b. Feb. 15, 1858, Wiśniewczyk, Galicia, Austria-Hungary [now in Poland]—d. Jan. 11, 1935, New York City), Polish coloratura known for both her operatic and her concert work.

She studied violin and piano with her father, Kasimir Kochański, and played both instruments at her first solo appearance at the age of 12. She also studied piano and voice with Wilhelm Stengel, whom she later married, and studied voice with Victor Rokitansky in Vienna. Franz Liszt, for whom she played and sang in 1874, is supposed to have encouraged her to work on her voice. Her operatic debut was in 1877 in Athens as Elvira in Vincenzo Bellini's *I puritani.* Her next performance, in Dresden, as Gaetano Donizetti's Lucia di Lammermoor, was so successful that she stayed there for two years. She then sang for five seasons at Covent Garden in London.

Sembrich's career took her to Austria, Russia, Scandinavia, France, Spain, and the United States, where she again sang the role of Lucia at the Metropolitan Opera in New York City during its premiere season in 1883. Fifteen years later she became a member of the Metropolitan company and remained there until her farewell opera performance in 1909. She continued to give concerts until 1917, after which she devoted much of her time to teaching such students as Alma Gluck, Maria Jeritza, and Dusolina Giannini.

Semelaic languages, also called SOUTHERN ASIAN LANGUAGES, small group of languages spoken in Malaysia, linguistically members of the Malacca subgroup of the Austro-Asiatic language family, and sometimes classified as the Southern category of the Senoic (or Sakai) languages. The total number of speakers is probably fewer than 5,000.

Southwestern dialects include Besisi of Kuala Langat, Selangor Sakai, Besisi of Melaka, and Orang Bukit of Ulu Langat. Southeastern dialects include Serting, Bera, Ulu Indau, and Ulu Palong.

Semele, also called THYONE, in Greek mythology, a daughter of Cadmus and Harmonia, at Thebes, and mother of Dionysus (Bacchus) by Zeus. Semele's liaison with Zeus enraged Zeus's wife, Hera, who, disguised as an old nurse, coaxed Semele into asking Zeus to visit her in the same splendour in which he would appear before Hera. Zeus had already promised to grant Semele her every wish and thus was forced to grant a wish that would kill her: the splendour of his firebolts, as god of thunder, destroyed Semele. Zeus saved his and her unborn child, Dionysus (*q.v.*), from the womb. According to some versions of the story, Dionysus, himself immortal, descended into Hades after reaching maturity and brought Semele up, and she too became an immortal or even a goddess.

semen, fluid that is emitted from the male reproductive tract and that contains sperm cells (*see* sperm), which are capable of fertilizing the female eggs. It also contains other liquids known as seminal plasma, which help to keep the sperm cells alive.

Sperm cells are produced by the testes; they constitute only about 2 to 5 percent of the total semen volume. As sperm travel through the male reproductive tract, they are bathed in fluids produced and secreted by the various tubules and glands of the reproductive system. After emerging from the testes, sperm are stored in the epididymis, in which secretions of potassium, sodium, and glycerylphosphorylcholine (an energy source for sperm) are contributed to the sperm cells. Sperm mature in the epididymis; they then pass through a long tube called the ductus deferens to another storage area, the ampulla. The ampulla secretes a yellowish fluid, ergothioneine, a substance that reduces (removes oxygen from) chemical compounds, and the ampulla also secretes fructose, a sugar that nourishes the sperm. During the process of ejaculation, liquids from the prostate gland and seminal vesicles are added, which help dilute the concentration of sperm and provide a suitable environment for them. Fluids contributed by the seminal vesicles are 40 to 80 percent of the total semen volume; these fluids contain fructose, amino acids, citric acid, phosphorus, potassium, and hormones known as prostaglandins. The prostate gland contributes 15 to 30 percent of the seminal plasma; the constituents of its secretions are mainly citric acid, acid phosphatase, calcium, sodium, zinc, potassium, protein-splitting enzymes, and fibrolysin (an enzyme that reduces blood and tissue fibres). The final addition to semen is fluid secreted by the bulbourethral and urethral glands; this is a thick, clear, lubricating protein commonly known as mucus.

The seminal plasma serves to dilute the sperm so that they become mobile. Too much or too little fluid will cause the sperm to be nonmotile. Essential also to sperm motility (self-movement) are small quantities of potassium and magnesium, the presence of adequate amounts of oxygen in the plasma, proper temperature, and a slight amount of acidity. Sulfate chemicals in semen help prevent the sperm cells from swelling; and fructose is the main nutrient to sperm cells.

In man the total volume of semen for each ejaculation averages between 2 and 5 ml (0.12 to 0.31 cubic inch); in stallions the average ejaculate is about 125 ml (7.63 cubic inches). In human beings each ejaculation contains normally 200,000,000–300,000,000 sperm. Semen frequently contains degenerated cells sloughed off from the network of tubules and ducts through which the semen has passed.

Semënov, Nikolay Nikolayevich (Soviet scientist): *see* Semyonov, Nikolay Nikolayevich.

Semi-Arianism, a 4th-century Trinitarian heresy in the Christian Church. Though it modified the extreme position of Arianism, it still fell short of the church's orthodox teaching that Father, Son, and Holy Spirit are of the same substance.

Arius held that the Father, Son, and Holy Spirit were three separate essences (*ousiai*) or substances (*hypostaseis*) and that the Son and Spirit derived their divinity from the Father, were created in time, and were inferior to the Godhead. Semi-Arians, however, admitted that the Son was "like" (*homoiousios*) the

Father but not of one substance (*homoousios*) with him. This doctrinal controversy, revolving around two words distinguished by a single iota (ι), gave rise to the popular expression, "It makes not one iota of difference." To Orthodox Christians, however, the iota was of great importance. Both Arianism and Semi-Arianism were condemned at the Council of Nicaea (325).

Semi-Pelagianism, in 17th-century theological terminology, the doctrine of an anti-Augustinian movement that flourished from about 429 to about 529 in southern France. The surviving evidences of the original movement are limited, but it is clear that the fathers of Semi-Pelagianism were monks who stressed the need of ascetical practices and who were highly respected leaders in the church. The writings of three of these monks had positive influence on the history of the movement. They were John Cassian, who had lived in the East and who founded two monasteries in Massilia (Marseille); Vincent, a monk of the celebrated Abbey of Lérins; and Faustus, bishop of Riez, a former monk and abbot at Lérins, who at the request of Provence bishops wrote *De gratia* ("Concerning Grace"), in which Semi-Pelagianism was given its final form and one more naturalistic than that provided by Cassian.

Unlike the Pelagians, who denied original sin and believed in perfect human free will, the Semi-Pelagians believed in the universality of original sin as a corruptive force in man. They also believed that without God's grace this corruptive force could not be overcome, and they therefore admitted the necessity of grace for Christian life and action. They also insisted on the necessity of Baptism, even for infants. But contrary to Augustine, they taught that the innate corruption of man was not so great that the initiative toward Christian commitment was beyond the powers of man's native will.

This commitment was called by John Cassian *initium fidei* ("beginning of faith") and by Faustus of Riez *credulitatis affectus* ("feeling of credulity"). According to this view, man by his unaided will could desire to accept the gospel of salvation, but he could not be actually converted without divine help. In later Semi-Pelagianism, divine help was conceived not as an internal empowering graciously infused by God into man but as purely external preaching or the biblical communication of the gospel, of the divine promises, and of the divine threats. The strong point for all Semi-Pelagians was the justice of God: God would not be just if man were not natively empowered to make at least the first step toward salvation. If salvation depended initially and unilaterally only on God's free election of the saved, those not chosen could complain that they were doomed by the mere fact of being born.

The result of Semi-Pelagianism, however, was the denial of the necessity of God's unmerited, supernatural, gracious empowering of man's will for saving action. It contradicted St. Paul and St. Augustine, and the latter was by papal declaration the approved Catholic doctor in the question of grace and thus beyond attack.

In its early stages, Semi-Pelagianism was opposed in Gaul by two polemicists, Prosper of Aquitaine and an otherwise unknown Hilary. After Faustus' death (*c.* 490), Semi-Pelagianism was still highly respected, but the doctrine declined in the 6th century, primarily through the action of Caesarius of Arles. At the instigation of Pope Felix IV (526–530), Caesarius condemned Semi-Pelagianism at the second Council of Orange (529). The condemnation was approved by Pope Boniface II, Felix' successor. From that point on, Semi-Pelagianism was recognized as a heresy in the Roman Catholic Church.

semibox turtle: *see* Blanding's turtle.

semiconductor, any of a class of crystalline solids intermediate in electrical conductivity between a conductor and an insulator. Such a material can be treated chemically to transmit and control an electric current. Semiconductors are employed in the manufacture of various kinds of electronic devices, including diodes, transistors, and integrated circuits.

The following article briefly treats semiconductors. Articles providing fuller treatment appear in the MACROPAEDIA. For the properties of semiconductors, *see* Matter; for a description of semiconductor devices, *see* Electronics.

Semiconductor materials may be divided into two general groups: intrinsic and extrinsic. An intrinsic semiconductor exhibits a high degree of chemical purity (*i.e.,* it has a ratio of impurities of only about one part in 10^{12}). Its conductivity is poor and largely temperature-dependent. Some common intrinsic semiconductors are single crystals of silicon, germanium, and gallium arsenide. Such materials may be converted into the technologically more important extrinsic semiconductors by addition of small amounts of impurities, usually to a concentration of one part in 10^6. This process, known as doping, alters the electrical properties to produce much greater conductivity. For example, the atom of an intrinsic semiconductor such as elemental silicon has four electrons in its outermost shell. These electrons attach the silicon atom to its neighbouring atoms and are not free to move through the solid. Accordingly, pure silicon is a poor conductor. If phosphorus atoms with five outer electrons are substituted as an impurity for some of the silicon atoms, the fifth electron is not needed for binding to adjacent atoms and is free to move through the solid. Other types of impurity atoms, such as boron, have one less outer electron than does silicon. When they are substituted for some of the silicon atoms, each captures one electron from a neighbouring silicon atom, leaving an empty space. Such a hole behaves like a freely moving particle with a positive charge. The presence of these holes increases the ability of the silicon to conduct electric current. The substitution of as few as 10 atoms of boron per 1,000,000 atoms of silicon yields the resulting extrinsic silicon semiconductor.

An extrinsic semiconductor is commonly classified as *n*- or *p*-type, depending on whether the impurity has an excess of negative charge (*n*-type) or a deficiency of negative charge (*p*-type). Under certain circumstances an intrinsic semiconductor may also be classified an *n*-type or *p*-type, since the mobility of electrons and holes can be different even though their carrier densities are closely equal. In cases such as these, the conduction process is dominated by the carriers with the highest mobility.

semiconductor device, electronic circuit component made from a material that is neither a good conductor nor a good insulator (hence semiconductor) and that may serve as a rectifier, amplifier, switch, light detector or emitter, or in other functions.

A brief treatment of semiconductor devices follows. For full treatment, *see* MACROPAEDIA: Electronics.

Development. The invention of the semiconductor device known as the transistor in 1947 by John Bardeen, Walter H. Brattain, and William B. Shockley of Bell Telephone Laboratories ushered in what many have called the "second industrial revolution." After a decade of further developmental work, the transistor became a viable alternative to the electron tube (*q.v.*) so long used in electronic equipment, and was adopted for use in digital computers. Computer manufacturers employed transistors in control, arithmetic, and logic circuits, enabling them to produce more efficient, smaller, and faster computer systems.

Continued research on semiconductor devices and fabrication techniques led to further miniaturization of electronic circuit components and major advances in computer hardware. The most notable of these was the development of the integrated circuit during the late 1950s. This type of device consists of numerous transistors, diodes, and resistors on a tiny chip of semiconductor material. The early 1970s saw the introduction of the microprocessor, a large-scale integrated circuit that contains all of the circuitry needed to perform the functions of a computer's central processing unit (*i.e.,* the part of the computer that interprets and executes instructions). The mass production of microprocessors has given rise not only to the ubiquitous microcomputer (*q.v.*) but also to industrial robots and other automated machines, as well as to a host of highly sophisticated electronic consumer products ranging from self-focusing cameras to programmable household appliances.

Characteristics. Semiconductor materials have electrical resistivities in the range between insulators and metals. The resistivity of elemental semiconductors always decreases with increasing temperature, and these materials often show some decrease in resistivity when illuminated with light (photoconductivity). Electrical conduction in extremely pure semiconductors is poor. The intentional addition of impurities to semiconductors is known as doping and modifies the electrical characteristics to produce much greater conduction. The atoms of semiconductor materials have four electrons in their outer (or valency) shell, whereas the impurities have either five or three valency electrons. The elements antimony, arsenic, and phosphorus add electrons, or *n* (negative) carriers; and the elements aluminum, boron, and indium effectively provide more holes, known as *p* (positive) carriers (*see* semiconductor). The small concentration of added impurities does not change the metallurgical characteristics of the basic semiconductor but modifies its electrical properties.

The most commonly used semiconductor is elemental silicon. Since the 1960s it has supplanted germanium as the preferred material for semiconductor devices for several reasons: (1) it is much more abundant and so intrinsically less expensive; (2) it retains its semiconducting properties at higher temperatures; and (3) it forms an oxide film with excellent electrical insulating properties, the film being used as a mask to permit the introduction of the desired impurities. Silicon is used for integrated circuits and such other devices as Varactor diodes, Schottky diodes, and thyristors.

Since the 1970s researchers have shown increasing interest in other semiconductors besides silicon and germanium, notably in the compounds formed by the elements from the third column of the periodic table of elements (*e.g.,* aluminum, gallium, and indium) with those from the fifth column (*e.g.,* phosphorus, arsenic, and antimony). These so-called III-V compounds permit the interconversion of photons (packets of radiant energy) with electrons and holes, making them suitable for optoelectronic devices—*i.e.,* those that emit light efficiently or that operate at exceptionally high frequencies. An example of such a device is the semiconductor laser used in compact audio digital disc players and in optical fibre communications systems. Other significant optoelectronic devices made of III-V semiconductors are solar cells and light-emitting diodes (LEDs), which are employed as numeric displays and as a source of coherent light in certain optical communications systems.

Researchers are seeking to develop a practical optoelectronic circuit, which is an assembly

of semiconductor lasers and transistors integrated on a single chip. Such circuits would make it possible for computer engineers to build systems that can manipulate and compute data at higher speeds than the most powerful supercomputers currently available, for their operations would involve photons that travel considerably faster than do electrons in conventional electronic circuits.

semiconductor memory, any of a class of computer memory devices consisting of one or more integrated circuits. (*See* computer memory).

semiconductor radiation detector: *see* solid-state detector.

seminal vesicle, either of two elongated saclike glands that secrete their fluid contents into the ejaculatory ducts of the male.

For a depiction of the seminal vesicles in human anatomy, shown in relation to other parts of the body, *see* the colour Trans-Vision in the PROPAEDIA: Part Four, Section 421.

The two seminal vesicles contribute 40 to 80 percent of the fluids passed from the male during ejaculation (*q.v.*). In certain other mammals the capacity of the seminal vesicles is much larger than in man. The boar, for example, may emit up to 50 times as much seminal fluid; cats and dogs, on the other hand, do not have seminal vesicles.

The secretion of the seminal vesicles is a thick fluid composed of the sugar fructose, proteins, citric acid, inorganic phosphorus, and potassium. Fructose acts as the main energy source for keeping the sperm cells alive; the other chemicals prevent the sperm fluid from being acidic and keep it neutral; and they help to make the sperm motile (self-moving).

In the sexually mature human male, the seminal vesicles are elongated bodies 5 to 7 cm (2 to 2¾ inches) long and about 2 to 3 cm (⅘ to 1⅕ inches) wide. In each vesicle is a tubule 15 cm (6 inches) long that is highly coiled and convoluted; surrounding this tube is connective tissue (blood and lymphatic vessels, nerve fibres, and supportive tissue). The tubule itself is composed of three layers: the inner lining, a moist and folded mucous membrane; a muscle layer of longitudinal and circular tissue; and a fibrous outside covering of elastic tissue. The mucous membrane secretes the fluids contributed by the seminal vesicles; it is highly folded while the tube is empty and can be distended without injury when its secretions cause it to fill the tubule. During ejaculation, the muscular tissue and elastic fibres contract to empty the vesicle's contents into the ejaculatory ducts shortly after the vas deferens has emptied the sperm into those ducts.

The size and activity of the seminal vesicles are controlled by hormones. Production of androgen, the major hormone that influences the growth and activity of the seminal vesicles, begins at puberty and starts to decline at about the age of 30. In the absence of this hormone, the seminal vesicles will degenerate (atrophy).

Seminole, North American Indian tribe speaking a Muskogean language; they are of Creek origin. In the last half of the 18th century, migrants from the lower Creek towns of Georgia moved southward into northern Florida, the former territory of the Apalachee and Timucua. By about 1775 these migrants had begun to be known under the name Seminole, derived from the Creek word *simanó-li* meaning "separatist," or "runaway." The name may also have derived from the Spanish *cimarrón,* "wild." The Seminoles were joined by runaway slaves—Indian and Negro—and others fleeing the power struggles between American whites and Indians in Georgia.

The Seminoles lived more by hunting and fishing than by agriculture, constructed simple shelters of thatched roofs supported by poles (similar to the summer houses of the tribes to the north), and decorated their clothes with bright-coloured strips of cloth in imitation of the brocaded materials worn by the Spanish.

In an effort to stem white encroachment of their land and avoid removal to the west, the Seminoles fought a succession of wars in 1817–18, 1835–42, and 1855–58. (*See* Seminole Wars.) As a result of the first Seminole war, Spain ceded its Florida holdings to the United States. In 1832 a treaty binding the Seminoles to move beyond the Mississippi River was rejected by a large portion of the tribe. The second Seminole war that ensued was one of the most costly of the U.S.–Indian wars. Most of the tribe ultimately surrendered and were moved to Indian Territory (present Oklahoma), where they were settled in the western part of the Creek reservation. A few Seminoles remained in Florida, where their descendants numbered about 1,000 in the late 20th century.

In Oklahoma the Seminoles were among the Five Civilized Tribes that included the Cherokee, Chickasaw, Creek, and Choctaw, all of whom had been forcibly removed from the southeastern United States by the federal government in the 1830s. For three-quarters of a century each tribe had a land allotment and a quasi-autonomous government modeled on that of the United States. In preparation for Oklahoma statehood (1907), some of this land was allotted to individual Indians; the rest, was opened up to white homesteaders, held in trust by the federal government, or allotted to freed slaves. Tribal governments were effectively dissolved in 1906 but have continued to exist in a limited form. Some Seminole Indians now live on tribal landholdings that are informally called reservations.

Seminole, city, Seminole county, central Oklahoma, U.S., east-southeast of Oklahoma City. Settled in 1890 as a trading centre for farmers and stockmen, it was known as Tidmore until 1907, when it was renamed for the Seminole Indians, on whose land the site was located. Its population grew from about 1,000 to 35,000 in one year after discovery of an oil field in 1926. The city's industries include petroleum refining, oil-field equipment, and the manufacture of clothing and sewer pipes. Seminole Junior College was established in 1931. Inc. town, 1908; city, 1926. Pop. (1984 est.) 9,073.

Seminole Wars (1817–18, 1835–42, 1855–58), three conflicts between the United States and the Seminole Indians of Florida in the period before the American Civil War, that ultimately resulted in the opening of their desirable land for white exploitation and settlement.

The First Seminole War (1817–18) began over attempts by U.S. authorities to recapture runaway black slaves living among Seminole bands. Under General Andrew Jackson, U.S. military forces invaded the area, scattering the villagers, burning their towns, and seizing Spanish-held Pensacola and St. Marks. As a result, in 1819 Spain was induced to cede its Florida territory under the terms of the Transcontinental Treaty.

The Second Seminole War (1835–42) followed the refusal of most Seminoles to abandon the reservation that had been specifically established for them north of Lake Okeechobee and to relocate west of the Mississippi River. Whites coveted this land and sought to oust the Seminoles under the Indian Removal Act. Led by their dynamic chief Osceola (*q.v.*), the Seminole warriors hid their families in the Everglades and fought vigorously to defend their homeland, using guerrilla tactics. As many as 2,000 U.S. soldiers were killed in this prolonged fighting, which cost the government between $40,000,000 and $60,000,000. Only after Osceola's capture while parleying under a flag of truce did Indian resistance decline. With peace, most Seminoles agreed to emigrate.

The Third Seminole War (1855–58) resulted from renewed efforts to track down the Seminole remnant remaining in Florida. It caused little bloodshed and ended with the United States paying the most troublesome band of refugees to go West.

semiotics, the study of signs and sign-using behaviour, including the use of words (linguistics), of tone of voice, tempo, or drawl (paralinguistics), of body motions and gestures (kinesics), and animal communication. The term semiotics was introduced in philosophy at the end of the 17th century by John Locke. It became more widely used as a result of the work of the American logician and philosopher Charles Peirce and later (1938) by the American behavioral semanticist Charles Morris, who divided semiotics into three branches: pragmatics, concerned with the way signs are used; semantics, concerned with the relations between signs and their meanings, abstracted from their use; and syntax, concerned with signs apart from their meanings. Although this threefold division has been widely adopted by logicians, and more recently by linguists, there is considerable disagreement as to the precise definition of pragmatics in relation to semantics, as also of such key terms as sign, symbol, and signal.

Semipalatinsk, *oblast* (province), eastern Kazakh Soviet Socialist Republic, occupying an area of 69,350 square miles (179,600 square km). It lies mainly in the Kazakh Upland and is drained by the Irtysh River in the north and the Ayaguz in the south. In the east are the Kalba Mountains, and in the centre and southeast on the Chinese frontier are the Chingiz-Tau and Tarbagatay ranges, which separate the Irtysh Basin from the Balkhash-Alakol Depression. Lakes Sasykkol, Alakol, and Zaysan form part of the *oblast*'s southern and eastern boundaries. The climate is continental and dry, and the vegetation mainly dry steppe.

The economy is predominantly agricultural, with most of the industrial undertakings concentrated in the capital, Semipalatinsk city. The other major towns are Ayaguz and Charsk. Crops, particularly grain, are grown in the extreme north and the southeast. Elsewhere sheep breeding on steppe, semidesert, and mountain pastures is the dominant activity. Gold is mined at Auezov in the Kalba Mountains. Copper ore is mined and concentrated at Zhezkent (formerly Orlovka). A major hydroelectric station on the Irtysh River at Novobazhenovo, 30 miles (50 km) east of Semipalatinsk, was completed in 1979. The population, nearly one-half of which is rural, consists mainly of Kazakhs and Russians, but there are also Germans, Tatars, and Ukrainians. Pop. (1987 est.) 816,000.

Semipalatinsk, city and capital of Semipalatinsk *oblast* (province), Kazakh Soviet Socialist Republic. It is a port on the Irtysh River where the latter emerges into the West Siberian Plain. It was founded as a Russian fort in 1718, 11 miles (18 km) downstream from the present site, near the ruins of a Buddhist monastery consisting of seven buildings, from which it got its name, meaning "seven-halled." It was moved to its present site in 1778 to escape regular flooding in the spring. Semipalatinsk lay at the junction of caravan trails from Mongolia to Russia and from Siberia to Central Asia, and before the 1917 Revolution more than 11,000 camels passed through annually. The writer Fyodor Dostoyevsky spent the years 1854–59 in Semipalatinsk in exile as a soldier in a line battalion.

The city's growth was furthered by the arrival of the railway from Siberia in 1906 and

the completion of the Turk-Sib line to Central Asia in 1931. The chief economic activities are food processing and other light industries, and the city accounts for about a third of the republic's output of consumer goods. It has one of the largest meat-packing plants in the U.S.S.R., as well as textile, clothing, and footwear factories and a large cement works. There are teacher-training, medical, and veterinary institutes, a Russian-Kazakh theatre, and three museums. The gates of the 18th-century fort survive. Pop. (1983 est.) 301,000.

semipalmated goose: *see* magpie goose.

semiplosive (semantics): *see* affricate.

Semiramis (Assyrian queen): *see* Sammuramat.

semispinalis muscle, any of the deep muscles just to either side of the spine that arise from the transverse processes (side projections) of the lower vertebrae and reach upward across several vertebrae to insert at (attach to) the spines of vertebrae farther up, except for the upper segment (semispinalis capitis), which inserts at the occipital bone of the skull. The lower and middle segments (semispinalis dorsi and semispinalis cervicis) help extend (*i.e.,* bend backward) and rotate the spinal column; the upper segment also helps in bending the head backward.

Semitic languages, group of languages spoken in northern Africa and the Near East that comprises one of the five branches of the Hamito-Semitic language family. (The other branches are Egyptian, Berber, Cushitic, and Chadic.) The Semitic languages are divided into four groups: (1) Northern Peripheral, or Northeastern, with only one language, Akkadian; (2) Northern Central, or Northwestern, including the ancient Canaanite, Amorite, Ugaritic, Phoenician and Punic, and Aramaic languages, and ancient and modern Syriac and Hebrew; (3) Southern Central, including Arabic and Maltese; and (4) Southern Peripheral, including South Arabic and the languages of northern Ethiopia.

Characteristic of the Semitic sound systems is the considerable number of consonants formed at the back of the mouth and in the throat. Words in the Semitic languages are formed from a root (composed of consonants) that gives the basic meaning of the word and a vowel pattern that expresses shades of the basic meaning. Originally there was no form for the definite article, although forms have developed in all the known languages of the group except Akkadian (spoken in ancient Mesopotamia) and Ge'ez (in Ethiopia). Semitic originally had three cases (subjective, or nominative; objective, or accusative; and possessive, or genitive), but the word endings indicating those cases are completely preserved only in Akkadian and Classical Arabic. All languages of the group have masculine and feminine gender. The modern languages have developed tense forms, in contrast to the earlier Semitic verb, which had aspects (expressing the manner or mode of an action) rather than tenses (expressing the time of an action).

Semito-Hamitic languages: *see* Hamito-Semitic languages.

Semler, Johann Salomo (b. Dec. 18, 1725, Saalfeld, Duchy of Saxe-Saalfeld—d. March 14, 1791, Halle, Brandenburg), German Lutheran theologian and critic, a major figure in the development of biblical textual criticism during his tenure (1753–91) as professor of theology at the University of Halle.

Semler was a disciple of the rationalist Siegmund Jakob Baumgarten, whom he replaced on his death in 1757 as head of the theological faculty. Seeking to study biblical texts scientifically, Semler evolved an undogmatic and strictly historical interpretation of Scripture that provoked strong opposition. He was the first to deny, and to offer substantial evidence supporting his denial, that the entirety of the text of Old and New Testaments was divinely inspired and fully correct. He challenged the divine authority of the biblical canon, which he reexamined in order to determine the sequence of composition of biblical books, their nature, and their manner of transmission. From this work he drew a crucial distinction between an earlier, Jewish form of Christianity and a later, broader form.

Despite his rationalist approach, however, Semler maintained that faith was a prerequisite for understanding religious matters, and he upheld this view in his rebuttal of 1779 to "Wolfenbüttel Fragments" by the radical rationalist Hermann Samuel Reimarus. Semler's method of textual criticism, which prepared the way for more extensive work during the 19th century, also made him aware of the diversity of answers to religious questions in the past and of the need to recognize varied theologies as avenues to the same truth. Among his works are several biblical commentaries and an edition of the works of the 2nd–3rd-century Christian theologian Tertullian.

Semliki River, waterway connecting Lakes Edward and Albert (Mobutu Sese Seko), in the western branch of the East African Rift Valley. It issues from the northwestern end of Lake Edward in Zaire and meanders for 143 mi (230 km) north-northeast along the western foot of the Ruwenzori Range to Lake Albert, the latter part of its course forming part of the border between Zaire and Uganda. The Semliki has built up a considerable alluvial plain, part of which is included in the Virunga National Park (formerly Park of the Volcanoes); wild game, including elephants, hippopotamuses, crocodiles, and various kinds of antelope, is abundant. The river's delta is choked with ambatch (a fast-growing thorny tree) and papyrus; and it is steadily encroaching on the shallow waters of Lake Albert.

Semmelweis, Ignaz Philipp (German), Hungarian IGNÁC FÜLÖP SEMMELWEIS (b. July 1, 1818, Buda, Hungary, Austrian Empire—d. Aug. 13, 1865, Vienna), Hungarian physician who discovered the cause of puerperal



Semmelweis, detail of an oil painting by A. Canzi, 1857; in the Semmelweis Medical Historical Museum and Library, Budapest

By courtesy of the Semmelweis Medical Historical Museum and Library, Budapest

("childbed") fever and introduced antisepsis into medical practice.

Educated at the universities of Pest and Vienna, Semmelweis received his doctor's degree from Vienna in 1844 and was appointed assistant at the obstetric clinic in Vienna. He soon became involved in the problem of puerperal infection, the scourge of maternity hospitals throughout Europe. Although most women delivered at home, those who had to seek hospitalization because of poverty, illegitimacy, or obstetrical complications faced mortality rates ranging as high as 25–30 percent. Some thought that the infection was induced by overcrowding, poor ventilation, the onset of lactation, or "miasma." Semmelweis proceeded to investigate its cause over the strong objections of his chief, who, like other continental physicians, had reconciled himself to the idea that the disease was unpreventable.

Semmelweis observed that, among women in the first division of the clinic, the death rate from childbed fever was two or three times as high as among those in the second division, although the two divisions were identical with the exception that students were taught in the first and midwives in the second. He put forward the thesis that perhaps the students carried something to the patients they examined during labour. The death of a friend from a wound infection incurred during the examination of a woman who died of puerperal infection and the similarity of the findings in the two cases gave support to his reasoning. He concluded that students who came directly from the dissecting room to the maternity ward carried the infection from mothers who had died of the disease to healthy mothers. He ordered the students to wash their hands in a solution of chlorinated lime before each examination.

Under these procedures, the mortality rates in the first division dropped from 18.27 to 1.27 percent, and in March and August of 1848 no woman died in childbirth in his division. The younger medical men in Vienna recognized the significance of Semmelweis' discovery and gave him all possible assistance. His superior, on the other hand, was critical—not because he wanted to oppose him but because he failed to understand him.

In the year 1848 a liberal political revolution swept Europe, and Semmelweis took part in the events in Vienna. After the revolution had been put down, Semmelweis found that his political activities had increased the obstacles to his professional work. In 1849 he was dropped from his post at the clinic. He then applied for a teaching post at the university in midwifery but was turned down. Soon after that, he gave a successful lecture at the Medical Society of Vienna entitled "The Origin of Puerperal Fever." At the same time, he applied once more for the teaching post, but, although he received it, there were restrictions attached to it that he considered humiliating. He left Vienna and returned to Pest in 1850.

He worked for the next six years at the St. Rochus Hospital in Pest. An epidemic of puerperal fever had broken out in the obstetrics department, and, at his request, Semmelweis was put in charge of the department. His measures promptly reduced the mortality rate, and in his years there it averaged only 0.85 percent. In Prague and Vienna, meantime, the rate was still from 10 to 15 percent.

In 1855 he was appointed professor of obstetrics at the University of Pest. He married, had five children, and developed his private practice. His ideas were accepted in Hungary, and the government addressed a circular to all district authorities ordering the introduction of the prophylactic methods of Semmelweis. In 1857 he declined the chair of obstetrics at the University of Zürich. Vienna still remained hostile toward him, and the editor of the *Wiener Medizinische Wochenschrift* wrote that it was time to stop the nonsense about the chlorine hand wash.

In 1861 Semmelweis published his principal work, *Die Ätiologie, der Begriff und die Prophylaxis des Kindbettfiebers* ("Etiology, Understanding and Preventing of Childbed Fever"). He sent it to all the prominent obstetricians and medical societies abroad, but the general reaction was adverse. The weight of authority stood against his teachings. He addressed several open letters to professors of medicine in other countries, but to little effect. At a conference of German physicians

and natural scientists, most of the speakers—including the pathologist Rudolf Virchow—rejected his doctrine. The years of controversy gradually undermined his spirit. In 1865 he suffered a breakdown and was taken to a mental hospital, where he died. Ironically, his illness and death were caused by the infection of a wound on his right hand, apparently the result of an operation he had performed before being taken ill. He died of the same disease against which he had struggled all his professional life.

Semmelweis' doctrine was subsequently accepted by medical science. His influence on the development of knowledge and control of infection was hailed by Joseph Lister, the father of modern antisepsis: "I think with the greatest admiration of him and his achievement and it fills me with joy that at last he is given the respect due to him." (I.Z.)

BIBLIOGRAPHY. The first comprehensive biography of Semmelweis was Schuerer von Waldheim, *Ignaz Philipp Semmelweis* (1905). A more recent work by G. Gortvay and I. Zoltán, *Semmelweis élete és munkássága* (1966; *Semmelweis: His Life and Work,* 1968), is critical of some of the romantic legends that have grown up around him.

Semmering, most easterly and lowest (3,232 ft [985 m]) of the great Alpine passes, at the boundary between *Bundesländer* (federal provinces) Steiermark (Styria) and Niederösterreich (Lower Austria), in east central Austria. Situated in the watershed dividing the Mur and Leitha drainage basins, it facilitates Vienna's communications with Yugoslavia via Steiermark, with Italy via Kärnten (Carinthia), and with Innsbruck via the upper Enns Valley. Since the ancient routes skirted the Alps in the east, the Semmering remained unimportant until the foundation of a hospice (Spital am Semmering) in 1160 and the union of Austria and Steiermark. The first road through the pass was built in 1728 and rebuilt in 1839–42. The Semmering Railway (1848–54), the first mountain railway in the world, passes 282 ft below the summit of the pass through a tunnel nearly one mile long. A second parallel tunnel was inaugurated in 1952.

The health and winter-sports resort of Semmering (pop. [1981] 840) lies on the open pass. It is surrounded by pine-forested heights and is overlooked on the north by the Rax (6,585 ft) and the Schneeberg (6,811 ft) peaks.

Semmes, Raphael (b. Sept. 27, 1809, Charles County, Md., U.S.—d. Aug. 30, 1877, Mobile, Ala.), American Confederate naval officer whose daring raids in command of the man-of-war "Alabama" interfered with Union merchant shipping during the middle two years of the American Civil War (1861–65).



Semmes
By courtesy of the U.S. Navy

Appointed a midshipman in the U.S. Navy in 1826, Semmes studied law while awaiting orders and was admitted to the bar in 1834. In the Mexican War (1846–48), he superintended the landing of troops at Veracruz (March 1847) and marched inland to Mexico City with Gen. Winfield Scott.

When Alabama, his home state, seceded from the Union (January 1861), Semmes resigned his commission as commander, and with the outbreak of war in April he received a similar appointment in the Confederate Navy. After capturing 17 Union merchant ships while in command of the packet "Sumter," he was assigned to command the "Alabama," newly built in England. Between 1862 and 1864 he made a series of brilliant and successful cruises, capturing, sinking, or burning 82 Union ships valued at more than $6,000,000. Finally he met the Union ship "Kearsarge" in the English Channel and, after a 90-minute battle, was forced to surrender. After being rescued from the water by an English yacht, he rested in Switzerland and returned to the Confederacy via Mexico.

As a rear admiral, Semmes subsequently helped command the Confederate Navy in the James River. After the war he returned to Mobile to practice law. He also wrote several books on the Mexican and Civil wars.

Semnān, also spelled SAMNĀN, *ostān* (province), northern Iran, bounded by the *ostān*s of Khorāsān on the east, Eṣfahān on the south, Markazī (Tehrān) on the west, and Māzandarān on the north. It has an area of 34,764 sq mi (90,039 sq km). The northern half of the region comprises an extension of the Elburz Mountains pierced by narrow defiles; to the south the land surface drops gradually by shallow terraces to the flat salt waste of the Kavīr-e Namak. The Rūdkhāneh-ye (stream) Qareh Sū, rising in the Elburz Mountains, flows southward into the Kavīr-e Namak. Most of the population is engaged in agriculture; corn (maize), tobacco, cotton, sugar beets, indigo plants, and fruit are the chief products. Industries produce sugar, ginned cotton, milled flour, bricks, alcoholic beverages, carpets, and leather goods. Chromium, lead, and coal are mined. Roads and rail service link Semnān (the capital) with Lāsjerd, Amīrābād, Dāmghān, Emāmshahr (formerly Shāhrūd), and Mayāmey. Pop. (1983 est.) 322,000.

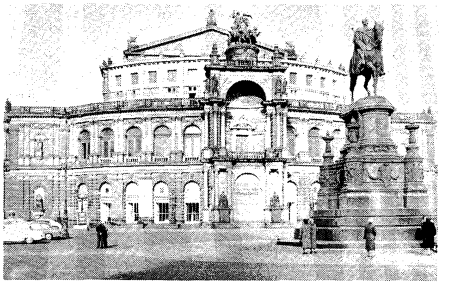
Semnān, also spelled SAMNĀN, chief town and county (*shahrestān*) in Semnān *ostān* (province), northern Iran; it lies 3,734 ft (1,138 m) above sea level on a large plain at the southern foot of the Elburz Mountains. In the town are an ornamented minaret (12th century) and several large places of worship. Semnān is a thriving market for local grains, cotton, and tobacco; textiles and carpets are also made there. The town is linked by rail with Tehrān and Meshed. Semnān was cited by Oriental geographers for the rivulets running through its streets; its soft cotton textiles and its sweet paste made from almonds and figs were also noted. Pop. (1976) town, 69,328; county, 66,506; province, 322,000.

semolina, the purified middlings of hard wheat used in making pasta; also, the coarse middlings used for breakfast cereals, puddings, and polenta. *See* pasta.

semology: *see* semantics.

Sempach, Battle of (July 9, 1386), decisive victory won by the Swiss Confederation in its struggle with the Austrian Habsburgs. At Meiersholz, near Sempach, Swiss confederate forces from Uri, Schwyz, Unterwalden, and Luzern met an Austrian army led by the Habsburg duke Leopold III of Tirol and his commander in chief, Johann von Ochsenstein. The Habsburg forces were retaliating against Luzern, which had recently invaded adjacent Habsburg territories. Estimates of the number of combatants on either side vary from 6,000 Austrians against 1,500 or 1,600 Swiss to 4,000 against 4,000; in any case the Austrians were routed, and Leopold himself was killed. According to legend, the Swiss owed their victory to the personal heroism of a certain Arnold Winkelried, who was said to have deliberately gathered into his own body the lances of the vanguard of Austrian knights.

Semper, Gottfried (b. Nov. 29, 1803, Hamburg—d. May 15, 1879, Rome), architect and



Opera House, Dresden, Ger., by Gottfried Semper, 1837–41, rebuilt 1871–78
Ullstein Bilderdienst, Berlin

writer on art who was among the principal practitioners of the Neo-Renaissance style in Germany and Austria.

Semper studied in Munich and Paris and from 1826 to 1830 travelled in Italy and Greece, studying classical architecture. He practiced architecture in Dresden from 1834 until 1849, when, because of revolutionary activities, he was forced into exile to Paris and London. He headed the architecture department of Zürich Polytechnikum und Yorstand der Bauschule (1855–71) and between 1871 and 1876 participated in the rebuilding of Vienna. His work marks the transition away from the Neoclassicism of his friend Karl Friedrich Schinkel.

As an eclectic, Semper achieved powerful design solutions. Among his main works are the Opera House (Dresden; 1837–41, rebuilt 1878); the Zürich Polytechnikum (1858–64); and, with Karl von Hasenauer, the Burgtheater (1874–88) and the two imperial museums (1872–81), all in Vienna. In his influential writings, principally *Der Stil in den technischen und tektonischen Künsten* (1860–63; "Style in the Technical and Tectonic Arts") he stressed a rational interpretation of techniques as a source of style, and recommended the use of colour in decorative arts and architecture.

Sempill (of Beltrees), Sir James (b. 1566—d. February 1626, Paisley, Renfrewshire, Scot.), Scottish poet remembered for his satirical poem *A picktooth for the Pope, or the packman's paternoster* (1630?), an antipapal dialogue between a peddler and a priest written in rhyming couplets. Born into a family of Scottish poets, he was reared with the young King James VI. He attended the University of St. Andrews and became Scottish ambassador to England (1599) and to France (1601). He was knighted in 1600.

Sempill, Robert (b. *c.* 1595—d. *c.* 1665), Scottish poet who first used the metre that became the standard form for the Scottish humorous elegy.

The son of the poet Sir James Sempill of Beltrees, he was educated at the University of Glasgow. He wrote the elegy "The Life and Death of Habbie Simson, the Piper of Kilbarchan" (1640). This humorous poem in Scots was included by James Watson in his *Choice Collection* (1706), and its fame was assured when the poet Allan Ramsay called its metre "Standart Habbie" and used it himself in several poems. "Standart Habbie," sometimes called the "Habbie Simson stanza," was later known, after its greatest exponent, Robert Burns, as "the Burns stanza."

Semple, Ellen Churchill (b. Jan. 8, 1863, Louisville, Ky. U.S.—d. May 8, 1932, West Palm Beach, Fla.), U.S. geographer known for promoting the view that the physical environ-

ment determines human history and culture, an idea that provoked much controversy until superseded by later antideterministic approaches.

Semple earned a B.A. (1882) and M.A. (1891) from Vassar College in Poughkeepsie, N.Y., and studied at the University of Leipzig with the German anthropogeographer Friedrich Ratzel. Her subsequent career alternated periods of writing with periods of teaching at a number of institutions, including the University of Oxford, the University of Chicago, Columbia University, the University of Colorado, Wellesley College, and Clark University, Worcester, Mass. She was professor of anthropogeography at Clark from 1923 until 1932. Her scholarly works include *American History and its Geographic Conditions* (1903), *Influences of Geographic Environment* (1911), and *The Geography of the Mediterranean Region* (1931).

Şemseddin Ahmet ibn Süleyman ibn Kemal Paşa: *see* Kemalpaşazâde.

Semyonov, Nikolay Nikolayevich, Semyonov also spelled SEMËNOV (b. April 15 [April 3, Old Style], 1896, Saratov, Russia—d. Sept. 25, 1986), Soviet physical chemist who shared the 1956 Nobel Prize for Chemistry with Sir Cyril Hinshelwood for research in chemical kinetics, notably the mechanisms of chain and branched-chain chemical reactions.

Semyonov was educated in St. Petersburg (Leningrad), graduating from the city's university in 1917, the year of the Russian Revolution, and taught for a time at the University of Tomsk in western Siberia. Associated with the Leningrad A.F. Ioffe Physicotechnical Institute from 1920 to 1931, he became a professor at the Leningrad Polytechnic Institute in 1928. He was director of the Institute of Chemical Physics at the Academy of Sciences of the U.S.S.R. after 1931 and became a professor at Moscow State University in 1944. The first Soviet citizen to win a Nobel Prize, he published the influential book *O nekotorykh problemakh khimicheskoy kinetiki i reaktsionnoy sposobnosti* (1954; *Some Problems in Chemical Kinetics and Reactivity*).

Sen, Keshab Chunder, also spelled KESHUB CHANDRA SEN (Hindu social reformer): *see* Keshab Chunder Sen.

Sen Rikyū, byname of SEN SŌEKI (b. 1522, Sakai, Japan—d. 1591, Kyōto), Japanese tea master who perfected the tea ceremony and raised it to the level of a national art.

Sen Rikyū redefined the tea ceremony in all its aspects: the rules of procedure, the utensils, the teahouse architecture (of which he designed several styles), and even the tea-garden landscaping. He returned to the utter simplicity practiced by Shukō, a 15th-century monk who founded the Japanese tea ceremony. He firmly established the concepts of *wabi* (deliberate simplicity in daily living) and *sabi* (roughly, "tranquillity") as its aesthetic ideals. During his time the teahouse became smaller (from Shukō's 4½-mat room to a 2-mat room—*i.e.,* 6 feet square [1.8 m square]) and more secluded with the introduction of the small door. The tea bowls produced under his direction were characterized by a rustic simplicity. Rikyū's influence on both artistic standards and social etiquette (his tea school was also a kind of finishing school for soldiers from the provinces) was so great that he has been considered one of the most outstanding figures of Japanese cultural history.

Sena, town, central Mozambique, on the Zambezi River. A river port and railway junction, it has an economy based on sugarcane cultivation and processing. Sena Sugar Estates Ltd., a formerly British-owned company that was granted a large land subconcession from the Zambezia Company, had estates at Luabo and Marromeu in the Zambezi River delta and also operated a copra plantation near Chinde, a forestry concession, and a cattle ranch near Luabo. In the mid-1960s it was the largest firm in Mozambique, with more than 10,000 employees. The company was centred in Sena and built sugar refineries nearby on the lower Zambezi River. Sugarcane is still processed there, although the company was nationalized in 1978 after Mozambique's independence, and its operation was turned over to Cuban experts. A rail spur connects the sugar refineries to the Beira Railway. Pop. (1986 est.) city, 102,000.

Sena DYNASTY, Indian dynasty ruling in Bengal in the 11th and 12th centuries. Their ancestors came from the south and established themselves as chieftains in southwestern Bengal early in the 11th century. Hemantasena, the founder of the dynasty, was originally a tributary of the Pāla dynasty. In the mid-11th century he declared his independence and set himself up as king. His successor, Vijayasena (reigned *c.* 1095–1158), built an empire on the ruins of that of the Pālas, gaining control of all Bengal and northern Bihār.

Sena rule in Bengal brought about a marked revival of orthodox Hinduism. The caste system, which had become lax because of the Buddhist influence of the Pālas, was reestablished, and the Bengali system of hypergamy, the socially upward marriage of women, was reputedly founded by the Sena king Vallalāsena. The last important Sena king, Lakṣmaṇasena (*c.* 1178–*c.* 1205), became a great patron of literature; the poets Jayadeva and Dhoyī wrote at his court at Nādia. In 1202 Lakṣmaṇasena was expelled from Nādia by the Turkish chief Muḥammad Bakhtyār Khaljī and died about three years later. Sena kings continued to rule in eastern Bengal for some decades, but the main political power in Bengal passed to the Muslims.

Sena Gallica (Italy): *see* Senigallia.

Sénac, Jean (b. Dec. 29, 1926, Beni Saf, Alg.—d. 1973, Algiers), French-language poet active in the cause of national literature in Algeria.

Sénac's early poetry, as in the volume *Poèmes* (1954), is bitter and regretful in its treatment of his childhood but optimistic with regard to his own creative possibilities as a man as well as to those of his people. With the outbreak of the Algerian war of independence in 1954, however, he turned to themes of combat and of more militant national pride, in *Le Soleil sous les armes* (1957; "The Sun Under Arms"), *Matinale de mon peuple* (1961; "Matinal of My People"), and later collections.

Sénac was a close friend of Albert Camus, but, unlike Camus and most other French writers in Algeria, Sénac threw in his fortunes with Algeria in its struggle against French colonial rule. In 1962 he joined the Ministry of National Education and from 1963 until 1966 served as secretary-general of the Union of Algerian Writers. He edited *Anthologie de la nouvelle poésie algérienne* (1971; "Anthology of New Algerian Poetry"), in which he brought before the public the work of nine young Algerian poets. At the time of his still-unexplained assassination, he was one of the most active and popular of Algerian poets.

Senanayake, D(on) S(tephen) (b. Oct. 20, 1884, Colombo, Ceylon [now Sri Lanka]—d. March 22, 1952, Colombo), first prime minister of Ceylon (1947–52) when the country became independent of Great Britain.

Brought up as a devout Buddhist, Senanayake remained in that faith but was educated at the Anglican St. Thomas College in Colombo. After a brief period as a clerk in the surveyor general's office, he turned to rubber planting on his father's estate. Senanayake entered the Legislative Council in 1922 and in 1931 was elected to the State Council and appointed minister for agriculture and lands, a post he was to hold for 15 years. Within two years he had put through the Land Development Ordinance, which brought barren lands into cultivation through irrigation schemes.

During World War II, faced with reduced foreign rice supplies, Senanayake opened new trade with Egypt and Brazil and increased imports of less scarce wheat flour tenfold. Having founded Ceylon's cooperative-society movement in 1923, he emphasized the development of cooperatives and attempted agricultural modernization. He refused a knighthood in 1946 but expressed gratitude for British goodwill and cooperation. As prime minister (from 1947) he gained respect from Ceylon's Sinhalese, Tamil, and European communities and was able to maintain the morale of the civil service during the transition period, despite its loss of British personnel. His Gal Oya multipurpose scheme to colonize uninhabited areas resettled 250,000 people. In a country without coal, oil, or gas deposits, he encouraged hydroelectric-power development. Already heading the ministries of defense and external affairs, he also assumed the ministry of health and local government in 1951.

An avid horseman, Senanayake died from injuries received when his horse threw him.

Senancour, Étienne Pivert de (b. Nov. 16, 1770, Paris, Fr.—d. Jan. 10, 1846, Saint-Cloud), French author of *Obermann* (1804), one of several early 19th-century novels that describe the sufferings of a sensitive and tormented hero. Rediscovered some 30 years after it first appeared, the book appealed to the taste of the Romantics and their public.



Senancour
H. Roger-Viollet

Senancour's father wanted him to enter the priesthood, but he fled to Switzerland in 1789 and made an unhappy marriage. His name was put on the list of émigrés after the French Revolution, and he did not return to France until 1803. Following the Restoration of 1815, he lived more or less as a recluse, writing for newspapers and reviews. In 1827 his *Résumé de l'histoire des traditions morales et religieuses* (1825; "Summary of the History of Moral and Religious Traditions") was judged blasphemous, and he was sentenced to a fine and imprisonment, though the sentence was reversed on appeal.

Obermann shows the influence of the Swiss philosopher Jean-Jacques Rousseau, who felt human nature to be perverted by the progress of civilization. The book's hero, a recluse living in the Swiss mountains, is tormented by melancholy and a sense of ineffectuality. The novel was ignored when it first appeared but was reissued in 1833 with an introduction by the critic Charles-Augustin Sainte-Beuve, who called it "one of the truest books of this century," with its depiction of aborted genius and a frustrated sensibility "lost in the desert."

Senate, in ancient Rome, the governing and advisory council that proved to be the most permanent element in the Roman constitution.

Under the early monarchy the Senate devel-

oped as an advisory council; in 509 BC it contained 300 members, and a distinction existed within it between the heads of the greater and of the lesser families. Throughout the monarchical period the Senate consisted entirely of patricians, and its powers at this time were indefinite.

With the abolition of the monarchy in Rome in 509 BC, the Senate became the advisory council of the consuls (the two highest magistrates), meeting only at their pleasure and owing its appointment to them; it thus remained a power secondary to the magistrates. However, the consuls held office only for one year, whereas the Senate was a permanent body; in experience and prestige, its individual members were often superior to the consuls of the year. A consul would seldom venture to disregard the advice of the Senate, especially because he himself, in accordance with steadily growing custom, would become a senator at the end of his year of office. (It was probably in their capacity of former magistrates that plebeians first entered the Senate.) But in the early Republic the Senate remained an advising body and assumed no definite executive powers.

In the last two centuries of the Roman Republic, a great change took place. The Senate became a self-perpetuating, automatically constituted body, independent of the annual magistrates, and a recognized factor in the Roman constitution, with extensive powers. About 312 BC the selection of senators was transferred from the consuls to the censors, who normally chose former magistrates. In 81 BC Sulla secured an automatic composition for the Senate by increasing the number of quaestors to 20 and enacting that all former quaestors should pass at once into the Senate.

The Senate's powers had by this time extended far beyond its ancient prerogatives. The Senate had acquired more effective control through the observance of certain unwritten rules regulating the relation between Senate and magistrates, to whom it formally gave advice. It became the chief governing body in Rome and tendered advice on home and foreign policy, on legislation, and on financial and religious questions. It acquired the right to assign duties to the magistrates, to determine the two provinces to be entrusted to the consuls, to prolong a magistrate's period of office, and to appoint senatorial commissions to help magistrates to organize conquered territory. Its earlier influence upon foreign policy developed into a definite claim to conduct all negotiations with a foreign power, although the formal declaration of war and ratification of treaties were referred to the people. It often acted as arbitrator in disputes among Italian communities, provincials, or client-states.

Although individual senators after 218 BC were debarred from trading, the control of finance was in the Senate's hands. Three circumstances had combined to bring this about. The censors, who were only occasional officials, were entrusted with the leasing of the public revenues; the Senate could order them to redraft contracts. Second, the details of public expenditure were entrusted to the quaestors, young and inexperienced magistrates whom the Senate could guide. Third, the general control exercised by the Senate over provincial affairs implied its direction of the income derived from the provinces. It also claimed the right of granting occupation and decreeing alienation of public lands. Every branch of state finance was therefore in its hands; it controlled revenue and expenditure and supervised the treasury.

This ever-widening influence and power of the Senate was challenged by tribunes from the time of Tiberius Gracchus onward (133 BC) and, more particularly, by the military leaders, from Marius onward, who pitted their administrative power against the authority of the Senate. Despite the short-lived attempt of Sulla to reinstate the Senate's ascendancy, the Republic collapsed under these repeated blows against the authority of the Senate. As a result of the civil war of 49–45 BC, the number of senators (which Sulla had earlier raised to 500 or 600) was seriously depleted. Julius Caesar revised the list and increased the Senate to 900, naturally filling it with his own supporters. The composition of the Senate thus underwent a considerable change: few of the senators who had opposed Caesar survived; the new senators included many knights and municipal Italians and even a few provincials from Gaul.

Because Augustus officially "restored the Republic" (27 BC), it was essential to preserve—at least outwardly—the prestige of the Senate. Although the emperor did not share his basic power with the Senate, he did allow it to cooperate with him in most of the spheres of government. It was left at the head of the ordinary administration of Rome and Italy, together with those provinces that did not require any military force or present special administrative difficulties. It continued to administer the treasury but was soon overshadowed by the emperor, who allowed it to supervise the copper coinage alone. The Senate received judicial functions and for the first time became a court of law, competent to try cases of extortion in the senatorial provinces. The legislative powers of the popular elective assemblies became very gradually extinct, and decrees of the Senate came to take the place of legislative bills adopted by the assemblies in ordinary matters although they did not at first acquire full recognition as laws. On the other hand, the Senate lost all its control of foreign policy; and, though it was occasionally consulted by the emperor, it was entirely subordinate to him in this department. The emperor could convene and preside over the Senate, his report and other communications taking precedence; his name also headed the list of senators. He could also select new senators virtually at will. They numbered ordinarily 300.

The number of Italian and provincial senators increased (especially under Vespasian), but the Italians were not outnumbered by the provincials until after the reign of Septimius Severus (AD 193–211). At first the provincials came predominantly from Spain and Narbonese Gaul, but later there were more Asians and Africans. Under Gallienus, senators lost the right to command legions and much of their part in provincial administration. Under Constantine they were virtually amalgamated with the knights, who had benefited from these changes. The number of the new senators rose in the 4th century to about 2,000. That the Senate was still regarded as a representative and necessary part of the constitution is shown by Constantine's creation of a duplicate Senate in Constantinople.

The most important senators were the great landowners throughout the empire, whose position became almost feudal. A great number of them failed to leave their estates to attend meetings, and the Senate often acted—as it had in the early days of the Republic—merely as a town council for Rome, under the chairmanship of the prefect of the city. Many of the great senatorial landowners were men of culture who represented Roman civilization amid increasing barbarism and tried to uphold paganism in Italy. In the 5th century, however, some of them helped the barbarian leaders against the imperial authority. In the 6th century the Roman Senate disappears from the historical record; it is last mentioned in AD 580.

Senate, one of the two houses of the legislature of the United States, established in 1789 under the Constitution. Each state elects two senators for six-year terms, the terms of about one-third of the Senate membership expiring every two years.

The role of the Senate was conceived by the Founding Fathers as a check on the popularly elected House of Representatives. Thus each state, regardless of size or population, is equally represented. Further, until the Seventeenth Amendment of the Constitution (1913), election to the Senate was indirect, by the state legislatures. They are now elected directly by voters of each state.

The Senate shares with the House of Representatives responsibility for all lawmaking within the United States. For an act of Congress to be valid, both houses must approve an identical document.

The Senate is given important powers under the "advice and consent" provisions (Article II, section 2) of the Constitution: ratification of treaties requires a two-thirds majority of all senators present and a simple majority for approval of important public appointments, such as those of Cabinet members, ambassadors, and judges of the Supreme Court. The Senate also adjudicates impeachment proceedings initiated in the House of Representatives, a two-thirds majority being necessary for conviction.

As in the House of Representatives, political parties and the committee system dominate procedure and organization. Each party elects a leader, generally a senator of considerable influence in his own right, to coordinate Senate activities. The Senate leaders also play an important role in appointing members of their party to the Senate committees, which consider and process legislation and exercise general control over government agencies and departments. Sixteen standing committees are grouped mainly around major policy areas, each having staffs, budgets, and various subcommittees. Among important standing committees are those on appropriations, finance, government operations, and foreign relations. At "mark-up" sessions, which may be open or closed, the final language for a law is considered. Select and special committees are also created to make studies or to conduct investigations and report to the Senate—for example, the Select Committee on Ethics and the Special Committee on Aging.

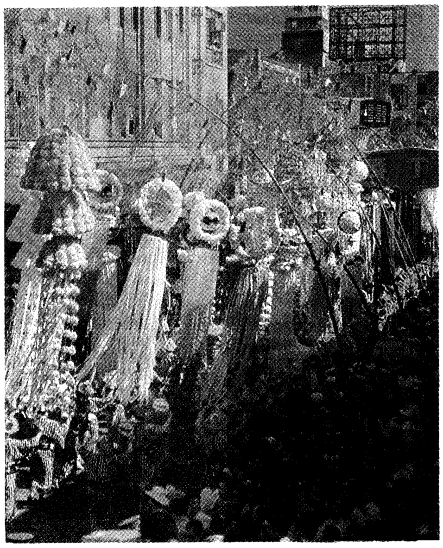
The smaller membership of the Senate permits more extended debate than is common in the House of Representatives. To check a filibuster—endless debate obstructing legislative action—three-fifths of the membership must vote for cloture; if the legislation under debate would change the Senate's standing rules, cloture may be invoked only on a vote of two-thirds of those present. There is a less-elaborate structure of party control in the Senate; the position taken by influential senators may be more significant than the position (if any) taken by the party.

The constitutional provisions regarding qualifications for membership of the Senate specify a minimum age of 30, citizenship of the United States for nine years, and residence in the state from which elected.

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Sendai, city, Kagoshima *ken* (prefecture), southwestern Kyushu, Japan, on the lower Sendai River. A communications centre since early historic times, it was a small castle town and naval port during the Tokugawa period (1603–1867). With the opening of the Kagoshima Line (railway) in the late 19th century, it developed as a local commercial centre. The city was damaged heavily during World War II but recovered as an industrial site, with large paper-pulp plants. A university was founded there in 1949. Pop. (1985) 71,-444.

Sendai, city and capital, Miyagi Prefecture (*ken*), northern Honshu, Japan, between the Nanakita-gawa (Nanakita River) and the Hirose-gawa. Sendai was architecturally designed by a feudal lord to be the headquarters of the Date daimyo family. Ruins of its 16th-century castle stand on Aoba-yama (Aoba Hill) in the western part of the contemporary city. Now the largest city and commercial centre of Tōhoku Region (*chihō*), Sendai is also the regional seat of federal administrative agencies. It is a rail hub but depends upon its outport of Shiogama, in the southwestern corner of Matsushima-wan (Matsushima Bay), for shipping. The city's relatively few manufactures, such as *kokeshi* (wooden dolls), are primarily for local consumption. Agriculture in the surrounding area consists of rice paddies and fruit orchards.



Tanabata Matsuri (Star Festival) in Sendai, Japan
Cosio—Shostal/EB Inc.

Sendai is an educational centre and the seat of Tōhoku University. Sendai has one of the highest ratios of park space to city area in Japan because of its reconstruction after World War II. The Shintō shrine of Osaki Hachiman is valued for its architectural beauty. Tourists from all over Japan are attracted to the city by the annual Tanabata Matsuri (Star Festival; August 6–8). Pop. (1983 est.) 660,076.

Sendak, Maurice (Bernard) (b. June 10, 1928, New York City), American artist best known for his illustrated children's books.

Sendak was the son of Polish immigrants and received his formal art training at the Art Students' League in New York City. While attending school he drew backgrounds for All-American Comics and did window displays for a toy store. The first children's books he illustrated were Marcel Ayme's *The Wonderful Farm* (1951) and Ruth Krauss's *A Hole is to Dig* (1952). Both were successful, and Sendak went on to illustrate more than 80 children's books by a number of writers including Meindert De Jong, Else Holmelund Minarik, and Randall Jarrell.

With *Kenny's Window* (1956), he began writing some of the stories that he illustrated. These include the tiny four-volume *Nutshell Library* (1962) and his innovative trilogy composed of *Where the Wild Things Are* (1963; winner of the 1964 Caldecott Medal), *In the Night Kitchen* (1970), and *Outside Over There* (1981).

In 1975 Sendak wrote and directed *Really Rosie,* an animated television special based on some of the children in his stories. It was expanded into a musical play in 1978. In addition to creating opera versions of some of his own stories—including *Where the Wild Things Are*—Sendak designed a number of other works for the stage, notably the city of Houston's production of Mozart's *Magic Flute* in 1980. In 1983 he designed a production of Tchaikovsky's ballet *The Nutcracker* for the Seattle (Wash.) Ballet.



Illustration by Maurice Sendak for *Where the Wild Things Are,* 1963
Copyright © 1963 by Maurice Sendak; reprinted by permission of Harper & Row, Publishers, Inc.

The Art of Maurice Sendak by Selma G. Lanes was published in 1980.

Sender, Ramón José (b. Feb. 3, 1902, Alcolea de Cinca, Spain—d. Jan. 15, 1982, near San Diego, Calif., U.S.), Spanish novelist whose works deal with Spanish history and social issues and with the search for individual philosophic and ethical certainty.

After studying at the University of Madrid, Sender became a lifelong Republican and was at one time imprisoned for political activities. In the early 1920s he served with the Spanish Army in Morocco, and he later worked on the staff of *El Sol* ("The Sun") in Madrid.

Imán (1929; *Pro Patria,* 1935), his first novel, was sharply critical of the war in Morocco. In the novels *O.P. (Orden público)* (1931; "Public Order"), on police brutality, and *Siete domingos rojos* (1932; *Seven Red Sundays,* 1936), on labour unrest, he continued his emphasis on social justice.

His literary reputation was secured by the award of the National Prize for Literature for *Mr. Witt en el cantón* (1935; *Mr. Witt Among the Rebels,* 1937). Mr. Witt of the novel's title is an Englishman who brings a detached view to the passions and aspirations of separatist rebels. The book was based on an uprising in Cartagena in 1873.

The Civil War (1936–39) had a deep and lasting influence on Sender. He served as an officer in the Spanish Republican Army, and his wife was killed by Nationalists. *Contraataque* (1938; *Counterattack,*1937) was based on his war experiences and was intended to win support for the Republicans. Sender often reworked and revised published material for republication in later works. After the Nationalist victory in the Civil War, Sender went into exile becoming a U.S. citizen in 1946. He taught Spanish literature at Amherst College in Massachusetts (1943–44), at the University of New Mexico (1947–63), and at the University of Southern California (1965–73).

Mosén Millán (1953; *Requiem for a Spanish Peasant,* 1960), on peasant life and the realities of war, was first published in Mexico because his work had been banned in Spain under the Franco regime. From the mid-1960s Sender's work could once more be published in Spain. *Crónica del alba* (*Chronicle of Dawn*), a series of nine novels published over more than two decades, explores the relationship between social and individual needs. In *Las criaturas saturnianas* (1968; "The Saturnian Creatures") and other works Sender explores mythological and mystical subjects.

Sendero Luminoso (Peruvian Maoist group): *see* Shining Path.

Senebier, Jean (b. May 6, 1742, Geneva—d. July 22, 1809, Geneva), Swiss botanist and naturalist who demonstrated that green plants consume carbon dioxide and release oxygen under the influence of light.

The son of a wealthy merchant, Senebier studied theology and was ordained a minister in 1765. In 1769 he became pastor of a church in Chancy, Switz., where he remained until 1773, when he was appointed city librarian of Geneva. His important literary work, *Histoire littéraire de Genève,* appeared in 1786.

Meanwhile, Senebier began a study of botany, and in 1787 he became a staff member of the *Encyclopédie méthodique,* with the task of producing a section on plant physiology. His most important contribution to botany, however, appeared in *Mémoires physicochimiques sur l'influence de la lumière....* (1782; "Physico-Chemical Memoirs on the Influence of Light"), the *Recherches sur l'influence de la lumière solaire...* (1783; "Research on the Influence of Sunlight"), and *Expériences sur l'action de la lumière solaire dans la végétation* (1788; "Experiments on the Action of Sunlight on Vegetation"). In 1800 he completed a major work, *Physiologie végétale,* in which he demonstrated that light is the agent responsible for the fixation of carbon dioxide and that oxygen is liberated only in the presence of carbon dioxide. This work was fundamental to subsequent research in photosynthesis.

Seneca, tribe of North American Indians of the Iroquoian linguistic group who lived in



Front chamber of a longhouse characteristic of the Seneca nation of the Iroquois Indians around 1600; model in the Rochester Museum of Arts and Sciences, Rochester, N.Y.
By courtesy of the Rochester Museum and Science Center, Rochester, N.Y.

what is now western New York state and eastern Ohio. They were the largest and one of the most important members of the original five nations of the Iroquois League (*q.v.*), in which they were represented by eight chiefs. In the autumn small parties of Seneca men left the villages for the annual hunt, returning about midwinter; spring was the fishing season. Seneca women were responsible for the cultivation of corn (maize) and other vegetables.

Families linked by maternal kinship lived together in longhouses; these families were grouped into eight exogamous clans, and the clans in turn grouped into two moieties, each moiety having its own chief. These moieties had mainly ceremonial functions in games and funerals. Each community had a council of adult males, which guided the village chief.

Warfare with other Indian nations was frequent; their own losses were made up by adopting whole towns of other tribes. During the 17th century wars led to the expansion of the original Seneca territory between Seneca Lake and the Genesee River to include all of western New York state from Niagara south along the Allegheny River into Pennsylvania. Remote from white contact, secure in game and corn, they could field 1,000 warriors, equalling the combined strength of the rest of the Iroquois League.

During the American Revolution the Seneca were British allies, resulting in the destruction of their villages by the American general John Sullivan in 1779. In 1797, having lost much of their land, they secured 12 tracts as reservations, 4 of which (Tonawanda, Cattaraugus, Oil Springs, and Allegany) existed in the late 20th century. Chiefs still governed more than 600 at Tonawanda, but the remainder of the Seneca Nation is a republic, formed in 1848 in reaction to the incompetence and corruption of the hereditary chiefs and in particular because of their surrender of Seneca lands to whites. In northeastern Oklahoma live 670 so-called Seneca-Cayuga, descended from the Seneca of Ohio. Though most Seneca are nominally Christian, some maintain the traditional ceremonies at three longhouses in western New York.

Seneca, Lucius Annaeus (b. *c.* 55 BC, Corduba, Spain—d. *c.* AD 39, Corduba?), author of a Latin work on declamation, a form of rhetorical exercise. Only about half of his book, *Oratorum sententiae divisiones colores,* survives; a 4th-century epitome preserves some of the rest, including two more prefaces, giving lively sketches of the persons whom he quotes.

Seneca disapproved of the artificial cleverness, often degenerating into absurdity, of many declaimers. He preferred the firmly disciplined style of Cicero. But he preserved some hundred examples of the declaimers' art. In the prefaces to the divisions of his work, he made valuable and amusing observations on the literary life of the early empire. He also preserved various accounts, such as Livy's, of the death of Cicero. The romantic topics of many of the *suasoriae* became part of the collection of tales known as the *Gesta Romanorum.*

Seneca, Lucius Annaeus, byname SENECA THE YOUNGER (b. *c.* 4 BC, Corduba, Spain—d. AD 65, Rome), Roman philosopher, statesman, orator, and tragedian. He was Rome's leading intellectual figure in the mid-1st century AD and was virtual ruler with his friends of the Roman world between 54 and 62 during the first phase of the emperor Nero's reign.

Early life and family. Seneca was the second son of a wealthy family. The father, Lucius Annaeus Seneca (Seneca the Elder), had been famous in Rome as a teacher of rhetoric; the mother, Helvia, was of excellent character and education; the older brother was Gallio, met by St. Paul in Achaea in AD 52; the younger brother was the father of the poet Lucan. An aunt took Lucius as a boy to Rome; there he was trained as an orator and educated in philosophy in the school of the Sextii, which blended Stoicism with an ascetic neo-Pythagoreanism. Seneca's health suffered, and he went to recuperate in Egypt, where his aunt was the wife of the prefect, Gaius Galerius. Returning to Rome about the year 31, he began a career in politics and law. Soon he fell foul of the emperor Caligula, who was deterred from killing him only by the argument that his life was sure to be short.

In 41 the emperor Claudius banished Seneca to Corsica on a charge of adultery with the princess Julia Livilla, the Emperor's niece. In that uncongenial milieu he studied natural science and philosophy and wrote the three treatises entitled *Consolationes.* The influence of Agrippina, the Emperor's wife, had him recalled to Rome in 49. He became praetor in AD 50, married Pompeia Paulina, a wealthy woman, built up a powerful group of friends, including the new prefect of the guard, Sextus Afranius Burrus, and became tutor to the future emperor Nero.



Seneca, marble bust, 3rd century, after an original bust of the 1st century; in the Staatliche Museen zu Berlin, Germany

By courtesy of the Staatliche Museen zu Berlin, Germany

The murder of Claudius in 54 pushed Seneca and Burrus to the top. Their friends held the great army commands on the German and Parthian frontiers. Nero's first public speech, drafted by Seneca, promised liberty for the Senate and an end to the influence of freedmen and women. Agrippina, Nero's mother, was resolved that her influence should continue, and there were other powerful enemies. But Seneca and Burrus, although provincials from Spain and Gaul, understood the problems of the Roman world. They introduced fiscal and judicial reforms and fostered a more humane attitude toward slaves. Their nominee Corbulo defeated the Parthians; in Britain a more enlightened administration followed the quashing of Boudicca's rebellion. But as Tacitus, the historian (*c.* 56–117), says, "Nothing in human affairs is more unstable and precarious than power unsupported by its own strength." Seneca and Burrus were a tyrant's favourites. In 59 they had to condone—or to contrive—the murder of Agrippina. When Burrus died in 62 Seneca knew that he could not go on. He received permission to retire, and in his remaining years he wrote some of his best philosophical works. In 65, Seneca's enemies denounced him as having been a party to the conspiracy of Piso. Ordered to commit suicide, he met death with fortitude and composure.

Philosophical works and tragedies. The *Apocolocyntosis divi Claudii* (*The Pumpkinification of the Divine Claudius*) stands apart from the rest of Seneca's surviving works. A political skit, witty and unscrupulous, its theme is the deification—or "pumpkinification"—of Claudius. The rest divide into philosophical works and the tragedies. The former expound an eclectic version of "Middle" Stoicism, adapted for the Roman market by Panaetius of Rhodes (2nd century BC), and developed by his compatriot Poseidonius in the 1st century BC. Poseidonius lies behind the books on natural science, *Naturales quaestiones,* where lofty generalities on the investigation of nature are offset by a jejune exposition of the facts. Of the *Consolationes, Ad Marciam* consoles a lady on the loss of a son; *Ad Helviam matrem,* Seneca's mother on his exile; *Ad Polybium,* the powerful freedman Polybius on the loss of a son but with a sycophantic plea for recall from Corsica. The *De ira* deals at length with the passion of anger, its consequences, and control. The *De clementia,* an exhortatory address to Nero, commends mercy as the sovereign quality for a Roman emperor. *De tranquillitate animi, De constantia sapientis, De vita beata,* and *De otio* consider various aspects of the life and qualities of the Stoic wise man. *De beneficiis* is a diffuse treatment of benefits as seen by giver and recipient. *De brevitate vitae* demonstrates that our human span is long enough if time is properly employed—which it seldom is. Best written and most compelling are the *Epistulae morales,* addressed to Lucilius. Those 124 brilliant essays treat a range of moral problems not easily reduced to a single formula.

Of the 10 "Senecan" tragedies, *Octavia* is certainly, and *Hercules Oetaeus* is probably, spurious. The others handle familiar Greek tragic themes, with some originality of detail. Attempts to arrange them as a schematic treatment of Stoic "vices" seem too subtle. Intended for playreadings rather than public presentation, the pitch is a high monotone, emphasizing the lurid and the supernatural. There are impressive set speeches and choral passages, but the characters are static, and they rant. The principal representatives of classical tragedy known to the Renaissance world, these plays had a great influence, notably in England. Shakespeare's *Titus Andronicus,* John Webster's *The Duchess of Malfi,* and Cyril Tourneur's *Revengers Tragaedie,* with their ghosts, witches, cruel tyrants, and dominant theme of vengeance, are the progeny of Seneca's tragedies.

Stature and influence. Hostile propaganda pursued Seneca's memory. Quintilian, the 1st-century AD rhetorician, criticized his educational influence; Tacitus was ambivalent on Seneca's place in history. But his views on monarchy and its duties contributed to the humane and liberal temper of the age of the Antonines (Antoninus Pius, Marcus Aurelius, and Commodus; AD 138–192). Meanwhile, the spread of Stoicism kept his philosophy alive: new horizons opened when it was found to have Christian affinities. There was a belief that he knew St. Paul and a spurious collection of letters to substantiate it. Studied by Augustine and Jerome, Seneca's works consoled Boethius in prison. His thought was a component of the Latin culture of the Middle Ages, often filtered through anthologies. Known to Dante, Chaucer, and Petrarch, his moral treatises were edited by Erasmus; the first complete English translation appeared in 1614. In the 16th to 18th century Senecan prose, in content and style, served the vernacular literatures as a model for essays, sermons, and moralizing. Calvin, Montaigne, and Rousseau are instances. As the first of "Spanish" thinkers, his influence in Spain was always powerful. Nineteenth-century specialization brought him under fire from philosophers, scientists, historians, and students of literature. But later scholarly work and the interest aroused by the bimillenary commemorations of his death in

Spain in 1965 suggested that a Senecan revival might be under way. In his 40 surviving books the thoughts of a versatile but unoriginal mind are expressed and amplified by the resources of an individual style. (D.R.D.)

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Seneca Falls, town, Seneca county, west-central New York, U.S. It lies in the Finger Lakes district on the Seneca River (connecting lakes Seneca and Cayuga). Hydroelectric power is generated from the 50-foot (15-metre) falls in the river, and there are important manufacturing industries making machinery, electrical and electronic equipment, textiles, and other products. Summer tourism is also important. The town was settled about 1787 and incorporated in 1831. Seneca Falls was the home of Amelia Jenks Bloomer, pioneer of women's dress reform, and (1847–62) of feminist and abolitionist Elizabeth Cady Stanton. The Seneca Falls Convention for women's rights was held there in 1848; the town has a Women's Hall of Fame. Pop. (1986 est.) 7,350.

Seneca Falls Convention, assembly held on July 19–20, 1848, at Seneca Falls, N.Y., that launched the woman suffrage movement in the United States. Seneca Falls was the home of Elizabeth Cady Stanton, who, along with Lucretia Mott, conceived and directed the convention. The two feminist leaders had been excluded from participating in the 1840 World Anti-Slavery Convention in London, an event that triggered their interest in struggling for women's rights.

At the 1848 convention, Stanton read the Declaration of Sentiments, a statement of grievances and demands patterned closely after the Declaration of Independence. It called upon women to organize and to petition for their rights. The convention passed 12 resolutions, 11 unanimously, designed to gain certain rights and privileges that women of the era were denied. The ninth resolution demanded the right to vote; passed narrowly upon the insistence of Stanton, it subjected the Seneca Falls Convention to subsequent ridicule and caused many backers of women's rights to withdraw their support. It nonetheless served as the cornerstone of the suffrage movement, culminating in passage of the Nineteenth Amendment in 1920.

Senecan tragedy, body of nine closet dramas (*i.e.,* plays intended to be read rather than performed), written in blank verse by the Roman Stoic philosopher Seneca in the 1st century AD. Rediscovered by Italian humanists in the mid-16th century, they became the models for the revival of tragedy on the Renaissance stage. The two great, but very different, dramatic traditions of the age—French Neoclassical tragedy and Elizabethan tragedy—both drew inspiration from Seneca.

Seneca's plays were reworkings chiefly of Euripides' dramas and also of works of Aeschylus and Sophocles. Probably meant to be recited at elite gatherings, they differ from their originals in their long declamatory, narrative accounts of action, their obtrusive moralizing, and their bombastic rhetoric. They dwell on detailed accounts of horrible deeds and contain long reflective soliloquies. Though the gods rarely appear in these plays, ghosts and witches abound. In an age when the Greek originals were scarcely known, Seneca's plays were mistaken for high Classical drama. The Renaissance scholar J.C. Scaliger (1484–1558), who knew both Latin and Greek, preferred Seneca to Euripides.

French Neoclassical dramatic tradition, which reached its highest expression in the 17th-century tragedies of Pierre Corneille and Jean Racine, drew on Seneca for form and grandeur of style. These Neoclassicists adopted Seneca's innovation of the confidant (usually a servant), his substitution of speech for action, and his moral hairsplitting.

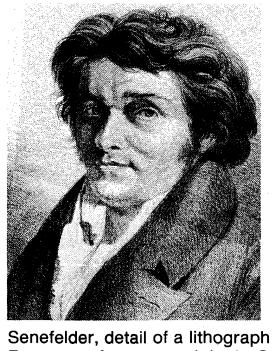
The Elizabethan dramatists found Seneca's themes of bloodthirsty revenge more congenial to English taste than they did his form. The first English tragedy, *Gorboduc* (1561), by Thomas Sackville and Thomas Norton, is a chain of slaughter and revenge written in direct imitation of Seneca. Senecan tragedy is also evident in Shakespeare's *Hamlet;* the revenge theme, the corpse-strewn climax, and such points of stage machinery as the ghost can all be traced back to the Senecan model.

sénéchal: *see* seneschal.

Senefelder, (Johann Nepomuk Franz) Alois, ALOIS also spelled ALOYS (b. Nov. 6, 1771, Prague—d. Feb. 26, 1834, Munich), German inventor of lithography.

The son of an actor at the Theatre Royal in Prague, Senefelder was unable to continue his studies at the University of Ingolstadt after his father's death and thus tried to support himself as a performer and author, but without success. He learned printing in a printing office, purchased a small press, and sought to do his own printing.

Desiring to publish plays that he had written but unable to afford the expensive engraving of printing plates, Senefelder tried to engrave them himself. His work on copper plates was not proving very successful when an accident led to his discovery of the possibilities of stone (1796). Senefelder records that one day he



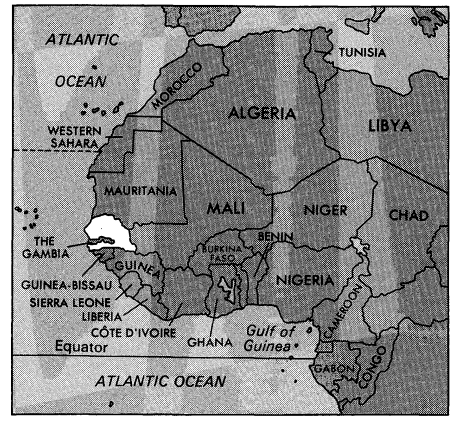
Senefelder, detail of a lithograph by S. Freeman, after a portrait by L. Quaglio, 1818

H. Roger-Viollet

jotted down a laundry list with grease pencil on a piece of Bavarian limestone. It occurred to him that if he etched away the rest of the surface, the markings would be left in relief. Two years of experimentation eventually led to the discovery of flat-surface printing (modern lithography). In 1818 he documented his discovery in *Vollständiges Lehrbuch der Steindruckerey* (1818; *A Complete Course of Lithography*).

Senefelder later accepted an offer from a music publisher, Johann Anton André, to set himself up at Offenbach and train others in his lithographic process. In later years the king of Bavaria settled a handsome pension on Senefelder.

Senegal, officially REPUBLIC OF SENEGAL, French RÉPUBLIQUE DU SÉNÉGAL, westernmost republic of the bulge of western Africa, covering an area of 75,955 square miles (196,722 square km). The capital is Dakar. Facing the Atlantic Ocean to the west, Senegal is bounded on the north and northeast by the Sénégal River, which separates it from Mauritania; on the east by the Falémé River, separating it from Mali; and on the south by Guinea-Bissau and Guinea. The Gambia forms an enclave along the Gambia River in the southwest. The population in 1990 was estimated at 7,618,000.



Senegal

A brief treatment of Senegal follows. For full treatment, *see* MACROPAEDIA: Western Africa.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. Senegal is a flat country having three major structural divisions. These are: the Cape Verde headland and its region, which forms the western extremity and consists of a grouping of small plateaus of hard volcanic rock; the southeastern and eastern fringes of ancient massifs contiguous with those buttressing the massif of the Fouta Djallon on the Guinea frontier, with the highest point reaching an elevation of 1,640 feet (500 m); and an immense shallow basin lying between Cape Verde to the west and the edges of the massif to the east. The Atlantic coast of Senegal is sandy and surf beaten. To the south of the Saloum River mouth, the coast consists of rias (drowned valleys) and is increasingly fringed with mangrove swamps. The major river basin, that of the Sénégal (about 24,700 square miles [about 64,000 square km] in Senegal and sharing its area with Mali, Mauritania, and Guinea), controls the country's general westward drainage into the Atlantic Ocean. Despite its apparent uniformity, Senegal contains a great diversity of soils, including alluvial, leached clay, Dior (ochred and light coloured), and sandy.

The climate over most of Senegal is Sudanese, transitional between dry desert and moist tropics; north of a line joining Thiès with the lower Falémé River valley, it belongs to the Sahelian zone. The rainy season lasts from July to October in the Sahelian zone and from June to October in the Sudanese, with annual rainfall of about 14 inches (355 mm) in the north and about 60 inches (1,525 mm) in the south. Temperatures vary according to the season, with an average range of 75° to 100° F (24° to 38° C), the highest being in the north. The vegetation in the Sahelian zone is characterized by scattered shrubs and spiny acacias, and south of Cape Verde the savanna grows steadily thicker. There are several species of monkey and antelope, as well as warthog, lion, panther, hyena, and wild hunting dog in Senegal. Crocodile, hippopotamus, and a variety of turtle species are found in the rivers.

Forests occupy about 31 percent of the total

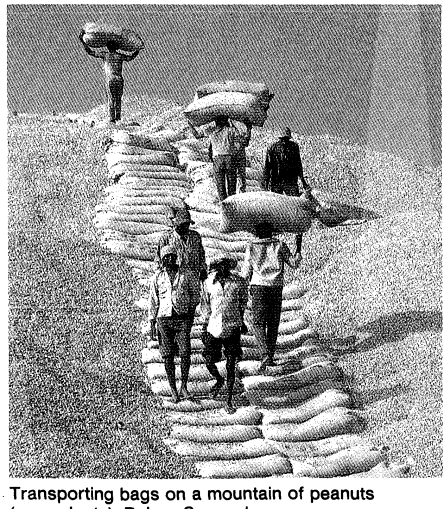
area. About 27 percent of Senegal is considered arable, and approximately 30 percent of the area is available as pasture or rangeland. Senegal has large reserves of phosphates and iron ore; other mineral reserves include marble and gold.

The people. There are seven major ethnic groups in Senegal—the Wolof, Serer, Fulani (Peul), Tukulor, Diola, Malinke, and Soninke—and a number of other, less-numerous groups. The major groups, each speaking a separate language, are located in the Sahel and savanna regions that formerly supported the ancient empires of the western Sudan, such as Ghana, Mali, and Songhai. Islām claims the most adherents (more than 90 percent) among practicing religionists.

The population as a whole is young, with 45 percent younger than 15 years of age. The birth and death rates remain high. Three-fifths of the population lives in rural areas.

The economy. Senegal has a developing market economy, based largely on agriculture. The limited economic growth it has achieved since independence is periodically interrupted by drought conditions that can send the economy into severe recession. The gross national product (GNP) has grown about as rapidly as the population, and the GNP per capita remains relatively low.

Agriculture accounts for about 17 percent of the GNP and employs three-quarters of the work force. The sector is essentially monocultural, with peanuts (groundnuts) being by far the most important cash and export crop, occupying about two-fifths the total cultivated area. Important food crops are millet and sorghum; large quantities of rice are imported. The government is attempting to reduce the country's economic dependence on peanuts by diversifying crops and expanding production of cotton, rice, sugar, and market-garden produce.



Transporting bags on a mountain of peanuts (groundnuts), Dakar, Senegal
Hoa-Qui/Viesti Associates, Inc.

The commercial-fishing industry has grown rapidly, with fish exports accounting for about one-tenth of total exports. The mining industry, dominated by phosphate production, is also expanding. Significant petroleum deposits have been located off the Casamance coast.

Senegal's manufacturing sector accounts for almost one-fifth of the GNP, employs about one-tenth of the work force, and is the most developed in French-speaking western Africa after Côte d'Ivoire. Peanut-oil extraction is the most important industry, followed by textiles. Domestic enterprises produce soft drinks, refined sugar, milk products, cigarettes, and canned fish (mainly tuna).

Services, trade and transportation account for about half of the GNP. Dakar is an important West African port, as well as the terminal point of Senegal's railway system. The highway system is good and is expanding. Tourism has become a major source of foreign revenue.

Economic development in Senegal is largely financed by foreign aid, primarily French, but with significant amounts provided by the World Bank and the International Monetary Fund. Although fluctuations in agricultural exports due to drought are partially offset by higher earnings from the export of minerals and fish, Senegal's trade deficit has remained large, and the debt-service burden is substantial. Chief trading partners include France, the United States, Brazil, Nigeria, Côte d'Ivoire, and the United Kingdom.

Government and social conditions. Senegal is a republic, basically socialist in orientation but built on a system of parliamentary democracy. The Constitution, dating from 1983, was closely modeled on the original 1963 constitution. The country's chief executive is the president, who is elected directly for a five-year term. The president appoints and leads a council of ministers and serves as the nation's commander in chief.

The National Assembly, composed of 120 deputies, is the nation's legislative branch, and its members are elected directly for five-year terms. The Parti Socialiste Sénégalais is the most important political party, dating from 1958, when it was known as the Union Progressiste Sénégalais. It was formed under the leadership of Léopold Senghor, who served as Senegal's president until 1981. In that same year the Constitution was amended to remove all limitations on the formation of political parties; by the mid-1980s, more than a dozen parties were in existence. Each of Senegal's administrative regions has a governor and a local assembly.

In 1982 the Senegambia confederation came into existence. The two participants, Senegal and The Gambia, retained their individual sovereignty but adopted joint defense, foreign, and monetary policies.

Education is compulsory between the ages of 6 and 12, but only approximately 40 percent of children are enrolled in schools. Secondary-school students are directed toward careers needed in the country's development. There is a university at Dakar.

Health conditions are generally much worse in rural areas than in the cities; about 70 percent of the doctors are located in Dakar. Life expectancy averages only 45 years for males and 48 years for females.

The cultural heritage of Senegal is preserved chiefly in the oral tradition. The *griot,* a kind of troubadour, recites poems that tell of warrior deeds. Sculpture in this Muslim country is characterized by abstraction and by the ideogram. Poet and former president Léopold Senghor is associated with the 20th-century literary movement known as Negritude, a term he defined as the tension between the defense and modernization of traditional black African values. Senegalese writer Sembène Ousmane became the first black African filmmaker.

History. Links between the peoples of Senegal and North Africa were established in the 10th century AD and were followed by the conversion of the Tukulor to Islām in the 11th century. The Tukulor were ruled, however, by a succession of animistic groups until the 18th century, and animism was widespread in Senegal well into the 19th century.

The Portuguese rounded Cape Verde in 1444 and explored the coast of Senegal the following year. The French established a trading post at the mouth of the Sénégal River in 1638 and founded Saint-Louis in 1659. Gorée Island, which had been occupied successively by the Portuguese and Dutch, was claimed by the French in 1677. Slaves, gum arabic, ivory, and gold were exported by Europeans throughout the 17th and 18th centuries.

Control over the coast of Senegal alternated between France and England from 1693 to 1814. Saint-Louis and Gorée Island, which had been awarded to France by the Treaty of Paris in 1814, were reoccupied by the French in 1817. Slavery was abolished in 1848. The French expanded inland under the command of Louis-Léon Faidherbe (1818–89), who checked the expansion of the Tukulor empire and established the basic colonial institutions of Senegal. The right of the colony to send a deputy to the French Parliament was restored in 1871.

All inhabitants of Senegal were made French citizens in 1946, and the colony became an overseas territory of France. Senegal became an autonomous republic within the French Community in 1958 and was federated with Mali in 1959–60. Senegal was recognized as an independent state in 1960, and Léopold Sédar Senghor, who had led the movement for independence, became the first president of the republic. Senghor turned the presidency over to the former prime minister, Abdou Diouf, in January 1981, and restrictions on political activity that had been imposed in 1963 were lifted. Diouf was reelected as president in 1983 and 1988.

Sénégal River, river of western Africa rising in the Fouta Djallon plateau of Guinea. It flows northwestward across Mali and then westward to the Atlantic Ocean, forming the border between Mauritania to the north and Senegal to the south.

A brief treatment of the Sénégal River follows. For full treatment, *see* MACROPAEDIA: Africa.

Its two major headstreams, the Bafing and Bakoye, meet at Bafoulabé in Mali to form the Sénégal proper. Downriver the Sénégal is joined by its chief tributary, the Falémé, which enters near Bakel at the Mali–Senegal–Mauritania tripoint. From Bakel to Dagana the river flows through an alluvial valley as much as 12 miles (20 km) wide. Floods come in early September at Bakal, reaching Dagana by mid-October. The water level rises 12 feet (about 3.5 m), the flow is 300 times greater than in the dry season, and the river occupies the entire valley. Below Dagana, where the Sénégal enters its delta, the river floods more widely, and water and soils are saline. The mouth has been deflected southward by the offshore Canary Current and by trade winds from the north; the result has been the formation of a long sandspit, the Barbary Tongue. The Bafing and Falémé sources receive 80 inches (2,000 mm) of annual rainfall; the Sénégal valley receives 10 to 30 inches.

Typical trees of the Sénégal valley are the acacia, including *A. senegal,* which provides the gum arabic of commerce. The grass *Vetiverea nigritiana* grows in tufts in wet depressions. Such birds as spoonbills, herons, and egrets are widespread. Hedgehogs, monitor lizards, and warthogs are common along the riverbanks. The principal inhabitants of the Sénégal valley are the Wolof, the Tukulor, and the Soninke peoples. Throughout the region, additional small groups of usually nomadic Fulani and Mauri (more commonly Maure, or Moors) are found. Rice is cultivated on lands from which floods have retreated. Near Dagana, fields are irrigated by means of a dam across the Taoué, a tributary stream up which Sénégal floods penetrate to Lake Guiers. The dam admits the fresh water, and it is retained by closing the sluices at the end of the flood, thereby preventing the admission of tidal saltwater during the dry season. Most traffic plies between the river ports of Rosso, Bugué, and Kaédi, in Mauritania. Length 1,020 miles (1,641 km); drainage basin 174,000 square miles (450,000 square km); discharge ranging from 180 cu ft/sec

(5 cu m/sec) to 180,000 cu ft/sec (5,000 cu m/sec).

Senegambia, limited confederation of the sovereign countries of Senegal and The Gambia, West Africa. The two countries reached a merger agreement in November 1981, and the Senegambia confederation came into being three months later. The terms of the agreement required Senegal and The Gambia to take the following steps toward union; integrate military and security forces; form an economic and monetary union; coordinate foreign policies and communications; and establish confederal institutions. The larger Senegal would dominate these institutions, controlling the confederal presidency and two-thirds of the seats in a confederal parliament. Despite the merger, each country would maintain its independence. Senegal and The Gambia began implementing the agreement in July 1982.

senescence, the deterioration of bodily functions that accompanies aging (*q.v.*) in a living organism. In addition to the process of aging, the term senescence denotes the state or condition of old age (*q.v.*).

seneschal, French SÉNÉCHAL, in medieval and early modern France, a steward or principal administrator in a royal or noble household. As time went on, the office declined in importance and was often equivalent to that of a bailiff (*q.v.*); the office and title persisted until the French Revolution.

In Merovingian times the seneschal was subordinate to the *major domus*, or mayor of the palace, and had charge of the personnel of the royal household. Under the Carolingians he became responsible for organizing the journeys of king or emperor and, by 1071, was the chief officer—steward of the household, head of the army, and administrator of the royal demesne. With the title *dapifer* he headed the names of those witnessing royal diplomas. By the mid-12th century, however, the office had weakened and become largely honorary.

Most of the great French feudatories—the dukes of Normandy and Aquitaine, the counts of Anjou, Poitiers, and Toulouse—had their seneschals. In Anjou and Poitou the title was given to subordinate officials on the counts' demesne. When these provinces became united to the crown after 1203, these officials were retained to perform the same duties as the bailiffs of the royal demesne elsewhere. This was the basis of the later classic administrative division of France into *bailliages* and *sénéchaussées,* although in Normandy, Maine, Anjou, and Auvergne the seneschals were replaced by bailiffs.

Senfl, Ludwig (b. *c.* 1490, Zürich or Basel—d. *c.* 1556, Munich), Swiss composer, considered the most important German-speaking master of his time.

A pupil of Heinrich Isaac, Senfl rapidly mastered the Franco-Flemish style and became chamber composer to Maximilian I. About 1520 he moved to Augsburg, where he completed Isaac's *Choralis Constantinus* and edited the *Liber selectarum cantionum* (1520), one of the earliest examples of German printed music. From 1523 he worked in Munich. Senfl's seven masses employ parody (reworking of a preexistent part-song) and cantus firmus; one mass combines two preexisting melodies simultaneously. He published about 150 German lieder (1534, 1544). A collected edition of his works was begun in 1937 in *Das Erbe deutscher Musik.*

Articles are alphabetized word by word, not letter by letter

Senga (people): *see* Nsenga.

Senghor, Léopold (Sédar) (b. Oct. 9, 1906, Joal, Senegal, French West Africa), poet and statesman, president of Senegal from 1960 to 1980. He was a major proponent of a moderate "African socialism."

Senghor was the son of a prosperous trader of the Serer tribe. He spent his first seven



Senghor, addressing the United Nations General Assembly, 1961
United Nations Photograph

years in a small village, and his first ambition was to become teacher-priest. He therefore attended school at a nearby Catholic mission and a seminary. When he was 20, he realized that the priesthood was not his calling and transferred to the lycée (secondary school) in Dakar.

From early in his life, Senghor demonstrated a tenacious faith in the importance of African cultural values. In 1928 he went to Paris on a partial scholarship and continued his formal studies at the Lycée Louis-le-Grand and at the Sorbonne. During these years Senghor discovered the unmistakable imprint of African art on modern painting, sculpture, music, and literature, which confirmed his belief in Africa's potential contribution to modern culture.

In 1935 Senghor became the first African agrégé, the highest rank of qualified teacher in the French school system, and began teaching French to French students in Tours. Two years later he was transferred to a lycée near Paris. Drafted in 1939, at the beginning of World War II, he was captured in 1940 and spent two years in Nazi concentration camps, where he wrote some of his finest poems. On his release, he joined the French Résistance.

After the war Senghor became a member of the French Constituent Assembly. In 1946 he was sent as one of Senegal's two deputies to the National Assembly in Paris. Elected on the Socialist (SFIO) ticket, Senghor founded the BDS (Senegalese Democratic Bloc) in 1948 and as that party's candidate was reelected by a wide margin in the 1951 elections for the French National Assembly. Five years later he became mayor of Thiès, Senegal's railroad centre, and was reelected deputy.

When the French Parliament passed (1956) the *loi cadre,* which gave a large measure of self-government to the African territories, Senghor was one of the first to oppose the act. The *loi cadre* emphasized territorial rather than federal government, and Senghor realized that this would result in the proliferation of small, unviable states. To counter the effects of the *loi cadre,* he helped to found and supported a series of parties that were dedicated to establishing a federal African unity. But none of these was as successful as the RDA. On the home front he helped found the UPS (Senegalese Progressive Union; called after 1976 the Socialist Party [PS]), which in the early 1980s was still the governing party of Senegal. In the late 1950s Senghor helped create an alliance between various West African political blocs that led to the creation in 1959 of the abortive Mali Federation, of which Senegal was a member (along with French Sudan [Mali], Dahomey [Benin], and Upper Volta [Burkina Faso]). In December 1959 Senghor made an eloquent, successful appeal to French president Charles de Gaulle for independence. The Mali Federation lasted only until the following August, when its last two members, Senegal and French Sudan, separated. Senegal became a republic, and Senghor was unanimously elected president.

A second major crisis for Senghor occurred in late 1962, when Prime Minister Mamadou Dia, longtime protégé of Senghor, attempted a coup d'etat. Again the Senegalese rallied behind Senghor, and Mamadou Dia was sentenced to life imprisonment. A new constitution was ratified, and Senghor was reelected president. He retired from office on Dec. 31, 1980, midway through his fifth term, and was succeeded by Abdou Diouf.

As chief executive, Senghor tried to modernize Senegal's agriculture, instill a sense of enlightened citizenship, combat corruption and inefficiency, forge closer ties with his African neighbours, and continue cooperation with the French, He advocated an African socialism based on African realities, free of both atheism and excessive materialism. He sought an open, democratic, humanistic socialism that shunned such slogans as "dictatorship of the proletariat." A vigorous spokesman for the Third World, he protested unfair terms of trade that worked to the disadvantage of the agricultural nations.

His concern with political and economic issues strengthened his espousal of negritude, which he defined as "the sum total of cultural values of the Negro-African world." For both his literary and his political works, he was awarded honorary doctorates by universities on four continents. In December 1969 he became the first African member of the French Academy of Moral and Political Sciences. In 1984 he was inducted into the French Academy, becoming the first black member in that body's history.

Senghor's career was replete with paradoxes. Although a Catholic and a Serer, he headed a predominantly Muslim, Wolof nation. An outstanding intellectual, he drew his main support from the peasants. A distinguished poet, he was also a professional politician of great skill who guided his nation to independence and proved to be an able and effective leader for the following two decades.

Senglea, town, eastern Malta, one of the Three Cities (the others being Cospicua and Vittoriosa), on a small, narrow peninsula between French Creek to the west and Dockyard Creek to the east, just south of Valletta across Grand Harbour. In 1552 a fort was built on the peninsula by the Hospitallers (Knights of St. John of Jerusalem), and the town was founded in 1554 by the Hospitallers' grand master Claude de la Sengle. Subsequently fortified, it played an important role during the Great Siege of Malta in 1565, when it suffered heavy damage. Extensive redevelopment and the establishment of commercial and shipbuilding facilities made it the most prosperous of the Three Cities in the 18th century. It was almost completely destroyed in World War II air raids. Its ship-repair yards have since been rebuilt and provide a major source of employment. Pop. (1983 est.) 4,931.

Senigallia, formerly SINIGAGLIA, Latin SENA GALLICA, town and episcopal see, Ancona province, Marche region, central Italy, on the Adriatic Sea at the mouth of the Misa River. Founded by the Senonian Gauls in the 6th century BC, it became the Roman colony of Sena Gallica in 289 BC. In the 6th century it was one of the five cities of the Maritime Pentapolis under the Byzantine exarchate of Ravenna. After it had been destroyed by

Manfredi in 1264 and rebuilt by Sigismondo Malatesta of Rimini in 1450, its lordship was assigned by Pope Sixtus IV (late 15th century) to the Della Rovere family, later dukes of Urbino. It was part of the Papal States from 1631 to 1860 and in that period was famous for its fair. Pope Pius IX was born at Senigallia in 1792. Principal buildings include the castle (1480); the Convento delle Grazie (1491), with a painting by Perugino; the cathedral (1787); and the 18th-century Ercolani Palace. Senigallia is a seaside resort, fishing port, and agricultural market and also has industries that manufacture farm tools, paper bags, and furniture. Pop. (1989 est.) mun., 40,991.

senile dementia, substantial loss of intellectual capacity that occurs in old age and is associated with the widespread loss of nerve cells and the shrinkage of brain tissue. Senile dementia is a substantial decline from a previous intellectual level in an aging person. Memory is the mental capacity most often affected. The memory loss may first manifest itself in simple absentmindedness or a tendency to forget or misplace things and to repeat oneself in conversation. As the dementia progresses, the loss of memory broadens in scope until the patient can no longer remember basic social and survival skills or function independently. There may also be declines in the person's language skills, spatial or temporal orientation, judgment, or other cognitive capacities, and personality changes may also manifest themselves. Senile dementia usually has a slow, gradual onset and is most common in persons over age 75.

The most common cause of the syndrome is Alzheimer's disease (*q.v.*), which accounts for about 50 percent of all elderly demented persons and is irreversible. The second most common cause is multi-infarct, or vascular, dementia, which arises from hypertension (high blood pressure) or some other vascular condition. In this type, a series of small strokes progressively destroy small portions of the brain, eventually leading to dementia. There is no cure for Alzheimer's disease, but multi-infarct dementia can sometimes be prevented or its course slowed by treatment of the underlying systemic vascular disorder. Among other significant causes of dementia in the elderly are Huntington's chorea, Parkinson's disease, and multiple sclerosis.

Senior, Nassau William, (b. Sept. 26, 1790, Compton Beauchamp, Berkshire, Eng.—d. June 4, 1864, London), British classical economist who exercised much influence in the political affairs of his day.

Senior was educated at Eton and the University of Oxford, graduating in 1812. He qualified as a lawyer in 1819. He became one of the leading economists of the first half of the 19th century and was the first Drummond professor of political economy at Oxford (1825–30, 1847–52).

Senior made many contributions to economic theory. In his *An Outline of the Science of Political Economy* (1836), he introduced the view—later attacked by Marxists—that the saving and accumulation of capital must be considered a part of the cost of production. He worked on the concept of rent, advanced the abstinence theory of the origin of interest (which proved highly influential), and led the revolt among the classical economists against the Malthusian theory of population. He also extended the theory of the distribution of precious metals and showed the importance of productivity for general price levels.

Senior was actively involved in the setting of economic policy. He served as adviser to the Whig party, and he wrote the New Poor Law of 1834. He was also one of the commissioners on handloom weavers (1841) and advised the government of Prime Minister William Melbourne to oppose trade unions.

senior citizen, elderly, or aged, person, especially one of more than 60 or 65 years of age. *See* old age.

Senlis, town, Oise *département,* Picardie region, northern France. It lies along the Nonette River, which is a tributary of the Oise, 32 miles (51 km) north-northeast of Paris, in a forested area. Senlis, whose name is derived from its 4th-century Roman name, Civitas Silvanectium ("City of the Silvanectes"), became part of the French royal domain under Hugh Capet, founder of the Capetian dynasty, who was proclaimed king there in 987.

Senlis is rich in medieval buildings. The Church (formerly the Cathedral) of Notre-Dame, with its elegant 13th-century spire (256 feet [78 m] high), constitutes one of the finest surviving examples of Ile-de-France Gothic, despite some Renaissance additions. It was begun in 1155 but was not completed until the 16th century. Senlis also has other medieval churches, Renaissance-era houses, and a royal chateau. The old centre of the town has an inner perimeter of massive Gallo-Roman walls and the remains of an outer ring of medieval walls.

Senlis is now a popular resort for Parisians. Its industries include metalworking and furniture manufacture. Pop. (1982) 14,345.

senna, any of several plants, especially of the genus *Cassia,* in the pea family (Fabaceae), mostly of subtropical and tropical regions. Many are used medicinally; some yield tanbark used in preparing leather. Some sennas are among the showiest flowering trees.



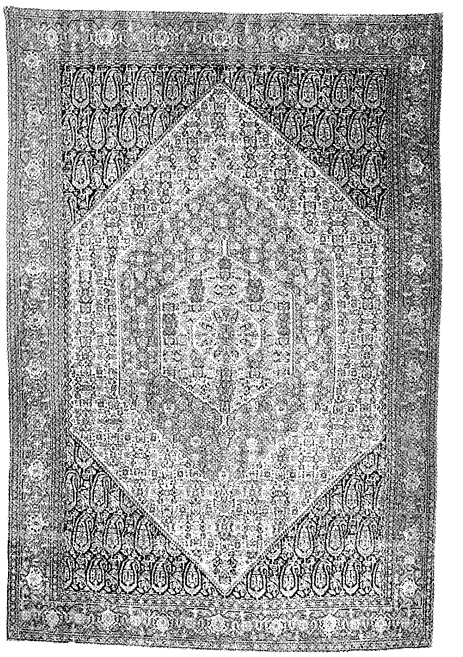
Senna (*Cassia didymobotrya*)
Gerald Cubitt

Alexandrian senna (*C. acutifolia*), from Egypt, The Sudan, and Nigeria, and *C. sieberana,* from Senegal to Uganda, are cultivated in India for their cathartic properties. Tanner's senna (*C. auriculata*), a tall shrub, is a principal native tanbark in southern India.

In the eastern United States, wild sennas (*C. hebecarpa* and *C. marilandica*) grow up to 1.25 m (4 feet) high and have showy spikes of yellow flowers. Coffee senna, or styptic weed (*C. occidentalis*), native to North and South America, is widely grown in the Old World tropics for its cathartic and laxative properties. The candlestick senna, or candlebush (*C. alata*), is a showy shrub that may grow up to 2.5 m high; it is common in the tropics and is cultivated in California as an ornamental.

The bladder sennas (*Colutea* species) are Old World shrubs or small trees; their yellow flowers are followed by inflated pods. Scorpion senna (*Coronilla emerus*), also shrubby, is grown as an ornamental for its yellow flowers.

Senna rug, Senna also spelled SEHNA, handwoven floor covering made by Kurds who live



Senna rug from Iran, *c.* 1900; in possession of Neshan G. Hintlian, Washington, D.C.
In possession of Neshan G. Hintlian, Washington, D.C.; photograph, Otto E. Nelson—EB Inc.

in or around the town of Senna (now more properly Sanandaj) in western Iran. The pile rugs and pile kilims of Senna are prized for their delicate pattern and colouring and for their fine weave. They are by far the most sophisticated of the Kurdish rugs. The designs usually involve some repeat pattern, or diaper, such as the *herāti,* in which a diamond lattice pattern peeps through a tangle of rose blossoms and leaves or through intricate versions of the *būteh,* a leaf with curling tip. The entire field may show such a pattern, or a medallion scheme may introduce a hexagonal centerpiece and straight-arched ends. The borders are full of fine detail, often featuring paired arabesques known in the trade as "turtles." The entire design is elaborated to the point of fussiness.

The finely woven Senna kilims are slit tapestries of the highest quality. Their small-scale borders are carried around the ends, as they are typically in pile carpets but rarely in such weavings. Senna seems to have been a favourite place of manufacture for saddle cloths, those in pile usually provided with a two-slope arch. Although the town of Senna has given its name to the Persian knot, it is the Turkish, or Ghiordes, knot, that is actually used there.

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Sennacherib, Akkadian SIN-AKHKHEERIBA (d. January 681 BC, Nineveh [now in Iraq]), king of Assyria (705/704–681 BC), son of Sargon II. He made Nineveh his capital, building a new palace, extending and beautifying the city, and erecting inner and outer city walls that still stand. Sennacherib figures prominently in the Old Testament.

Early career and the Babylonian campaigns. Sennacherib was the son and successor of Sargon II, from whom he inherited an empire that extended from Babylonia to southern Palestine and into Asia Minor. Before his accession he served, with ability demonstrated by his extant reports, as a senior administrator and diplomat in the north and northwest of the empire. The main problem of his reign was in Babylonia, where the growth of the power of the Chaldean and Aramaean tribes seriously disturbed the old urban centres, whose

interests in commerce and need for safe trade routes made them usually pro-Assyrian. Political instability was worsened by the interference of Elam (southwestern Iran), so that between 703 and 689 Sennacherib had to undertake six campaigns in that area; his attitude toward the capital city, Babylon, changed from acceptance of native rule to hostility.

The peace was broken in 703 by a tribal insurrection under the Chaldean Merodach-Baladan (Marduk-apaliddina), with Elamite military assistance. By skillful generalship Sennacherib recovered northern Babylonia and appointed a native Babylonian, Bel-ibni, as subking. His army devastated the tribal areas in southern Babylonia, though he spared major Babylonian cities, except for a few that had gone over to the tribesmen. Elamite interference in Babylonia probably dictated a campaign in 702 against the petty kingdoms of the Zagros Mountains, vassals of Elam, to forestall a possible Elamite thrust by that route toward eastern Assyria.

In 701 a rebellion, backed by Egypt, though probably instigated by Merodach-Baladan (II Kings 20:12–18; Isaiah 39:1–7), broke out in Palestine. Sennacherib reacted firmly, supporting loyal vassals and taking the rebel cities, except for Jerusalem, which, though besieged, was spared on payment of a heavy indemnity (II Kings 18:13–19:36; Isa. 36:1–37:37). The biblical narrative has been interpreted as implying two campaigns against Jerusalem, but this receives no support from Assyrian sources.

Further intrigues by Merodach-Baladan necessitated another Assyrian campaign into the Chaldean area in 700. Merodach-Baladan thereupon took refuge in Elam, where he soon died. Sennacherib's hardening attitude toward Babylon was marked by the introduction of direct Assyrian rule through the replacement of Bel-ibni by Sennacherib's son Ashur-nadin-shum. This gave Babylonia a brief period of stability, during which Sennacherib undertook campaigns in Cilicia and the north. But continuing Elamite support for disaffected Chaldean tribesmen led in 694 to a further attack on southern Babylonia, coupled with a seaborne invasion of Elam across the Persian Gulf. Elam reacted by raiding northern Babylonia, capturing Ashur-nadin-shum, and installing a nominee who reigned for 18 months until removed during a fresh Assyrian attack.

Another Chaldean leader, Mushezib-Marduk, now seized Babylon and, by opening the temple treasuries, bought massive military support from Elam. In 691 the Assyrian and Elamite armies met at Halule on the Diyālā, where Sennacherib, though claiming a victory, suffered losses that left him temporarily impotent. In 689 he returned to besiege Babylon, capturing it after nine months. Abandoning attempts to conciliate this great cult centre, Sennacherib systematically sacked Babylon; a text exists that probably represents a theological justification for this impiety.



Sennacherib leading a military campaign, detail of a relief from Nineveh, *c.* 690 BC; in the British Museum

Reproduced by courtesy of the trustees of the British Museum

Building and technological achievements. Sennacherib's most enduring work was the rebuilding of Nineveh, his official residence as crown prince. On his accession he made it his capital, building a splendid new palace, Shanina-la-ishu (Nonesuch). Using prisoners of war for labour, he extended and beautified the city, laying out streets, restoring and extending public buildings, and erecting a great inner wall, nearly 8 miles (13 kilometres) long, which encircled the city, and an outer wall; both walls still stand.

Around his capital he established plantations of fruit trees and parks of exotic trees and plants; among his introductions was the cotton plant, described as "the wool-bearing tree." To irrigate the plantations, for which at times the Tigris and Khosr rivers fell too low, Sennacherib sought springs and streams in the hills north of Nineveh and led them by 6 miles (10 kilometres) of canal and a massive stone aqueduct to feed the Khosr. He also undertook building activities in other cities, particularly Ashur.

Sennacherib claimed to be "of clever understanding," a boast supported by his initiatives in technology. He had surveys undertaken for new sources of alabaster and building stone, and he discovered new stands of giant timber in mountain forests. He devised a new and less laborious method of bronze casting and introduced more convenient equipment for raising water from wells. He showed considerable logistic ability in his seaborne attack on Elam, in which ships built in Nineveh were taken by Phoenician sailors down the Tigris, overland to a canal of the Euphrates, and thence to the Persian Gulf.

Sennacherib died in January 681 by parricide, probably at Nineveh. He was survived by his principal wife Naqia, mother of his heir Esarhaddon, whose non-Assyrian name suggests that she was of either Jewish or Aramaean origin.

Because of his attack on Jerusalem, Sennacherib receives prominence in the Bible. Isaiah regarded Sennacherib as God's instrument (II Kings 19:23–28; Isa. 37:24–29); the prophet did not condemn the King's military activities as such, though punishment was decreed for his arrogance in not acknowledging the divine source of his power.

In *The Story of Ahikar* (a pre-Christian Oriental work), Sennacherib is seen as a king of apparently good repute, under whom the sage Ahikar served; where this same story is alluded to in the book of *Tobit,* however, the King is cast in an evil role. A similar ambivalence is shown in Jewish Talmudic tradition, where Sennacherib, though called an evil man, is also regarded as the ancestor of the teachers of the celebrated Rabbi Hillel.

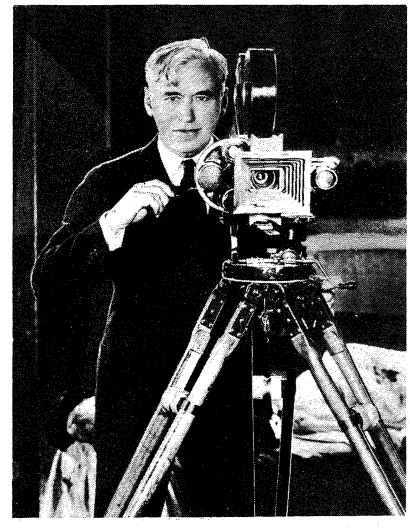
Classical tradition retained a memory of Sennacherib's activities not only in Babylonia but also in Cilicia, where the building of Tarsus, on the plan of Babylon, was attributed to him. He was also credited with building a temple at Athens. Herodotus' story of an attempted invasion of Egypt frustrated by mice eating the Assyrian bowstrings and quivers may reflect a plague epidemic during Sennacherib's Palestinian campaign; this possibly underlay the story (in II Kings 19:35; Isa. 37:36) of the decimation of the Assyrian army by God's destroying angel, which inspired Lord Byron's poem "The Destruction of Sennacherib."

(H.W.F.S.)

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Senneterre, town, Nord-Ouest (Northwest) region, southwestern Quebec province, Canada, on the Bell River south of Parent Lake. Founded as a trading post in 1914, it was called Nottaway, after the river of which the Bell is a tributary, and then renamed after an army officer in 1818. The town, 30 mi (48 km) northeast of Val-d'Or, is a junction on the transcontinental railway and a terminus of several provincial highways. It serves as an outfitting post on the edge of a vast wilderness for hunters, fishermen, forest workers, and Indians. Economic activities include a rail repair yard, sawmills, and a Hudson's Bay Company store. Pop. (1981) 4,339.

Sennett, Mack, original name MICHAEL SINNOTT (b. Jan. 17, 1880, Richmond, Que., Can.—d. Nov. 5, 1960, Hollywood), creator



Sennett

By courtesy of the Museum of Modern Art Film Stills Archive, New York

of the Keystone Kops and the father of American slapstick comedy in motion pictures. A master of comic timing and effective editing, Sennett was a dominant figure in the silent era of Hollywood film production and was the first director of comedies to develop a distinctive style.

He performed in the circus, burlesque, vaudeville, and the legitimate theatre before joining Biograph studios in 1909 as an actor. He soon became a scriptwriter and director, learning movie technique from D.W. Griffith, a director who pioneered in the development of cinematic art. Three years later he left to form his own independent Keystone Company in Los Angeles.

In 1914 Sennett's company produced the first American feature-length comedy, *Tillie's Punctured Romance,* but he is most famous for more than 1,000 one- and two-reel comedy shorts. At first he both directed and acted in his short comedies, many of which were improvised on the spot to take advantage of parades, fires, and similar events too costly to stage. His name is generally associated with the bathing beauties who adorned his come-

dies and with the antics of the Keystone Kops, a group of uniquely talented actors who became internationally popular comedians. The vintage Sennett films, however, such as *His Bitter Pill* (1916), *A Small Town Idol* (1921), and *The Shriek of Araby* (1923) were often biting parodies or incisive satires that mocked the foibles of an increasingly mechanized society. His films were characterized by trick camera work and high-speed and slow-motion photography reminiscent of the French "chase" comedies popular in the United States after 1907. Sennett trained a coterie of clowns and comediennes that made the Keystone trademark world famous: Mabel Normand, Marie Dressler, Gloria Swanson, Roscoe ("Fatty") Arbuckle, Harry Langdon, Ben Turpin, Charlie Chaplin, Harold Lloyd, and W.C. Fields among them. Such important directors as Frank Capra, Malcolm St. Clair, and George Stevens also received experience under Sennett's tutelage.

The coming of sound, the advent of double features, and the popularity of animated cartoons, combined with the Wall Street crash of 1929 that wiped out his large personal fortune, severely crippled Sennett's style, and he retired in 1935. In 1937 the Academy of Motion Picture Arts and Sciences voted him a special award "for his lasting contribution to the comedy technique of the screen."

Sennusiya (Muslim brotherhood): *see* Sanūsīyah.

Šenoa, August (b. Nov. 14, 1838, Zagreb, Croatia, Austrian Empire—d. Dec. 13, 1881, Zagreb), Croatian novelist, critic, editor, poet, and dramatist who urged the modernization and improvement of Croatian literature and led its transition from Romanticism to Realism.

Introducing the historical novel to Croatian literature, Šenoa contributed to the growing sense of national identity among the Croatian people. He also wrote on contemporary social themes, claiming that literature should educate the public. He edited (after 1869) and contributed to the critical journal *Vijenac* ("The Wreath"), publishing many short stories, poems, and essays. His novels include *Seljačka buna* (1877; "Peasants' Revolt") and *Diogenes* (1878).

Senoi, Veddoid people found in the Malay Peninsula and in small groups along the coastal plains of Siak in Sumatra, Indonesia. In the late 1970s they were estimated to number about 34,000. Traces of such a people also appear in the eastern islands of Indonesia. They are sometimes known as Sakai, a derogatory term applied by the Malays.

In the peninsula they speak a language apparently related to or influenced by Mon-Khmer, but in Sumatra they have adopted the language and matrilineal institutions of the Menangkabau. There are indications that the Senoi entered the area with a well-developed dry-land agriculture and that they lived in communal houses and had some degree of political development. Despite their cultivation of manioc and rice, they are also active in hunting, fishing, and food gathering. In the hunt they employ the blowgun and poison darts, like the neighbouring Malay and Semang of the peninsula. Although skilled in basketry, they do not weave or do metalwork.

Senoic languages, also called SAKAI, member of the Malacca subgroup of the Austro-Asiatic language family. Senoic languages are subclassified into Central, called Semai; Eastern, or Jah Hut; and Northern, called Temiar. The Southern Senoic languages have a number of dialects and are sometimes treated as a separate group of languages called Semelaic.

Senoic languages are spoken in Malaysia by approximately 32,000 people. The languages are found primarily inland but extend to the coast south of Kuala Lumpur.

Senones, either of two ancient Celtic tribes, or perhaps two divisions of the same people, one living in Gaul, the other in Italy. The Gallic Senones lived in the area which includes the modern French *départements* of Seine-et-Marne, Loiret, and Yonne. They fought against Julius Caesar in 53–51 BC; in later times these Senones were included in Gallia Lugdunensis. Their chief town was Agedicum (later Senonus, whence Sens).

The other group of Senones crossed the Alps into Italy, perhaps *c.* 400 BC, and settled on the east coast between Ariminum (Rimini) and Ancona, driving out the Umbrians there. In 391 they invaded Etruria and besieged Clusium. Roman intervention, in reply to an appeal from Clusium, led to the Gauls' capture of Rome in 390. Livy and Diodorus Siculus, but not Polybius, record that the Senones led the Gauls that captured Rome. For the next century the Senones were engaged in hostilities with Rome, but they were finally defeated and expelled by Publius Cornelius Dolabella in 283. Their territory was used either for colonies or for land allotments to individual Roman citizens.

Senoufo (people): *see* Senufo.

Sens, town, Yonne *département,* Bourgogne region, north central France, southeast of Paris. The Old Town, situated on the right bank of the Yonne River, is surrounded by shady boulevards and promenades built on the site of the old Roman walls. The railway station and industrial zone are located on the left bank.

Before becoming a major Roman settlement, the town was the capital of the powerful Senones Gallic tribe, from which the name Sens is derived. In medieval times it was an ecclesiastical centre with five abbeys. The council at which St. Bernard of Clairvaux condemned the doctrines of the philosopher and teacher Peter Abelard for the second time was held there in 1140. The 12th-century English martyr Thomas Becket resided (1166–70) at the Monastery of St. Colombe (largely rebuilt), located 1.2 mi (2 km) north of the city. The French king Louis IX was married in the cathedral in 1234. The ecclesiastical province of Sens was dismembered in 1627 when Paris became an archbishopric, but the archiepiscopal see was reestablished in 1821.

The town's chief monument is the cathedral of Saint-Étienne (mid-12th to early 16th century), which was one of the earliest important Gothic churches. Its 12th-century architect, the master mason William of Sens, based the design of the choir of Canterbury cathedral in England on that of Saint-Étienne. The asymmetrical facade has three portals with fine 12th- to 14th-century sculptures, but only the south tower was ever completed; it was reconstructed during the 14th–16th century. The cathedral has magnificent 12th- to 17th-century stained-glass windows, and its treasury contains a rich collection of ancient fabrics and vestments, including those of Thomas Becket. The 13th-century Officiality (restored by E.-E. Viollet-le-Duc in the 19th century), which now houses a museum containing important examples of Gallo-Roman sculpture, and the largely 16th-century Archbishop's Palace adjoin the cathedral.

The navigable Yonne River links Sens to the French inland waterways system. Main industries of Sens include metal and electrical works, and plants manufacturing pharmaceutical and dairy products. Pop. (1982) 25,793.

sensation, in neurology and psychology, any concrete, conscious experience resulting from stimulation of a specific sense organ, sensory nerve, or sensory area in the brain. The word is used in a more general sense to indicate the whole class of such experiences. In ordinary speech the word is apt to be ambiguous; it is frequently used in such a way as to leave uncertain whether the speaker is referring to the process of sensing or to whatever it is that is being sensed (*e.g.,* the apparent painful stimulus, sound of a bell, or red glow of a fire). This double meaning has produced confusion about whether or not sensations are purely mental (as opposed to physical). Though the process of sensing is thought by some to be purely mental, some psychologists and philosophers hold that what is sensed is normally a physical quality existing independently of mind: *e.g.,* the grass is literally green whether or not any person is present to perceive it. To avoid this ambiguity, Bertrand Russell, in England, introduced the term sense-datum to signify what is sensed or "given in sensation"; the word sensation is then reserved for a so-called mental process or activity.

More empirically inclined psychologists and physiologists prefer to regard sensation as a concept (not a datum) defined in terms of dependent relationships between discriminatory responses of organisms and properties of physical stimuli. Characteristics of sensory functions may be ascertained by training a laboratory animal or asking a human being to respond differentially to various aspects of the stimulus. In this approach sensation is seen much as sensing is regarded in modern automated devices. Sensing elements (sensors) in automated systems indicate characteristics (presence, absence, intensity, or degree) of some form of energy impinging on them. These sensors are called transducers; they convert their input energy into electrical currents that can be used as signals. The definition of sensation in terms of discriminative responses in living organisms is analogous. When a stimulus impinges on a sense organ and the organism responds appropriately, it is said that the stimulus has been sensed. Nonetheless, a mentalistic definition of sensation is seen by many as basic to the psychology of sensation. *See also* psychophysics.

sensationalism, in epistemology and psychology, the doctrine that relies entirely or mostly on the functioning of the senses to explain knowledge. The doctrine is a consequence of the notion of the mind as a tabula rasa, or "clean slate." In ancient Greek philosophy, the Cyrenaics, proponents of a pleasure ethic, subscribed unreservedly to a sensationalist doctrine. The medieval Scholastics' maxim that "there is nothing in the mind but what was previously in the senses" must be understood with Aristotelian reservations that sense data are converted into concepts. The Empiricism of the 17th century, however—exemplified by Pierre Gassendi, a French neo-Epicurean, and by the Englishmen Thomas Hobbes and John Locke—put a greater emphasis on the role of the senses, in reaction against the followers of René Descartes who stressed the mind's faculty of reasoning. Locke's influence on 18th-century French philosophy produced the extreme *sensationnisme* (or, less often, *sensualisme*) of Étienne Bonnot de Condillac, who contended that "all our faculties come from the senses or . . . more precisely, from sensations"; that "our sensations are not the very qualities of objects [but] only modifications of our soul"; and that attention is only the sensation's occupancy of the mind, memory the retention of sensation, and comparison a twofold attention.

sense, also called SENSORY RECEPTION, or SENSE PERCEPTION, the mechanism or faculty by which an organism is able to react to changes in its external or internal environment, in particular through the activation of specific parts, which transform the energy change involved into vital processes. In all higher animals this involves transduction—conversion of internal or external stimuli into

nerve impulses that travel to specialized areas of the brain, where they are analyzed. The higher organism is thus enabled to react appropriately.

A brief treatment of sense follows. For full treatment, *see* MACROPAEDIA: Sensory Reception.

The five senses ordinarily enumerated for animals include sight, hearing, smell, taste, and touch. Other senses include the kinesthetic (motion) sense, the senses of heat, cold, pressure, pain, and equilibrium, or balance.

Classification. The most efficient and frequently used means of classifying sensory systems is by type of stimulus. Each sense cell is responsive to one sort of energy change and can cause only one sensation, though the intensity of sensation depends on the nerve's threshold. Humans are known to have sensory nerves that fall into the following categories: photoreceptors (for light), mechanoreceptors (for touch, sound, and equilibrium), chemoreceptors (for smell and taste), thermoreceptors (for heat), and nociceptors (for pain). Other organisms are able to detect different forms of stimuli. For a treatment of sensory reception in living organisms other than man, *see* in the MICROPAEDIA: chemoreception; mechanoreception; photoreception; sound reception; thermoreception. For treatment of specific sensory systems, *see* ear; eye.

The transduction processes for all human senses have four general similarities: all sense organs contain receptor cells that are especially sensitive to one type of stimuli; the sense cells are often located at a membrane in the body that receives a given stimulus (*e.g.,* light receptors are near the retina of the eye); primary sense cells are often connected to secondary, ingoing (afferent) nerve cells that carry impulses along threadlike axons, which carry nerve impulses; and afferent nerves (those leading to the brain) usually connect with pathways that lead to deeper, specialized parts in the brain and eventually to the cerebral cortex.

Cutaneous (skin) senses. The cutaneous senses include sensitivity to temperature, pressure, and pain; different areas of the skin are particularly sensitive to certain modalities. The nerve endings found in skin may be either Ruffini endings, encapsulated endings, Meissner's corpuscles, Krause end bulbs, pacinian corpuscles, and free nerve endings, all of which can respond to any one or a combination of cutaneous stimuli. Axons project from these nerve endings and form bundles (nerves) that lead to the spinal cord. The axons range from 10 to 15 microns in diameter to small fibres only tenths of a micron wide; the larger ones are usually myelinated (sheathed). The impulse conduction speed tends to increase with axon size, but there is no relationship between axon size and the type of stimulus to which it responds.

Kinesthetic (motion) sense. Kinesthesis is the awareness of the position of one's limbs and the ability to perceive their active or passive movement. The four varieties of sensory structures that regulate this sense—the neuromuscular spindle, the Golgi tendon organ, the joint receptors, and free nerve endings—are located in the muscles, tendons, and joints; they work in conjunction to transmit information on active muscle contraction, passive stretch of muscles, and actively or passively produced tension.

When the muscles are in a state of passive stretch, receptors are sending impulses along the afferent nerves. In active contraction, the neuromuscular spindles stop transmitting neural signals as tension is released, while tendon receptors still discharge signals. Most of the sensory impulses then travel from the spinal cord to the cerebellum. Important functions of this sensory system are the regulation of voluntary movement, involuntary, or reflex, responses, and maintenance of muscle tone.

Vestibular sense (equilibrium). The vestibular system receives sensory signals for rotation, orientation in the field of gravity, and acceleration in space. Rotation, or sense of balance, is regulated by the flow of the fluid endolymph within the semicircular canals of the inner ear. The sets of canals in the two ears work in reciprocal fashion to produce equilibrium. Response to static pressure (gravitational forces) is regulated by the utricle and saccule of the vestibule of the ear.

Gustatory (taste) sense. In humans the structures for taste are taste buds, which consist of cuplike structures, or papillae. The papillae are distributed throughout all areas of the tongue, and in adjacent structures of the palate and throat. Each taste bud contains 50 to 75 receptor cells that are always in different stages of a 7–10-day regenerative cycle. Receptors on the tongue are more sensitive to sweet and salty stimuli, while those on the palate and throat respond more readily to sour and bitter ones.

The receptors inside the taste buds connect with either the lingual, glossopharyngeal, or vagus nerve, all of which transmit touch, temperature, and pain as well as taste stimuli. The nerves come together in the medulla oblongata, from which gustatory fibres ascend to the thalamus and eventually the taste reception area in the cerebral cortex.

Olfactory (smell) sense. In mammals olfactory receptors are found high in the nasal cavity. The end of each receptor narrows to a fine nerve fibre, and all the nerve fibres lead to the olfactory bulb of the brain. The olfactory bulb ends in a number of glomeruli, each of which directs stimuli from receptors to specialized olfactory areas at the base of the brain.

sensitive plant, either of two plants, in the pea family (Fabaceae), that respond to touch and other stimulation by closing up their leaves and drooping. The more common plant is *Mimosa pudica,* also called humble plant. A spiny, shrubby plant growing to a height of about 30 cm (1 ft), it has fernlike leaves and small, globular, mauve flower puffs. A widespread weed in tropical regions, it is naturalized elsewhere in warm areas and is grown as a curiosity in greenhouses. The plant's unusually quick response to touch is due to rapid water release from specialized cells located at the bases of leaflet and leaf stalks.

Wild sensitive plant (*Cassia nictitans*), up to 50 cm, also exhibits sensitivity to touch but to a lesser degree. It is native to the eastern U.S. and the West Indies.

Consult the INDEX *first*

sensitivity training, psychological technique in which intensive group discussion and interaction are used to increase individual awareness of self and others; it is practiced in a variety of forms under such names as T-group, encounter group, human relations, and group-dynamics training. The group is usually small and unstructured and chooses its own goals. A trained leader is generally present to help maintain a psychologically safe atmosphere in which participants feel free to express themselves and experiment with new ways of dealing with others. The leader remains as much as possible outside the discussion. Issues are raised by the group members, and their interactions evoke a wide variety of feelings. The leader encourages participants to examine verbally their own and others' reactions. It is believed that as mutual trust is developed, interpersonal communication increases, and eventually attitudes will change and be carried over into relations outside the group. Often, however, these changes do not endure. Sensitivity training seems to be most effective if sessions are concentrated and uninterrupted, as in several days of continuous meetings.

Sensitivity-training methods derived in large part from those of group psychotherapy. They have been applied to a wide range of social problems (as in business and industry) in an effort to enhance trust and communication among individuals and groups throughout an organization.

sensorimotor skill, also called PERCEPTUAL-MOTOR SKILL, or PSYCHOMOTOR SKILL, any acquired ability to perform tasks in response to sensory stimuli.

A brief treatment of sensorimotor skills follows. For full treatment, *see* MACROPAEDIA: Learning and Cognition, Human.

Certain motor acts occur automatically, such as blinking the eyes or retracting a finger from a hot surface. Many human motor skills, however, require practice. Such seemingly elementary skills as walking, eating, and dressing must be mastered through practice by every child.

To acquire and perform such complex skills, a person must closely monitor sensory stimulation. One may need to use visual cues to judge the velocity and trajectory of an approaching object, or monitor the pressure applied by one's own muscles. Hence, the term sensorimotor skills reflects the idea that sensory and motor information must be integrated to accomplish such acts.

Research suggests that motor abilities are actually an amalgam of basic components. Manual dexterity appears to be composed of subskills such as aiming ability, arm-wrist speed, and fine finger dexterity. Strength is separable into parts, including static strength, which is pounds of pressure exerted against an immovable object, and dynamic strength, the force exerted by limb movements.

Acquiring a motor skill is thought to involve three distinct stages. In the first, called the cognitive stage, the person must comprehend the task requirements. Studies demonstrate that those individuals who were pretrained with a verbal or illustrative description of the task were more likely to master the skill. During the second, or intermediate stage, the individual must apply already acquired motor skills to the new task, master the motor skills unique to that task, and integrate the two to avoid inappropriate and unnecessary movements. In the final stage the skill becomes automatized, freeing the performer from thinking about each step of the process, and minimizing dependence on external cues. Fluid execution of motor skills on the part of accomplished performers has led researchers to think that sensorimotor skills are enacted via a motor program, a blueprint for the entire motor act, not just the sequencing of elements. This is well illustrated by the phenomenon of coarticulation. Speech production of the letter *b* in bat is different from the production of the *b* in beat. For such a distinction to occur, the brain must be aware that one *b* is followed by an *a* and that the other is followed by an *ea,* suggesting a preconceived plan for the whole utterance.

As motor skills are attained, changes in attention to sensory cues and changes in reliance on feedback take place. While beginners rely mostly on external cues, someone who has mastered a skill will rely more on internal sources of feedback, such as those provided by muscles.

The kind of formal instruction that aids most in perfecting motor skills varies for the early and later stages of acquisition. During the initial stages, the most essential factors for learning are perceptual awareness, an under-

standing of spatial relations, and comprehension of mechanical principles. Later, motor abilities such as speed of reaction, speed of movement, and coordination become critical.

Retention of motor skills appears to be most dependent upon the degree to which the skill was perfected, rather than upon other variables such as the conditions under which it was learned. If a skill has been overlearned, exceeding a particular criterion, retention will be better than if such levels had not been reached initially.

Sensuntepeque, capital of Cabañas department, north central El Salvador. Sensuntepeque is located in hills south of the Río Lempa Valley at an elevation of 3,000 ft (900 m). In colonial times a major producer of indigo, the city has become an agricultural centre for grain, henequen (a fibre for twine), sugarcane, and coffee production in the surrounding area. Industrial activities include pottery making and liquor distilling. Pop. (1983 est.) 10,565.

sentence, in law, formal judgment of a convicted defendant in a criminal case setting the punishment to be meted out. In civil cases the terms decision, award, and judgment are used.

Various types of sentences can be given. In cumulative sentences a defendant convicted on several counts receives a separate sentence for each count; such sentences may run concurrently or consecutively. A sentence may also be for an unspecified period, with the intention of allowing the prisoner to be released on good behaviour at an earlier time than would be possible under a specific sentence. A sentence may also stipulate the conditions under which the prisoner is to be released when he has served his time; for example, he may be released on probation or be discharged absolutely or conditionally.

sentential calculus (logic): *see* propositional calculus.

sentimental comedy, a dramatic genre of the 18th century, denoting plays in which middle-class protagonists triumphantly overcome a series of moral trials. Such comedy aimed at producing tears rather than laughter. Sentimental comedies reflected contemporary philosophical conceptions of humans as inherently good but capable of being led astray through bad example. By an appeal to his noble sentiments, a man could be reformed and set back on the path of virtue. Although the plays contained characters whose natures seemed overly virtuous, and whose trials were too easily resolved, they were nonetheless accepted by audiences as truthful representations of the human predicament. Sentimental comedy had its roots in early 18th century tragedy, which had a vein of morality similar to that of sentimental comedy but had loftier characters and subject matter than sentimental comedy.

Writers of sentimental comedy included Colley Cibber and George Farquhar, with their respective plays *Love's Last Shift* (1696) and *The Constant Couple* (1699). The best known sentimental comedy is Sir Richard Steele's *The Conscious Lovers* (1722), which deals with the trials and tribulations of its penniless heroine Indiana. The discovery that she is an heiress affords the necessary happy resolution. Steele, in describing the affect he wished the play to have, said he would like to arouse "a pleasure too exquisite for laughter." Sentimental comedies continued to coexist with such conventional comedies as Oliver Goldsmith's *She Stoops to Conquer* (1773) and Richard Brinsley Sheridan's *The Rivals* (1775) until the sentimental genre waned in the early 19th century.

In France *comédie larmoyante* (*q.v.*), similar to sentimental comedy, was written principally by Pierre-Claude Nivelle de La Chaussée, whose *Le Préjugé à la mode* (1735; "Fashionable Prejudice") is a good example of the genre.

sentimental novel, broadly, any novel that exploits the reader's capacity for tenderness, compassion, or sympathy to a disproportionate degree by presenting a beclouded or unrealistic view of its subject. In a restricted sense the term refers to a widespread European novelistic development of the 18th century, which arose partly in reaction to the austerity and rationalism of the Neoclassical period. The sentimental novel exalted feeling above reason and raised the analysis of emotion to a fine art. An early example in France is Antoine-François Prévost's *Manon Lescaut* (1731), the story of a courtesan for whom a young seminary student of noble birth forsakes his career, family, and religion and ends as a card shark and confidence man. His downward progress, if not actually excused, is portrayed as a sacrifice to love.

The assumptions underlying the sentimental novel were Rousseau's doctrine of the natural goodness of man and his belief that moral development was fostered by experiencing powerful sympathies. In England, Samuel Richardson's sentimental novel *Pamela* (1740) was recommended by clergymen as a means of educating the heart. In the 1760s the sentimental novel developed into the "novel of sensibility," which presented characters possessing a pronounced susceptibility to delicate sensation. Such characters were not only deeply moved by sympathy for their fellow man but also reacted emotionally to the beauty inherent in natural settings and works of art and music. The prototype was Laurence Sterne's *Tristram Shandy* (1759–67), which devotes several pages to describing Uncle Toby's horror of killing a fly. The literature of Romanticism adopted many elements of the novel of sensibility, including responsiveness to nature and belief in the wisdom of the heart and in the power of sympathy. It did not, however, assimilate the novel of sensibility's characteristic optimism.

Sentleger, Sir Anthony: *see* Saint Leger, Sir Anthony.

Senufo, also spelled SENOUFO, a group of closely related peoples of the northern Ivory Coast and southeastern Mali. They speak at least four distinct languages (Palaka, Dyimini, and Senari in Côte d'Ivoire [Ivory Coast]; Suppire in Mali), which belong to the Gur branch of the Niger-Congo language family. Within each group, numerous subdivisions use their own names for the people and language; the name Senufo is of external origin. Palaka separated from the main Senufo stock well before the 14th century AD; at about that time, with the founding of the town of Kong as a Bambara trade-route station, the rest of the tribe began migrations to the south, west, and north, resulting in the present divisions.

Senufo peoples are agricultural, their major crops including corn (maize) and millet. Their farms cluster around villages of small mud-brick houses, thatched in the south but with flat roofs in the drier north. The domestic unit is the extended family: a patriarch, with his sons and their wives and children. Marriage is by parental arrangement; polygyny is fairly common. Inheritance and succession are matrilineal. Initiation rites for adolescents are the introduction to adult tribal responsibilities.

The Senufo are outstanding musicians, using marimbas, tuned iron gongs, and a variety of drums, horns, and flutes. They are also internationally famous carvers of wood sculpture (mainly masks and figures).

Senusret, also spelled SENUSRIT: *see under* Sesostris.

Seoni, town, administrative headquarters of Seoni district, Madhya Pradesh state, central India. A road and rail junction, it is the chief commercial centre of the Sātpura Plateau. Cloth weaving, sawmilling, oil milling, and the manufacture of shellac and lac bangles are among its important industries. Founded in 1774, Seoni has a hospital and two colleges affiliated with the University of Saugar.

Seoni district (3,379 sq mi [8,752 sq km]) occupies a narrow section of the Sātpura Range, bounded by the Narmada Valley (north) and the Nāgpur plain (south). The Wainganga River and its tributaries drain the area. Grains, cotton, and oilseeds are the chief crops in the district. A large portion of the district is forested, yielding teak, bamboo, lac, and myrobalans. Pop. (1981) town, 54,017; district, 809,713.

Seoul, Korean SŎUL, formally SŎUL-T'ŬKPYŎLSI (Special City of Seoul), city and capital of the Republic of Korea (South Korea). Its location, in the northwestern part of the country on the Han-gang (Han River), which flows northwestward into the Yellow Sea 37 mi (60 km) downstream, was favourable for a capital city because it was near the centre of a previously undivided Korea and on a navigable river. Seoul was the capital of Korea from 1394 and was later the centre of Japanese rule in the country. The 20th-century demilitarized zone, which divides North and South Korea, runs partially through the mouth of the Han, diminishing Seoul's role as a river port.

A brief treatment of Seoul follows. For full treatment, *see* MACROPAEDIA: Seoul.

Central Seoul lies within the lowland of a topographic basin encircled by low hills ranging up to 1,000 ft (300 m) high. The basin is drained by a small tributary of the Han. The central city is located in the lower part of the basin. The climate of Seoul is characterized by large variations in temperature, from a mean in January of 26° F (−3° C) to an August mean of 78° F (25° C). Precipitation averages 54 in. (1,370 mm), with summer being the wettest season.

Manufacturing, commerce, and service industries account for most of Seoul's economic activity. Within the manufacturing sector the production of textiles, machinery, and chemicals is most prominent; other important industries are food processing, printing, and publishing. Most manufacturing operations are small scale. Two large shopping areas, located near the south and east gates of the old city, attract shoppers from all parts of the country.

Rectangular street patterns predominate in the city centre, but toward the foothills surrounding the city the streets accommodate the irregular terrain. The capitol and other government offices are located along Sejong-no. The areas of Chong-no, Myong-dong, and Ŭlchi-ro contain the central business district. Urban expansion has included the construction of new streets, the establishment of satellite cities, the scattering of industry throughout the city, and the renewal of the old section.

The city is a centre of higher education, and its major institutions include Seoul National, Yonsei, Korea, and Ewha Woman's universities. It is the home of the Korean National Symphony Orchestra, the Seoul Symphony Orchestra, and the National Classical Music Institute, which is engaged in the preservation of the traditional court music of Korea. Other cultural institutions include a national theatre, national and private museums, and public libraries.

Subways, automobiles, buses, taxis, and railroads are the principal means of transportation in the increasingly congested city; motor vehicles contribute significantly to air pollution. Railway lines connect Seoul with most major provincial cities and seaports. Kimp'o, the only international airport in Korea, is located

in the western part of Seoul and is the centre of the national airline network. Metropolitan area, 234 sq mi (605 sq km). Pop. (1984 est.) 9,501,400.

Sęp Szarzyński, Mikołaj (b. *c.* 1550, Zimna Woda, near Lwów, Kingdom of Poland—d. 1581, Wolica, near Przemyśl), Polish poet and metaphysician.

A member of a noble Protestant family, Sęp Szarzyński studied in Wittenberg and Leipzig, moving later to the University of Padua. He returned to Poland in 1567 as a fervent Catholic and a member of the Dominican order. He died young but left a collection of patriotic odes, sonnets, and psalms, which were published by his brother and entitled *Rytmy abo wiersze polskie* (1601; "Rhythms or Polish Verses"). Though indebted to Jan Kochanowski (1530–84), Sęp devised a language of metaphysics not present in his master's work.

separation, in law, mutual agreement by a husband and a wife to discontinue living together. A legal separation does not dissolve the marriage contract but merely adjusts the couple's obligations under it in light of their desire to live separately. Practically, however, separation is often a prelude to divorce. Such agreements usually contain provisions on the care and support of children.

If a lawsuit occurs over the meaning of the agreement, the courts have traditionally favoured the wife, on the theory that her dependency demands that she be protected.

The parties need not go to court to terminate a separation agreement. They can do so at any time by mutual assent, and the law presumes that they have done so if they resume living together.

The filing of a divorce suit or even the granting of a divorce does not terminate a separation agreement, which is an independent contract. A claim for alimony, however, is usually interpreted as an assent to repudiation of the old agreement.

One spouse can acquire from the court the equivalent of a separation if the other has deserted or is behaving cruelly or viciously. This is called a decree of separate maintenance. It fixes the obligations of the deserting spouse toward the other. The procedures for obtaining separate maintenance and setting its terms are essentially the same as those involved in alimony. The grounds required for separate maintenance must usually be serious, especially if there are children involved. Under some jurisdictions, they must be such as would render the normal performance of marital duties impossible. Under other jurisdictions, they must be such as would justify divorce.

A spouse's right to separate maintenance ends with the dissolution of the marriage relation or with the other spouse's death. The same effect obtains if the couple resumes living together or if the spouse being maintained acquires unexpected wealth. Misconduct of the spouse being maintained also ends the other's obligation.

separation of ——— : *see under* substantive word (*e.g.,* powers, separation of; variables, separation of).

Separatist (religious group): *see* Independent.

Sephar (ancient Arabia): *see* Ẓafār.

Sephardi, also spelled SEFARDI (from Hebrew *Sefarad,* Spain), plural SEPHARDIM, or SEFARDIM, a member of the Jews, or their descendants, who lived in Spain and Portugal from the Middle Ages until their persecution and mass expulsion from those countries in the last decades of the 15th century. The Sephardim initially fled to North Africa and other parts of the Ottoman Empire, and many of these eventually settled in such countries as France, Holland, England, Italy, and the Balkans. Salonika (Thessaloníki) in Macedonia and the city of Amsterdam became major sites of Sephardic settlement. The transplanted Sephardim largely retained their native Judeo-Spanish language (Ladino), literature, and customs. They became noted for their cultural and intellectual achievements within the Mediterranean and northern European Jewish communities. The Sephardim differ notably from Ashkenazi (German-rite) Jews in preserving Babylonian rather than Palestinian Jewish ritual traditions. Of the estimated 700,000 Sephardic Jews in the world today (far fewer than the Ashkenazim), many now reside in the state of Israel. The chief rabbinate of Israel has both a Sephardic and an Ashkenazi chief rabbi.

Though the term Oriental Jews is perhaps more properly applied to Jews of North Africa and the Middle East who had no ties with either Spain or Germany and who speak Arabic, Persian, or a variant of ancient Aramaic, the designation Sephardim frequently signifies all North African Jews and others who, under the influence of the "Spanish Jews," have adopted the Sephardic rite.

Sephardic language: *see* Ladino language.

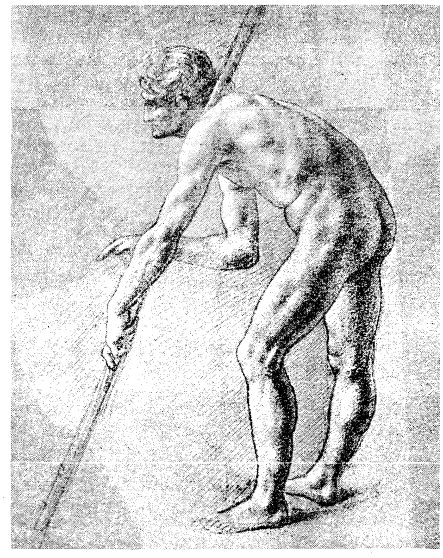
Sepher Ḥasidim (Jewish book): *see* Sefer Ḥasidim.

Sepher Torah (Judaism): *see* Sefer Torah.

Sepheriades, Yeoryios Stilianou: *see* Seferiades, Georgios S(tylianou).

sephira (Judaism): *see* sefira.

sepia, dyestuff, coloured brown with a trace of violet, that is obtained from a pigment protectively secreted by cuttlefish or squid. Sepia is obtained from the ink sacs of these invertebrates. The sacs are speedily extracted from the bodies and are dried to prevent putrefaction. The sacs are then dissolved in dilute alkali, and the resulting solution is filtered. The pigment thus obtained is precipitated with dilute hydrochloric acid and is then washed, filtered, and dried. The chemically inert pigment is fairly permanent and is used as a drawing ink and as an artist's watercolour, particularly in monochrome.



Study of a nude man, sepia drawing by Leonardo da Vinci; in the Biblioteca Ambrosiana, Milan

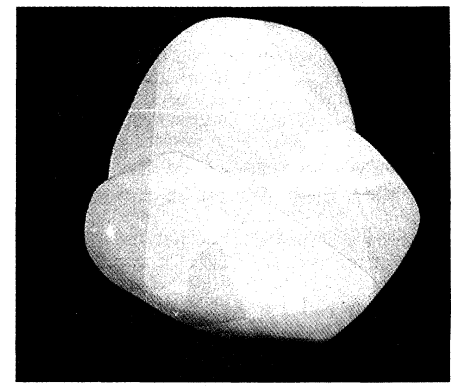
By courtesy of Biblioteca Ambrosiana, Milan

As a type of ink, sepia has been known at least since ancient Roman times. Only from Renaissance times onward, however, did sepia become popular as a drawing medium. In the late 18th and 19th centuries it was particularly popular and generally replaced bistre as a medium for making wash drawings. As a primary pigment, it has been superseded in the 20th century by industrially manufactured watercolours.

Sepik River, formerly KAISERIN AUGUSTA RIVER, one of the largest rivers on the island of New Guinea. It rises on the Victor Emanuel Range of the central highlands, near Telefomin in Papua New Guinea. The Sepik flows northwestward and then, turning east, follows the great Central Depression, receiving numerous tributaries draining from the Bewani and Torricelli mountains (north) and the Central Range (south) before entering the Bismarck Sea through a delta about 700 mi (1,100 km) from its source. It flows through East Sepik and West Sepik provinces. For most of its lower course the river meanders through a wilderness of sago and nipa palm swamp and lagoons with large floating islands of vegetation drifting in the channel. The amount of sediment carried down this channel is so great that the waters of the ocean are discoloured for 20 mi beyond the mouth, which is more than 1 mi wide. The river is navigable for more than 300 mi by vessels drawing 13 ft (4 m) of water or less.

There are no settlements of great size along the Sepik; Angoram is the largest, and the entire lower basin is sparsely populated. The isolation of the river's small tribal groups, including the Arapesh, Iatmul, and Mundugumor, from external influences has given rise to one of the most original and extensive artistic traditions in Oceania. Characterized by the term Sepik River style, the ornamentation of household and cult objects, weapons, musical instruments, houses (high-gabled with decorated house posts), and canoe prows is highly developed. Masks and sculpture are characterized by a "hooked," or "beaked," style, with an elongation of the nose, and there is also a tradition of modeling faces in clay on human skulls. These arts are most fully developed in the lower reaches of the river and in adjacent areas of the lower Ramu River.

sepiolite, also called MEERSCHAUM (German: "sea-foam"), a fibrous hydrated magnesium silicate that is opaque and white, grey, or cream in colour. It may resemble the bones of the cuttlefish *Sepia,* from which the name derives. In the Black Sea region, where the light, porous clay mineral is abundant, it is said to resemble sea-foam, hence the German name. For its chemical formula, structure, and physical properties, *see* clay mineral (table).



Sepiolite (meerschaum) from Turkey

B.M. Shaub

As in palygorskite, the structure of sepiolite contains extended silicon-oxygen sheets, so that the mineral belongs to the layer silicate family, but the tetrahedral SiO_4 groups forming these sheets are oriented so as to develop extended lathlike features that give rise to the fibrous character of the mineral.

Sepiolite's chief use is for tobacco pipes. The

most important commercial deposit is the plain of Eskişehir, Tur., where it is found as irregular nodules in alluvial deposits; it is an alteration product of serpentine. When first extracted, sepiolite is soft, but it hardens on drying. Sepiolite also occurs in France, Greece, Czechoslovakia, and the United States.

Sepoy Mutiny: *see* Indian Mutiny.

seppuku (Japanese: "self-disembowelment"), also called HARA-KIRI ("belly-cutting"), the honourable method of taking one's own life practiced by men of the samurai (military) class in feudal Japan. The word hara-kiri, though widely known to foreigners, is rarely used by Japanese, who prefer the term seppuku. The proper method was to plunge a short sword into the left side of the abdomen, draw the blade across to the right, and then turn it upward. It was considered exemplary form to stab again below the chest and press downward across the first cut, and then to pierce one's throat. Being an extremely painful and slow means of suicide, it was favoured as an effective way to demonstrate the courage, self-control, and strong resolve of the samurai and to prove sincerity of purpose.

There were two kinds of seppuku: voluntary and obligatory. Voluntary seppuku evolved during the wars of the 12th century as a method of suicide used frequently by warriors who, defeated in battle, chose to avoid the dishonour of falling into the hands of the enemy. Occasionally, a samurai performed seppuku to demonstrate loyalty to his lord by following him in death, to protest against some policy of a superior or of the government, or to atone for failure in his duties. There have been numerous instances of voluntary seppuku in modern Japan.

Obligatory seppuku refers to the method of capital punishment for samurai to spare them the disgrace of being beheaded by a common executioner. This practice was prevalent from the 15th century until 1873, when it was abolished. Great emphasis was placed on proper performance of the ceremony. The ritual was usually carried out in the presence of a witness (*kenshi*) sent by the authority issuing the death sentence. The prisoner was usually seated on two tatami mats, and behind him stood a second (*kaishakunin*), usually a relative or friend, with sword drawn. A small table bearing a short sword was placed in front of the prisoner. A moment after he stabbed himself, the second struck off his head. It was also common practice for the second to decapitate him at the moment that he reached out to grasp the short sword, his gesture symbolizing that the death was by seppuku.

Sept-Îles, English SEVEN ISLANDS, city, seat of Côte-Nord (North Shore) region, eastern Quebec province, Can. It lies on the north shore of the estuary of the St. Lawrence River and is situated on an almost circular bay at the entrance of which are six steep, rocky islands. (The seventh "island" is illusory, being part of the mainland.) Sept-Îles is an important shipping outlet for iron ore brought by rail from Schefferville (Knob Lake), Labrador, about 360 miles (580 km) to the north.

The name of the site was suggested by the French navigator Jacques Cartier on an early map of Canada, drawn about 1536. The settlement was founded in 1650 as a trading post and Jesuit mission, but not until 1744 was a chapel built. Captured by the British in 1759, the post was operated by the North West Company until 1821 and thereafter by the Hudson's Bay Company. The adjoining area became the township of Letellier in 1866.

The community grew rapidly after 1950 with increased iron-ore shipments, and in 1954 extensive ore docks were built and a hydroelectric project was completed to supply the area with power. It is linked by ferry with Sainte-Anne-des-Monts on the Gaspé Peninsula. Inc. town, 1951; city, 1959. Pop. (1981) 29,262.

September, ninth month of the Gregorian calendar. *See* month.

September Massacres, French MASSACRES DU SEPTEMBRE, or JOURNÉES DU SEPTEMBRE ("September Days"), mass killing of prisoners that took place in Paris from September 2 to 6 in 1792—a major event of what is sometimes called the "First Terror" of the French Revolution.

The massacres were an expression of the collective mentality in Paris in the days after the overthrow of the monarchy (Aug. 10, 1792). The people believed that political prisoners were planning to rise up in their jails to join a counterrevolutionary plot.

The actual killing began on September 2, when a group of prisoners being transferred to Abbaye prison (near Saint-Germain-des-Prés on the Left Bank) was attacked by an armed band. In the next four days the massacres spread to the other prisons of the city, and the civil authorities were powerless to stop them. In all, about 1,200 prisoners were killed, often without the benefit of even a summary trial. Of these, over 220 were priests held for refusing to accept the Revolutionary church reorganization, but the majority of the victims were criminals arrested for legal offenses.

The September Massacres made a profound impression abroad, where they were publicized as proof of the horrors of revolution. The responsibility for the massacres became a political issue in party struggles in the ruling National Convention, where the moderate Girondins blamed their more radical enemies, especially Jean-Paul Marat and Georges Danton.

septic arthritis, acute inflammation of one or more joints, caused by infection. Symptoms and treatment vary with the type of infection.

In suppurative arthritis the joints are swollen, feverish, sore, and pus-filled; the condition may occur following infection by such bacteria as *Streptococcus hemolyticus, Staphylococcus aureus,* pneumococcus, or meningococcus. The pus produced in response to the infection erodes articular cartilages. Since these have almost no regenerative capacity, permanent damage may result if treatment is delayed. Treatment includes antimicrobial drug therapy and drainage and rest of the joint.

Nonsuppurative arthritis may accompany many diseases such as tuberculosis, congenital syphilis, gonorrhea, typhoid fever, German measles, fungous infections, or rheumatic fever. Pain on movement, stiffness, and swelling are symptoms; rest, drug therapy, and, in the case of tuberculosis, orthopedic care to prevent skeletal deformity are used in treatment. *See also* osteoarthritis; rheumatoid arthritis.

septic tank, sewage-disposal unit used principally for single residences not connected to sewer lines. It consists ordinarily of either a single- or double-compartment concrete or steel tank buried in the ground, so arranged that settled sludge is in contact with the waste water as it flows through the tank and thence to a tile drain field. Solids are decomposed by the anaerobic bacterial action of the sludge. After several years the accumulation of sludge interferes with the action, and a scavenger unit must pump the sludge out of the tank for disposal elsewhere.

septicemia, also called BLOOD POISONING, serious infection of the bloodstream combining bacteremia (the presence of bacteria in the blood) and toxemia (the presence of circulating toxins). Septicemia's onset is signaled by a high fever, chills, weakness, and excessive sweating, followed by a decrease in blood pressure. The typical microorganisms that produce septicemia, usually gram-negative bacteria, release toxic products that trigger immune responses and blood clotting; these in turn cause widespread coagulation within the blood vessels and reduce the flow of blood to tissues and organs, thus producing the acute symptoms. Septicemia often cannot be traced to a single microorganism but results from multiple infections, so that broad-spectrum antibiotic therapy may be required. If not treated promptly with appropriate antibiotics and surgical drainage of any detectable foci of infection, septicemia is followed by septic shock, in which the mortality rate exceeds 50 percent. Pyemia is a type of septicemia in which infectious microorganisms circulating in the bloodstream lodge in the mucosa of the body, causing internal abscesses and the formation of pus.

The development of septicemia following surgery or after the patient has contracted an infectious disease indicates that the infectious process has escaped the control of the body's immune system and requires immediate medical intervention to prevent septic shock and possible death. Septicemia has increased in both severity and incidence, especially in hospitalized patients, because of both the more invasive technology employed and the increased prevalence of antibiotic-resistant bacteria in the hospital environment.

Septimania, French SEPTIMANIE, ancient territory in what is now southwestern France, between the Garonne and Rhône rivers and between the mountains of the Pyrenees and the Cévennes. During the reign of the Roman emperor Augustus, it was settled by a colony of veterans of the Seventh Legion (Septimani); hence probably the name, which persisted into the early Middle Ages. Septimania was the last Gallic holding of the Visigoths of Spain, after Clovis drove them from most of the Frankish kingdom; it then included seven cities, or dioceses (hence another etymology sometimes adduced): Narbonne, Nîmes, Béziers, Maguelonne, Lodève, Agde, and Uzès (afterward Elne and Carcassonne)—that is, much of the area occupied later by the province of Languedoc. The repulse of the invading Moors by Charles Martel in 732 opened up the country for the Frankish occupation, which was completed by 768. Under



Fishing boats moored in the Moisie River, near Sept-Îles, Quebec
Winston Fraser

the Carolingians, Septimania became part of the kingdom of Aquitaine, but it became a separate duchy in 817. As a separate entity it disappeared from history in the 9th century as the territory passed into the hands of the counts of Toulouse.

Septimia Zenobia: *see* Zenobia.

Septimius Odaenathus: *see* Odaenathus, Septimius.

Septimius Severus: *see* Severus, Septimius.

Septuagint, abbreviation LXX, the earliest extant Greek translation of the Old Testament from the original Hebrew, presumably made for the use of the Jewish community in Egypt when Greek was the lingua franca throughout the region. Analysis of the language has established that the Torah, or Pentateuch (the first five books of the Old Testament) was translated near the middle of the 3rd century BC and that the rest of the Old Testament was translated in the 2nd century BC.

The name Septuagint (from the Latin *septuaginta:* "70") was derived later from the legend that there were 72 translators, 6 from each of the 12 tribes of Israel, who worked in separate cells, translating the whole, and in the end all their versions were identical. In fact there are large differences in style and usage between the Septuagint's translation of the Torah and its translations of the later books in the Old Testament. A tradition that translators were sent to Alexandria by Eleazar, the chief priest at Jerusalem, at the request of Ptolemy II Philadelphus (285–246 BC), a patron of literature, first appeared in the *Letter of Aristeas,* an unreliable source.

The language of much of the early Christian church was Greek, and it was in the Septuagint text that many early Christians located the prophecies they claimed were fulfilled by Christ. Jews considered this a misuse of Holy Scripture, and they stopped using the Septuagint. Its subsequent history lies within the Christian church.

In the 3rd century Origen attempted to clear up copyists' errors that had crept into the text of the Septuagint, which by then varied widely from copy to copy. Other scholars also consulted the Hebrew text in order to make the Septuagint text more accurate. But it was the Septuagint, not the original Hebrew, that was the main basis for the Old Latin, Coptic, Ethiopic, Armenian, Georgian, Slavonic, and part of the Arabic translations of the Old Testament. It has never ceased to be the standard version of the Old Testament in the Greek church, and from it Jerome began his translation of the Vulgate Old Testament.

In addition to all the books of the Hebrew canon, the Septuagint under Christian auspices separated the minor prophets and some other books and added the extra books known to Protestants and Jews as apocryphal and to Roman Catholics as deuterocanonical. The Hebrew canon has three divisions: the Torah (Law), the Nevi'im (Prophets), and the Ketuvim (Writings). The Septuagint has four: law, history, poetry, and prophets, with the books of the Apocrypha inserted where appropriate. This division has continued in the Western church in most modern Bible translations, except that in Protestant versions the Apocrypha are either omitted or grouped separately.

The text of the Septuagint is contained in a few early, but not necessarily reliable, manuscripts. The best-known of these are the Codex Vaticanus (B) and the Codex Sinaiticus (S), both dating from the 4th century AD, and the Codex Alexandrinus (A) from the 5th century. There are also numerous earlier papyrus fragments and many later manuscripts. The first printed copy of the Septuagint was in the Complutensian Polyglot (1514–22).

Sepulchre, Holy (tomb of Jesus): *see* Holy Sepulchre.

Seqenenre, also called SEQENENRE TAO (fl. 16th century BC), king of Egypt (*c.* 1545 BC) who, according to tradition, faced unreasonable demands from the Hyksos, the west-Semitic conquerors who had overrun much of Egypt in the 17th century BC.

As shown by a later school papyrus, Seqenenre was contemporary to the last great Hyksos king and initially probably paid him tribute as a vassal. According to the text, the Hyksos ruler provoked a quarrel by claiming that hippopotamuses at Thebes were disturbing his sleep at his Delta capital, 400 miles (644 km) away. Unfortunately, the preserved text ends with Seqenenre and his court pondering a suitable response. Nonetheless, because his son claimed a definite portion of Egypt as his own, Seqenenre probably managed to secure some independence.

Seqenenre died violently: his mummy displays five terrible head wounds: a crushing blow, three ax wounds, and a spear or sword thrust. Because the ax wounds were inflicted while he lay on the ground, some scholars suggest that he was assassinated as he slept. It is equally possible that his death occurred in battle. Nonetheless, the evident hasty embalming, accompanied by failure to arrange the limbs correctly, suggests that the king died under extreme circumstances.

Sequani, Celtic people in Gaul, who in the first century BC occupied the territory between the Saône, Rhône, and Rhine rivers, with their chief city at Vesontio (modern Besançon). Quarrels with the Aedui (*q.v.*) led them to call in the German Ariovistus, who defeated the Aedui but occupied Sequanian territory in modern Alsace and gradually raised his demands. Together with the Aedui, the Sequani appealed to Julius Caesar (58 BC). He expelled the Germans but compelled the Sequani to restore all Aeduan land they had seized. Under the Roman Empire the Sequani belonged to Gallia Belgica; in Diocletian's reorganization (late 3rd–early 4th century AD), their territory, with that of the Rauraci and Helvetii, became the separate province of Sequania or Maxima Sequanorum.

sequence, in music, a melodic or chordal figure repeated at a new pitch, thus unifying and developing musical material. "Real" sequences are exact repetitions; tonal sequences are modified to conform to the key of the composition.

In medieval music and literature the sequence was a Latin text and music sung at mass between the Alleluia and the Gospel. It developed about the 8th century from the trope (addition of music, text, or both) to the jubilus, the florid ending of the last syllable of the Alleluia. Sequences became highly popular throughout Europe—most notably as an element of the Gregorian chant—and thousands of examples of them survive that are appropriate to different liturgical feasts. Secular musical forms influenced by the sequence include the estampie (a dance) and the lai (a song genre of the trouvères, medieval French poet-composers).

The melodic tropes originally added to the jubilus were normally broken into phrases that were repeated in performance (as *aa, bb, cc, . . .*) by alternating choirs. Texts set to these and to Alleluia melodies were originally prose, hence the medieval Latin name *prosa.* By the 9th century the sequence developed a common poetic form that reflected the musical structure: typically, introductory and closing lines enclosed a series of rhymed, metrical couplets of varying lengths (*x aa bb cc . . . y*). Each syllable was set to a single note of music. Eventually, texts were set to newly composed melodies, and the lengths of the couplets were equalized.

In the 16th century the Council of Trent removed all but four sequences from the liturgy: *Victimae paschali laudes* ("Praise the Paschal Victim"), *Veni Sancte Spiritus* ("Come Holy Spirit"), *Lauda Sion* ("Praise Zion"), and *Dies irae* ("Day of Wrath"). The *Stabat Mater* ("At the Cross the Mother Standing") was reinstated in 1727.

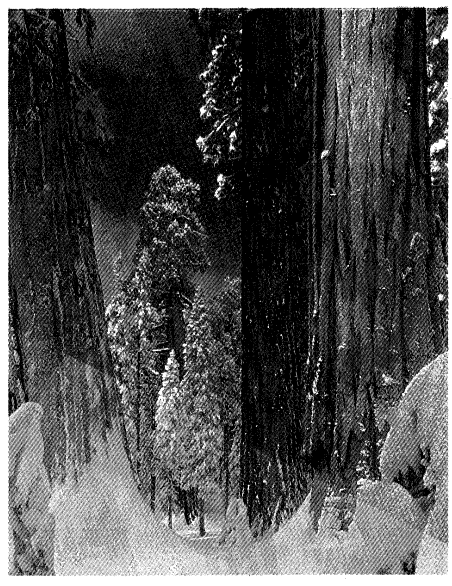
sequestration, in its broadest legal sense, the removal of property from a person in possession of the property. In international law, sequestration denotes the seizure of property of an individual by a government, which uses it to its own benefit. A judicial sequestration involves a court decree ordering a sheriff, in some cases, to seize property pending a decision by the court as to who is entitled to it.

In Roman law two persons who fought over a piece of property gave control over it to a third, the *sequester,* until the dispute could be settled. Later courts, after appointing a sequestrator to take possession of the property, would retain the property until the noncomplying party submitted to the court's order. The appointing of a sequestrator is now rare, although sequestration itself is a part of both the civil- and common-law systems.

The purpose of sequestration, in most instances, is essentially one of preservation. The property remains in the custody of the court until it is determined to whom the property belongs. Consequently, under certain statutes, the court may return the sequestered property if a bond is posted to ensure that either the property or indemnification will be available to the rightful owner. *See also* receivership.

Sequoia, genus of conifers of the bald cypress family (Taxodiaceae), comprising one species, *Sequoia sempervirens* (redwood; *q.v.*). The big tree (*q.v.*), or giant sequoia (*Sequoiadendron giganteum*), is sometimes included in this genus. The redwood is native in the fog belt of the Coast Ranges from southern Monterey county, Calif., to southern Oregon, U.S., and the big tree occurs in scattered groves on the westerly slopes of the Sierra Nevada from Placer to Tulare counties in California. Fossil remains of Sequoia as old as the Jurassic period (208 to 144 million years ago) are widely dispersed in the Northern Hemisphere. The bald cypress (*Taxodium distichum*) and dawn redwood (*Metasequoia glyptostroboides*) are closely related to Sequoia. The generic name commemorates the great Cherokee Indian Sequoyah (or Sequoya).

Sequoia National Park, forested area (*c.* 402,480 acres [162,870 hectares]) in the Sierra



Giant sequoias, Sequoia National Park, California
David Muench—EB Inc.

Nevada of California, U.S. The area was set aside in 1890 to protect groves of big trees (*Sequoiadendron giganteum; see* big tree), which are among the world's largest and oldest living things. The largest big tree in the park is called the General Sherman Tree, which is thought to be 3,000 to 4,000 years old. Animal life in the park includes black bears, deer, foxes, and squirrels and other small mammals. Plants present, besides the big trees, include shrubs, smaller trees, and wild flowers in the meadows. The park headquarters is at Three Rivers. Kings Canyon National Park adjoins to the north, and on the eastern boundary is Mount Whitney (14,494 feet [4,418 m]), the highest mountain in the contiguous 48 states.

Sequoyah, also spelled SEQUOYA, or SEQUOIA, Cherokee SIKWAYI, also called GEORGE GIST, or GEORGE GUESS (b. *c.* 1760/1770, Taskigi, North Carolina colony [U.S.]—d. August 1843, near San Fernando, Mex.), creator of the Cherokee writing system.

Sequoyah was probably the son of a British trader named Nathaniel Gist. Reared by his Cherokee mother in the Tennessee country, he never learned to speak, read, or write English. He was an accomplished silversmith, painter, and warrior and served with the U.S. Army in the Creek War in 1813–14.

Sequoyah became convinced that the secret of the white men's superior power was written language, which enabled them to accumulate and transmit more knowledge than was possible for a people dependent on memory and word of mouth. Accordingly, in about 1809 he began working to develop a system of writing for the Cherokees, believing that increased knowledge would help them maintain their independence from the whites. He experimented first with pictographs and then with symbols representing the syllables of the spoken Cherokee language, adapting letters from English, Greek, and Hebrew. His daughter helped him to identify the Cherokee syllables. By 1821 he had created a system of 86 symbols, representing all the syllables of the Cherokee language.

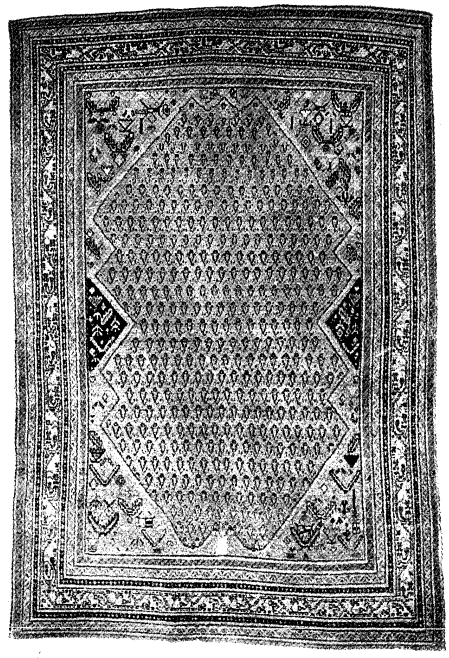
Sequoyah convinced his people of the utility of his syllabary by transmitting messages between the Cherokees of Arkansas (with whom he went to live) and those of the east and by teaching his daughter and other young people of the tribe to write. The simplicity of his system enabled pupils to learn it rapidly, and soon Cherokees throughout the nation were teaching it in their schools and publishing books and newspapers in their own language.

Sequoyah's name (spelled Sequoia) was given to the giant redwoods (*Sequoia sempervirens*) of the Pacific coast and the big trees (*Sequoiadendron giganteum*) of the Sierra Nevada Range.

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Seraband rug, Seraband also spelled SARABAND, handwoven floor covering made in the Ser-e Band district, southwest of Arāk in western Iran. These 19th- and early 20th-century rugs, noted for their sturdiness and unobtrusive charm, have a characteristic pattern (known commercially as the *mīr* design) of small, complex leaf (*būteh*) or pear forms in diagonal rows, their tips pointed alternately in opposite directions. A geometric vine with similar leaf forms usually occupies the principal border stripe. There may be geometric cornerpieces or perhaps a small, similarly geometric central medallion.

Dark blue and ivory are used as ground



Seraband rug from Iran, 19th century; in the Textile Museum, Washington, D.C.

Textile Museum Collection, Washington, D.C.; photograph, Otto E. Nelson—EB Inc.

colours as well as the usual Seraband red. The knotting is Ghiordes, on a cotton foundation. Large Seraband rugs are narrow rather than of room dimension.

Seraculeh, also called SERAHULI (people): *see* Soninke.

Seraikela (India): *see* Saraikela.

Seraing, municipality, Liège *province,* eastern Belgium, on the Meuse River, 6 miles (10 km) upstream from Liège. It is the hub of the Belgian iron, steel, and machine industry, founded in 1817 by an Englishman, John Cockerill; the first steam locomotive on the Continent was built at the Cockerill works in 1835. The château of the prince-bishops of Liège now serves as the headquarters of the amalgamated Cockerill-Ougrée Company (1955), a huge enterprise with plants covering 500 acres (200 hectares); in 1979 the government of Belgium became a participant in the company's ownership as part of a reorganization of all Belgian steel companies. An old Cistercian abbey at the edge of the town is now the Val Saint-Lambert glassworks, one of the largest in Europe. Coal is mined in the vicinity. Pop. (1986 est.) mun., 62,202.

Seram (Indonesia): *see* Ceram.

Serampore, also spelled SERAMPUR (India): *see* Shrīrāmpur.

Serao, Matilde (b. March 7, 1856, Patras [now Pátrai], Greece—d. July 25, 1927, Naples), novelist and journalist, founder and editor of the Neapolitan daily *Il Giorno* and



Matilde Serao

Brogi—Alinari from Art Resource/EB Inc.

one of the best of the southern Italian novelists.

Born in Greece of a Neapolitan father and a Greek mother, Matilde Serao returned to Naples with her family, studied there, worked in a telegraph office and then on the staff of Naples' *Corriere del mattino.* In 1882 she moved to Rome and two years later married Eduardo Scarfoglio, with whom she was to found *Corriere di Roma* and two other periodicals. Returning to Naples, she separated from her husband and in 1904 founded the influential *Il Giorno,* which she edited until her death.

While pursuing her journalistic career, she wrote about 40 very popular novels and a number of short stories dealing with lower middle-class Neapolitan life. Her best novel was probably *Il paese di cuccagna* (1890; *The Land of the Cockayne*), a lively story of the Neapolitans' passion for the lottery. Other notable novels are *Il romanzo della fanciulla* (1886; "A Girl's Romance") and *Suor Giovanna della Croce* (1901). A. Gisolfi's *The Essential Serao* was published in 1968.

Serapeum (ancient Egyptian temple): *see* Sarapeum.

seraph, plural SERAPHIM, in Jewish, Christian, and Islāmic literature, celestial being variously described as having two or three pairs of wings and serving as a throne guardian of God. Often called the burning ones, seraphim in the Old Testament appear in the Temple vision of the prophet Isaiah as six-winged creatures praising God in what is known in the Greek Orthodox church as the Trisagion (thrice holy): "Holy, holy, holy is the Lord of



Seraphim surrounding the throne of God, manuscript from Reichenau, late 10th century; in the Staatsbibliothek Bamberg (Codex Bibl. 76, Fol. 10V)

Hirmer Fotoarchiv, Munchen

hosts; the whole earth is full of his glory" (Isaiah 6:3). In Christian angelology the seraphim are the highest ranking celestial beings in the hierarchy of angels.

In art the four-winged cherubim are painted blue (symbolizing the sky) and the six-winged seraphim red (symbolizing fire). *Compare* cherub.

Seraphim OF SAROV, SAINT, Russian SVYATOY SERAFIM SAROVSKY, original name PROKHOR MOSHNIN (b. July 19, 1759, Kursk, Russia [now in Russian S.F.S.R.]—d. Jan. 2, 1833, Sarov monastery, Tambov; canonized 1903; feast day January 2), Russian monk and mystic whose ascetic practice and counseling in cases of conscience won him the title *starets* (Russian: "spiritual teacher"), one of the most renowned in Russian Orthodox history.

He took the religious name Seraphim on entering the monastery of Sarov in 1777. After ordination to the priesthood in 1793, he withdrew as a solitary to a forest hut, sometimes kneeling on a bare stone for many successive days, in the tradition of the Eastern penitential saints. After 25 years as a hermit he returned to an active, pastoral ministry in 1815, following the direction indicated by a spiritual experience that Seraphim attributed to the Virgin Mary. He engaged in spiritual direction, serving as confessor to a number of the surrounding faithful and to pilgrims, and was reputed to work some wonders, including the discernment of thoughts and conscience.

Seraphim's spiritual doctrine centred on a program of contemplative prayer seeking a mystical experience of the Holy Spirit that assured the believer of the divine Presence within. He was original in extending to laypersons in general the traditional monastic method of contemplation that included a systematic discipline of self-denial to combat vices and meditative methods toward ecstatic prayer. Seraphim maintained that prayer was not limited to the cloistered mystic but was within the capacity of any earnest Christian. He was acclaimed a saint by the Russian Orthodox Church in 1903 and proposed as a standard for spirituality.

Serapias, genus of orchids, family Orchidaceae, containing about 10 species native to the Mediterranean region. The flowers of all species have a helmetlike structure formed by the union of two sepals and one petal. The long, triangular flower lip resembles a tongue.

One species, *S. lingua,* is commonly known as the tongue orchid. It has a reddish lip, lance-shaped leaves, and a stem up to 30 cm (12 inches) long. The heart-flowered serapias (*S. cordigera*) has purple flowers with blackish purple lips that often have a tonguelike lobe.



Heart-flowered serapias (*Serapias cordigera*)
A.J. Huxley

Serapion, SAINT: *see* Sarapion, Saint.

Serapion Brothers, Russian SERAPIONOVY BRATYA, group of young Russian writers formed in 1921 under the unsettled conditions of the early Soviet regime. Though they had no specific program, they were united in their belief that a work of art must stand on its own intrinsic merits, that all aspects of life or fantasy were suitable subjects, and that experiments in a variety of styles were desirable. Admirers of E.T.A. Hoffmann, the German Romantic storyteller who wrote a series of exotic tales that were supposedly exchanged by a group gathered around a hermit, Serapion, the brothers adopted this name as indicative of their interest in the art of storytelling. Though they could not entirely eliminate social themes from their work, the Serapion Brothers introduced to them a fresh use of intricate plots, surprise endings, and techniques of mystery and suspense. They regarded much of the escapist literature of the West, such as the romantic adventure stories of Alexandre Dumas, Robert Louis Stevenson, and Rider Haggard, as superior in technical artistry to the formlessness of traditional Russian realism.

The Serapion Brothers met in the House of Arts, a cultural institute established in Petrograd (now Leningrad) by Maksim Gorky. They learned their craft in the literary workshop of the innovative elder writer Yevgeny Zamyatin. The members, most of whom were in their early 20s, included Mikhail Zoshchenko, Vsevolod Ivanov, Veniamin Kaverin, Konstantin Fedin, Lev Lunts, Nikolay Nikitin, Nikolay Tikhonov, Vladimir Pozner, Mikhail Slonimsky, and Viktor Shklovsky; but their influence extended beyond their nuclear group and affected most of the other writers who remained aloof from political orthodoxy and dominated the literary scene in the early Soviet period.

Serapis (Egypto-Grecian deity): *see* Sarapis.

Serapis and Bonhomme Richard, engagement between (naval battle): *see* Bonhomme Richard and Serapis, engagement between.

Serbia, officially SOCIALIST REPUBLIC OF SERBIA, Serbo-Croatian SOCIJALISTIČKA REPUBLIKA SRBIJA, constituent republic, eastern Yugoslavia. It is bounded by Croatia (northwest), Bosnia and Hercegovina and Montenegro (west), Albania (southwest), Macedonia (south), Bulgaria and Romania (east), and Hungary (north). Including the autonomous region of Vojvodina in the north and that of Kosovo in the south, it has a total area of 34,116 square miles (88,361 square km). Belgrade, the capital of Yugoslavia, is also the capital of the republic.

Physical and human geography. Serbia is generally mountainous, with the Dinaric Alps on the west, the North Albanian Alps (Prokletije) and the Šar Mountains on the southwest, and the Balkan Mountains on the east. The Danube River is joined in the north by the Tisa, Sava, Tamiš, and Morava river systems and flows southeastward to form the border between Yugoslavia and Romania; it passes through a series of four great gorges over a stretch of 72 miles (116 km), the most famous of which is the Iron Gate Gorge, site in the 1970s of an immense hydroelectric and navigation project.

The climate of Serbia and the autonomous provinces is on the whole mild, though it is often subject to extremes. In the summer the temperature may exceed 100° F (38° C), while in the winter it will often fall below 0° F (−18° C).

Serbia proper, excluding Vojvodina and Kosovo, is ethnically homogeneous, with Serbs accounting for the vast majority of the population. In Vojvodina, Serbs are the majority ethnic group, but a large minority population of Hungarians and a smaller group of Croats also reside in the autonomous province. Albanians account for more than three-quarters of the population of Kosovo. The Serbian population in Kosovo has declined substantially since the mid-20th century, while the population of Albanians has increased dramatically. This increase in the Albanian population has been the result of the higher birth rate of the Albanian people and of the emigration of Serbs from the province in the wake of rising Albanian nationalism.

Serbia and Vojvodina are two of Yugoslavia's more-developed regions. Kosovo is the poorest and least-developed region in the country. The fertile plains of Vojvodina, along with neighbouring Croatia, constitute the most productive agricultural area in Yugoslavia. More than one-half of Yugoslavia's coal reserves are located in Kosovo. Mining and manufacturing are the largest contributors to the economy of Serbia, although agriculture also plays a significant role. Industries produce metal products, machinery, farm equipment, paper, glass, textiles, and chemical products.

History. The Serbs, who belong to the South Slav group of the Slavic peoples, arrived in the Balkans during the 7th century. The origin of their name, which first appeared in the *Frankish Annals* (822), is obscure; the Slavs of Lusatia (now in Hungary), however, similarly called themselves Sorbs. Clans more or less related to one another occupied territory under the political and military leadership of a *župan.* The *župan* Mutimir accepted Orthodox Christianity in about 879. From 1331 to 1355 Serbia prospered under the leadership of Stefan Dušan (Dushan), who assumed the title of tsar (emperor) of the Serbs and Greeks in 1346 and ruled over Albania, Epirus, Aetolia, and Thessaly. After his death in 1355, Serbian power declined under Tsar Uroš (1355–71). In the Battle of Kosovo (June 28 [June 15, Old Style], 1389), the Serbs were catastrophically defeated by the Turks, and their prince, Lazar Hrebeljanović, was captured and beheaded; the battle, in which the Serbs chose death rather than surrender, is a permanent symbol in Serbian national consciousness.

After 1459 the Serbs fell under Turkish rule. All land in Serbia became the property of the sultan, and the Serbs themselves were bondslaves of the land. Their national identity survived only with the restoration of the Serbian patriarchate at Peć in 1557.

The Austro-Turkish War of 1716–18 led to the Treaty of Passarowitz, whereby Austria obtained both the Banat (a region lying across the modern frontiers of Hungary, Romania, and Yugoslavia) and also the adjacent part of Serbia (known as Šumadija) south of the Sava and Danube rivers, with Belgrade. The Turkish frontier, however, was restored in 1739.

The move for Serbian independence began with uprisings under Karageorge (1804–13) and Miloš Obrenović I (1815–17). After the Russo-Turkish War of 1828–29, Serbia became an internationally recognized autonomous principality under Turkish suzerainty and Russian protection.

During the Russo-Turkish War of 1877–78, Serbia fought on the side of the Russians, and in July 1878 the Congress of Berlin granted Serbia's independence and increased its territory with the addition of several small districts. Serbia was proclaimed a kingdom on March 6, 1882.

Austria-Hungary's annexation of Bosnia and Hercegovina (October 1908) culminated in Serbia's determination to form a Balkan alliance. In October 1912 Serbia, Bulgaria, Montenegro, and Greece together declared war on Turkey, at the end of which Serbia was awarded northern Macedonia, thereby doubling its territory.

The assassination of the Austrian archduke Francis Ferdinand by Gavrilo Princip, a Bosnian Serb, at Sarajevo on June 28, 1914, was the event that precipitated World War I, a war that cost Serbia 23 percent of its population.

In 1918 Serbia became a part of the Kingdom of Serbs, Croats, and Slovenes; the kingdom officially took the name of Yugoslavia in 1929. The Yugoslav constitution of 1946 gave to the federal republic of Serbia a smaller area than that of the Serbia of 1918–29, as Montenegro and the formerly Serbian Macedonia became separate federal republics at the same time. Pop. (1987 est.) 9,714,000.

Serbian Orthodox Church, autocephalous, or ecclesiastically independent, member of the Eastern Orthodox communion, located in Serbia and Macedonia in modern Yugoslavia.

The southern Serbs wavered for long periods in their ecclesiastical allegiance between Rome and Constantinople; the consecration of St. Sava as autocephalous archbishop of Serbia in 1219, however, aligned the various Serbian principalities into one ecclesiastical whole behind Constantinople. As the medieval kingdom of Serbia grew in size and prestige and Stefan Dušan, king of Serbia from 1331, assumed the imperial title of tsar in 1346 to 1355, the archbishopric of Peć was correspondingly raised to the rank of patriarchate. By 1459, however, Serbia was a Turkish *paşalik* (province). The patriarchate was abolished, then restored in 1557, only to be abolished once again in 1766. The church remained under the jurisdiction of the ecumenical patriarch of Constantinople until it became autocephalous in 1879, the year after the recognition of Serbia as an independent state. After World War I all the Serbs were united under one ecclesiastical authority, and the patriarchate was reestablished in 1920, the patriarch's full title being "archbishop of Peć, metropolitan of Belgrade and Karlovci, and patriarch of the Serbs." The communist government after World War II prohibited the teaching of religion except in church buildings.

The supreme authority of the Serbian church, the Holy Synod, is composed of all its bishops, who meet once a year. There is also a standing synod of four members who administer the day-to-day affairs of the church, which is estimated to number some 9,000,000 faithful. There are 31 dioceses, including 3 in North America; four seminaries and a theological faculty train candidates for the clergy; and a patriarchal journal, *Glasnik* ("Messenger"), is published monthly.

Serbo-Bulgarian War (Nov. 13, 1885–March 3, 1886), military conflict between Serbia and Bulgaria, which demonstrated certain inadequacies of the Balkan peace settlement fashioned by the Congress of Berlin (Treaty of Berlin, 1878).

The settlement proved flawed when a coup d'état occurred in Eastern Rumelia (Sept. 18, 1885) and that autonomous province of Ottoman Turkey announced its unification with Bulgaria. Serbia, which had been dissatisfied with the extent of the territory allotted to it by the Treaty of Berlin, was opposed to the strengthening of its rival, Bulgaria. After the coup d'état, the Serbian prince Milan, who also hoped that an aggressive foreign policy would relieve his domestic problems, demanded that Bulgaria cede some of its territory to Serbia. An international conference was convened to consider how the powers should respond to Bulgaria's enlargement and to Serbia's claims. It became deadlocked (November 1885), and Serbia declared war. Although a swift Serbian victory was expected, Prince Alexander I of Bulgaria won the decisive battle at Slivnitsa (Nov. 17–19, 1885) and entered Serbia on November 26. He accepted an armistice only when Austria-Hungary threatened to enter the war in Serbia's defense. The Treaty of Bucharest (March 3, 1886), which concluded the war, reestablished the prewar Serbo–Bulgarian borders but left Bulgaria and Eastern Rumelia united.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Serbo-Croatian language, Serbo-Croatian SRPSKOHRVATSKI JEZIK, South Slavic language that is the principal language of Yugoslavia. It is the native language of most speakers in the Yugoslavian republics of Serbia, Montenegro, Bosnia and Hercegovina, and Croatia and serves as an important secondary language in Slovenia and Macedonia. The Croats, who are Roman Catholic and who lived for centuries under Venetian or Austro-Hungarian rule, and the Serbs, who are Eastern Orthodox in religion and who, after a short period of independence, lived for five centuries under Turkish domination, often exaggerate the minor regional differences in the language in an attempt to prove that there are two languages; the language of the Serbs and Croats, however, is actually the same except for a few minor vocabulary differences and the use of different alphabets (the Croats use the Roman, or Latin, alphabet; the Serbs use Cyrillic).

The earliest surviving texts in Serbo-Croatian date from the 12th century. The written language in Serbia was a local variant of Church Slavonic until the end of the 17th century, when Russian Church Slavonic was adopted and the compromise style of writing known as Slavono-Serbian began to develop. The modern literary language is based on the Central dialect, also known as the Shtokavian dialect because the form of the interrogative pronoun "what?" in this dialect is *shto* (*što*). It was used in the writings of Vuk Stefanović Karadžić (1787–1864), who is also responsible for adapting the Cyrillic alphabet to the sound system of the Serbo-Croatian language. The Chakavian dialect (*cha* [*ča*] = "what?"), although rapidly disappearing, can still be heard on the Dalmatian islands and in much of Istria, while the Kajkavian dialect (*kaj* = "what?") is spoken in most of northern Croatia, including the region around Zagreb. *See also* Old Church Slavonic language.

Serbo-Turkish War (1876–78), military conflict in which Serbia and Montenegro unsuccessfully fought the Ottoman Turks in support of Bosnian rebels and, in the process, intensified the Balkan crisis that culminated in the Russo-Turkish War of 1877–78; by the settlement of that conflict, Serbia and Montenegro acquired their independence from the Ottoman Empire and an expansion of their territory. In July 1875 the Christian peasants of Hercegovina rebelled against their Muslim landlords and Ottoman Turkish rulers. The revolt quickly spread to Bosnia and stimulated enthusiastic popular support in Serbia, which was then an autonomous principality within the Ottoman Empire. After the attempts of the great European powers to mediate between the belligerents failed, Milan Obrenović IV of Serbia, together with Prince Nicholas of Montenegro, succumbed to public pressure and declared war on the Turks (June 30, 1876).

Serbia's military capacity was extremely limited, and, although a Russian general assumed command of the Serbian army and Serbia received Russian volunteers and financial donations, the Russian government did not at once provide the expected military assistance. The Serbian effort to invade Bosnia failed; and while their sole ally, Montenegro, successfully fought in Hercegovina, the Serbs, after losing the Battle of Aleksinac (Sept. 1, 1876), were confronted with a Turkish advance toward Belgrade. Only then did Russia present an ultimatum to the Turks and force them to conclude an armistice (Oct. 31, 1876).

When subsequent international negotiations produced no settlement, the Serbs and Turks concluded a peace treaty based on the status quo (March 1, 1877). Russia, however, insisted that the Turks institute reforms for its Christian populations and declared a new war on the Ottoman Empire (April 1877); in December the Serbs also renewed their hostilities against the Turks. By the Treaty of Berlin, which ultimately concluded the Russo-Turkish War of 1877–78, Serbia received its independence from the Turkish empire as well as a land allotment of almost 4,000 square miles (10,360 square km) on its southeastern frontier. During the Serbo-Turkish War and the negotiations associated with it, however, Serbia had become disillusioned with Russia, which, it considered, had betrayed its interests. Consequently, after the war Serbia shifted its allegiance to Austria-Hungary, which also assumed the administration of Bosnia and Hercegovina after 1878.

Serbs, Croats, and Slovenes, Kingdom of, Balkan state formed on Dec. 1, 1918. Ruled by the Serbian Karageorgević dynasty, the new kingdom included the previously independent kingdoms of Serbia and Montenegro and the South Slav territories in areas formerly subject to the Austro-Hungarian Empire: Dalmatia, Croatia–Slavonia, Slovenia, Bosnia and Hercegovina, and Vojvodina. In 1919 four small Bulgarian territories in the southeast, including Strumica, were ceded to the new state. In 1925 the monastery of St. Naum was transferred from Albania to Serbia. King Alexander I renamed the state Yugoslavia (*q.v.*) in 1929.

Sercq (Channel Islands): *see* Sark.

Seremban, town, West Malaysia (Malaya), on the Linggi River, about 25 miles (40 km) inland from Port Dickson on the Strait of Malacca. The town originated as a tin-mining settlement in the 1840s. Rubber production is now the principal activity; tin is still mined, and paddy rice is grown in the well-drained valleys of the Main Range to the east. The Singapore–Kuala Lumpur road and railway system passes through the town, which is linked by a branch railway to Port Dickson. A road through a nearby mountain gap leads to Kuala Pilah and eastern Malaya.

The Lake Gardens, a museum, and a model Malay house (built without nails, like traditional Sumatran structures) are there. In the foothills, about 25 miles (40 km) east, lies Seri Menanti, site of the palace of the sultan of Negeri Sembilan. A hot spring 12 miles (19 km) south is a popular resort. A teacher-training college is located at Seremban. Pop. (1980) 132,911.

serenade, originally, a nocturnal song of courtship; in the late 18th century the name was applied particularly to a short suite of instrumental pieces, similar to the divertimento, cassation, and notturno. An example of the first type in art music is the serenade "Deh! vieni alla finestra" ("Oh, Come to the Window"), from Wolfgang Amadeus Mozart's *Don Giovanni.* The instrumental serenade gradually lost its association with courtship and became (*c.* 1770) primarily a collection of light pieces such as dances and marches suitable for open-air performance.

Mozart wrote several serenades for a variety of ensembles, as did subsequently Franz Schubert, Ludwig van Beethoven, Johannes Brahms, and Max Reger. In the 20th century Igor Stravinsky seized upon the traditional lightness of the genre when he called one of his neoclassical keyboard compositions *Serenade.*

serenata (Italian: "evening music"), plural SERENATAS, or SERENATE, form of 18th-century vocal music combining many features of cantata, oratorio, and opera. Although semidramatic in nature, the serenata was shorter and not as elaborately staged as opera; rather, it usually consisted of a small orchestra and several singers, in costume. There was little scenery, and it was simple and unpretentious; the performance traditionally was presented as an evening entertainment in a palace reception room. The pieces were customarily written to commemorate some special occasion, such as the birthday of a royal person, and were very much in vogue at the courts of Europe (particularly the emperor's court at Vienna). Frequently, the texts were of an allegorical character, the subject being chosen from mythology or ancient history

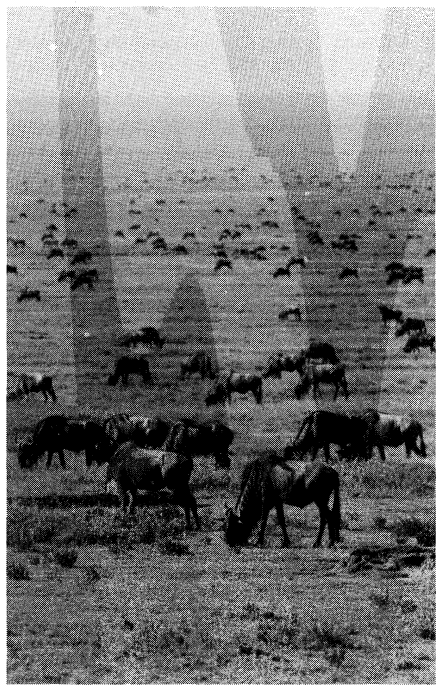
and treated in such a manner as to portray a very flattering and symbolic resemblance to the celebrant. Alessandro Stradella was one of the first composers of serenatas (*Qual prodigio è ch'io miri, c.* 1675); he was followed by Alessandro Scarlatti, George Frideric Handel, and most other composers of the late 17th and the 18th centuries. One of the most enduring and well-known examples of this genre is Handel's pastoral serenata *Acis and Galatea* (*c.* 1718).

Serendib, also spelled SERENDIP, Arabic SARANDĪB, the island of Ceylon. The name, Arabic in origin, was recorded in use at least as early as AD 361 and for a time gained considerable currency in the West. It is best-known to speakers of English through the word *serendipity,* invented in the 18th century by the English man of letters Horace Walpole on the inspiration of a Persian fairy tale, "The Three Princes of Serendip," whose heroes often made discoveries by chance.

The name *Serendib* is a corruption of the Sanskrit compound *Siṃhaladvīpa* ("Dwelling-Place-of-Lions Island"). The Arabs are thought to have borrowed the name from Indians with whom they traded. The name is no longer used.

Serengeti National Park, national park and wildlife refuge in north-central Tanzania, eastern Africa. Best-known for its huge herds of plains animals (especially wildebeest, gazelle, and zebra), it is the only place in Africa where vast land-animal migrations still take place, and consequently it is an international tourist attraction.

The park was established in 1941 and consists of some 5,700 square miles (14,800 square km) of some of the best grassland range in Africa, as well as extensive thorn tree (acacia) woodland savanna. With elevations ranging from 3,000 to 6,000 feet (900 to 1,800 m),



Wildebeest grazing on the plains in the Serengeti National Park

Stephen J. Krasemann—Natural History Photographic Agency

the park extends 100 miles (160 km) east and southeast from the southeastern shore of Lake Victoria, with a 25-mile- (40-kilometre-) wide eastern corridor extending 100 miles north to the Kenya–Tanzania border. It is along this eastern corridor that the 1,500,000 wildebeest, the 200,000 zebras, equally numerous gazelles, and other animals migrate annually. During the wet season, from December to May, the herds graze the southeastern plains within the park. They later move west into the park's woodland savanna and then north into the grasslands just beyond the Kenya–Tanzania border, an area known as the Mara. The herds return to the park's southeastern plains in November, at the end of the dry season.

In addition to more than 35 species of plains animals, there are great numbers of lions (estimated at 3,000), leopards, elephants, rhinoceroses, hippopotamuses, giraffes, and baboons. More than 200 species of birds have also been recorded. Elephants, which were not found in the Serengeti 30 years ago, moved into the park as human populations outside its borders increased in numbers. The killing of elephants for their ivory tusks, the slaughter of the now virtually extinct black rhinoceros for its horn (which is prized in Yemen [Ṣan'ā'] for dagger handles), and the poaching of game animals for meat are major problems for the park authorities. The park's headquarters are at Seronera near the centre of the park.

Serer, people of western Senegal and The Gambia who speak a language also called Serer, a West Atlantic branch of the Niger-Congo language family.

The Serer are a settled, agricultural people who grow millet, rice, and a wide variety of other crops, including tree crops. Cattle, sheep, and goats are tended, and trade, conducted in regular markets, is well-developed.

Contemporary Serer villages typically contain a cluster of small square or round huts of thatched reed or millet stalk. In polygynous families, each wife has a separate hut. A bride-price, usually in livestock, is required. Inheritance and succession are matrilineal. The Serer have remained largely animists, with few converts to Islām or Christianity.

serfdom, condition in medieval Europe in which a tenant farmer was bound to a hereditary plot of land and to the will of his landlord. The vast majority of serfs in medieval Europe obtained their subsistence by cultivating a plot of land that was owned by a lord. This was the essential feature differentiating serfs from slaves, who were bought and sold without reference to a plot of land. The serf provided his own food and clothing from his own productive efforts. A substantial proportion of the grain the serf grew on his holding had to be given to his lord. The lord could also compel the serf to cultivate that portion of the lord's land that was not held by other tenants (called demesne land). The serf also had to use his lord's grain mills and no others.

The essential additional mark of serfdom was the lack of many of the personal liberties that were held by freedmen. Chief among these was the serf's lack of freedom of movement; he could not permanently leave his holding or his village without his lord's permission. Neither could the serf marry, change his occupation, nor dispose of his property without his lord's permission. He was bound to his designated plot of land and could be transferred along with that land to a new lord. Serfs were often harshly treated and had little legal redress against the actions of their lords. A serf could become a freedman only through manumission, enfranchisement, or escape.

Beginning as early as the 2nd century AD, many of the large, privately held estates in the Roman Empire that had been worked by gangs of slaves were gradually broken up into peasant holdings. These peasants of the late Roman Empire, many of whom were descended from slaves, came to depend on larger landowners and other important persons for protection from state tax collectors and, later, from barbarian invaders and oppressive neighbours. Some of these coloni, as the dependent peasants were called, may have taken up holdings granted them by a proprietor, or they may have surrendered their own lands to him in return for such protection. In any case, it became a practice for the dependent peasant to swear fealty to a proprietor, thus becoming bound to that lord.

The main problem with the coloni was that of preventing them from leaving the land they had agreed to cultivate as tenant farmers. The solution was to legally bind them to their holdings. Accordingly, a legal code established by the Roman emperor Constantine in 332 demanded labour services to be paid to the lord by the coloni. Although the coloni were legally free, the conditions of fealty required them to cultivate their lord's untenanted lands as well as their leased plot. This not only tied them to their holdings but also made their social status essentially servile, since the exaction of labour services required the landlord's agents to exercise discipline over the coloni. The threat, or the exercise, of this discipline was recognized as one of the clearest signs of a man's personal subjection.

By the 6th century AD the *servi,* or serfs, as the servile peasants came to be called, were treated as an inferior element in society. Serfs subsequently became a major class in the small, decentralized polities that characterized most of Europe from the fall of the Roman Empire in the 5th century to the initial reconstitution of feudal monarchies, duchies, and counties in the 12th century.

By the 14th century, economic conditions in western Europe were favourable to the replacement of serfs by a free peasantry. The growth of the power of central and regional governments permitted the enforcement of peasant–landlord contracts without the need for peasant servility, and the final abandonment of labour services on demesnes removed the need for the direct exercise of labour discipline on the peasantry. The drastic population decline after 1350 as a result of the Black Death left much arable land uncultivated and also created an acute labour shortage, both economically favourable events for the peasantry. And finally, the endemic peasant uprisings in western Europe during the 14th and 15th centuries also forced more favourable terms of peasant tenure. Although the new peasants were not necessarily better off economically than were their servile forebears, they had increased personal liberties and were no longer entirely subject to the will of the lords whose lands they worked.

This favourable evolution was not shared by the peasants of eastern Europe. Peasant conditions there in the 14th century do not seem to have been worse than those of the west, and in some ways they were better, because the colonization of forestlands in eastern Germany, Poland, Bohemia, Moravia, and Hungary had led to the establishment of many free-peasant communities. But a combination of political and economic circumstances reversed these developments. The chief reason was that the wars that devastated eastern Europe in the 14th and 15th centuries tended to increase the power of the nobility at the expense of the central governments. In eastern Germany, Prussia, Poland, and Russia, this development coincided with an increased demand for grain from western Europe. To profit from this demand, nobles and other landlords took back peasant holdings, expanded their own cultivation, and made heavy demands for peasant labour services. Peasant status from eastern Germany to Muscovy consequently deteriorated sharply. Not until the late 18th century were the peasants of the Austro-Hungarian Empire freed from serfdom, thus recovering their freedom of movement and marriage and the right to learn a profession according to personal choice. The serfs of Russia were not given their personal freedom and their own allotments of land until Alexander II's Edict of Emancipation of 1861.

Throughout Chinese history, land-bound peasants were considered freemen in law but depended entirely upon the landowner for subsistence. In this system of serfdom, peasants could be traded, punished without due process of law, and made to pay tribute to the lord with labour. All serfs were freed, however, upon the creation of the People's Republic of China in 1949.

serge (from Latin *serica,* "silk"), fabric much-used for military uniforms, made in an even-sided twill weave and usually clear-finished—that is, the fibre ends on the surface of the cloth are sheared or singed so that the twill weave is prominent. The resulting flat diagonal rib pattern goes from the lower left to the upper right selvage on the right side.

Serge was originally made of silk or wool but is now sometimes made of other single fibres or of wool blended with other fibres. It is used primarily for clothing.

sergeant fish: *see* cobia.

Sergeyev, Ivan Ilich: *see* John of Kronshtadt.

Sergeyev, Nicholas, Sergeyev also spelled SERGUEEFF, Russian in full NIKOLAY GRIGORYEVICH SERGEYEV, or SERGEEV (b. Sept. 15, 1876, St. Petersburg [now Leningrad]—d. June 23, 1951, Nice, Fr.), Russian dancer and company manager of the Imperial Ballet in St. Petersburg, who re-created for several western European companies the many classical ballets that had been preserved in the Russian repertoire.

Trained at the St. Petersburg Imperial Ballet School, Sergeyev joined the company in 1894 and was promoted to soloist and *régisseur,* or stage manager, in 1904 and *régisseur-général* in 1914. Unpopular with the dancers for what they considered his dictatorial control of the company, he left Russia in 1918 with choreography for 21 ballets recorded in Stepanoff dance notation, a system used by the Imperial Ballet at the end of the 19th century. Since many of the classical ballets had not been consistently included in western European repertoires, Sergeyev was instrumental in re-creating for various companies such ballets as *La Fille mal gardée, Giselle, Coppélia, Swan Lake, The Sleeping Beauty,* and *The Nutcracker.*

Beginning in 1921, Sergeyev worked with Sergey Diaghilev's Ballets Russes, the Markova-Dolin company, the Ballet Russe de Monte Carlo, and the Metropolitan Opera Ballet, but principally with Sadler's Wells (now the Royal) Ballet and with the International Ballet, whose director, Mona Inglesby, inherited Sergeyev's notes after his death. The Stepanoff scores are now housed in the Harvard Theater Collection.

Sergii (Russian personal name): *see under* Sergius.

Sergio (Italian personal name): *see under* Sergius.

Sergios (Greek personal name): *see under* Sergius.

Sergipe, smallest *estado* ("state") of Brazil, located on the southern coast of that country's northeastern bulge into the Atlantic. It is bounded on the east by the Atlantic, on the south and west by the state of Bahia, and on the north by the state of Alagoas, from which it is separated by the São Francisco River. Sergipe has an area of 8,492 square miles (21,994 square km), and the state capital is Aracaju. Sergipe is named after Serigy, who was a gallant native Indian chief.

Located between the captaincies of Pernambuco and Bahia (the latter being at the time the seat of the general government) in the 16th century, Sergipe Rei, as it was then called, was conquered and settled by cattlemen and sugar planters from Bahia. The local Indians were easily subdued by the firearms of Cristóvão de Barros, who founded the city of São Cristóvão, the first capital, in 1590. In 1820 Sergipe became an independent captaincy. It became a province of the empire in 1824 and a state of the Brazilian republic in 1889.

The state is divided into two major geographic regions, a narrow, low, heavily forested coastal region and a higher inland zone of rough open country, including tablelands rising to mountainous areas in the west. The northern part of the state drains into the São Francisco River, the southern part into the Atlantic.

The coastal area of Sergipe is hot, with adequate rainfall extending into the São Francisco Valley; the interior is hot and dry and subject to both flood and drought. Vegetation is distributed as follows: 34 percent tropical forests, 50 percent thorny deciduous scrub woodland, called caatinga, and 16 percent coastal vegetation. The forests of the coastal zone have almost been destroyed; only palms and cashew trees still abound. Bird life includes varieties of tinamou, and there are some mammals such as deer and cavies and armadillos.

Population density is heaviest in the coastal and central regions. About half of the population is urban. The most populous cities are Aracaju, Estância, Propriá, Itabaiana, Lagarto, and São Cristóvão. About three-fourths of the people are of mixed racial origin. Higher education in the *estado* is furnished by the Universidade Federal de Sergipe, founded in 1967, in Aracaju. The São Cristóvão Museum has a collection of colonial-era art.

The economy of the state is predominantly agricultural. Cotton, rice, sugarcane, coconut, beans, tobacco, cassava, and corn (maize) are the principal agricultural crops. Agriculture is concentrated on the lower, fertile lands, the higher interior being devoted primarily to raising livestock. Livestock includes mostly cattle, as well as hogs, sheep, and goats. Sergipe's petroleum reserves are being increasingly exploited. There are also reserves of rock salt, potassium, kaolin, gypsum, limestone, and manganese. The industrial sector is made up of traditional industries: sugarcane-processing, textile, and small food-processing enterprises (cassava meal, rice, coconut meal, and milk).

Sergipe has several thousand miles of roads and is served by the Brazilian East Federal Railway Transit System. A railway bridge over the São Francisco River linking Propriá (Sergipe) with Pôrto Real do Colégio (Alagoas) was constructed in the 1970s. Pop. (1987 est.) 1,339,000.

Sergius, name of rulers grouped below by papacy or patriarchate and indicated by the symbol •.

Foreign-language equivalents:

Greek	Sergios
Italian	Sergio
Latin	Sergius
Russian	Sergy, or Sergii

PAPACY

•**Sergius I,** SAINT (b. Palermo—d. *c.* Sept. 8, 701, Rome; feast day September 8), pope from 687 to 701, one of the most important 7th-century pontiffs.

Of Syrian parentage, he served under popes St. Leo II and Conon, whom he succeeded after a fierce struggle between two other candidates, the archdeacon Paschal and the archpriest Theodore. Although canonical, his election was irregular. Paschal had already bribed the imperial exarch John Platyn, who first effected Paschal's nomination against a minority favouring Theodore but who then approved the higher clergy's candidate, Sergius, from whom he extorted the gold that Paschal originally promised. Sergius reluctantly paid and was consecrated on Dec. 15, 687; Theodore ceded, but Paschal refused to submit and died in prison five years later.

In 692 the Byzantine emperor Justinian II Rhinotmetus held the Quinisext (Council in Trullo), the decrees of which accentuated the growing differences between Eastern and Western practice and would have made Constantinople ecclesiastically equal with Rome. Sergius rejected several canons of the council, for which Justinian ordered his arrest and transportation to Constantinople, but the Romans and the militia of Ravenna forced Justinian to abandon his attempt against the pope. Justinian was deposed soon after, easing further Byzantine animosity toward Sergius.

Sergius was interested in the Anglo-Saxons and the Franks. He baptized King Caedwalla of Wessex in Rome on Easter 689, and *c.* 691 he ordered Bishop St. Wilfrid of York restored to his see, thereby confirming Pope St. Agatho's injunction of 679 on Wilfrid's behalf. He also seemingly approved Beorhtweald as archbishop of Canterbury (692–731) and primate of all Britain. At the request of the Carolingian king Pepin II the Young, he consecrated the Northumbrian St. Willibrord as bishop of the Frisians in 695, encouraging with some sponsorship the latter's mission to Friesland.

Since 556 the Italian province of Aquileia had been in schism from Rome because Pope Pelagius I had finally endorsed the Council of Constantinople (553) that had condemned certain Nestorian writings, subsequently causing the "Three Chapters Controversy." With the help of King Cunipert of the Lombards, Sergius healed the Aquileian schism, thus ending the entire controversy and unifying the church in Italy. He is also credited with introducing to the mass the Agnus Dei ("Lamb of God"—a liturgical chant preceding the eucharistic rite) and with instituting the procession for Candlemas, a festival of February 2 commemorating the Virgin Mary's visit to Jerusalem to present Jesus to God as her firstborn.

•**Sergius II** (b. Rome—d. Jan. 27, 847), pope from 844 to 847.

Of noble birth, he was made cardinal by Pope St. Paschal I and became an archpriest under Pope Gregory IV, whom he was elected to succeed by the Roman nobility against the wishes of the populace, which enthroned the deacon John as antipope. Although John momentarily occupied the Lateran Palace, Rome, he was soon imprisoned in a monastery by Sergius, who was consecrated in January 844 without waiting for the sanction of the Frankish emperor Lothair I. The emperor accordingly sent his son Louis II, later his successor, with an army to punish the breach of the Roman Constitution of 824, which had affirmed imperial sovereignty over the pope.

A peaceful settlement was arranged, in which Sergius agreed that no one could become pope without imperial consent, and Louis swore not to attack Rome. On June 15, 844, Sergius crowned Louis as king of the Lombards. He rejected, however, Roman fealty to Louis as proposed by Bishop Drogo of Metz, arranging, instead, an oath of allegiance to Lothair. In 844 he made Drogo his legate to the Frankish kingdoms.

Sergius' pontificate was dominated by his brother, Bishop Benedict of Albano, to whom, partly because of his severe gout, he delegated most of the papal business. Benedict proved opportunistic, however, usurping power and finagling money while executing a large building program that included the enlargement of the St. John Lateran basilica. The worst blow to Sergius' reign was the brutal raid on the Roman walls by the Saracens, who pillaged the basilicas of St. Peter and St. Paul. Sergius was accused of failing to provide protection.

He died while trying to mediate a dispute between the Italian patriarchs of Aquileia and Grado.

• **Sergius III** (b. Rome—d. April 14, 911, Rome), pope from 904 to 911, during a scandalous period of pontifical history.

Of noble birth, he was a deacon when made bishop of Caere by Pope Formosus, during whose pontificate powerful Roman factions developed that involved the influential Tusculani count Theophylactus. Later, Sergius became a supporter of Pope Stephen VI (VII), who exhumed Formosus' corpse, subjected it to a posthumous trial (the "Cadaver Synod"), and nullified Formosus' pontificate and acts. The ensuing intrigue became complex and malicious, casting a shadow over the papacy: from 896 (Formosus' death) to 904 (Sergius' consecration) there was a bloodstained succession of seven popes and one antipope, most of whom were concerned either to rehabilitate Formosus' memory or to degrade it again.

Sergius was elected pope by Stephen's party in 898, simultaneously with the opposing faction's candidate, Pope John IX, who later abrogated Stephen's acts by exonerating Formosus. Sergius attempted to seize the papacy but was expelled from Rome by his adversaries. The antipope Christopher drove Pope Leo V out of Rome in 903, and, in the following year, Sergius, with the military help of the Tusculani Alberic I of Spoleto, reappeared in Rome and deposed Christopher, who with Leo was apparently strangled by Sergius' orders. Sergius, consecrated pope on Jan. 29, 904, allied himself with Theophylactus, who became virtual dictator of the papal administration and, through the Pope's help, expanded his territorial claims.

Sergius reversed John's policy by once again invalidating all of Formosus' ordinations and by praising Stephen, thus causing the church grave disorders. He considered John, Pope Benedict IV, Leo, and Christopher all as antipopes. Sergius is reputed to have been the lover of Theophylactus' daughter Marozia, and the father of her son, the future pope John XI. Sergius restored the Lateran basilica, which had collapsed from an earthquake during the posthumous trial of Formosus.

• **Sergius IV,** original name PIETRO BUCCAPORCI, byname BUCCA PORCI (Pig's Snout) (b. Luna, Tuscany—d. May 12, 1012, Rome), pope from 1009 to 1012. He became bishop of Albano, Papal States, *c.* 1004. Elected to succeed Pope John XVIII, he was consecrated on July 31, 1009. He was powerless in the hands of the Roman nobles and the patrician Crescentius II, head of the Crescentii, an infamously powerful Roman family that manipulated the papacy from the mid-10th to the early 11th century.

While temporally weak, Sergius was particularly noted for his aid to the poor and for granting privileges to several monasteries. He was buried in the St. John Lateran basilica, Rome.

PATRIARCHATES

• **Sergius I** (d. Dec. 9, 638, Constantinople), Greek Orthodox theologian and patriarch of Constantinople (610–638), one of the most forceful and independent churchmen to hold that office, who not only supported the emperor Heraclius (610–641) in the victorious defense of the Eastern Roman Empire against Persian and Avar invaders but also strove in the Christological controversy to achieve doctrinal unity throughout Eastern Christendom by submitting a compromise formula, later condemned as unorthodox.

Assisting Heraclius in his campaigns of 622–28 with moral support and with the donation of the church treasury, Sergius functioned as regent and galvanized Byzantine resistance to enemy attacks west and east of Constantinople while the Emperor was taking the field against the Persians in the outer provinces.

In religious matters, particularly concerning Christology, Sergius was preoccupied in reconciling dissident Monophysite Christians (*see* Monophysite) with the orthodox decrees of the general council of Chalcedon (451). The Monophysites, however, steadfastly resisted Sergius' indoctrination because he continued to maintain a functional humanity in Christ. About 633 Sergius won recognition for his theory of monoenergism (that though Christ had two natures, there was but one operation or energy) from Heraclius, who then ordered that doctrine propagated throughout the Byzantine Empire. Further support came *c.* 633 from Cyrus, patriarch of Alexandria, Egypt. At first tolerated by Pope Honorius I (625–638), who responded to Sergius' appeal that the terminology needed clarification, monoenergism met strong opposition led by Sophronius, patriarch of Jerusalem, and later was definitively rejected by both Latin and Greek churches at the third Council of Constantinople (680/681). Still seeking a mediatory solution, Sergius formulated in 638 the doctrine of Monothelitism (*see* Monothelite). Although this teaching was incorporated in Heraclius' imperial edict, the *Ecthesis,* that same year, it was repudiated by both Monophysite and Orthodox parties, and later the Latin church declared it heretical at a Roman council in 649. Sergius' action, however, became symbolic of cooperation between Byzantine church and emperor and indicated the autonomy of the patriarch of Constantinople relative to the papacy.

• **Sergius II** (d. July 1019), patriarch of Constantinople (1001–19) who claimed the title Ecumenical Patriarch against the objections of the papacy and who supported for a time the continuing schismatical movement begun in 867 in the Byzantine Church by the patriarch Photius (*c.* 820–895), occasioned by the speculative theological controversy concerning the doctrine of the divine Trinity.

Abbot of a monastery in Constantinople, Sergius II was elected patriarch *c.* July 1001. A story that the pope Sergius IV (1009–12) sent Sergius II the *Synodicon,* a letter insisting on the Latin Trinitarian teaching that the Holy Spirit relates to both Father and Son (*Filioque*), thus initiating the Eastern schism when Patriarch Sergius reacted by erasing the Pope's name from the Byzantine prayer intercessions, is the invention of 12th-century controversialists. Patriarch Sergius' support of the Photian schism was temporary, for political reasons, and it is not certain that he ever excommunicated Sergius IV for not acknowledging the Greek Orthodox doctrine that the Spirit relates only to the Father.

Sergius II resisted a movement for the veneration of the 10th-century mystical theologian Simeon the Studite and supported the Byzantine landowners against the attempt of the emperor Basil II (976–1025) to make them answerable for unpaid taxes due from the peasantry.

Sergius, Russian SERGY, original name IVAN NIKOLAYEVICH STRAGORODSKY (b. Jan. 23, 1867, Arzamas, Novgorod region, Russia—d. May 15, 1944, Moscow), theologian and patriarch of Moscow and the Russian Orthodox Church who, by his leadership in rallying the church membership in a united effort with the Soviets to repel the German invasion of 1941, obtained substantial advantages for the church in the postwar period.

The son of an Orthodox priest, Ivan Stragorodsky became a monk after his theological studies, taking the name Sergius, and was nominated successively to several bishoprics, including Finland in 1905 and Nizhni-Novgorod, where he became metropolitan, or archbishop, in 1917. Elected a member of the Holy Synod, or Orthodox administrative-theological council, Sergius supported the pro-Soviet schismatic faction of the clergy, called the "Living Church," in 1922–23, during the political imprisonment of the Moscow patriarch Tikhon, but publicly repudiated the affiliation after Tikhon's release in June 1923. Sergius went into exile at the Patriarch's death in 1925 but returned two years later. After a brief imprisonment he was made patriarchal administrator when he influenced the Orthodox Synod to issue a declaration of solidarity with the Soviet regime, enjoining the faithful to dutifully support the system and directing the clergy to declare their political loyalty or face deposition. Objecting to political pressure, a conservative Orthodox group, the Josephites, led by metropolitan Joseph of Leningrad, refused to recognize Sergius' authority.

During World War II, Sergius directed financial drives to outfit Russian tank units and assisted in setting up field hospitals and refuges for the homeless. With the archbishops of Leningrad and Kiev, he was called to an audience with Premier Stalin on Sept. 4, 1943, to reach an agreement normalizing church–state relations, the first since the 1917 Bolshevik Revolution. He received permission to open a limited number of religious schools and to convene on September 8 a national synod that elected him patriarch of Moscow and all Russia. The acknowledged status thus given the Russian Orthodox effectively neutralized any claim of legitimacy by the schismatic "Living Church."

Sergius OF RADONEZH, SAINT, Russian SVYATOY SERGY RADONEZHSKY, original name BARFOLOMEY KIRILLOVICH (b. May 3, 1314, Rostov, Russia—d. Sept. 25, 1392, Radonezh, near Moscow), Russian Orthodox monk whose spiritual doctrine and social programs made him one of Russia's most respected spiritual leaders and whose monastery of the Trinity became the Russian centre and symbol of religious renewal and national identity.

He was tonsured a monk in 1337 and later was ordained a priest. His chapel retreat in the forest of Radonezh became, by 1354, a spiritual centre traditionally known as the Sergian monastery of the Trinity (renamed Zagorsk by the Soviets in 1930). The religious house, probably the first in Russian Christendom to be named after the Trinity, contributed to Russia's economic and cultural recovery by the establishment of monastic schools after the ravages of 13th-century Mongol invasions and also served as a centre of missionary and colonizing activities in northern Russia, establishing as many as 75 monasteries.

Sergius soon gained fame for his ascetical life, wonder-working, and compassion for the needy and backward, teaching the peasants better methods for cultivating the soil. He also carried out several diplomatic missions designed to unite the scattered Russian principalities under the authority of Great Prince Dmitry Donskoy of Moscow, who, after Sergius' exhortation, in 1380 led Russian forces in repelling the Tatars and Mongols at Kulikovo, a plain south of Moscow by the Don River. As a consequence, Sergius was hailed as the saint protector of Russia. Although he left no writings, his teachings and monastic institutions inspired an oral tradition that exerted a principal influence on Russian spirituality. Hundreds of his disciples, beginning even during his lifetime, adopted the monastic way, founded new monasteries throughout the forests of northern Russia, and thus contributed to the colonization and development of the area.

Sergius OF RESAINA (d. 536, Constantinople), Syrian theologian, physician, and transla-

tor, a scholar of encyclopaedic interests whose own Syriac writings and translations of Greek philosophers, particularly Aristotle, provided a link in the transmission of Hellenistic learning to Eastern and Western cultures.

A Christian, having studied in Alexandria, Sergius practiced medicine and later may have become a monk or a priest. He translated more than 20 Greek philosophical, medical, and horticultural works, including Aristotle's treatises on logic and the writings of the Greek Neoplatonist Pseudo-Dionysius. He also produced his own Syriac commentaries on Greek philosophers (*On the Writings of Aristotle,* which is lost; *On the First Cause of the Universe;* and other works), in which he clarified and systematized their thought, sometimes providing an even better empirical basis for it. About 535, when he went to Antioch (now Antakya, Tur.), the patriarch Ephraem made him his legate and sent him to Rome to ask the support of Pope Agapetus I against the rising tide of Monophysitism in Constantinople. Sergius died soon afterward on a visit with Agapetus to Constantinople in 536.

Sergius and Bacchus, SAINTS (d. *c.* 303, Risafe, Syria; feast day October 7), among the earliest authenticated and most celebrated Christian martyrs, originally commemorated in the Eastern and Western churches.

Early martyrologies record that Sergius and Bacchus were officers in the Roman army on the Syrian frontier. They were supposedly favourites of the Roman emperor Maximian, whose wrath they incurred by refusing to sacrifice to the pagan god Jupiter because they were Christians. Maximian demoted Sergius and Bacchus, ordering them to be costumed in women's dress and marched through the streets. They were then sent to Risafe (now a city in ruins in central Syria), where they were scourged so severely that Bacchus died. Boards were nailed to Sergius' feet, upon which he was forced to walk before being beheaded.

Considerable posthumous homage has been paid the martyrs. In 431 Alexander, metropolitan of Hierapolis, restored the church over Sergius' grave, and shortly afterward Risafe became a bishopric. The Byzantine emperor Justinian I changed the name of Risafe to Sergiopolis, making it an archdiocese, and in honour of Sergius he had churches built at Constantinople and at Acre in Palestine.

The church at Risafe became famous in the East as a major pilgrimage site. Sergius and Bacchus were designated protectors of the Byzantine army, and numerous Eastern sanctuaries and churches were subsequently dedicated to them. Their veneration is old, and a mass ascribed to Pope St. Gelasius I is assigned to them. Christian desert nomads regard Sergius as their patron saint.

Sergiyev (Russian S.F.S.R.): *see* Zagorsk.

Sergueeff, Nicholas: *see* Sergeyev, Nicholas.

Sergy (Russian personal name): *see under* Sergius.

Seri, a tribe of Mexican Indians who live on Tiburón Island in the Gulf of California and on the adjacent mainland in Sonora. Their language seems to be related to the Yuman languages, and both are commonly assigned to the hypothetical Hokan super-stock. The 300 to 400 surviving Seri in the late 20th century constituted a single community composed of the remnants of several groups.

Although the Seri now engage in commercial fishing and farm labour, traditionally they lived by gathering, hunting, or fishing for such edibles as shellfish, turtles, pelicans, and cactus fruit. Their simple cane spears, hunting bows, pebble tools, and crude dwellings of twigs and cacti earned them a reputation as being among the most primitive aboriginal groups of North America. They did, however, produce pottery, basketry, and boat-shaped rush rafts.

The Seri lived in mobile bands of not more than 50 individuals. There were no formal band leaders and no social units larger than the band. Shamans, or medicine men, whose powers derived from dreams and visions, were important.

After an unsuccessful missionary attempt in the 18th century, the Seri were little influenced by Europeans. Although their population has declined, they retain most of their aboriginal social and religious customs.

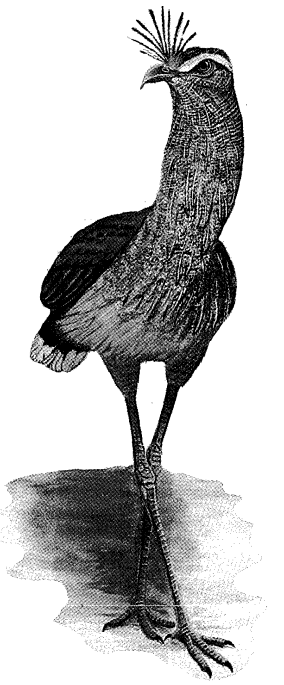
Seria, town, Brunei, on Borneo's South China Sea coast, southwest of Bandar Seri Begawan, the national capital. It is the centre of an important oil-producing area, including offshore wells. A pipeline carries Seria's oil to Lutong, 23 mi (37 km) southwest in Sarawak, Malaysia, where some of it is refined. A tanker terminal accommodates ships carrying crude oil. Its oil has provided much of the revenue for Brunei's modern development. Brunei Shell Petroleum, the sultanate's largest corporation, is headquartered there. Pop. (1981 prelim.) 23,511.

serialism, in music, technique that has been used in some musical compositions roughly since World War I. Strictly speaking, a serial pattern in music is merely one that repeats over and over for a significant stretch of a composition. In this sense, some medieval composers wrote serial music, because they made use of isorhythm, which is a distinct rhythmic pattern that repeats many times regardless of what melodies it belongs to. Another pre-20th-century example of serialism is the ground bass, a pattern of harmonies or of melody that repeats, most often in the lower vocal or instrumental parts of a composition. Countless numbers of composers have written music with a ground bass. The term serial music is often used interchangeably with twelve-tone music (*q.v.*), but the latter is more properly an example of the former.

Just as the Austrian-born composer Arnold Schoenberg (1874–1951) and others have suggested the serial ordering of musical tones as part of a method of composing music, some composers have gone on to serialize other elements of music. In *Structures* for two pianos (I, 1952; II, 1961) by the French composer Pierre Boulez, serial elements include pitch (the actual tones sounded), rhythm, dynamics (volume levels), and attack (how notes are struck and released); in *Simon Says* (1972) by Beauregard Forth, serial elements include specific harmonies, melodies, metres (organizations of the beats or pulses), and key centres. Other composers who have written music that serializes more than the pitch element include the Catalonia-centred composer Roberto Gerhard, Austrian-American Ernst Krenek, and the German Karlheinz Stockhausen. The music of any serial composer is likely to differ greatly from that of any other serial composer, because serialism is a method or technique of composing that specifies by itself little about the total sound and style of a piece of music.

sericite, fine-grained variety of either of the silicate minerals muscovite and paragonite (*qq.v.*).

seriema, also called CARIAMA, South American bird of grasslands, constituting the family Cariamidae (order Gruiformes). There are two species, both restricted to southern central South America. The red-legged, or crested, seriema (*Cariama cristata*), with long legs and neck, stands about 60 centimetres (2 feet) tall. The beak and legs are red, and the plumage is brownish above and dull white beneath, with bluish skin around the eyes. It inhabits grasslands, but the nest is built in bushes or trees.



Crested seriema (*Cariama cristata*)
Painting by H. Douglas Pratt

The young are hatched covered with gray down. The seriema feeds on insects, snails, reptiles, and berries.

The black-legged, or Burmeister's, seriema (*Chunga burmeisteri*), sometimes called gray seriema, which inhabits wooded areas, is darker and grayer, with a shorter crest and shorter legs.

serine, an amino acid obtainable by hydrolysis of most common proteins, sometimes comprising 5 to 10 percent by weight of the total product. First isolated in 1865 from sericin, a silk protein, serine is one of several so-called nonessential amino acids for mammals; *i.e.,* they can synthesize it from glucose and do not require dietary sources.

Serine and some of its derivatives (*e.g.,* ethanolamine) are also important components of a class of lipids (phospholipids) found in biological membranes.

Seringapatam, also called SRIRANGAPATNAM, town, Mandya district, south central Karnātaka (formerly Mysore) state, southern India, at the western end of Seringapatam Island in the Cauvery River, just north-northeast of Mysore town. Named for its 12th-century temple dedicated to Śrī Raṅga (the Hindu god Vishnu), the town was fortified in the 15th century and became capital of the Mysore rajahs (1610) and of the sultans (1761). Haidar (Hyder) Ali and his son, Tippu (Tipu) Sultan, reigned when a treaty was concluded with the British (1792), who had successfully besieged the fort. During the Fourth Mysore War (1799), Tippu was killed and the fort again fell to the British.

The modern town caters to tourists who visit its 17th-century Hindu monuments as well as a large mosque (Jāmi' Masjid) built by Tippu Sultan. The Daria Daulat (1784), the Tippu's elaborate summer palace with murals of processions and battle scenes, is in the eastern suburb of Ganjām. Nearby Lal Bagh (Red Garden) contains the mausoleum where the two sultans are interred. Several islands nearby are part of Ranganthittoo Bird Sanctuary (1.6 sq mi [4.1 sq km]), home of the openbill stork, white ibis, night heron, and cattle egret. Pop. (1981) 18,137.

serjeanty, in European feudal society, a form of land tenure granted in return for the per-

formance of a specific service to the lord, whether the king or another. Serjeants included artisans, bailiffs within the lord's realm, domestic servants, and sometimes those who provided the lord with some form of military service. When land was not available, the serjeants were maintained in the lord's household. Those who were tenants were subject to many feudal dues but were relieved of paying taxes and performing certain labours.

Land held by serjeanty was not to be sold or divided among heirs, but in practice there was much alienation and subdivision. In England attempts were made in the 13th century to control these activities. As a result, the holders of the alienated portions were required to pay rent or do a quota of knight service, and the unalienated portion remained charged with the original duty. Later a fine was charged to serjeants who alienated their land without the king's permission.

Conflict and rivalry often occurred between serjeants and the lord's regular vassals, largely because the former were often of a lower class, quite often serfs, yet they had many of the rights and privileges of the free vassals. Many indeed were free, particularly in England, or became so by the 13th century, as in France.

The serjeants themselves were often divided into two well-defined groups. In England there was a grand serjeanty, a tenure so noble that it ranked socially above knight service, and a petty serjeanty, a tenure so meagre that it ranked with the peasants' tenure, called socage. In origin there was no distinction between serjeanties, but inevitably those bringing their holders into immediate contact with the sovereign acquired prestige and became known as grand serjeanties.

Serkin, Rudolf (b. March 28, 1903, Eger, Bohemia, Austria-Hungary [now in Czechoslovakia]), Austrian-born American pianist and teacher who concentrated on the music of J.S. Bach, W.A. Mozart, Ludwig van Beethoven, Franz Schubert, and Johannes Brahms.

A student of Richard Robert (piano) and of Joseph Marx and Arnold Schoenberg (composition), Serkin made his debut with the Vienna Symphony Orchestra at the age of 12. Following important performances in Berlin with the Busch Chamber Orchestra, he settled in Basel in 1926. In 1936 he gave his first American performance, and he moved to the United States permanently in 1939. Serkin served as director of the Marlboro Festival and as head of the piano department of the Curtis Institute in Philadelphia. He became known for his chamber music performances, which began during his association with Adolf Busch in the 1920s. His playing is characterized by faithfulness to the text and classical clarity.

Serlio, Sebastiano (b. Sept. 6, 1475, Bologna [Italy]—d. 1554, Fontainebleau, Fr.), Italian Mannerist architect, painter, and theorist, who introduced the principles of ancient Roman architecture into France.

Trained by his father as a painter, Serlio went to Rome in 1514, where he studied architecture under Baldassarre Peruzzi, one of the initiators of the Mannerist style of architecture. With the sack of Rome in 1527, he fled to Venice, where he remained until 1540, when King Francis I of France employed him as a consultant in the building of the palace of Fontainebleau. Only two extant structures, however, can be attributed to Serlio: a doorway at Fontainebleau and the chateau of Ancy-le-Franc, begun in 1546.

Although Serlio's buildings were not influential, his treatise *Tutte l 'opere d 'architettura, et prospetiva* (1537–75; "Complete Works on Architecture and Perspective") exerted immense influence throughout Europe. It was translated into English in 1611 and into other European languages. A hitherto unpublished manuscript of Book VI, text in Italian, edited by Myra Nan Rosenfeld, with commentary in English, was published in 1978 as *Sebastiano Serlio on Domestic Architecture: Different Dwellings from the Meanest Hovel to the Most Ornate Palace.*

The treatise was the first architectural handbook that emphasized the practical rather than the theoretical aspects of architecture, and it was the first to catalogue the five orders. Serlio was also the first to incorporate illustrations into an architectural handbook, using drawings of Peruzzi and Bramante, as well as his own. *Estraordinario libro,* the last book of the treatise to be published in his lifetime, contained 50 fanciful designs for doorways, which were much-copied in northern Europe and decidedly influenced the course of Mannerist architectural decoration. The international scope of this influence may be seen in such buildings as Wollaton Hall in England, the Ottheinrichsbau in Heidelberg, Ger., and the Palace of Charles V in Granada, Spain.

Serlio also made important contributions to scenography. Borrowing from Vitruvius, an ancient Roman writer on architecture, he divided sets into three types, tragic, comic, and satiric, and, believing that the five orders correspond to human psychological types, he specified the architectural motifs to be used in each. His ideas on scenography were widely disseminated in his treatise, which illustrated ideal scenes for the three types of sets.

Sermon on the Mount, a biblical collection of religious teachings and ethical sayings of Jesus of Nazareth, as found in Matthew, chapters 5–7. The sermon was addressed to disciples and a large crowd of listeners to guide them in a life of discipline based on a new law of love, even to enemies, as opposed to the old law of retribution. In the Sermon on the Mount are found many of the most familiar Christian homilies and sayings, including the Beatitudes and the Lord's Prayer (*qq.v.*).

serological test, any of several laboratory procedures carried out on a sample of blood serum, the clear liquid that separates from the blood when it is allowed to clot. The purpose of such a test is to detect serum antibodies or antibodylike substances that appear specifically in association with certain diseases. The various types of serological tests include: (1) Flocculation tests, of which the complement-fixation tests are the most common. They are based on the precipitation, or flocculation, that takes place when antibody and specially prepared antigens are mixed together. (2) Neutralization tests, which depend on the capacity of antibody to neutralize the infectious properties of the infectious organisms. (3) Hemagglutinin inhibition tests, which make use of the finding that certain viruses will cause the red blood cells of certain animal species to agglutinate (congeal, or clump together) and that this agglutination will be prevented by antibody.

Serological testing is particularly helpful in the diagnosis of rickettsial and viral diseases such as Rocky Mountain spotted fever, influenza, measles, poliomyelitis, and yellow fever, as well as of infectious mononucleosis and rheumatoid arthritis. As a practical mass-screening diagnostic tool, it has proved valuable in the detection of such conditions as syphilis. *See also* blood analysis.

Serooskerken, Isabella Agnetta Elisabeth van Tuyll van (Swiss novelist): *see* Charrière, Isabelle-Agnès-Elizabeth de.

serosa (embryology): *see* chorion.

serotine, any of certain known bat species. *See* brown bat.

serotonin, also called 5-HYDROXYTRYPTAMINE, a chemical substance that is derived from the amino acid tryptophan. It occurs in the brain, intestinal tissue, blood platelets, and mast cells and is a constituent of many venoms, including wasp venom and toad venom. Serotonin is a potent vasoconstrictor and functions as a neurotransmitter. It is localized in distinct regions of the brain, and changes in its concentration are connected with mental states such as depression. Some drugs, used as tranquilizers, cause liberation of serotonin from storage granules at nerve endings. The hallucinogenic compound LSD may act by inhibiting the action of serotonin.

Serov, formerly (until 1939) NADEZHDINSK, city, Sverdlovsk *oblast* (province), western Russian Soviet Federated Socialist Republic, on the Kakva River. The city developed in the 1890s into the largest pre-Revolutionary iron-working centre in the Urals, producing rails for the Trans-Siberian Railroad. Today, with a large, full-cycle iron and steel plant, it is the main centre of the northern Urals mining and metallurgical region. Pop. (1987 est.) 103,000.

Serowe, village, central Botswana, southern Africa. It lies southwest of Bulawayo, Zimbabwe, and 30 miles (50 km) northwest of the Cape-to-Zimbabwe railway. Most of the country's inhabitants live in large centralized villages of from 500 to 25,000 inhabitants.



Thatched huts in Serowe, Botswana
D. Rawson—Photo Researchers/EB Inc.

Serowe, the largest of these, is the traditional headquarters of the Bamangwato people. It consists primarily of clusters of round, traditional African houses surrounded by extensive compounds and gardens, the whole village in turn being surrounded by about 30 miles (50 km) of arable agricultural lands and cattle-grazing posts. Serowe was first occupied by the Bamangwato in 1920, after they had abandoned their earlier home in Palapye. One of Botswana's main hospitals and an airfield are located there. Pop. (1984 est.) 29,000.

Serpa Pinto (Angola): *see* Menongue.

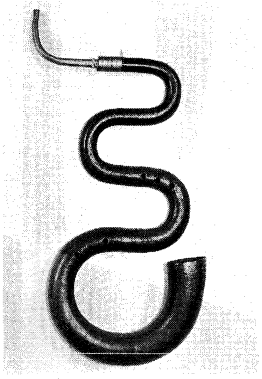
Serpa Pinto, Alexandre Alberto da Rocha de (b. April 20, 1846, Portugal—d. Dec. 28, 1900, Lisbon), Portuguese explorer and colonial administrator who crossed southern and central Africa on a difficult expedition and mapped the interior of the continent.

Serpa Pinto went to east Africa in 1869 on an exploration of the Zambezi River. Eight years later he led an expedition from Benguela, Angola, into the basins of the Congo and Zambezi rivers and investigated the country between the west-coast Portuguese colony of Angola and Mozambique on the east coast. When he completed the mission in 1879, he had traveled through Angola and parts of present-day Zambia, Zimbabwe, and Republic of South Africa. His expedition gave impetus to a scheme for a coast-to-coast Portuguese colony, but the plan was scrapped in 1888 after a British ultimatum. In 1887 he was named consul general to Zanzibar and, in 1889, governor-general of Mozambique.

serpent (zoology): *see* snake.

serpent, in music, a bass wind instrument sounded by the vibration of the lips against a cup mouthpiece. It was probably invented in 1590 by Edme Guillaume, a French canon of Auxerre, as an improvement on bass ver-

sions of the closely related cornett. It is made of wood in a serpentine curve 7 to 8 feet (2 to 2.5 m) long, and it has a conical bore and six finger holes. Originally it accompanied plainchant (Gregorian chant) in churches; from the 18th century, until superseded by brass basses in the 19th century, it was a standard wind bass in military bands. It possessed a



Serpent; in the Musée Instrumental du Conservatoire Royal, Brussels

By courtesy of the Musee Instrumental, Brussels; photograph, © A.C.L., Brussels

rich tone and wide dynamic range. It was the instrument of several early 19th-century virtuosos and was sometimes used in orchestras. In about 1800, keys were added, extending the player's reach and allowing higher notes to be produced. Metal serpents also appeared, as did bassoon-shaped versions. Serpents were played in some Spanish bands as late as 1884 and in a few rural French churches on into the early 20th century.

serpent star (invertebrate): *see* brittle star.

serpentine, any of a group of hydrous magnesium-rich silicate minerals. The composition of these common rock-forming minerals approximates $Mg_3Si_2O_5(OH)_4$. Serpentine generally occurs in three polymorphs: chrysotile (*q.v.*), a fibrous variety used as asbestos; antigorite, a variety occurring in either corrugated plates or fibres; and lizardite, a very fine-grained, platy variety. Named in allusion to its resemblance to a snake's skin, serpentine is usually grayish, white, or green but may be yellow (chrysotile) or green-blue (antigorite); the green colour is due to iron replacing magnesium.

Serpentine is formed below 500° C (930° F) by the addition of water and sometimes silica to various magnesium silicates, *e.g.*, forsterite or enstatite. It characteristically occurs along the crests and axes of great folds, such as island arcs or Alpine mountain chains. Typical occurrences are in altered peridotites, dunites, or pyroxenites; serpentinite is a rock consisting largely of serpentine. Serpentine takes a high polish and is sometimes used as an ornamental stone.

Serpotta, Giacomo (b. 1656, Palermo [Sicily]—d. 1732, Palermo), the outstanding member of a family of Italian sculptors and stuccoworkers. His methods for creating the illusion of perspective and his asymmetrical arrangements of two or more independent decorations became basic principles of the system of ornamentation used by German artists of the Rococo period.

In Palermo, Giacomo decorated the oratories of San Lorenzo (1690/98–1706), the oratory of San Zita (1668–1718), and the oratory of Rosario di San Domenico (1710–17), as well as the Palermo hospital chapel, the Archbishop's Palace in Santa Chiara, and the Badio Nuovo at Alcomo. His statues in San Francesco d'Assisi (1723) appear to be falling from air and not attached to the wall, even though all the figures, cupids, draperies, and garlands are on the same plane as the wall. He is credited with raising Sicilian stuccowork from a craft to an art.

Serpukhov, also spelled SERPUCHOV, city, Moscow *oblast* (province), western Russian Soviet Federated Socialist Republic, on the Nara River at its confluence with the Oka. Founded in 1374 as a stronghold protecting Moscow from attack by the Tatars, who sacked it in 1382 and 1408, modern Serpukhov is a major textile (cotton and artificial silk) city; engineering is also important. Pop. (1987 est.) 142,000.

Serra, Junípero, BLESSED (b. Nov. 24, 1713, Petra, Majorca, Spain—d. Aug. 28, 1784, Carmel, California, New Spain [now in U.S.]), Spanish Franciscan priest whose missionary work in North America earned him the title of Apostle of California.

After entering the Franciscan Order in 1730 and being ordained in 1738, Serra taught philosophy at Lullian University (Palma, Majorca). In 1750 he arrived in Mexico City for missionary work among the Indians, serving first in the Sierra Gorda missions from 1750 to 1758 and then in south-central Mexico from 1758 to 1767.

When Spain began its occupation of Alta California (present-day California), Serra joined the expedition's commander, Gaspar de Portolá. On July 16, 1769, he founded Mission San Diego, the first within the present state of California. From 1770 to 1782 he founded eight more Californian missions: Carmel, his headquarters, at Monterey, in 1770; San Antonio and San Gabriel (near Los Angeles), 1771; San Luis Obispo, 1772; San Francisco (Mission Dolores) and San Juan Capistrano, 1776; Santa Clara, 1777; and San Buenaventura, 1782. Serra's missions helped strengthen Spain's control of Alta California.

Serra's treatment of the Indians is debated. His advocates claim that he was a strenuous defender of the Indians and introduced to their lands the cattle, sheep, grains, and fruits of Mexico. Some 20th-century American Indians have charged that he enslaved their ancestors and was part of the colonial system.

Serra was beatified on Sept. 25, 1988.

Sérrai, also spelled SERRES, historically SIRIS, chief town and capital, *nomós* (department) of Sérrai, Macedonia, northern Greece. Sérrai is situated on the east bank of the fertile agricultural valley of the Struma River. The town was fortified by Byzantine emperors in their efforts to command the Rupel Pass into Bulgaria. Unsuccessfully besieged by Bulgarians in the 10th century, it was held by the Serbs (1345–71), who lost it to the Turks (1368), who in turn lost it to Bulgaria in 1913. Sérrai later passed into Greek territory, but the Bulgarians occupied it again during both World Wars I and II. In the late 20th century the town became a prosperous service centre for a labour-intensive manufacturing area built with foreign capital attracted by government incentives. Pop. (1981) 46,317.

Serrano (Spanish: "Mountaineer"), groups of Indians speaking a Uto-Aztecan language and originally inhabiting a mountainous region of southern California (U.S.). One group, the Kitanemuk, lived in the drainage area of the Kern and San Joaquin rivers; another group, the Vanyume, resided along the Mojave River; and a third group, the Serrano proper, held the San Bernardino Mountains and adjacent valleys and a portion of the Mojave Desert.

Little is known of the life of the Kitanemuk; and of the Vanyume of aboriginal times it can be said for certain only that they lived in a desert that offered a meagre existence.

The Serrano proper were somewhat more prosperous, though they too were hunter-gatherers living off the small game, acorns, piñon nuts, and berries of their semiarid environment. The Serrano were organized into clans or village communities, each clan having a hereditary chief and assistant chief.

The Serrano proper built circular, domed dwellings using willow branches covered with tule thatching. Most villages also had a ceremonial house where the chief lived, as well as a heated sweat house for cleansing one's body by sweating.

In the late 20th century there remained fewer than 400 Serrano proper.

Serrano y Domínguez, Francisco, DUQUE (duke) DE LA TORRE (b. Dec. 17, 1810, Cádiz, Spain—d. Nov. 26, 1885, Madrid), one of the chief military politicians of 19th-century Spain. He played an important part in the Revolution of 1868, which dethroned the Bourbon Spanish queen Isabella II.

Serrano joined the army at the age of 12 and fought with the forces of Isabella II against her uncle Don Carlos (First Carlist War, 1833–39). He later came to exercise influence on the queen but was eventually removed from court. He took part in the successful revolution by the moderate General Leopoldo O'Donnell in 1854. He served as captain general of Cuba (1859–62), and in 1867, upon the death of O'Donnell, Serrano succeeded him as head of the Liberal Union Party.

After the Revolution of 1868, Serrano became chief of the executive power, but political preeminence rested with Juan Prim y Prats, the prime minister. Serrano served as regent until January 1871, when Amadeus of Savoy became king. On Amadeus' abdication (February 1873) and the formation of the First Republic, Serrano went into exile in France. But, after the coup d'état of January 1874, Serrano again headed the government until he was once more driven into exile upon the accession of Alfonso XII in December 1874. Serrano decided to recognize Alfonso in 1881, and he resumed his political career. In 1884 he was named Spanish ambassador to Paris.

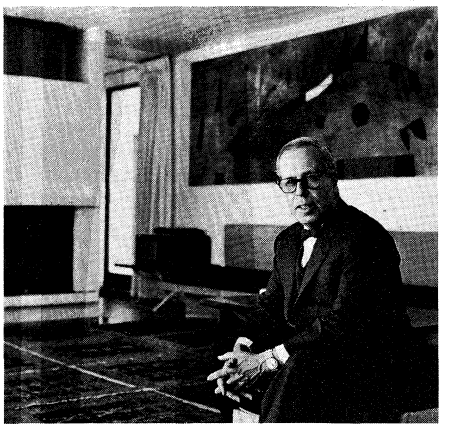
Serravalle, town in the northeastern part of the Republic of San Marino. Serravalle is located on the Ausa Stream at an elevation of 485 feet (148 m) above sea level. It is the manufacturing centre of the republic and has industries producing textiles, ceramics, and metalwork. Serravalle was given to the republic in 1463 by Pope Pius II in return for San Marino's help in opposing Sigismondo Pandolfo Malatesta, tyrant of Rimini, who had taken part in all the wars of Renaissance Italy from 1433 to 1464, mostly for purposes of self-aggrandizement. The castle of the Malatesta family, who ruled Rimini in the Middle Ages, still stands in the town. A highway connects Serravalle with Rimini, Italy, and with the city of San Marino, the republic's capital. Pop. (1988 est.) Serravalle/Dogano, 4,619.

Serres (city, Greece): *see* Sérrai.

Sert, José Luis, Catalan JOSEP LLUIS SERT (b. July 1, 1902, Barcelona—d. March 15, 1983, Barcelona), Spanish-born American architect particularly noted for his accomplishments in city planning and urban development.

After graduation from the Escuela Superior d'Arquitectura, Barcelona (1929), Sert worked with Le Corbusier and Pierre Jeanneret in Paris. From 1929 to 1937 he had his own architectural office in Barcelona; works from the period include apartment houses in Barcelona, weekend houses in Garraf, and a master plan for the city of Barcelona. He designed the Spanish pavilion at the Paris World's Fair (1937) in collaboration with Joan Miró, Alexander Calder, and Pablo Picasso.

With the fall of Spain's Republican government in 1939, Sert moved to the United States and from 1941 to 1956 was a partner in Town Planning Associates, a New York City firm that engaged in city planning and urban design for a number of new or existing South



Sert
Hans Namuth

American cities, including Bogotá and other Colombian cities, Chimbote in Peru, Ciudad dos Motores in Brazil, and Havana. Sert's master plans for these sites were notable for their integration of natural landscape features into the urban building scheme. Sert made prominent use of patios and other aspects of Mediterranean architecture in his innovative designs for large groupings of houses. From 1947 to 1956 Sert was president of CIAM (Congrès Internationaux d'Architecture Moderne). He became a U.S. citizen in 1951. In 1953 he was appointed dean of the Graduate School of Design and professor of architecture at Harvard University, a position he held until his retirement in 1969.

Sert's importance in the field of comprehensive multifamily housing rivals that of Le Corbusier. A notable example of the work carried out by his Cambridge, Mass., architectural office is the Peabody Terrace Married Students' Housing at Harvard (1963–65), in which a cluster of high-rise and low-rise apartment buildings are harmoniously connected with each other. Two outstanding examples of museum design by Sert are the Maeght Foundation (1968) at St.-Paul-de-Vence on the French Riviera and the Miró Centre for the Study of Contemporary Art, Barcelona (1972–75), which houses works by Miró.

sertão (Portuguese: "backwoods," or "bush"), dry interior region of northeastern Brazil that is largely covered with *caatingas* (scrubby upland forests). *Sertão* is also used to refer to the sparsely populated wilderness beyond areas of permanent settlement and may be equated with the Canadian "bush," the U.S. "backwoods," or the Australian "Outback."

Sertorius, Quintus (b. *c.* 123 BC, Nursia, Sabini—d. 72 BC), Roman statesman and military commander who, defying the Roman Senate, became independent ruler of most of Spain for eight years.

After acquiring some reputation in Rome as a jurist and orator, Sertorius fought in Gaul against the invading Cimbri and Teutons (105 and 102) and in 97 served in Spain. In 90 he was quaestor in Cisalpine Gaul and commanded an army in the Social War.

During the civil war (87–86) between the supporters of Lucius Cornelius Sulla and Gaius Marius, Sertorius supported Marius and was prominent in the latter's successful seizure of Rome. Sertorius was praetor in 83 and was assigned the Spanish provinces, for which he left immediately. When Sulla sent two legions against him, Sertorius retreated to Mauretania. Sertorius returned to Spain in 80, and his bravery and eloquence gained him the allegiance of the Lusitanians as well as of many Roman refugees and deserters. With these forces he was able to overthrow the Sullan governor of Farther Spain, Quintus Metellus Pius. Sertorius was the ruler of all Nearer Spain and most of Farther Spain by the end of 77. He was soon joined by M. Perperna and other armed supporters of the unsuccessful anti-Sullan rebel Marcus Lepidus. In 77 a Roman army under Gnaeus Pompey arrived to reestablish the Senate's control in Spain. For several years Sertorius skillfully kept the armies of both Pompey and Metellus Pius at bay and retained his rule over Spain. In 74, however, the tide began to turn against Sertorius. The Iberians' morale declined, and Sertorius, driven to harsh measures to maintain order, lost popularity. In 72 he was murdered in a conspiracy headed by Perperna and other officers jealous of his authority.

Sertorius was in revolt perhaps less against Rome than against the constitution Sulla had imposed on Rome. He established in Spain a senate of 300 members drawn mainly from Roman immigrants but probably including a few Spaniards. Strict and severe with his soldiers, he was considerate of the local inhabitants. He was accompanied everywhere by a white fawn, which, while supposedly communicating to him the advice of the goddess Diana, served to promote his popularity among the superstitious tribesmen.

serum, blood: *see* blood serum.

serum albumin, protein that accounts for 55 percent of the total protein in blood plasma. Its major function is to help maintain the osmotic pressure between the blood vessels and tissues. Circulating blood tends to force fluid out of the blood vessels and into the tissues, where it results in edema (swelling from excess fluid). The colloid nature of albumin and, to a lesser extent, of other blood proteins called globulins, keeps the fluid within the blood vessels. Albumin also contains two materials necessary for the control of blood clotting: (1) antithrombin, which keeps the clotting enzyme thrombin from working unless needed, and (2) heparin cofactor, which is necessary for the anticlotting action of the acid heparin. The albumin level falls and rises in such liver disorders as cirrhosis or viral hepatitis. Transfusions of albumin are used to combat shock and whenever it is necessary to remove excess fluid from the tissues. Similar albumin compounds with other functions occur in plants, animal tissues, egg whites, and milk.

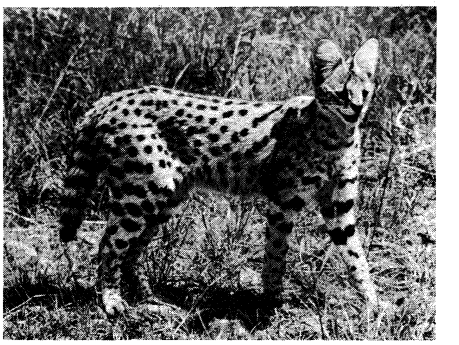
serum sickness, allergic reaction to animal serum, or antiserum, injected into an individual's blood to provide immunity against such illnesses as tetanus, botulism, and snake-venom poisoning. Symptoms include skin eruption, itching, swelling of the face and extremities, fever, joint pain and sometimes swelling, abdominal pain, nausea, and vomiting; severe cases may also show neurological symptoms.

The disorder arises when the patient's antibodies attack the animal serum's proteins as they would any foreign invader, forming antigen–antibody complexes that lodge in the blood-vessel walls. Complement, a series of blood proteins, is then activated, causing inflammation. Serum sickness develops within two weeks of serum injection and usually lasts only a few days. Its severity depends on both the amount of serum injected and the previous immune state of the patient; sensitized patients react more quickly than those producing antibodies for the first time. Also, persons with a history of allergy are more likely than normal persons to develop serum sickness.

Sérusier, (Louis-)Paul(-Henri) (b. 1863?, Paris—d. Oct. 6, 1927, Morlaix, Fr.), French artist who was a Postimpressionist painter and theorist.

Originally a student of philosophy, Sérusier decided to become an artist and attended the Académie Julian (1886) in his native Paris. He painted with Paul Gauguin in Brittany at Pont-Aven (1888) and at Le Pouldu (1889–90), and in the 1890s he was associated with the Nabis—many of whom he had known at the Académie Julian—especially as the movement's theorist. After visiting (1897, 1903) the school of religious art at the Benedictine abbey of Beuron in Germany, Sérusier became deeply influenced by their concepts of religious symbolism and sacred proportions. Retiring to Brittany in 1914, he became known as a mystic and his work in this period as a theorist is usually regarded as more important than his paintings. In his earlier works depicting the peasants of Brittany, he achieved a muted, contemplative mood by using firm contours and blocks of unmodulated colour.

serval (*Felis serval*), long-limbed cat, family Felidae, found in Africa south of the Sahara, especially in grass- and bush-covered country near water. A swift, agile cat, the serval climbs and leaps very well. It is a nocturnal hunter



Serval (*Felis serval*)
Christina Loke—Photo Researchers

preying on birds and small mammals such as rodents and hares.

The serval is a slender cat with a long neck, small head, and large, slightly cupped ears. The adult is 80 to 100 centimetres (32 to 40 inches) long, the tail accounting for an additional 20–30 cm. It stands about 50 cm at the shoulder and weighs about 15 kilograms (33 pounds). The coat is typically long and whitish on the underparts and yellowish to reddish brown above, liberally marked with black spots and stripes. These bold markings are replaced by smaller spots or specks on some individuals, which are known as servaline cats and were once considered a distinct species (*Felis brachyura* or *servalina*). All-black individuals are found in some populations, especially those from the high country of Kenya.

The female serval normally bears a litter of two to four kittens; the gestation period has been given as 68 to 74 days.

Servan-Schreiber, Jean-Jacques (b. Feb. 13, 1924, Paris), French journalist and politician.

Servan-Schreiber volunteered in the Free French Army forces of Charles de Gaulle as a fighter pilot in 1943 and received the Cross of Valor for his services. After serving as foreign affairs editor of the Paris daily paper *Le Monde* (1948–53), he founded and managed (1953–70) *L'Express,* a moderately left-wing weekly news magazine modeled on *Time.* The publication of *L'Express* was halted temporarily in 1954 when the magazine printed a top-secret government report. Servan-Schreiber was inducted into the army in 1956 but was court-martialed upon the publication of his first book, *Lieutenant en Algérie* (1957; *Lieutenant in Algeria*), which exposed French atrocities in the war. The book was later credited with helping turn French public opinion against the Algerian conflict. In *Le Défi américain* (1967; *The American Challenge*) he warned against Europe's becoming merely an economic colony of the United States.

Servan-Schreiber was secretary general of the Radical Party (1969–71) and president (1971–75, 1977–79). His *Ciel et terre: Manifeste radical* (1970; *The Radical Alternative,* 1970) is a party manifesto. Elected as a deputy to the National Assembly in 1970, he served briefly as minister of reforms in the government of Pres. Valèry Giscard d'Estaing but was ousted for opposing government policy on nuclear testing.

Servan-Schreiber founded the Mouvement Réformateur ("Reform Movement") in 1972 with Jean Lecanuet and once again served briefly as minister of reforms in June 1974. He was president of the Regional Council of Lorraine from 1976 to 1978, and in 1979 he founded the Groupe de Paris ("Paris Group"), in conjunction with which he published *Le Défi mondial* (1980; *The World Challenge,* 1980). He also continued in the 1970s to be associated with the direction of *L'Express.*

Other publications of Servan-Schreiber include *Les Réveil de la France* (1968; *The Spirit of May,* 1969), a collection of editorials examining causes of the student uprisings in France in 1968; *Forcer le destin* (1970; "Forcing Destiny's Hand"); *Le pouvoir régional* (1971; "Regional Power"); *Appel à la reforme* (1971; "A Call to Reform"); *L'arme de la confiance* ("The Weapon of Confidence"); and *Le manifeste* (1977; "The Manifesto").

Servandoni, Giovanni Nicolo, also called JEAN-NICOLAS SERVANDO, OR SERVANDON (b. May 2, 1695, Florence—d. Jan. 19, 1766, Paris), theatrical designer and architect famous for his Baroque stage sets and for his proto-Neoclassical plan for the facade of the church of St.-Sulpice in Paris (1732).

Probably born of Italian parents, Servandoni is considered a French artist, although his training was in Rome with the painter Giovan Paolo Panini and the architect Giuseppe Rossi. After his apprenticeship he went to Lisbon to design scenery for the theatre. He settled in Paris in 1724, working there as both architect and stage designer, and made the French capital his home; his career, however, took him to many of the capitals of Europe including London (1749), and Vienna (1760).

Servants of India Society, society founded by Gopal Krishna Gokhale in 1905 to unite and train Indians of different races and religions in welfare work. It was the first secular organization in that country to devote itself to the underprivileged, rural and tribal people, emergency relief work, the increase of literacy, and other social causes.

Members go through a five-year training period and agree to serve on extremely modest salaries. In 1915 Gokhale was succeeded as president by Srinivasa Sastri (1869–1946). The organization has its headquarters in Poona (Pune) and branches in Madras, Bombay, Allāhābād, and Nāgpur. Though the number of members has always been few, the society has been influential in its demonstration of the ideals of social service.

Servants of Mary, Order of the: *see* Servite.

Servetus, Michael, Spanish MIGUEL SERVETO (b. 1511?, Villanueva or Tudela, Spain—d. Oct. 27, 1553, Champel, Switz.), Spanish physician and theologian whose unorthodox teachings led to his condemnation as a heretic by both Protestants and Roman Catholics and to his execution by Calvinists from Geneva.

While living in Toulouse, Fr., Servetus studied law and delved into the problem of the Trinity. In February 1530 he accompanied his patron, the Franciscan Juan de Quintana, to the coronation of Emperor Charles V at Bologna. Distressed by papal ostentation and



Servetus, detail from an engraving by Carl Sichem

By courtesy of the National Library of Medicine, Bethesda, Md.

by the Emperor's deference to the worldly pope, he left his patron and visited Lyon, Geneva, and Basel. At Basel and Strasbourg he met with Reformation leaders John Oecolampadius, Martin Bucer, and Kaspar Schwenckfeld. Servetus published his new ideas on the Trinity in *De Trinitatis erroribus libri vii* (1531), attacking the orthodox teaching and attempting to form a view of his own, asserting that the Word is eternal, a mode of God's self-expression, whereas the Spirit is God's motion or power within the hearts of men. The Son is the union of the eternal Word with the man Jesus. Although both Catholics and Protestants may have had difficulty following Servetus' involved speculations, what he proposed was clearly odious to them. He therefore published a revised formulation, *Dialogorum de Trinitate libri ii* (1532).

Moving to Lyon under the name Villanovanus, Servetus edited scientific works and published a translation of Ptolemy's *Geographia.* About 1534 a rendezvous was arranged with John Calvin in Paris to discuss theological questions, but Servetus failed to arrive.

Four years later he published a work on astrology, maintaining that the stars influenced health; despite attacks by the medical faculty, he matriculated in medicine at Paris in 1538 and subsequently became physician to the Archbishop at Vienne, Fr. Servetus remained outwardly a conforming Catholic while pursuing his private theological studies. He soon published at Lyon his most important work, *Biblia sacra ex Santis Pagnini tra[ns]latione* (1542), notable for its theory of prophecy.

Servetus forwarded the manuscript of an enlarged revision of his ideas, the *Christianismi Restitutio,* to Calvin in 1546 and expressed a desire to meet him. After their first few letters, Calvin would have nothing more to do with him and kept the manuscript. He declared to his eloquent French preacher colleague Guillaume Farel that if Servetus ever came to Geneva he would not allow him to leave alive.

A rewritten version of Servetus' manuscript was secretly printed in 1,000 copies at Vienne in 1553. In discussing the relationship between the Spirit and regeneration in that book, Servetus almost incidentally made known his discovery of the pulmonary circulation of blood. In the book, Servetus argued that both God the Father and Christ his Son had been dishonoured by the Constantinian promulgation of the Nicene Creed, thus obscuring the redemptive role of Christ and bringing about the fall of the church; Servetus felt he could restore the church by separating it from the state and by using only those theological formulations that could be proved from Scripture and the pre-Constantinian fathers.

When some of Servetus' letters to Calvin fell into the hands of Guillaume de Trie, a former citizen of Lyon, he exposed Servetus to the inquisitor general at Lyon. Servetus and his printers were seized. During the trial, however, Servetus escaped, and the Catholic authorities had to be content with burning him in effigy. He quixotically appeared in Geneva and was recognized, arrested, and tried for heresy from Aug. 14 to Oct. 25, 1553. Calvin played a prominent part in the trial and pressed for execution, although by beheading rather than by fire. Despite his intense biblicism and his wholly Christocentric view of the universe, Servetus was found guilty of heresy, mainly on his views of the Trinity and Baptism. He was burned alive at Champel on October 27. His execution produced a Protestant controversy on imposing the death penalty for heresy, drew severe criticism upon John Calvin, and influenced Laelius Socinus, a founder of modern unitarian views.

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Service, Elman Rogers (b. May 18, 1915, Tecumseh, Mich., U.S.), U.S. anthropological theorist and formulator of the nomenclature now in standard use to categorize primitive societies as bands, tribes, chiefdoms, and states. Although widely accepted, the system has been abandoned by Service himself because his subsequent research made him question the accuracy of the terminology, especially in the case of "tribe." His examination of cultural evolution in Paraguay and his studies of cultures elsewhere in Latin America and the Caribbean led to a series of books on social systems and the rise of the state.

Service received his Ph.D. from Columbia University (1950). He served on the anthropology faculty there (1949–53), as well as at the University of Michigan (1953–69) and the University of California, Santa Barbara (from 1969). He is the author of *A Profile of a Primitive Culture* (1958; rev. ed. published as *Profiles in Ethnology,* 1971) and co-editor, with Marshall D. Sahlins, of *Evolution and Culture* (1960). Other works include *Primitive Social Organization* (1962), *The Hunters* (1966), *Cultural Evolutionism* (1971), and *Origins of the State and Civilization* (1975).

Service, Robert W(illiam) (b. Jan. 16, 1874, Preston, Lancashire, Eng.—d. Sept. 11, 1958, Lancieux, Fr.), popular verse writer called "the Canadian Kipling" for rollicking ballads of the "frozen North," notably "The Shooting of Dan McGrew."

He emigrated to Canada in 1894 and, while working for the Canadian Bank of Commerce in Victoria, B.C., was stationed for eight years in the Yukon. He was a newspaper correspondent for the Toronto *Star* during the Balkan Wars of 1912–13 and an ambulance driver and correspondent during World War I.

Service's first verse collections, *Songs of a Sourdough* (1907) and *Ballads of a Cheechako* (1909), describing life in the Canadian north, were enormously popular. Among his later volumes of verse are *Rhymes of a Red Cross Man* (1916) and *Bar Room Ballads* (1940). *The Trail of '98* (1910) is a vivid novel of men and conditions in the Klondike. He also wrote two autobiographical works, *Ploughman of the Moon* (1945) and *Harper of Heaven* (1948). From 1912 he lived in Europe, mainly on the French Riviera.

service club, an organization, usually composed of business and professional men or women, that promotes fellowship among its members and is devoted to the principle of volunteer community service. The idea of the service club originated in the United States and has had its greatest popularity there, though service clubs now exist in many other countries and are often linked in international associations.

All service clubs have high-principled mottoes and creeds, such as Rotary International's "Service Above Self." About half of these

clubs are in semirural communities and have memberships of less than 50. Most hold a luncheon or dinner meeting each week. The larger service organizations publish magazines that report their activities and also carry articles of general interest by well-known writers. Many of the service organizations have clubs in more than one country.

The idea of creating a civilian service club originated in 1905 with Paul P. Harris, a young attorney in Chicago. His plan of organization envisioned all the essential features of the present-day service club and included the classification principle that restricts membership in a given club to a quota from each business or profession. Because meetings were to be held in rotation in members' offices, Harris proposed the name Rotary. Growth was rapid. With the formation of clubs in Winnipeg, Man., Dublin, and London, the name International Association of Rotary Clubs was adopted but was replaced in 1922 by the name Rotary International. In the late 1970s there were more than 17,350 Rotary clubs in 152 countries, with a total membership exceeding 811,000.

Other clubs of somewhat similar design followed in rapid succession. In 1915 Kiwanis (International) was organized in Detroit, the name being derived from Indian lore suggesting self-expression. Kiwanis clubs may select two members from each business or profession. The International Association of Lions Clubs was organized in Dallas, Texas, in 1917. Lions clubs adopted more lenient rules for admission and did not follow the classification principle rigidly. As a result, their membership increased rapidly, and the Lions soon became one of the largest of the service-club organizations.

Other large service clubs include Sertoma (International), 1912; Gyro (International), 1912; National Exchange Club, 1917; Optimist (International), 1919; Civitan (International), 1920; Ruritan (National), 1928; and Cosmopolitan (International), 1933. Major women's service clubs include Altrusa (International), 1917; Quota (International), 1919; Zonta (International), 1919; Soroptimist (International), 1921; and Pilot Club, 1921.

It is estimated that each year service clubs carry on several hundred thousand local community projects, ranging in complexity from sponsoring bazaars to building and equipping hospitals or summer camps for underprivileged children.

service industry, an industry in that part of the economy that creates services rather than tangible objects. Economists divide all economic activity into two broad categories, goods and services. Goods-producing industries are agriculture, mining, manufacturing, and construction; each of them creates some kind of tangible object. Service industries include everything else: banking, communications, wholesale and retail trade, all professional services such as engineering and medicine, nonprofit economic activity, all consumer services, and all government services, including defense and administration of justice.

The proportion of the world economy devoted to services has been rising for hundreds of years, most notably since the beginning of the 20th century. A services-dominated economy is characteristic of developed nations, while less developed nations tend to employ more people in "primary" activities such as agriculture. In the United States, for example, the service sector in 1929 accounted for only 54 percent of the gross national product, whereas in 1978 service industries accounted for about 66 percent of the gross national product. This rapid growth did not occur because goods production declined but rather because the total gross national product increased nearly fivefold, with most of the increase attributable to services.

The simplest explanation for the growth of service industries is that goods production has become increasingly mechanized. Because machines allow a smaller work force to produce more tangible goods, the service functions of distribution, management, finance, and sales become relatively more important. Growth in the service sector also results from a large increase in government employment.

For international statistical data on the service sector and component service industries, *see* the *Britannica World Data* section in the BRITANNICA WORLD DATA ANNUAL.

Servilia (b. *c.* 100 BC), mistress of Julius Caesar, mother to his murderer Marcus Brutus, and one of the grandes dames of Rome's late republican period.

Servilia was the daughter of Quintus Servilius Caepio and Livia. Servilia was first wed to Marcus Junius Brutus, by whom she bore the younger Brutus in 85 BC. She was then married to Decius Junius Silanus (consul in 62 BC) from 77 to 61 BC, by whom she had three daughters.

She was Caesar's favourite mistress for a period of 20 years. He appears to have been captivated more by her cleverness than by her physical beauty. It was rumoured that her son Brutus was actually by Caesar, but this is unlikely as the two men were born only 15 years apart. The irony of her relation to Caesar is compounded in that Tertia, a daughter by her first marriage, was the wife of Cassius, another of the principal conspirators against Caesar.

Caesar gave Servilia several estates confiscated following the civil wars. She survived to see not only Caesar's death but also that of Brutus, whose ashes Antony sent her after Brutus committed suicide following the Battle of Philippi (42 BC).

Servite, member of ORDER OF THE SERVANTS OF MARY (O.S.M.), a Roman Catholic order of mendicant friars—religious men who lead a monastic life, including the choral recitation of the liturgical office, but do active work—founded in 1233 by a group of seven cloth merchants of Florence. These men, known collectively as the Seven Holy Founders, left their families and occupations to withdraw outside the gates of Florence and live a life of poverty, penance, and fellowship. In 1241 a part of the group departed for Monte Senario, about 12 miles (19 kilometres) from the city, where they continued their penitential life but lived in greater solitude as hermits. Gradually there developed a desire within these two communities for official recognition, and in 1256 the order was approved by Pope Alexander IV.

The Servites' apostolic work consists primarily in preaching, administering parishes, giving missions, and in fostering devotion to Mary, especially under the title of Our Lady of Sorrows. The Servite family also includes sisters, traditionally known as Mantellate Sisters, engaged in many active works, and nuns devoted entirely to prayer within the monastery.

Servite Founders, Seven: *see* Seven Holy Founders.

servitude, in property law, the obligation or burden attached to certain land for the advantage or benefit of other land. The concept is derived from Roman law and is similar to easement in English common law, except that servitude refers to the burden owed, whereas easement refers to the benefit derived from the servitude. The land burdened with the servitude is referred to as the servient tenement, and the land "served" by the servitude is the dominant tenement. Land servitudes are either personal or real. Personal servitudes are burdens or obligations owed to a certain person, and, when that person dies, the servitude is extinguished. Real servitudes are obligations owed to land of another, the servitude having been created for the benefit of that land; the servitude is a property right attached to the dominant tenement, generally passing with the land when it is conveyed or devised.

European civil law divides real servitudes into rural and urban servitudes, having reference to the nature of the obligation rather than the location of the servitude. Rural servitudes include various rights of way; urban servitudes include building rights, such as rights of support, rights of view, and rights of sewer.

Servitudes may be either positive or negative. A positive servitude obligates a landowner to allow a certain use of his property by another. A negative servitude obligates a landowner to refrain from making a certain use of his property, which will serve some benefit to the owner of the dominant tenement. *See also* restrictive covenant.

Servius (ancient Roman personal name, or praenomen): *see under* gens or family name or honorific (*e.g.*, under Galba for Servius Sulpicius Galba), except as below.

Servius, in full MARIUS, or MAURUS, SERVIUS HONORATUS (fl. 4th century AD, Rome), Latin grammarian, commentator, and teacher, author of a valuable commentary on Virgil.

As an *adulescens* Servius was one of the speakers in the *Saturnalia* of Ambrosius Theodosius Macrobius, and at least the greater part of his life was spent in Rome. His commentary on Virgil is extant in two versions, a longer and a shorter. The longer and anonymous version, first printed in 1600 in an edition by Pierre Daniel, consists of Servius' own work—somewhat altered—in which he sought to meet the needs of schools and paid special, but not exclusive, attention to grammatical and stylistic points. With it are incorporated some valuable additions, in the main from a commentary—perhaps those parts of the commentary by Aelius Donatus which were not used by Servius—which mostly concern Virgil's rhetoric, mythology, and subject matter. These are a precious source of knowledge about Roman antiquities.

Servius Tullius (fl. 578–534 BC), traditionally the sixth king of Rome, who is credited with the Servian Constitution, which divided citizens into five classes according to wealth. This attribution may be a reading back into the uncertain past of reforms that were not effected until a much later date. He is also credited, probably incorrectly, with introducing silver and bronze coinage.

According to one tradition, Servius was Etruscan, but other versions suggest that he was Latin. He founded the earliest and most important shrine of the Latin deity Diana on the Aventine Hill. A crucial treaty between Rome and the Latin League is also assigned to his reign. The Servian Wall surrounding Rome, ascribed to this period, dates, however, from the 4th century BC.

In legend he was born a slave in the household of the fifth (traditional) king, Tarquinius Priscus, whose daughter he married and whom he succeeded by the contrivance of his mother-in-law, Tanaquil, who had prophetic powers and saw his greatness. Servius was eventually killed by his daughter and her husband, the seventh king, Lucius Tarquinius Superbus.

servomechanism, automatic device used to correct the performance of a mechanism by means of an error-sensing feedback. The term servomechanism properly applies only to systems in which the feedback and error-correction signals control mechanical position or velocity. Servomechanisms were first used in gunlaying and in fire-control and marine-navigation equipment. Today, applications of servomechanisms include their use in automatic machine tools, satellite-tracking antennas, celestial-tracking systems on telescopes,

automatic navigation systems, and antiaircraft-gun-control systems.

In many applications, servomechanisms allow high-powered devices to be controlled by signals from devices of much lower power. The operation of the high-powered device results from a signal (called the error, or difference, signal) generated from a comparison of the desired position of the high-powered device with its actual position. The ratio between the power of the control signal and that of the device controlled can be on the order of billions to one.

All servomechanisms have at least these basic components: a controlled device, a command device, an error detector, an error-signal amplifier, and a device to perform any necessary error corrections (the servomotor). In the controlled device, that which is being regulated is usually position. This device must, therefore, have some means of generating a signal (such as a voltage), called the feedback signal, that represents its current position. This signal is sent to an error-detecting device. The command device receives information, usually from outside the system, that represents the desired position of the controlled device. This information is converted to a form usable by the system (such as a voltage) and is fed to the same error detector as is the signal from the controlled device. The error detector compares the feedback signal (representing actual position) with the command signal (representing desired position). Any discrepancy results in an error signal that represents the correction necessary to bring the controlled device to its desired position. The error-correction signal is sent to an amplifier, and the amplified voltage is used to drive the servomotor, which repositions the controlled device.

A typical system using a servomechanism is the communications-satellite-tracking antenna of a satellite Earth station. The objective is to keep the antenna aimed directly at the communications satellite in order to receive and transmit the strongest possible signal. One method used to accomplish this is to compare the signals from the satellite as received by two or more closely positioned receiving elements on the antenna. Any difference in the strengths of the signals received by these elements results in a correction signal being sent to the antenna servomotor. This continuous feedback method allows a 30-metre (98-foot), multi-ton antenna to be aimed at a satellite 37,007 km (23,000 miles) above the Earth to an accuracy measured in hundredths of a centimetre.

Consult the INDEX *first*

sesame, also called BENNE, erect, annual plant (*Sesamum indicum*) of many types and varieties belonging to the family Pedaliaceae, cultivated since antiquity for its seeds, which are used as food and flavouring and from which a prized oil is extracted. The whole seed is used extensively in Middle Eastern and Asian cuisines. Halvah is a confection made of crushed and sweetened sesame seeds. In Europe and North America the seeds are used to flavour and garnish various foods, particularly breads and other baked goods. The aroma and taste of sesame seed are mild and nutlike. The chief constituent of the seed is its fixed oil, which usually amounts to about 44 to 60 percent. Noted for its stability, the oil resists oxidative rancidity. It is used as a salad or cooking oil, in shortening and margarine, and in the manufacture of soaps, pharmaceuticals, and lubricants. Sesame oil is used as an ingredient in cosmetics. The press cake remaining after the oil is expressed is highly nutritious.



Sesame (*Sesamum indicum*)
Shunji Watari—EB Inc.

Probably originating in Asia or East Africa, sesame is now found in most of the tropical, subtropical, and southern temperate areas of the world. Before the time of Moses, the Egyptians used the ground seed as grain flour. The Chinese used it 5,000 years ago, and for centuries they have burned the oil to make soot for the finest Chinese ink blocks. The Romans ground sesame seeds with cumin to make a pasty spread for bread. Once it was thought to have mystical powers, and sesame still retains a magical quality, as shown in the expression "open sesame," from the *Arabian Nights* tale of "Ali Baba and the Forty Thieves."

Depending on conditions, varieties grow from about 0.5 to 2.5 m (2 to 9 feet) tall; some have branches, others do not. One to three flowers appear in the leaf axils. Hulled seeds are creamy or pearly white and about 3 mm (0.1 inch) long and have a flattened pear shape. The seed capsules open when dry, allowing the seed to scatter. Considerable hand labour is needed in harvesting to prevent loss. With the development of a nonscattering variety in the mid-20th century, mechanized harvesting of the crop was made possible.

Seshāchalam Hills, hill ranges of the eastern Ghāts, southern Andhra Pradesh state, southeastern India. Formed in the Precambrian time (3.8 billion to 570 million years ago), the ranges contain sandstone and shale interbedded with limestone, are highly dissected, and have a number of longitudinal valleys. Bounded by Rayalaseema uplands in the northeast and the Nandyāl Valley (formed by the Kunderu River) in the southeast, Seshāchalam extends over approximately 3,000 square miles (8,000 square km). The general trend of the hills is east-southeast. The Seshāchalam Hills, together with the Erramala Range to the northeast, vary in elevation from 1,300 feet (400 m) to 4,500 feet (1,370 m). Hill slopes have only a thin forest cover because of scanty rainfall. Tributaries of the Krishna River drain the region. The ruggedness of the topography, the infertility of the soils, and the semiarid climate restrict agriculture. Jowar (sorghum) and peanuts (groundnuts) are the major crops. Asbestos, barite, and limestone are worked; handloom weaving, bamboo working, and brickmaking are the only other economically significant activities. Pulivendla is the only important town.

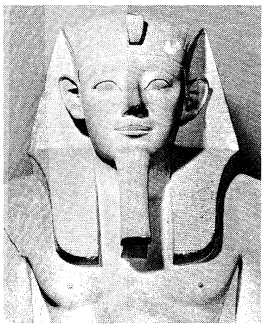
Seshego, town, former capital (replaced by Lebowakgomo in 1974) of the nonindependent black state of Lebowa, northern Transvaal, South Africa, directly northwest of Pietersburg. The largest town in Lebowa, it contains industries producing food, beverages, tobacco, textiles, wearing apparel, leather goods, wood and wood products, fabricated metal products, machinery, and equipment. Many of Seshego's inhabitants commute to Pietersburg for employment. Pop. (1979 est.) 38,590.

Sesostris (Greek), Egyptian SENUSRET, also spelled SENUSRIT, USERTESEN, or USIRTESEN, name of kings of Egypt grouped below chronologically and indicated by the symbol •.

• **Sesostris I** (fl. 20th century BC), king of Egypt (reigned 1918–1875 BC) who succeeded his father after a 10-year coregency and brought Egypt to a peak of prosperity.

Associated on the throne in 1928 BC with his aging father, Amenemhet I, who founded the 12th dynasty, Sesostris assumed the more rigorous duties of rule. While his father completed his domestic reforms, Sesostris undertook the conquest of Nubia, to the south of Egypt, and in the year 30 of his father's reign he led an expedition against the Libyans in the Western Desert.

While returning victorious from Libya, Sesostris learned of his father's assassination. Leaving the army, he hurried to the capital to seize his inheritance. He undertook a political consolidation by disseminating his father's testament, *The Instructions of Amenemhet,* a document that stressed his father's good deeds and the conspirators' baseness and reaffirmed Sesostris' right to the throne.



Sesostris I, detail of a limestone statue, *c.* 1930 BC; in the Egyptian Museum, Cairo
By courtesy of the Egyptian Museum, Cairo; photograph, Hirmer Fotoarchiv, Munchen

Once securely in power, Sesostris continued the conquest of Nubia. Establishing an operational base at Elephantine (modern Aswān), in the year 18 of his reign, he thoroughly subjugated Nubia and established forts with garrisons at strategic points. The governor of Elephantine, the king's own appointee, became responsible for the new territory. After the war the exploitation of Nubia's resources began. Gold, copper, amethysts, and diorite were extracted at several sites, and inscriptions by the leaders of expeditions and inspectors attest much activity.

Within Egypt, Sesostris worked the granite quarries at Aswān and gold mines and quarries in the Wādī Ḥammāmat, east of Coptos in Upper Egypt, while he pursued an active building program. In the year 3 of his reign he rebuilt a major sanctuary at Heliopolis, near Cairo. At Thebes he built in the temple complex of Karnak, where the cult and temple of Amon began to flourish. Sesostris also brought several of the western oases under his jurisdiction, as is shown by messengers and police officials who traveled there.

With Palestine and Syria, Sesostris maintained peaceful relations. As shown by *The Story of Sinuhe,* the fictional biography of a court official, the king did not profess a desire to acquire territory in Asia, although his emissaries traversed its lands and sought to exert diplomatic pressures. In reality, he seems to have conducted campaigns there.

Sesostris built his pyramid and funerary temple near his father's, at Lisht, near the capital, north of the Fayyūm. In its architecture, the king fostered a revival of Old Kingdom traditions, imitating the pyramid complex of Pepi II, a 6th dynasty king. About the 42nd year of his reign, Sesostris associated his son Amenemhet as coregent and passed some of the more strenuous duties to him. Two years later, the king died after a long and prosperous reign.

• **Sesostris II** (fl. 19th century BC), 12th-dynasty king of Egypt (reigned 1844–37 BC) who devoted himself to the peaceful exploitation of Nubia, Egypt's territory to the south, and initiated the development of the Fayyūm, a great oasis-like depression west of the Nile above Cairo.

Following the established practice of his dynasty, Sesostris spent three years as his father's coregent. In year 1 of this period, a trading expedition to Punt, on the east African coast around Somalia, recorded its trip on the rocks at Egypt's Red Sea port.

Early in Sesostris' sole reign, the fortresses of Lower Nubia, built by the king's grandfather, were inspected, and in year 6 the fort at Aniba, near the gold-mining region of Nubia, was rebuilt. As attested by commemorative stelae and inscriptions, diorite, copper, and possibly amethysts were extracted at a number of sites in Nubia. Inscriptions at Sinai indicate that the king's miners were also active there.

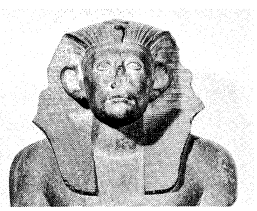
Contacts with Palestine and Syria were also maintained, as is shown by the scene of Asiatic traders in a provincial tomb at Banī Ḥasan, in Middle Egypt. During this reign the noble family at this site increased its influence through intermarriage with neighbouring potentates.

Sesostris' greatest achievement was his beginning of the development of the Fayyūm, the rich area near the royal residence. There, where the lake in the Fayyūm received its inflow from a branch stream off the Nile, the king constructed waterworks that were designed to regulate the lake's level and reclaim partly the marshy ground around its shores. The project was later extended widely by Amenemhet III.

Nearby, Sesostris built his pyramid, which exhibits great craftsmanship; part of its town, nearby, has survived, yielding town-planning evidence and documents that reveal something of Egypt's social conditions.

• **Sesostris III** (fl. 19th century BC), 12th-dynasty king of Egypt (reigned 1836–18 BC) who completely reshaped Egypt's government and extended his dominion in Nubia, the land immediately south of Egypt.

During the reigns of his predecessors, the provincial nobles of Middle Egypt had enhanced their power through royal favours and intermarriage with the families of neighbouring potentates. Around the middle of Sesostris III's reign, the rich provincial tombs, which were a mark of the nobles' power, abruptly ceased to be built. Simultaneously, the memorials of middle-class persons increased at Abydos, the Upper Egyptian shrine of the popular god Osiris. As shown by documents of the next dynasty, Sesostris III strengthened the central government, shearing the feudal nobility of their power and influence. Egypt was divided into four great districts, each of which possessed a hierarchy of officials and scribes directly responsible to the vizier. The vizier possessed a ministry, and countrywide departments of the treasury, agriculture, war, and labour resources were created. These assumed governmental functions and kept strict accounts of income and disbursement. So effective were the reforms that in the following dynasty, in spite of weak rulers, the central government under the viziers continued to function effectively for over a century.



Sesostris III, detail of a statue; in the Egyptian Museum, Cairo

By courtesy of the Egyptian Museum, Cairo; photograph, Hirmer Fotoarchiv, Munchen

Sesostris III's second great achievement was his overhaul and extension of Egypt's Nubian possessions. Probably responding to the growing strength of the native Nubian polities of the region, the king conducted four campaigns in which he quelled the nomads and extended the frontier to the southern end of the Second Nile Cataract. He then added to a network of forts within signaling distance of one another, extending from the northern fort at Buhen at the Second Nile Cataract to the new frontier at Semna, where both river traffic and nomads in the desert were screened and observed. Nile inundation heights also were recorded at the forts, giving valuable advance notice to Egypt proper.

Before his first Nubian campaign in year 8 of his reign, Sesostris cut a canal through the First Nile Cataract at Elephantine, thus easing the passage of both military and commercial shipping. Probably after his Nubian campaigns, Sesostris conducted a minor foray into Palestine, defeating a place that may be Shechem. Inscriptions of the king's officials reveal that miners were busy at Sinai and at several places in Nubia. The king built his pyramid near that of Amenemhet II but incorporated the innovations of the tomb of Sesostris II.

It was partly the exploits of this king, partly those of his two like-named predecessors, and also the deeds of Ramses II of the 19th dynasty that came to figure in the legend of Sesostris that Herodotus recorded. Sesostris III's memory long outlived him, for he became the patron deity of Egyptian Nubia. Ramses II accounted for the Asiatic conquests of the legend, and the rest was heroic elaboration.

Sessa Aurunca, town and episcopal see, Caserta *provincia,* Campania *regione,* southern Italy, on a lava deposit of the extinct Roccamonfina volcano, north-northwest of Naples. The town is on the site of the ancient Suessa Aurunca, the chief city of the Aurunci (an ancient Italic tribe), which was punished by the Romans for refusing to pay tribute. Later, it became a Roman municipium and was the site of a colony under the emperor Augustus; its Roman ruins include a theatre, baths, a large cryptoporticus (private gallery), and a bridge with 21 arches. The town is dominated by its Romanesque cathedral, and there are ruins of a medieval castle. The local volcanic soils are very fertile, and there is trade in cereals, fruit, and wine. Pop. (1987 est.) mun., 24,586.

Sesshū, original surname ODA, also called TŌYŌ, UNKOKU, or BIKEISAI (b. 1420, Akahama, Bitchū province, Japan—d. Aug. 26, 1506, near Masuda, Iwami province), artist of the Muromachi period, one of the greatest masters of the Japanese art of *sumi-e,* or monochrome ink painting. Sesshū adapted Chinese models to Japanese artistic ideals and aesthetic sensibilities. He painted landscapes, Zen Buddhist pictures, and screens decorated with birds, flowers, and animals. His style is distinguished for its force and vehemence of brush stroke as well as by its intensity of conception.

Early life and career. In contrast to many of the masters of Japanese art about whose lives little is known, the biography and artistic career of Sesshū are recorded in detail. His family name was Oda; his original personal name is no longer known. In 1431, at the age of 10, he was enrolled at the local Zen temple, known as Hofuku Temple, where he received the name Tōyō, meaning "willowlike" (perhaps because he was slender and graceful). Zen Buddhist temples were the artistic and cultural centres of the period as well as the centres of spiritual life. As a young novice, therefore, Sesshū undoubtedly received not only religious guidance but also instruction in calligraphy and painting.



"Winter Landscape" by Sesshū, ink on paper, about 1470–90; in the Tokyo National Museum

By courtesy of the Tokyo National Museum

In about 1440 he left his native province for Kyōto, then the capital city and the intellectual and artistic focus of Japan. The young monk lived at Shōkoku Temple, a famous Zen temple adjacent to the Imperial Palace of the Ashikaga shoguns, who were great art patrons. Shūbun, the most famous Japanese painter of the day, was the overseer of the buildings and grounds at Shōkoku Temple. In addition to studying painting under Shūbun, Sesshū studied Buddhism under the famous Zen master Shurin Suto. Although there are no paintings that can be assigned with certainty to this early period of Sesshū's career, it is believed that he must have worked in the style of Shūbun, who was profoundly influenced in both choice of subject matter and style by the Chinese painters of the Sung period (960–1279). Sung masters enjoyed great favour with the Japanese Zen painters, and their work was eagerly collected by Japanese connoisseurs and artists alike. The young Sesshū, therefore, must have had many opportunities to study masterpieces of Chinese painting.

After spending 20 years in Kyōto, Sesshū left the capital for Yamaguchi in the western part of the island of Honshu, a city that had become an important cultural centre under the Ōuchi clan. In Yamaguchi, the artist became the chief priest of Unkoku Temple, and it was at this time, probably in 1466, that he began to call himself Sesshū ("Snow Boat"). It seems certain that one of the reasons Sesshū chose to move to Yamaguchi was his desire to go to China. Strategically located, this section of

Japan was the staging point for many expeditions to the Asian mainland. The Ōuchi lords, in fact, had a trade permit that enabled them to conduct very profitable commercial transactions with China.

Journey to China. Sesshū succeeded in joining one of these Japanese trading missions as an art expert and landed in 1468 at Ning-po in southern China. He was to act as a "purchaser priest," who would buy Chinese paintings for his patrons and would also study at the Chinese Zen monasteries. Sesshū was disappointed with contemporary Chinese painting, which, under the Ming dynasty (1368–1644), had turned away from the spiritual and aesthetic ideas prevalent during the Sung period. Nevertheless, the magnificent scenery of China, as well as the contact with the Ch'an (Chinese word for Zen) monasteries, was a source of great inspiration to Sesshū, who often referred to these experiences in his later life. As a distinguished visitor from Japan, Sesshū was treated with great respect. He was honoured with the "First Seat" (that is, the seat next to the abbot in the famous Ch'an monastery of Mt. T'ien-t'ung), which led him to sign several of his paintings "Occupant of the First Seat at T'ien-t'ung." He also travelled to the Chinese capital of Peking. A friend who accompanied him on this trip reported that Sesshū was invited to paint the walls of one of the halls of the Ministry of Rites at the Imperial Palace. It is not known whether this story is true or whether it is an exaggeration of some other invitation, but it does indicate in what high esteem this Japanese master was held by his Chinese contemporaries. What Sesshū's painting of this period may have looked like is perhaps best exemplified by a set of four landscape scrolls (Tokyo National Museum) that are signed "Tōyō, Japanese Zen Priest," a designation hardly necessary if they were painted in Japan.

The mature years and works. Having been honoured at the Imperial Court in Peking and at the most celebrated Zen monastery in China, Sesshū was at the height of his career. In 1469 he returned to Japan, where his fame had greatly increased. It is believed that he first went back to Yamaguchi but eventually (probably in 1476) built a charming rustic retreat across the strait near Oita in Bungo Province. He called his new house and studio Tenkai Zuga-rō (Heaven Created Painting Pavilion) as a tribute to the peace and beauty of the setting. Sesshū painted some of his most outstanding works here and received many visitors who wished to hear about his trip to China or to study painting under him.

After many trips through northern Kyushu and other sections of Japan, Sesshū again returned to Yamaguchi in 1486 and rebuilt his studio. It is not certain whether or not he also lived in Iwami, as some sources suggest. Several temples claim the honour of being his burial site.

A large body of work has been assigned to Sesshū, but the question of authenticity is particularly vexing. Some of the paintings usually attributed to him are accepted without question on the basis of their outstanding quality, provenance, or inscriptions. Many others bearing his seal and signature are merely assigned to him because of their style and may be school pieces produced by his numerous followers. The largest group of authentic Sesshū scrolls are those in the Tokyo National Museum, which, in addition to four early landscapes believed to have been painted in China, has three of the major works of his maturity. Two of them are hanging scrolls (*kakemono*) representing autumn and winter. The third is a landscape painted in the *haboku,* or splashed-ink technique, and therefore usually referred to as the "Haboku-sansui" scroll. Painted in 1495, this work was given by Sesshū to his pupil Sōen when he returned to Kamakura after studying under the master.

The so-called long landscape scroll, or "Sansui Chōkan" (probably painted in 1486) is generally considered his masterpiece and is often regarded as the greatest Japanese ink painting. Depicting the four seasons, beginning with spring and ending with winter, it extends more than 50 feet (15 metres). Though based in both theme and style on Chinese models, it nevertheless is Japanese in character; heavier lines, sharper contrasts of dark and light tones, and a flatter effect of space are employed than was customary in Sung painting. Almost equally outstanding is another horizontal landscape scroll in the Asano Collection, Odawara. Believed to be somewhat earlier in date, the inscription says that it was painted in 1474 at the request of his pupil Tōetsu. Its style is far freer and more subtle. A very different kind of landscape painting is the "Amano-Hashidate" scroll (*c.* 1502–05) in the Kyōto National Museum. Much more detailed and realistic, it is almost like a topographic view of a particular place.

In addition to these landscapes, Sesshū painted a large number of Buddhist pictures that were often directly inspired by Zen teachings. The most famous of these is the scroll dated 1496 showing Bodhidharma and Hui K'o (1496; Sainen-ji, Aichi Prefecture). Painted in heavy, vigorous lines, it reveals how Hui K'o cut off his arm in order to demonstrate his seriousness to Bodhidharma, the founder of Zen Buddhism who is called Daruma in Japan.

Sesshū also painted decorative screens. Perhaps the best of the ones attributed to him is the pair of six-fold screens showing birds and flowers in the Kosaka Collection in Tokyo. Painted in a realistic yet decorative manner, with slight additions of colour, they reveal yet another aspect of the artist's genius. In contrast to the landscapes and Zen pictures that are inspired by the paintings of Sung China, these pictorial compositions are closer to the type of decorative painting that flourished in China during the Ming period.

While his most celebrated works are all in Japan, other pictures attributed to Sesshū are located in the West, especially in United States collections. The Museum of Fine Arts, Boston, for example, has seven paintings attributed to him, but the only one that is at all likely to be by Sesshū himself is a pair of screens depicting falcons and monkeys, which has Sesshū's seal and signature, as well as an inscription saying it was painted during the artist's 72nd year. Other works that may be authentic are found in the Cleveland Museum of Art and the Seattle Art Museum. The great bulk, however, of the many scrolls traditionally attributed to Sesshū both in Japan and in the West are generally considered to be school pieces or copies inspired by the work of the master.

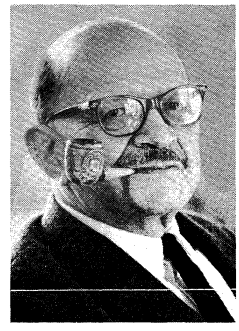
Assessment. Of all the many distinguished painters Japan has produced, Sesshū is often considered to have been the most outstanding. This estimate is based not only on the excellence of his work but also on his eminence as a Zen monk and man of learning. The tradition of the Zen-Buddhist-inspired style of ink painting (*sumi-e*) finds its ultimate expression in his art. He transformed an artistic style imported from China in the 14th century into something characteristically Japanese.

Sesshū was already hailed during his lifetime as the greatest Japanese painter of his time, a verdict ratified by later generations of artists, many of whom imitated his style or were influenced by his work even as late as the 19th century. Several painters even used his name; these included the great 16th-century master Hasegawa Tōhaku, who proudly signed himself Sesshū of the fifth generation. An entire school of Japanese painting, the Unkoku school, devoted itself to continuing his artistic heritage. (H.Mu.)

MAJOR WORKS. There are only a few authenticated works by Sesshū, the most important of which are: "Four Seasons Landscape," four landscape scrolls (*c.* 1470–90; Tokyo National Museum); "Autumn Landscape," hanging scroll (*c.* 1470–90; Tokyo National Museum); "Winter Landscape," hanging scroll (*c.* 1470–90; Tokyo National Museum); "Short Scroll Landscape" (*c.* 1474–90; Asano Collection, Odawara, Japan); "Portrait of Masuda Kanetaka" (1479; Masuda Collection, Tokyo); "Long Scroll Landscape," or "Sansui Chōkan" (*c.* 1486; Mōri Collection, Yamaguchi, Japan); "Haboku-Sansui," scroll (1495; Tokyo National Museum); "Daruma and Hui K'o," scroll (1496; Sainen-ji, Aichi, Japan); "Amano-Hashidate," scroll (*c.* 1502–05; Kyoto National Museum); "Flowers and Birds," pair of six-fold screens (undated; Kosaka Collection, Tokyo).

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Sessions, Roger (Huntington) (b. Dec. 28, 1896, Brooklyn, N.Y., U.S.—d. March 16, 1985, Princeton, N.J.), American composer of symphonic and instrumental music who played a leading part in educating his contemporaries to an appreciation of modern music.



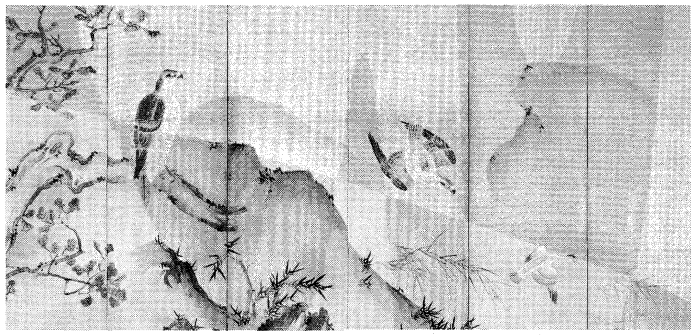
Sessions
By courtesy of Ulli Steltzer

He studied at Harvard University and at the Yale School of Music and later took composition lessons from Ernest Bloch. After several years in Europe he returned to the United States in 1933. Between 1928 and 1931, however, in association with Aaron Copland, he had presented an important series of concerts of modern music, the Copland–Sessions Concerts in New York City. He taught composition at Princeton University (1935–45), at the University of California, Berkeley (1945–52), and again at Princeton from 1953. In 1965 he was appointed to the staff of the Juilliard School of Music, New York City.

His first important work, an orchestral suite from the incidental music for Leonid Andreyev's play *The Black Maskers* (1923), is marked by rhapsodic eloquence and even flamboyance and has remained his most popular score. His eight symphonies (1927, 1946, 1957, 1958, 1964, 1966, 1967, and 1968) are severe in idiom, using a polyphonic technique and asymmetrical rhythms. Similar qualities mark his two string quartets (1936 and 1951), string quintet (1958), three piano sonatas (1930, 1946, and 1965), and chorale preludes for organ (1925). Sessions considers his *Violin Concerto* (1935) to be one of the earliest of his mature works. His one-act opera *The Trial of Lucullus* (1947) and his *Idyll of Theocritus* (1954) for soprano and orchestra have affinities with the central European Expressionist style. His opera *Montezuma* (1947) was produced in West Berlin in 1964. Later works are the cantata *When Lilacs Last in the Door-yard Bloom'd* (1970) and *Rhapsody* (1970) for orchestra. He also composed the *Concertino for Chamber Orchestra* (1972) and *Three Bibli-*

cal Choruses (1971; premiered 1975), which includes text from the book of Psalms and Isaiah. A retrospective of Sessions' work was given in the Continuum Concerts in New York City in 1981. His critical works deal with the artistic and sociocultural concerns of musical life and include *The Intent of the Artist* (1941), *The Musical Experience of Composer, Performer, Listener* (1950), *Harmonic Practice* (1951), *Questions About Music* (1970), and *Roger Sessions on Music* (1979). Sessions was named to the National Institute of Arts and Letters in 1938 and to the American Academy of Arts and Letters in 1953. In 1974 he received a Pulitzer Special Citation for Music; in 1982 he received a second Pulitzer Prize for the final work of his career, *Concerto for Orchestra* (1981).

Sesson Shūkei, original name SATAKE HEIZO (b. 1504, Hitachi, Japan—d. *c.* 1589, Iwashiro Province), Japanese artist who was the most distinguished and individualistic talent among the numerous painters who worked in the style of Sesshū, the 15th-century artist considered the greatest of the Japanese *suiboku* ("water-ink") painters.



"Landscape with Hawks," one of a pair of six-fold screens by Sesson Shūkei, ink on paper, late 16th century; in the Tokyo National Museum

By courtesy of the Tokyo National Museum

Sesson was a monk of the Sōtō sect of Buddhism and a self-taught artist who lived in northern Honshu (the main island of Japan), far from the Imperial capital, Kyōto, the centre of artistic activity. He studied the paintings of Shūbun (a *suiboku* artist active in the first half of the 15th century) and later, from 1533, those of Sesshū and called himself Sesson Shūkei in tribute to the two masters. His style, however, was influenced more by Sesshū than by Shūbun. Like Sesshū, he excelled in landscapes, to which he imparted dynamic expression with his bold brushwork. Several of his landscapes are still extant, among them "The Wind and the Waves" and three versions of the "Eight Views," executed in 1563, 1564, and 1589. His unique style is perhaps most evident in his figure drawings (*e.g.,* "Li Po Gazing at the Waterfall") and in his pictures of animals (*e.g.,* "The Tiger"). A prolific artist who lived to be more than 80, Sesson also left behind some fine studies of flowers and birds (*e.g.,* "Landscape with Hawks").

sestina, elaborate verse form employed by medieval Provençal and Italian, and occasional modern, poets. It consists, in its pure medieval form, of six stanzas of blank verse, each of six lines—hence the name. The final words of the first stanza appear in varied order in the other five, the order used by the Provençals being: *abcdef, faebdc, cfdabe, ecbfad, deacfb, bdfeca.* Following these was a stanza of three lines, in which the six key words were repeated in the middle and at the end of the lines, summarizing the poem or dedicating it to some person.

The sestina was invented by the Provençal troubadour Arnaut Daniel and was used in Italy by Dante and Petrarch, after which it fell into disuse until revived by the 16th-century French Pléiade, particularly Pontus de Tyard. In the 19th century, Ferdinand, comte de Gramont, wrote a large number of sestinas, and Algernon Charles Swinburne's "Complaint of Lisa" is an astonishing tour de force—a double sestina of 12 stanzas of 12 lines each. In the 20th century, Ezra Pound, T.S. Eliot, and W.H. Auden wrote noteworthy sestinas.

Sesto San Giovanni, town, Milano province, Lombardia (Lombardy) region, northern Italy. A northeastern industrial suburb of Milan, it has blast furnaces, foundries, glassworks, and aircraft assembly plants and manufactures railway and electrical equipment. With one of the largest concentrations of organized labour in Italy, Sesto San Giovanni has long been a bastion of Italian Communism. Pop. (1981 prelim.) mun., 94,738.

Set (Egyptian god): *see* Seth.

set theory, branch of mathematics that deals with the properties of well-defined collections of objects, which may be of a mathematical nature, such as numbers or functions, or not. The theory is less valuable in direct application to ordinary experience than as a basis for precise and adaptable terminology for the definition of complex and sophisticated mathematical concepts.

A brief treatment of set theory follows. For full treatment, *see* MACROPAEDIA: Set Theory.

Sets may be finite or infinite. A finite set has a definite number of members; such a set might consist of all the integers from 1 to 1,000 or all marked bus stops along a given route. An infinite set has an endless number of members; all the positive integers or all points along a given line compose infinite sets. A set is commonly represented by a list of its members, or elements, enclosed within braces; the statement that a set called A comprises the numbers 1, 2, and 3 is made by the expression $A = \{1,2,3\}$. A set that has no members is called an empty set (or a null or void set) and is denoted by the symbol symbol $\emptyset$.

Operations on sets include union, symbolized $\cup$, and intersection, symbolized $\cap$. The union of two sets is itself the set containing all members of the two original sets; the intersection includes only the members common to both original sets. Thus, if $A = \{1,2,3\}$ and $B = \{3,4,5\}$, then $A \cup B = \{1,2,3,4,5\}$ and $A \cap B = \{3\}$.

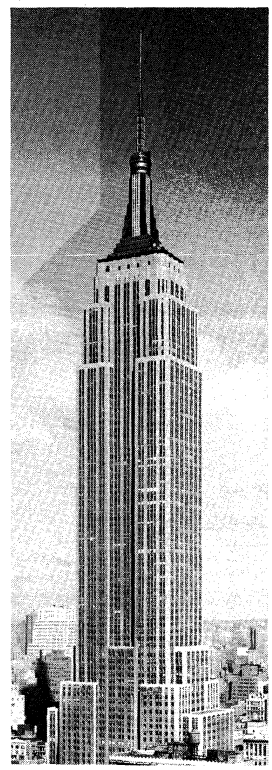
Various relations can exist between sets. Equivalent sets have the same number of members; thus, if $A = \{j,k,l,m\}$ and $B = \{1,2,3,4\}$, then $A \sim B$ ("A is equivalent to B"). Equal sets, on the other hand, consist of the same members; if $A = \{o,p,q\}$ and $B = \{p,q,o\}$, then $A = B$ ("A is equal to B"). One set is a subset of another (symbolized $\subset$) if all the members of the first are members of the second; if $A = \{1,2,3\}$ and $B = \{1,2,3,4,5\}$, then $A \subset B$. Disjoint sets have no members in common. The complement of a set A with respect to a larger set B is the set A', which contains all members of B that are not members of A. Thus, if B is the set of all positive integers and A is the set of all even positive integers, then A' is the set of all odd positive integers.

The value of set theory is its usefulness in analyzing difficult concepts in mathematics and logic. The intuitive notion of a set, however, is probably even older than that of number: members of a herd of animals, for example, could be paired with stones in a sack or notches in a stick without engaging in the process of actually counting anything. As mathematics evolved, its practitioners used the idea of sets, but only informally until the 19th century, when George Boole and Georg Cantor discovered the value of clearly formulated sets in the analysis of problems in symbolic logic and number theory.

Cantor, now regarded as the father of set theory, developed the general theory of transfinite numbers. He revolutionized the philosophical foundations of mathematics by boldly insisting on the actual infinite, that is, on the existence of infinite sets as mathematical objects on a par with numbers and finite sets. In erecting his theory, Cantor did not promulgate specific axioms as its basis, though his reasoning was based on certain assumptions.

The first axioms explicitly formulated for set theory led to logical inconsistencies, as pointed out by Bertrand Russell and others around 1900. Resolution of the deficiencies has led to two alternative systems as bases of modern set theory. The first of these was initiated by Ernst Zermelo in 1908 and strengthened by Abraham Fraenkel and Thoralf Skolem in the early 1920s. The second was devised by John von Neumann in the late 1920s and later modified by Paul Bernays and Kurt Gödel. Both systems obviate the paradoxes that plagued earlier theories of sets, but neither has reached its proponents' goal of providing a complete basis for all of mathematics.

setback, in architecture, steplike recession in the facade of a building especially associated with the construction of skyscrapers. Aesthet-



Series of setbacks on the Empire State Building, New York City, designed by Shreve, Lamb, & Harmon, 1931

Ewing Galloway

ically, a series of setbacks breaks the vertical line of a skyscraper; practically, it decreases the amount of floor space on the upper stories. Setbacks are thus usually dictated by the building code or zoning restrictions of a municipality.

As skyscrapers became popular early in the 20th century, it became obvious that laws had to be passed if sunlight was to reach lower buildings and the streets. In a New York City zoning ordinance of 1916, for example, districts were created in which buildings were not permitted to attain a height greater than twice the width of the street below. But for each foot (30 cm) that the building was set back from the street an additional four feet in height was allowed. The first major setback on the Empire State Building (completed 1931) is at the fifth floor; the plan of the top section, the tower, is equal in area to only one-fourth of the plan at ground level.

In their early setback high-rise buildings of the 1920s, architects drew attention to the setbacks with decorative devices—mosaics, Chinese or Mayan or Greek motifs, or Cubistic blocks. Later architects deemphasized the setbacks, placing greater emphasis on vertical lines, plain surfaces, and windows. Later glass-wall skyscrapers were often built entirely without setbacks, zoning requirements being met by the amounts of space left open at ground level. In the late 20th century there was a return to decorative setbacks.

Sète, formerly (until 1827) CETTE, town and a principal French Mediterranean commercial port, lying in Hérault *département,* Languedoc-Roussillon *région,* southern France, southwest of Montpellier. It occupies the lower slopes and foot of Mont Saint-Clair, situated on a tongue of land between the Mediterranean and the large marshy Thau Lagoon. A network of canals links the town with the lagoon, the docks, and the harbour basins. The port is connected (via the lagoon) by the Midi Canal with the Garonne River. It is also connected to the neighbouring oil and sulfur refineries at Frontignan by pipeline and by the Sète Canal, which also links it with the Rhône.

After being damaged in World War II, the port, construction of which was first begun in 1666, was rebuilt to receive large fuel and wine tankers. It also has facilities for handling mineral cargoes as well as fish and general merchandise. After the independence of Algeria, the wine traffic declined in favour of oil and a new trade in tropical woods.

Local industries include the manufacture of chemical products, phosphates, and spirits. Sète is also a popular tourist resort, having a sandy beach. It has a museum dedicated to the poet Paul Valéry (1871–1945), who was born and buried in Sète. Pop. (1982) 39,258.

Sete Lagoas, city, central Minas Gerais *estado* ("state"), Brazil, in the highlands near the Serra do Espinhaço. It is a commercial centre for an agricultural region that raises corn (maize), *feijão* (beans), sugarcane, cassava, and rice, as well as livestock. Manufacturing and dairy and food-processing plants are in the city, which is on the Rio de Janeiro–Brasília highway and is easily accessible from Belo Horizonte, the state capital, to the southeast. Pop. (1980 prelim.) 94,502.

Sete Quedas Falls (South America): *see* Guaíra Falls.

Seth, also called SETESH, SETEKH, or SET, ancient Egyptian god, patron of the 11th nome, or district, of Upper Egypt.

The worship of Seth originally centred at Nubt (Greek Ombos), the predynastic capital (*c.* 3400 BC) of the kingdom of the red crown, located near modern Ṭūkh, on the western



Seth
From L. Casson, *Ancient Egypt*

bank of the Nile River in Upper Egypt. It was removed from there (probably with the unification of Egypt) by the pharaohs of Hierakonpolis, whose patron god was Horus, the falcon god and enemy of Seth. This historical event probably gave rise to the myth concerning the struggle between Horus and Seth.

Seth was represented as a composite figure with a jackal's body, slanting eyes, square-tipped ears, tufted (in later representations, forked) tail, and a long, curved, pointed snout; various animals (including aardvark, antelope, ass, camel, fennec, greyhound, jackal, jerboa, long-snouted mouse, okapi, oryx, pig or wild boar, and tapir) have been suggested as the basis for his form. Because even the ancient Egyptians showed confusion in rendering his figure, it is probably a mythical composite. Originally he was a sky god, lord of the desert, master of storms, disorder, and warfare—in general an unreliable trickster, not patently evil but dangerous to deal with.

The vicissitudes of the cult of Seth reflect the ambivalent attitude of the Egyptians toward him, as well as the shifting political fortunes of Egypt. During the 2nd dynasty (*c.* 2775–*c.* 2650 BC), a pharaoh, Peribsen, identified himself with Seth for the first time, changing his name to Sekhemib. A succeeding king, Khasekhemwy, gave both Horus and Seth equal prominence in his titulary, reflecting the mythical resolution of the two gods. During the rule of the Hyksos invaders (*c.* 1630–*c.* 1523 BC), Seth was worshiped at their capital, Avaris, in the northeastern delta, probably because they identified him with their god, the Canaanite storm god, Baal. During the New Kingdom (1539–1075 BC), Seth was popular because, in his role as lord of confusion, he could sow discord among Egypt's enemies. The Ramesside pharaohs (1292–1075 BC), originating in the northeastern delta, ranked him among the great gods of Egypt, used his name in their personal names (Seti I and II, Setnakht), and promoted the image of Seth as the protector of Re in the prow of the bark, slaying his enemy, Apepi.

In myths, Seth was the brother of Osiris; and even there his character was troublesome, for he was depicted as bursting out of the womb of his mother, Nut; and he was shown being an unfaithful husband to his wife and sister, Nephthys, and murdering his brother, whom he tricked into entering a chest which he then locked and hurled into the sea. This act provoked the wrath of Horus, who had come to be identified as the son of Osiris during the later Old Kingdom. Conceived miraculously after Osiris' murder by Isis, wife and sister of Osiris, Horus struggled with Seth, who sought to dispossess him from his father's throne. This struggle forms the theme of the Ramesside text *Contendings of Horus and Seth,* which borders on satire, and the later, much more sombre version recorded by Plutarch, in which Seth is the embodiment of Typhon, the Greek demon.

After the close of the New Kingdom, as Egypt lost its empire, and later its independence, and as the cult of Osiris grew in prominence, Seth was gradually ousted from the Egyptian pantheon; his name and image were effaced from the monuments. Already associated with the Canaanite Baal in earlier periods, he was now identified as the god of the eastern, mainly Semitic, invaders of Egypt. Revulsion at Seth as the murderer of Osiris was then transferred to the people associated with him, giving rise to an early manifestation of anti-Semitism. No longer able to reconcile Seth with Horus, the Egyptians equated him with evil and the demon Apepi, or Typhon, who had become the Egyptian version of the devil.

Seti, also spelled SETHI, or SETHOS, name of kings of Egypt grouped below chronologically and indicated by the symbol •.

• **Seti I** (d. 1279 BC), Egyptian king of the 19th dynasty who reigned from 1290 to 1279 BC. His father, Ramses I, reigned only two years, and it was Seti who was the real founder of the greatness of the Ramessids.

In the early years of his reign he led his army northward to restore Egyptian prestige, partly lost during the troubled years of the late 18th dynasty. He battled in northern Palestine and Syria and fought at least one battle with the Hittite king Muwatallis; he subsequently concluded a peace treaty that may have established the frontier at Kadesh on the Orontes River between Lebanon and Anti-Lebanon.

Seti did much to promote the prosperity of Egypt. He fortified the frontier, opened mines and quarries, dug wells, and rebuilt temples and shrines that had fallen into decay or been damaged; and he continued the work begun by his father on the construction of the great hypostyle hall at Karnak, which is one of the most impressive monuments of Egyptian architecture. His greatest memorial is perhaps his mortuary temple at Abydos, which he dedicated to Osiris and six other deities and decorated with reliefs of great delicacy on which some of the original colour remains. Behind this temple is a curious building thought to be his cenotaph. His tomb is the finest in the Valley of the Kings in western Thebes.

Although his son Ramses II is more famous, Seti is thought by many scholars to have been the greatest king of the 19th dynasty.

• **Seti II** (d. 1198 BC), king of Egypt (reigned 1204–1198 BC).

Seti, the immediate successor of his father, Merneptah, was one of the last rulers of the 19th dynasty, which was marked by short reigns, dynastic intrigue, and usurpations. One of his most serious threats was a rebellion by a usurper, Amenmeses, who claimed the kingship and acquired recognition in Upper Egypt.

Upon his death, Seti was succeeded by Siptah, who was installed on the throne by a Syrian royal butler, Bay, who became chancellor of Egypt. Siptah was succeeded by Seti II's widow, Tausert, who counted her reigning years from the year of Seti II's death (though she effectively reigned only from 1193 to 1190). Of the rulers or would-be rulers of this period, Seti II was the only one recognized by Ramses III (of the 20th dynasty) as a legitimate king.

Sétif, also called STIF, town, northeastern Algeria, near the Wadi Bou Sellam. As ancient Sitifis, it became important when the Roman emperor Nerva established a veterans' colony there in AD 97. Sitifis became the chief town of the province of Mauretania Sitifensis (created AD 297) and remained so under Byzantine rule. The town declined until garrisoned by the French in 1838. In 1945 the Sétif town area was the site of a spontaneous outburst against French colonial rule, and more than 100 Europeans were killed. In retaliation, by Algerian count after the fact, between 6,000 and 8,000 Muslims were massacred. The area

around Sétif was developed as a centre of cereal cultivation during the French colonial period, and wheat is processed in local factories to produce semolina, couscous (cracked wheat), and noodles.

Sétif, laid out in a grid pattern of wide streets, is one of Algeria's highest places (elevation 3,596 feet [1,096 m]). The Université de Sétif was founded in 1978. Remains of the great Byzantine fortress are to the north. In 1959 a Roman necropolis was discovered near the town centre. Pop. (1987 prelim.) mun., 185,-786.

Setit River (The Sudan): *see* Takazē River.

Seto, city, Aichi *ken* (prefecture), Honshu, Japan, northeast of Nagoya. Seto, established about 1230, is well known for its porcelain (Seto ware). Since the Meiji period (1868–1912), the pottery industry has expanded significantly to include more than 900 factories and 1,000 kilns. Tableware, electric insulators, and toys are also produced. Seto houses the National Ceramic Experimental Station. Memorials to Katō Shirōzaemon include a chinaware monument in Seto Park and the Suehiko Shrine. Pop. (1987 est.) 124,531.

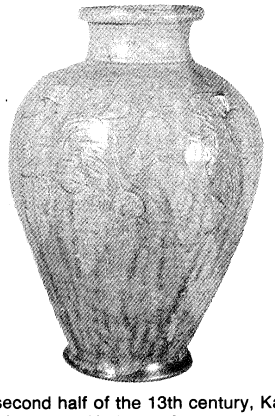
Seto Great Bridge, Japanese SETO ŌHASHI, a series of suspension bridges spanning the Inland Sea between the islands of Honshu and Shikoku, Japan. The double-tiered rail and vehicular roadway is a network of six bridges, straddling a chain of five small islands, and extends 5.6 miles (9 km) over water to link the towns of Kojima, on Honshu, and Sakaide, on Shikoku. Its total length is 7.6 miles (12.2 km), and it consists of three main suspensions—the longest being the central span of Minami Bisan-Seto Bridge, at 3,609 feet (1,100 m). The Seto Great Bridge took 10 years to build and was opened on April 10, 1988.

Seto-guro ware, Japanese ceramic ware created at Mino during 1573–96. A black ware, it stands in contrast to the contemporary pure-white Shino ware.

Seto-guro ("black Seto") was produced by a process that involved firing the iron-glaze ware in an oxidizing kiln from which it was suddenly removed and immediately cooled. The shade of black achieved was far richer than had been achieved in the earlier black *temmoku* glazes.

Seto-naikai (Japan): *see* Inland Sea.

Seto ware, ceramics manufactured by one of the so-called Six Ancient Kilns of Japan, appearing in the later Kamakura period toward the close of the 13th century, around Seto (now in Aichi prefecture). The origin of Seto ware is usually attributed to Katō Kagemasa, who studied ceramic manufacture in southern China and produced ceramics of his own in the Seto district upon his return. The wares, clearly influenced by those of the Southern Sung dynasty in China and those of the Koryŏ dynasty in Korea, eventually became a substitute for continental wares.



Seto jar, second half of the 13th century, Kamakura period; in the Tokyo National Museum

By courtesy of the Tokyo National Museum

Seto ware differs from the aforementioned Chinese and Korean wares in character and feeling because of the different clays used, the remodeled Sueki kilns (less sophisticated than their Chinese counterparts), and in part because of the strong influence of Japan's own pottery traditions.

Seton, Saint Elizabeth Ann, *née* BAYLEY (b. Aug. 28, 1774, New York City—d. Jan. 4, 1821, Emmitsburg, Md., U.S.; canonized 1975; feast day January 4), first native-born American to be canonized by the Roman Catholic church; she was the founder of the Sisters of Charity, the first American religious society.

In 1794 she married William Magee Seton, whose death (1803) in Italy (where the family had gone for his health) left her with five children. She returned to the United States and converted from Anglicanism to Roman Catholicism in 1805.

After she opened (1809) an elementary school in Baltimore, several young women were soon entrusted to her care. Together they took simple vows, but not until 1812, after the community moved to Emmitsburg, were the constitution and rules formally adopted. The Sisters of Charity was founded on July 19, 1813. Elizabeth, then known as Mother Seton, was named first superior and was allowed to remain legal guardian of her children. Although hers was not the first Catholic elementary school, she has been called the mother of the parochial-school system in the United States. At her death, Elizabeth's order had branched into 20 communities.

BIBLIOGRAPHY. H. Bailly de Barberey's *Elizabeth Seton* appeared in 1927, followed by K. Burton's *His Dear Persuasion* in 1940.

Seton, Ernest Thompson, original name ERNEST EVAN THOMPSON, also called ERNEST E. THOMPSON, or ERNEST SETON-THOMPSON (b. Aug. 14, 1860, South Shields, Durham, Eng.—d. Oct. 23, 1946, Seton Village, Santa Fe, N.M., U.S.), naturalist and writer, who was an early practitioner of the modern school of animal-fiction writing.

Seton was raised in North America, his family having emigrated to Canada in 1866. Drawn to nature, Seton resisted his family's attempt to make an artist of him. He gained experience as a naturalist by trailing and hunting in the prairie country of Manitoba in the final years of the 19th century. He used this knowledge as the basis for his animal stories. His artistic training enabled him to earn a living for a time as an illustrator of wild animals. He collected his stories into his most popular book, *Wild Animals I Have Known* (1898). He continued to write such books into the 1940s.

Deeply concerned with the future of the prairie, Seton fought vigorously to establish reservations for Indians and parks for animals threatened by extinction. In order to provide children with the opportunities for nature study, he founded the Woodcraft Indians in 1902 and later was chairman of the committee that established the Boy Scouts of America.

Seton, George Seton, 5th Lord (b. 1531—d. Jan. 8, 1586), one of the most loyal supporters and friends of Mary, Queen of Scots.

He was the eldest son of the 4th Lord Seton (d. 1549) and was educated in France. He was present at Mary's marriage with the dauphin (afterward Francis II of France) in 1557, and three years later he was again in France because of his adherence to Roman Catholicism. When Mary returned to Scotland (1561), he became privy councillor and master of the household, but four years later he again found it advisable to retire to France. Mary and Lord Darnley spent their honeymoon at Seton Palace, and Mary found a retreat there after the murder of David Riccio and again after the murder of Darnley. After her escape from Lochleven in May 1568, Lord Seton took her to his castle at Niddrie, Linlithgowshire, and thence to Hamilton. A week later he was taken prisoner at Langside. He was set free after the assassination of the regent, the 1st Earl of Moray, and made his way to Flanders, where he was said to have made his living as a wagoner. He was, in fact, entrusted by Mary's supporters with a mission to the Duke de Alva and sought in vain to secure for service in Scotland two regiments of Scots then in Spanish pay.

He returned home in 1571, being apparently reconciled with the government, but he retained his Roman Catholicism and his friendship for Mary, who wrote to Elizabeth I in 1581 desiring a passport for Lord Seton that he might alleviate her solitude. In 1581 he was one of the judges in the trial of the accused murderer of Darnley, the 4th Earl of Morton; in 1583 he was sent as ambassador to France, where he sought interference on Queen Mary's behalf. He died soon after his return in 1585.

Setouchi, industrial region, southern Japan. Setouchi includes the southern portion of Chūgoku *chihō* (region) on the island of Honshu, the northern part of Shikoku, and many nearby industrial areas on islands of the Inland Sea. Setouchi is neither an administrative nor a political entity; it includes portions of the prefectures (*ken*) of Okayama, Hiroshima, and Yamaguchi on Honshu, and Kagawa and Ehime on Shikoku. Most industrial activity occurs in cities located on the Inland Sea coast; agriculture includes rice paddies and orchards growing grapes, persimmons, and peaches further inland.

During the Tokugawa period (1603–1867), Setouchi's traditional industries produced tatami matting, cotton textiles, indigo dye, and wooden clogs and boats, which were transported to Ōsaka via the Inland Sea. Copper mining began near Niihama, a small farming and fishing village, in 1690. During the Meiji period (1868–1912), a copper refinery was built in Niihama by Sumitomo Zaibatsu. The copper refinery was relocated to Shisaka Island in 1905 because of air pollution. From 1926, Sumitomo operated chemical industries to convert sulphur dioxide by-products from the copper refineries into superphosphates and fertilizers. Subsequent factories produced sulfuric acid, ammonium, methanol, and nitric acid, establishing the area as a chemical-producing centre.

Meanwhile, a textile industry evolved in Setouchi, influenced by new techniques from the Keihanshin (Kyōto–Ōsaka–Kōbe) Industrial Zone. More chemical plants and most of Setouchi's heavy industries, including iron, steel, transport machinery, and petrochemicals, were introduced to the area during World War II. Ube developed in chemical production, and Onoda evolved as a cement-producing centre; Hiroshima city concentrated on the building of ships, locomotives, and freight cars, and Himeji was a centre of iron and steel production. Much industrial expansion in the region occurred during the 1960s as the Keihin (Tokyo–Yokohama) and Keihanshin industrial zones expanded. Land was reclaimed from the Inland Sea, and former military-use land and salt fields were transformed for industrial use. Petrochemical complexes began operation in Iwakuni and Tokuyama, and steel plants were built in Fukuyama. The rapid industrialization caused shipping problems including traffic congestion, accidents, and pollution affecting both air and the Inland Sea. Air pollution has been ameliorated by new techniques, but the Inland Sea remains

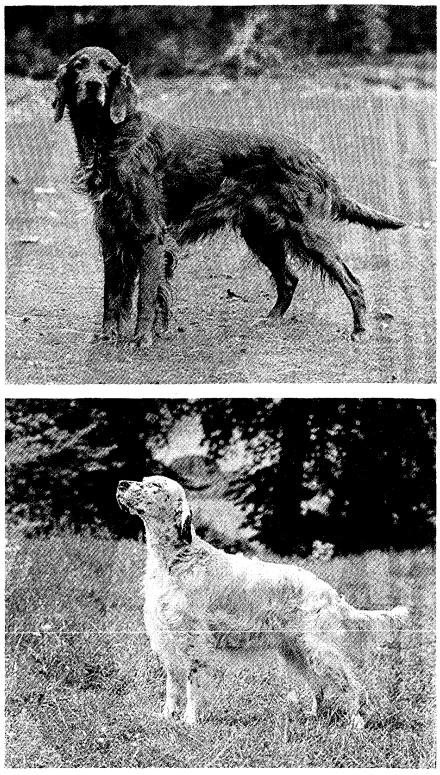
polluted. Fish-spawning areas were destroyed during land reclamation. Islands with historic relics have been designated as conservation areas. Railway, highway, and shipping connections are extensive.

Settat, city, central Morocco. Situated on the coastal plain immediately south of Casablanca, the city is the largest market centre in the fertile Chaouia coastal plain. Settat city's most notable features are a late 17th-century casbah built by the 'Alawī ruler Moulay Ismā'īl and a *millah* (traditional Jewish quarter) established in the 19th century. The city is connected by road and railway with Casablanca to the north and Marrakech to the south.

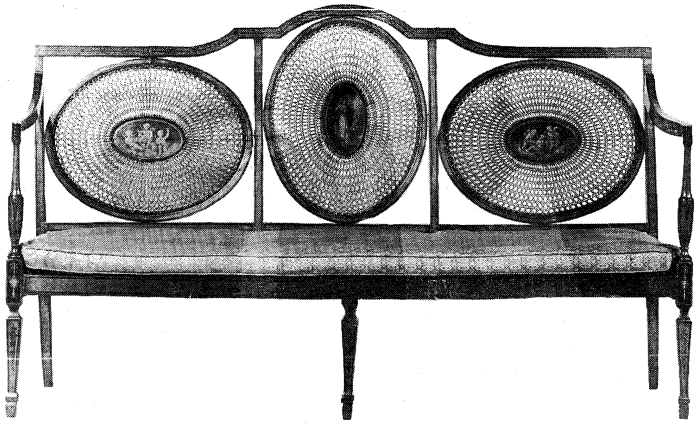
The area around Settat has a high-density rural population, and Settat is a natural agricultural-market centre. The area is one of the principal truck-gardening areas for Casablanca. Pop. (1982) mun., 65,203.

settee, also called SOFA, an upholstered seat with back and arms (sometimes upholstered), designed for two or more people in a sitting or reclining position. The earliest surviving types, dating back to the 17th century in Europe, have sides that let down for conversion into a bed. Variations of backrests and armrests appeared, and the precedent, still followed in the 20th century, was established of making the settee part of a matched set of chairs.

Different types of settee were given names deriving from their function, their style, or someone associated with them. Typical examples are the chaise longue, a kind of elongated chair with an inclined back; the chesterfield, a large, very heavily stuffed and buttoned variety; the hall settee, largely an 18th-century form, usually having an upholstered seat and elaborately carved back, designed to be used with matching chairs in a hall or gallery; and



(Top) Irish setter; (bottom) English setter
Sally Anne Thompson—EB Inc.



Settee in Adam style, painted satinwood with caned ovals in back, English, 18th century; in the Museum of Fine Arts, Boston
By courtesy of the Museum of Fine Arts, Boston

the so-called daybed, a carved or upholstered piece originating in the 16th century, with a long seat and one inclined end.

setter, any of three sporting dogs used in pointing birds. Setters are derived from a medieval hunting dog, the setting spaniel, that was trained to find birds and then to set (*i.e.,* crouch or lie down) so that a net could be thrown over the birds and the dog.

The English setter has served as a hunter for more than 400 years and has been bred in its present form since about 1825. Characteristically rugged yet aristocratic in appearance, it stands 61 to 63.5 cm (24 to 25 inches) and weighs 23 to 32 kg (50 to 70 pounds). Like the other setters, it has a long head, hanging ears, a deep chest, and a pointed tail, and its coat is longer on the ears, chest, legs, and tail. A valued hunter and companion dog, the English setter may be all white, black and white-and-tan, or white flecked with a darker colour.

The Gordon, or black-and-tan, setter dates from 17th-century Scotland and is named for the Duke of Gordon, whose kennels brought the breed to prominence. The Gordon stands 58 to 69 cm (23 to 27 inches) and weighs 20 to 32 kg (44 to 70 pounds). Its soft, wavy coat is black with tan on the head, throat, chest, and legs. Noted for its appearance and loyalty, the Gordon setter is generally methodical in the field.

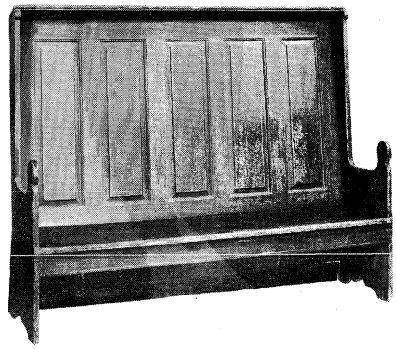
The Irish setter, renowned for its elegant build and its bright, mahogany-coloured coat, was bred as a gun dog in early 18th-century Ireland. Probably of English and Gordon setter, spaniel, and pointer ancestry, it stands about 64 to 69 cm (25 to 27 inches) and weighs 27 to 32 kg (60 to 70 pounds). Its coat is straight and flat; originally red-brown and white, solid colours are now preferred. The Irish setter is noted for being good-tempered and swift in the field.

Setthathirat I, also called SAI SETTHATHIRAT I, or SETTHAVONG (b. 1534—d. 1571, southern Laos), sovereign of the Lao kingdom of Lan Xang who prevented it from falling under Burmese domination and whose reign was marked by notable achievements in domestic and foreign affairs.

As the son of King Phothisan, Setthathirat was placed on the throne of the principality of Chiang Mai (now in northern Thailand) in 1546. When Phothisan died in the following year, Setthathirat returned to Laos to assume his father's throne but remained king of Chiang Mai until 1551. He made Vientiane his capital in 1560 and had the Emerald Buddha—a green jasper statue of the Buddha and the most sacred object of Chiang Mai—brought there, where he built a majestic temple to house it. He continued his father's policy of promoting Buddhism by edict, and it flourished during his reign.

Setthathirat married a princess from Ayutthaya (Thailand) and formed a political alliance with the Thai against their common enemy, Burma. During a Burmese invasion in about 1565, Setthathirat's military strategy preserved the autonomy of his kingdom. Still regarded by the Lao as a national hero, Setthathirat is a central figure in the spiritual cult of some mountain peoples in southern Laos.

settle, long wooden bench with backrest and arms, designed to seat several people. Originating in Europe in the 10th century, it was apparently derived from the chest, a re-



Settle, Lebanon, Conn., 1710–1800; in the collection of William L. Warren, Litchfield, Conn.
By courtesy of William L. Warren, Litchfield, Conn.; photograph, Wadsworth Atheneum, Hartford, Conn.

semblance often retained, with additional elements based on the monastic choir stall. It could be used for a variety of purposes: as a seat, a bed, a chest, and, in examples with a hinged backrest that can be turned down to rest on the arms, a table. Other additions to the basic shape were a footrest and sconces at the side or back to accommodate candles. The height of the backrest varied considerably and sometimes extended down to the floor. Both back and sides were usually paneled or ornamented (or both) with traditional carved patterns.

Although usually freestanding, settles were occasionally incorporated into the structure of a room, sometimes designed to fill a corner. By the 15th century they had become standard articles of furniture in inns and taverns, where they were usually provided with shelves protruding from the armrests, on which customers could rest their tankards. By the end of the 17th century, domestic versions had nailed-on leather upholstery, and for greater comfort the backrest was inclined. Surviving mainly in rural areas throughout the 18th and 19th centuries, settles became popular again with the historicizing movements in design during the early part of the 20th century. A spindled variety resembling an extended Windsor chair was sometimes called a schoolmaster's, or parson's, bench.

settlement, in law, a compromise or agreement between litigants to settle the matters

in dispute between them in order to dispose of and conclude their litigation. Generally, as a result of the settlement, prosecution of the action is withdrawn or dismissed without any judgment being entered (*see* nolle prosequi). In such cases, the settlement itself, as a binding contract between parties, prevents renewal of the litigation. But the parties may, and often do, incorporate the terms of the settlement into a consent judgment, recorded by the court. Such a judgment may afford the same protection against a reopening of the dispute in litigation as is provided by a court judgment at the conclusion of a fully litigated case.

Settlements commonly provide for, or are construed to allow, either party to enforce their terms or to ignore them and reopen the underlying dispute if the other party fails to fulfill the terms and conditions agreed upon. Because, in modern litigation, most suits brought are either withdrawn or settled, the settlement constitutes an important feature of the process.

The term settlement is also applied to a disposition of property to be held in trust.

Settlement, Act of (June 12, 1701), act of Parliament that, since 1701, has regulated the succession to the throne of Great Britain.

Toward the end of 1700 William III was ill and childless; his sister-in-law, the prospective queen, Anne, had just lost her only surviving child; and abroad the supporters of the exiled king, James II, were numerous and active. The need for the act was obvious. It decreed that, in default of issue to either William or Anne, the crown was to pass to Sophia, electress of Hanover and grandaughter of James I, and to "the heirs of her body being Protestants." The act was thus responsible for the accession of the House of Hanover in 1714.

In addition to settling the crown, the act contained some important constitutional provisions: (1) all future monarchs must join in communion with the Church of England; (2) if a future monarch is not a native of England, England is not obliged to engage in any war for the defense of territories (*e.g.,* Hanover) not belonging to the crown of England; (3) judges were to hold office during good behaviour rather than at the sovereign's pleasure, though they are subject to impeachment by both houses of Parliament; (4) impeachments by the House of Commons are not subject to pardon under the Great Seal of England (*i.e.,* by the sovereign).

The act as originally passed contained four other clauses. One of these provided that "all matters properly cognizable in the Privy Council . . . shall be transacted there" and that all resolutions "shall be signed by such of the Privy Council as shall advise and consent to the same." Another declared that all officeholders and pensioners under the Crown shall be incapable of sitting in the House of Commons. The first of these clauses, which was an attempt to destroy the growing power of the Cabinet, was repealed; and the second was seriously modified in 1706. Another clause, repealed in the reign of George I, forbade the sovereign to leave England, Scotland, or Ireland without the consent of Parliament. Finally a clause said that "no person born out of the kingdoms of England, Scotland, or Ireland, or the dominions thereunto belonging (although he be naturalized or made a denizen), except such as are born of English parents, shall be capable to be of the Privy Council, or a member of either House of Parliament, or enjoy any office or place of trust, either civil or military, or to have any grant of lands, tenements, or hereditaments from the Crown to himself, or to any other or others in trust for him." By the Naturalization Act of 1870 this clause was virtually repealed for all persons who obtain a certificate of naturalization.

settlement house: *see* social settlement.

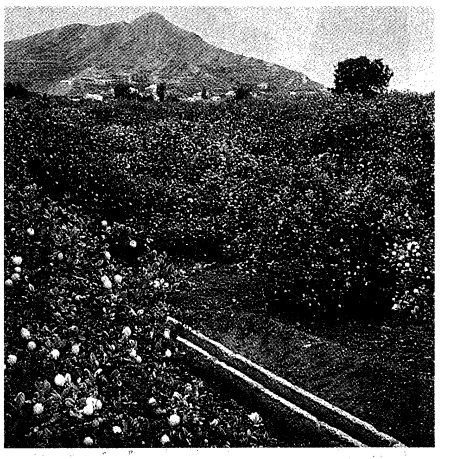
settling, in soil mechanics, refers to sedimentation; *i.e.,* the settling out of solid particles from suspension in water. The velocity of settling depends on the size, shape, and density of the particles, and on the viscosity of the water. Particles may be classified in size by relative settling rates.

Settling also refers to movement of structures located above deep beds of soft clay. This may continue for several years after a structure is completed. The mineral particles in the clay form an open compressible structure, the voids of which are filled with water, the flow being restricted by the smallness of the openings between voids. When first applied, the load is carried mainly by relatively incompressible water. Settling takes place as the load stress is slowly transferred from the water to the clay structure.

settling tank: *see* sedimentation tank.

Setúbal, city, capital, and *concelho* (municipality), Setúbal district, southwestern Portugal, southeast of Lisbon, on the northern shore of the deep estuary formed by the Sado, Marateca, and São Martinho rivers.

The city served as a royal residence during the reign of King John II (1481–95). With the exception of the Igreja (church) de Jesus (begun 1490) and the 17th-century Castelo de São Filipe, the older buildings of Setúbal were almost totally destroyed in the catastrophic earthquake of 1755. In the sand hills of the left



Orange grove near Setúbal, Port.
Suend Allan—Shostal/EB Inc.

bank of the estuary are the ruins of the Roman town of Cetobriga, which was destroyed by tidal wave in AD 412.

The city is Portugal's third most important port. It exports salt, oranges, and muscatel wine and grapes and has boat-building establishments and canneries. Industries produce glassware, chemicals, electrical equipment, and pharmaceuticals.

Setúbal district (area 1,955 sq mi [5,064 sq km]) occupies the peninsula between the Tagus and Sado estuaries, as well as more arid stretches south of the Sado estuary in which wheat, rye, and corn (maize) are grown along with considerable quantities of olives and fruits. The peninsula is remarkable for the profuse vegetation on the southern slope of the Serra de Arrábida along the southern coast. A magnificent Moorish castle in Palmela and the 15th- and 16th-century Quinta da Bacalhoa at Vila Fresca de Azeitão are notable landmarks. A highway between Lisbon and Setúbal opened in 1979. Other highways extend east to Spain and south to Faro district. A thermal electric station on the Mitrena Peninsula is located about 27 mi from Setúbal town. Pop. (1981) city, 77,230; *concelho,* 97,762; district, 654,312.

Seurat, Georges (b. Dec. 2, 1859, Paris—d. March 29, 1891, Paris), painter, founder of the 19th-century French school of Neo-Impressionism whose technique for portraying the play of light using tiny brushstrokes of contrasting colours became known as Pointillism. Using this techique, he created huge compositions with tiny, detached strokes of pure colour too small to be distinguished when looking at the entire work but making his paintings shimmer with brilliance. Works in this style include "Une Baignade, Asnières" (1883–84) and "Sunday Afternoon on the Island of La Grande Jatte" (1884–86).

Georges was the son of Antoine-Chrisostôme Seurat, a 44-year-old property owner, originally from Champagne, and Ernestine Faivre, a Parisienne. His father, a singular personality who had been a bailiff, spent most of his time in Le Raincy, where he owned a cottage with a garden (in which Seurat often painted). The young Seurat lived primarily in Paris with his mother, his brother Émile, and his sister Marie-Berthe. At the time of the Paris Commune, in 1871, when Paris rebelled against the French state and set up its own government, the prudent family temporarily withdrew to Fontainebleau.

While attending school, Georges began to draw, and, beginning in 1875, he took a course from a sculptor, Justin Lequien. He officially entered the École des Beaux-Arts in 1878, in the class of Henri Lehmann, a disciple of Ingres, who painted portraits and conventional nudes. In the school library Seurat discovered a book that was to inspire him for the rest of his life: the *Essai sur les signes inconditionnels de l'art* (1827; "Essay on the Unmistakable Signs of Art"), by Humbert de Superville, a painter-engraver from Geneva; it dealt with the future course of aesthetics and with the relationship between lines and images. Seurat was also impressed with the work of another Genevan aesthetician, David Sutter, who combined mathematics and musicology. Throughout his brief career, Seurat manifested an unusually strong interest in the intellectual and scientific bases of art.

In November 1879, at the age of 20, Seurat went to Brest to do his military service. There he drew the sea, beaches, and boats. When he returned to Paris the following autumn, he shared a studio with another painter, Édmond-François Aman-Jean, who then joined him in Lehmann's class. But Seurat and Aman-Jean departed from the policies of the École des Beaux-Arts in admiring the warm landscapes of Jean-Baptiste Millet at the Louvre. The two friends often frequented dance halls and cabarets in the evening, and in spring they took the passenger steamer to the island of La Grande Jatte, the setting of Seurat's future paintings. Seurat exhibited at the official Salon—the state-sponsored annual exhibition—for the first time in 1883. He displayed portraits of his mother and of his friend Aman-Jean, and in that same year he began his studies, sketches, and panels for "Une Baignade, Asnières." When the picture was refused by the jury of the Salon in 1884, Seurat decided to participate in the foundation of the Groupe des Artistes Indépendants, an association "with neither jury nor prizes," where he showed his "Baignade" in June.

During this period, he had seen and been strongly influenced by the monumental symbolic paintings of Puvis de Chavannes. He also met the 100-year-old chemist Michel-Eugène Chevreul and experimented with Chevreul's theories of the chromatic circle of light and studied the effects that could be achieved with the three primary colours, yellow, red, and blue, and their complements. Seurat fell in with Paul Signac, who was to become his chief disciple, and painted many rough sketches on

small boards in preparation for his masterpiece, "Sunday Afternoon on the Island of La Grande Jatte." In December 1884 he exhibited the "Baignade" again, with the Société des Artistes Indépendents, which was to be of immense influence in the development of modern art.

Seurat spent the winter of 1885 working on the island of La Grande Jatte and the summer at Grandcamp, in Normandy. The Impressionist master Camille Pissarro, who was temporarily converted to the technique of Pointillism, was introduced to Seurat by Signac during this period. Seurat finished the painting "La Grande Jatte" and exhibited it from May 15 to June 15, 1886, at an Impressionist group show. This picture demonstration of his technique aroused great interest. Seurat's chief artistic associates at this time, painters also concerned with the effects of light on colour, were Signac and Pissarro. The unexpectedness of his art and the novelty of his conception excited the Belgian poet Émile Verhaeren. The critic Félix Fénéon praised Seurat's method in an avant-garde review. And Seurat's work was exhibited by the eminent dealer Durand-Ruel in Paris and in New York City.

In 1887, while he was temporarily living in a garret studio, Seurat began work on "Les Poseuses." This painting was to be the last of his compositions on the grand scale of the "Baignade" and "La Grande Jatte"; he thought about adding a "Place Clichy" to this number but abandoned the idea. In the following year he completed "Les Poseuses" and also "La Parade." In February 1888 he went to Brussels with Signac for a private viewing of the exposition of the Twenty (XX), a small group of independent artists, in which he showed seven canvases, including "La Grande Jatte."

Seurat participated in the 1889 Salon des Indépendants, exhibiting landscapes. He painted Signac's portrait at this time. His residence at this point was in the Pigalle district, where he lived with his mistress, Madeleine Knobloch, a girl of 21. On Feb. 16, 1890, Madeleine presented him with a son, whom he officially acknowledged and entered in the register of births under the name of Pierre-Georges Seurat. During that year Seurat completed the painting "Le Chahut," which he sent to the exhibition of the Twenty (XX) in Brussels. During that period he also painted the "Jeune Femme se poudrant," a portrait of his mistress, though he continued to conceal his liaison with her even from his most intimate friends. He spent that summer at Gravelines, near Dunkirk, where he painted several landscapes and planned what was to be his last painting, "Le Cirque."

As if from some sort of premonition of his impending death, Seurat showed the uncompleted "Cirque" at the eighth Salon des Indépendants. As an organizer of the exhibition, he exhausted himself in the presentation and hanging of the works. He caught a chill, developed infectious angina, and, before the exhibition was ended, he died on Easter Sunday 1891. On the following day Madeleine Knobloch presented herself at the town hall of her district to identify herself as the mother of Pierre-Georges Seurat. The child, who had contracted his father's contagious illness, died April 13, 1891. Seurat was buried in the family vault at Père Lachaise cemetery. In addition to his seven monumental paintings, he left 40 smaller paintings and sketches, about 500 drawings, and several sketchbooks. Though a modest output in terms of quantity, they show him to have been among the foremost painters of one of the greatest periods in the history of art. (P.Co.)

MAJOR WORKS. *Paintings.* "Casseurs de pierre, Le Raincy" (*c.* 1880–81; private collection, Paris); "Maison dans les arbres" (1881; Museum and Art Gallery, Glasgow); "Les Pêcheurs à la ligne" (1883; Pierre Lévy Collection, Troyes, Fr.); "Une Baignade, Asnières" (1883–84; National Gallery, London); "Sunday Afternoon on the Island of La Grande Jatte" (1884–86; Art Institute of Chicago); "Le Bec du Hoc, Grandcamp" (1885; Tate Gallery, London); "The Bridge at Courbevoie" (1886; Courtauld Institute Galleries, London); "The Asylum and the Lighthouse, Honfleur" (1886; Chester Beatty Collection, London); "Les Poseuses" ("The Models"; 1887–88; Barnes Foundation, Merion, Pa.); "La Parade" ("Invitation to the Side-Show"; 1887–88; Metropolitan Museum of Art, New York City); "Sunday at Port-en-Bessin" (1888; Rijksmuseum Kröller-Müller, Otterlo, Neth.); "A Young Woman Holding a Powder-puff" (1889–90; Courtauld Institute Galleries); "The Channel at Gravelines, Evening" (1890; Museum of Modern Art, New York City); "Le Cirque" ("The Circus"; 1890–91; Louvre, Paris).

Drawings. "Le Marchand d'oranges" (1881; Louvre); "Le Labourage" (1881; Louvre); "Paysans" (1882–83; Louvre); "La Mère de l'artiste" (1882–83; Metropolitan Museum of Art); "Au concert européen" (1886–87; Museum of Modern Art).

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Seuse, Heinrich (German mystic): *see* Suso, Heinrich.

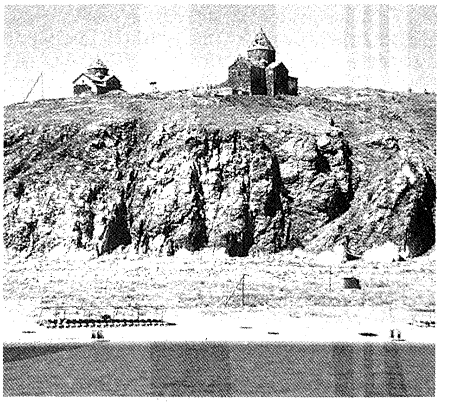
Seuss, Doctor (U.S. writer): *see* Geisel, Theodor Seuss.

Seuthopolis (Bulgaria): *see* Kazanlŭk.

Sevagram, town, Wardha district, Mahārāshtra state, western India. Originally called Segaon, the village was given its present name (Hindī: Village of Service) by Mohandas Gandhi, the Indian nationalist leader. In 1936 he left his ashram (hermitage) on the Sābarmati River, near Ahmadābād, and settled at Sevagram. There he founded another ashram and directed the independence movement. Within this he created a model community that still flourishes, in which the inhabitants live a simple existence.

The town is also the site of the Nai Tālimi Sangh, the educational centre established by Gandhi. He gave it the tasks of building a self-sufficient community by providing its own food, clothing, shelter, and tools and of establishing a society able to fulfill its aesthetic, spiritual, and intellectual needs by creating its own art, music, literature, and drama.

Sevan, Lake, Russian OZERO SEVAN, lake in the Armenian Soviet Socialist Republic, with an area of 525 sq mi (1,360 sq km). Lying at 6,250 ft (1,905 m) above sea level in a mountain-enclosed basin, it drains by the Razdan River into the Araks and to the Caspian Sea, but most of its water is lost by evaporation rather than by runoff. The lake is in two connected parts, the smaller but deeper Maly Sevan (northwest), with a maximum depth



Shoreline along Lake Sevan, Armenian S.S.R.; ancient Armenian churches are in the background
Alexander M. Chabe

of 282 ft, and the Bolshoy Sevan (southeast), reaching 131 ft in depth. The construction of six hydroelectric plants on the Razdan led to a fall of the lake level. To stabilize its level, a 30 mi (49 km) tunnel to divert water from the Arpa River was constructed in the late 1970s. Lake Sevan is rich in fish, especially trout, and fishing is important. Several ancient Armenian churches lie along the shores.

Sevastopol, also spelled SEVASTOPOL', city and seaport, Crimean *oblast* (administrative region), Ukrainian Soviet Socialist Republic, in the southwestern Crimean Peninsula on the southern shore of the long, narrow Akhtiarskaya Bay, which forms a magnificent natural harbour. West of the modern town stood the ancient Greek colony of Chersonesus, founded in 421 BC. Originally a republic, Chersonesus (Heracleotio Chersonese) became, in turn, part of the Kingdom of Pontus, of the Cimmerian Bosporus, of the Roman Empire, and of the Byzantine Empire. In 988 or 989 Prince Vladimir of Kiev captured the town and was baptized there; he restored it to Byzantium, but it later passed to the Empire of Trebizond and declined into insignificance. In 1783 the Russians, having annexed the Crimea, began the construction there of a naval base and fortress, named Sevastopol the following year. In 1808 a commercial port was opened. From October 1854 to September 1855, during the Crimean War (1853–56), the Anglo-French armies laid siege to Sevastopol, which had been strongly fortified. After the war the severely damaged town was reconstructed, and its growth was stimulated by the coming of the railway in 1875. The transfer of the commercial harbour to Feodosiya in 1894, however, was a serious setback. Since then, Sevastopol's principal function has been as a major naval base and fortress. In World War II the town again underwent a seige, this time for a month, by the Germans from June to July 1942. The town was reduced to rubble, but, after liberation in May 1944, it was again reconstructed. Among many memorials of the town's stormy history are several monuments devoted to the many defenses of Sevastopol and a vast panorama 377 ft (115 m) long of the Crimean War siege. Pop. (1983 est.) 328,000.

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Sevastopol, Siege of (Oct. 17, 1854–Sept. 11, 1855), the major operation of the Crimean War (1853–56), in which 50,000 British and French troops (joined by 10,000 Piedmontese troops during 1855), commanded by Lord Raglan and Gen. François Canrobert, besieged and finally captured the main naval base of the Russian Black Sea fleet. Sevastopol's defenses had been built by the military engineer

Colonel Eduard Totleben, and the Russian troops were commanded by Prince Aleksandr Menshikov. The siege lasted 11 months because the allies lacked heavy artillery to smash the defenses effectively, while all Russian efforts to break the siege failed. Winter brought on severe suffering and heavy casualties among the allied troops, whose commanders had made little or no provision for a winter campaign. This situation produced several crises within the British government. On Sept. 8, 1855, French troops took and held the Malakhov, a vital defensive position at the southeast end of the city. On September 11 the Russians sank their ships in the harbour, blew up the fortifications, and evacuated Sevastopol. The allies took the city but did not pursue the Russians. The war then moved rapidly toward an end in early 1856.

Seven, Group of, Toronto-centred group of Canadian painters devoted to landscape painting (especially of northern Ontario subjects) and the creation of a national style. Tom Thomson and J.E.H. MacDonald were the circle's leaders and initiators in 1913. The other members included Lawrence Harris, Arthur Lismer, Frederick Varley, Franklin Carmichael, Frank H. Johnston, and Alexander Young. The group was particularly influential in the 1920s and '30s. In 1933 the name was changed to the Canadian Group of Painters.

Seven Against Thebes, in Greek mythology, the seven champions who were killed fighting against Thebes after the fall of Oedipus, the king of that city. The twins Eteocles and Polyneices, who had been cursed by their father, Oedipus, failed to agree on which of them was to succeed to the Theban throne and decided to rule in alternate years. As Eteocles' turn came first, Polyneices withdrew to Argos, where he married Argeia, daughter of King Adrastus. Another daughter, Deipyle, married Tydeus, son of the exiled king Oeneus of Calydon. At the end of the year, Polyneices' turn came to rule Thebes. When Eteocles refused to give up the throne, Adrastus mobilized an army, whose chieftains, in Aeschylus' tragedy about the Seven, were Tydeus, Capaneus, Eteoclus, Hippomedon, Parthenopaeus, Amphiaraus, and Polyneices. Other authors count Adrastus as one of the Seven and omit Hippomedon or Polyneices. Polyneices and Eteocles killed each other, fulfilling Oedipus' curse. When the sons of the dead Seven, the Epigoni, or second generation, had grown to manhood, Adrastus again attacked the city and occupied it after the Thebans had evacuated it by night. He died at Megara on the homeward journey.

The story of the Seven was a great favourite in antiquity. It is the subject not only of Aeschylus' tragedy *Seven Against Thebes* but also of Euripides' play *Phoenician Women.*

Seven Days' Battles (June 25–July 1, 1862), series of American Civil War battles in which a Confederate army under General Robert E. Lee drove back General George B. McClellan's Union forces and thwarted the Northern attempt to capture the Confederate capital of Richmond, Va. McClellan was forced to retreat from a position 4 miles (6 km) east of the Confederate capital to a new base of operations at Harrison's Landing on the James River.

After the indecisive Battle of Oak Grove (June 25), Lee's attack on the Union right at Mechanicsville (June 26) was repulsed with great losses, but Lee and General "Stonewall" Jackson combined to defeat General Fitz-John Porter's V Corps in a bloody encounter at Gaines's Mill (June 27). In the battles of Peach Orchard and Savage's Station (June 29) and Frayser's Farm (Glendale; June 30), the retreating Union forces inflicted heavy casualties on the pursuing Confederates. Reaching the James River, and supported by Union gunboats, the Northern troops turned back Lee's final assults at Malvern Hill (July 1). Lee later stated in his official report that "Under ordinary circumstances the Federal Army should have been destroyed."

McClellan's failure to capture Richmond, and the subsequent withdrawal of the Union's Army of the Potomac from the Yorktown Peninsula, signified the end of the Peninsular Campaign (*q.v.*). Northern casualties were estimated at 16,000 men and Southern at 20,000.

Seven Gods of Luck (Japanese mythology): *see* Shichi-fuku-jin.

Seven Golden Cities of Cibola: *see* Cibola, Seven Golden Cities of.

Seven Hills (Germany): *see* Siebengebirge.

Seven Hills of Rome, group of hills on or about which the ancient city of Rome was built. The original city of Romulus was built upon Palatine Hill (Latin: Mons Palatinus). The other hills are the Capitoline, Quirinal, Viminal, Esquiline, Caelian, and Aventine (known respectively in Latin as the Mons Capitolinus, Mons Quirinalis, Mons Viminalis, Mons Esquilinus, Mons Caelius, and Mons Aventinus).

Seven Holy Founders, also called SEVEN SERVITE FOUNDERS (fl. 13th century, Compartimento of Tuscany, Italy; canonized 1888; feast day February 17), saints Bonfilius, Alexis Falconieri, John Bonagiunta, Benedict dell'Antella, Bartholomew Amidei, Gerard Sostegni, and Ricoverus Uguccione, who founded the Ordo Fratrum Servorum Sanctae Mariae ("Order of Friar Servants of St. Mary"). Popularly called Servites, the order is a Roman Catholic congregation of mendicant friars dedicated to apostolic work.

According to the 14th-century *Legenda de origine* (ascribed to Peter of Todi, Servite prior general from 1314 to 1344), the earliest writing to mention the seven, the men were Florentine merchants. They joined together, living a penitential life, and were members of the Society of St. Mary at a time when Florence was in political upheaval and was being further disrupted by the Cathari (heretical Christians proclaiming that good and evil have two separate creators). Led by Bonfilius, they became closely knit and devoted themselves to the Virgin Mary, who, according to tradition, appeared to the seven in a vision and bade them withdraw into solitude.

With the approval of their bishop, Ardingus (Ardingo), they moved, in 1233, outside the gates of Florence to a neighbouring area called Cafaggio, into a house dedicated to Mary. There they lived a life of poverty, fellowship, and witness based on a literal interpretation of the Gospel. Seeking stricter isolation, they departed, at an unstated date, for Monte Senario, about 12 miles (19 km) from Florence, where they built a hermitage, continued their penitential life without distraction, and laid the foundation for what was to become their order. According to 15th–16th-century legends, on April 13, 1240, a second vision of Mary disclosed her wishes that they serve her, wear a black habit, and adopt the Rule of St. Augustine of Hippo; thenceforward they were known as the Servants of St. Mary (or Servites). They returned to Florence, where they built a church called St. Mary of Cafaggio (later, Santissima Annunziata). Bonfilius was chosen superior, and Ardingus approved their community.

According to the *Legenda,* however, in 1244, after prayer and with the advice of St. Peter Martyr, the Dominican preacher who was then preaching in Florence and who was later murdered by the Cathari, they adopted Augustine's Rule and the black habit, which became distinctive of the Servites; at this time also, they decided to retain the name of Servants of St. Mary, which they had earlier been called by the people.

Pope Alexander IV formally approved the Servites on March 23, 1256. The exact date of birth and death and place of death of each founder is uncertain. At the beginning of the 16th century, however, it was recorded that the bodies of Bonfilius, Benedict dell'Antella, and Alexis Falconieri were buried on Monte Senario. In 1649, when the main altar of the chapel at Monte Senario was being remodeled, the remains of seven bodies were found, and, after being moved several times, they are now enshrined in the Chapel of the Seven Holy Founders, Monte Senario.

Seven Islands (Canada): *see* Sept-Îles.

seven-note scale (music): *see* heptatonic scale.

Seven Oaks Massacre (1816), destruction of the Hudson's Bay Company's Red River Settlement (*q.v.*) in what is now Manitoba, Canada, by agents of the rival North West Company.

On June 19, 1816, a party of about 60 Métis (persons of mixed European and Indian blood) under Cuthbert Grant, a North West Company employee, set out to run provisions for North West Company canoes past the Red River colony; they plundered some outlying posts on the Assiniboine River and then stopped at a place called Seven Oaks, near the Hudson's Bay Company's post at Fort Douglas. Robert Semple, the governor of the colony and governor in chief of the Hudson's Bay Company's territories in North America, led a group of about 25 soldiers and settlers to parley with the Métis. A fight broke out in which Semple and 19 of his men were killed; Grant lost only one man. The Métis gave no quarter to their wounded opponents, and in the following days they forced the remaining settlers to leave under the threat of massacre. The destruction of the Red River colony, however, was only temporary; it was restored the following year.

Seven Pagodas (India): *see* Mahābalipuram.

Seven Pines, Battle of, also called BATTLE OF FAIR OAKS (May 31–June 1, 1862), in the American Civil War, two-day battle in the Peninsular Campaign, in which Confederate attacks were repulsed, fought 6 miles (10 km) east of the Confederate capital at Richmond, Va. The Union Army of the Potomac was commanded by Major General George B. McClellan and the Confederates by General Joseph E. Johnston, who was severely wounded in the first day of fighting. Northern casualties numbered more than 5,000, Southern more than 6,000.

Seven Sages of the Bamboo Grove, also called SEVEN WORTHIES OF THE BAMBOO GROVE, Wade–Giles romanization CHU-LIN CH'I HSIEN, Pinyin ZHULIN QI XIAN, a group of Chinese scholars and poets of the mid-3rd century AD who banded together to escape from the hypocrisy and danger of the official world to a life of drinking wine and writing verse in the country. Their retreat was typical of the Taoist-oriented *ch'ing-t'an* ("pure conversation") movement that advocated freedom of individual expression and hedonistic escape from the extremely corrupt politics of the short-lived Wei-dynasty (AD 220–265/266) court.

Most prominent among the Seven Sages was the free-thinking, eccentric, and highly skilled poet Yüan Chi (AD 210–263). Another of the group's poets was Liu Ling (AD 225?–?280). Hsiang Hsiu (AD 230?–280) wrote a famous commentary, the *Chuang-tzu chu,* with Kuo Hsiang, a Neo-Taoist contemporary, on

the works of the early Taoist philosopher Chuang-tzu (died *c.* 300 BC). Other members of the group included the musician Yüan Hsien, the devout Taoist Shan T'ao, and Wang Jung.

Host of the group at his country home in Shan-yang, in the south of present-day Shantung Province, was the gifted writer and amateur smith Hsi K'ang (AD 223–262), whose independent thinking and scorn for court custom led to his execution by the state, strongly protested by his several thousand followers; Hsi K'ang's execution testifies to the very real dangers that forced the Sages' retirement from palace life.

The tensions created by such forced retirement are revealed in the writings of the Seven Sages and other eremitic poets of their time. Their poems and essays frequently centre on the impossibility of palace life for the scholar (with criticisms of the court sometimes necessarily veiled in allegory) and the pleasures and hardships of country life. The retirement of the Seven Sages served as a model for that of later Chinese writers living in troubled times.

Seven Sleepers of Ephesus, the heroes of a famous legend that, because it affirmed the resurrection of the dead, had a lasting popularity in all Christendom and in Islām during the Middle Ages. According to the story, during the persecution of Christians (AD 250) under the Roman emperor Decius, seven (eight in some versions) Christian soldiers were concealed near their native city of Ephesus in a cave to which the entry was later sealed. There, having protected themselves from being forced to do pagan sacrifices, they fell into a miraculous sleep. During the reign (AD 408–450) of the Eastern Roman emperor Theodosius II, the cave was reopened, and the Sleepers awoke. The emperor was moved by their miraculous presence and by their witness to their Christian doctrine of the body's resurrection. Having explained the profound meaning of their experience, the Seven died, whereupon Theodosius ordered their remains to be richly enshrined; and he absolved all bishops who had been persecuted for believing in the Resurrection.

A pious romance of Christian apologetics, the legend is extant in several versions, including Greek, Syriac, Coptic, and Georgian. Western tradition calls the Seven Sleepers Maximian, Malchus, Marcian, John, Denis, Serapion, and Constantine; Eastern tradition names them Maximilian, Jamblichus, Martin, John, Dionysius, Antonius, and Constantine.

Their feast day is July 27 in the Roman Catholic church and August 2/4 and October 22/23 in the Greek Orthodox church.

seven-tone scale (music): *see* heptatonic scale.

Seven Weeks' War, also called AUSTRO-PRUSSIAN WAR (1866), war between Prussia on the one side and Austria, Bavaria, Saxony, Hanover, and certain minor German states on the other. It ended in a Prussian victory, which meant the exclusion of Austria from Germany. The issue was decided in Bohemia, where the principal Prussian armies met the main Austrian forces and the Saxon army, most decisively at the Battle of Königgrätz (*q.v.*). A Prussian detachment, known as the army of the Main, meanwhile dealt with the forces of Bavaria and other German states that had sided with Austria. Simultaneously, a campaign was fought in Venetia between the Austrian army of the south and the Italians, who had made an alliance with Prussia.

The 1866 campaign was a carefully planned stage in the unification of Germany under Prussia's Hohenzollern dynasty, of which Otto von Bismarck was the principal agent. The issue was clear-cut: Prussia deliberately challenged Austria for the leadership of the German Confederation. Prussia had challenged Austria in 1850, but the complete failure of its mobilization in that year compelled the acceptance at Olmütz of the somewhat humiliating terms of Austria. Since then Prussia, with Bismarck as statesman, Count Helmuth von Moltke as strategist, and Count Albrecht von Roon as army organizer, had prepared methodically for a fresh challenge. The actual pretext found by Bismarck in 1866 was a dispute over the administration of Schleswig and Holstein, which Austria and Prussia had seized from Denmark in 1864 and had since held jointly. Diplomatic exchanges began in January and military preparations a little later, but hostilities did not actually break out until the middle of June.

By the alliance with Italy, Bismarck contrived to divert part of the Austrian forces to the south. This advantage, together with that of Prussia's modernized army discipline, resulted in a Prussian victory; the war was formally concluded on August 23 by the Treaty of Prague. Italy won Venetia.

Seven Wise Masters, also called THE SEVEN VIZIERS, THE STORY OF THE SEVEN SAGES, or SINBADNAMEH ("The Book of Sindbad"), a cycle of stories, presumably Indian in origin, that made its way through Middle Persian and Arabic into Western lore. In the frame story, an Oriental king entrusted the education of his son to a wise tutor named Sindbad (not to be confused with the sailor of *The Thousand and One Nights*). During a week when the prince was ordered by Sindbad to maintain silence, his stepmother tried to seduce him. Having failed, she tried to accuse the prince before the king and sought to bring about his death by relating seven stories. Each of her narratives, however, was confuted by seven sages, who in turn told tales of the craft of women. The prince's lips were at last unsealed and the truth was exposed.

The oldest surviving text of the story is in Middle Arabic and is included in *The Thousand and One Nights* (nights 578–606 in Sir Richard Burton's translation, vol. 6, 1886). The Arabic text gave rise to Hebrew, Syrian, and Spanish translations (13th century); the Greek version (11th century) is derived from the Syrian. Of the Persian versions the most important is that of al-Samarqandī (12th century). The tales entered Latin via the Greek version, in the 12th century, under the title *Dolopathos,* which was translated into French. The German, English, French, and Spanish chapbooks of the cycle are generally based on a Latin original.

Seven Wonders of the World, preeminent architectural and sculptural achievements of the ancient Mediterranean and Middle East, as listed by various observers. The best known are those of the 2nd-century-BC writer Antipater of Sidon and of a later but unknown observer of the 2nd century BC who claimed to be the mathematician Philon of Byzantium. Included on the list in its eventual form were the following:

Pyramids of Giza, the oldest of the wonders and the only one of the seven substantially in existence today.

Hanging Gardens of Babylon, a series of landscaped terraces ascribed to either Queen Sammu-ramat or King Nebuchadrezzar II.

Statue of Zeus at Olympia, a large, ornate figure of the god on his throne, made *c.* 430 BC by Phidias of Athens.

Temple of Artemis at Ephesus, a structure famous for its imposing size and for the works of art that adorned it.

Mausoleum of Halicarnassus, monumental tomb of the Anatolian king Mausolus built by his widow Artemisia.

Colossus of Rhodes, a huge bronze statue built at the harbour of Rhodes in commemoration of the raising of the siege of Rhodes (305–304 BC).

Pharos of Alexandria, the most famous lighthouse of the ancient world, built for Ptolemy II of Egypt *c.* 280 BC on the island of Pharos off Alexandria.

Some early lists included the Walls of Babylon or the Palace of King Cyrus of Persia in place of one of the sites noted above.

(*See also* Artemis, Temple of; Rhodes, Colossus of; Giza, Pyramids of; Hanging Gardens of Babylon; Mausoleum of Halicarnassus; Pharos of Alexandria; Zeus, Statue of.)

Seven Years' War (1756–63), the last major conflict before the French Revolution to involve all the great powers of Europe. Generally, France, Austria, Saxony, Sweden, and Russia were aligned on one side against Prussia, Hanover, and Great Britain on the other, although the ranging of Great Britain against France requires a stretch of geography. The main points of contention between these two traditional rivals were not European but colonial—the struggle for control of North America (*see* French and Indian War) and India. The end of the war therefore had worldwide as well as European consequences.

The war began in 1756 when Austria, which had lost the rich eastern German province of Silesia to Prussia a few years before in the War of the Austrian Succession, attempted to recover it. Frederick II the Great of Prussia, finding himself facing a formidable alliance of Austria, Saxony, Sweden, Russia and France, struck the first blow, at Saxony, and occupied Dresden, its capital. The Saxon forces capitulated not long after, and over the next year Frederick won a series of victories over the Austrians, culminating in the Battle of Prague on May 6, 1757. A month later, however, he was forced to retreat from Bohemia, having suffered a heavy defeat in the Battle of Kolin.

Frederick now faced a war on several fronts. Sweden attacked Prussian Pomerania; a Russian army entered East Prussia and won a major victory there; France attacked from the west; and Austria moved on Silesia. Gambling for success against France and her allies, Frederick met a Franco-German army at Rossbach in Thuringia on November 5 and, although outnumbered two to one, fought a two-hour battle that cost his enemies 7,000 men as against 550 Prussian troops. He then turned to meet the Austrians in Silesia and, again heavily outnumbered, won his greatest victory at Leuthen on December 5.

In 1758 an Anglo-Hanoverian army defeated a much larger French force at Krefeld on June 23, and Frederick beat back the Russians in a bloody battle at Zorndorf on August 25, but his attempt to save Saxony from the Austrians was only partially successful, and he was forced to retreat into Silesia. On Aug. 12, 1759, he suffered a disastrous defeat by a joint Austro-Russian force at Kunersdorf. His position was precarious, but a new treaty with Britain that gave him much-needed financial support enabled him to continue in the field.

The low point of the war came in December 1761. Frederick, his armies all but exhausted by a war that had forced them into a series of rapid maneuvers against multiple enemies, was near despair. But at that point, through the death of the Russian empress Elizabeth and the succession of Tsar Peter III, an admirer of Prussia, Russia not only made peace with Frederick but also mediated a peace between Prussia and Sweden and finally joined Frederick in an effort to oust the Austrians from Silesia. Though Peter was soon afterward assassinated, his successor, Catherine II the Great, did not renew hostilities against Prussia. Frederick then drove the Austrians from Silesia while his ally, Ferdinand of Brunswick, won victories over the French at Wilhelmsthal and over the Saxons at Lutterberg and captured the important town of Göttingen.

By the end of 1762 the end of the war was in sight. Austria saw nothing to be gained from continuing without Russia. France had no interest in further supporting a war over Silesia, and Britain came to similar conclusions about supporting Prussia. By the Franco-British Treaty of Paris (Feb. 10, 1763) Britain won North America and India and became the chief power in overseas colonization. Five days later at the Treaty of Hubertusburg, Frederick confirmed Prussian possession of Silesia and his country's stature as a major European power.

Seveners (Islāmic sect): *see* Ismāʿīlīyah.

Sevenoaks, district, county of Kent, England, southeast of London. With an area of 143 sq mi (371 sq km), it is a predominantly rural area with a rolling landscape. Much of the district is wooded. The major towns are Sevenoaks in the south and Swanley in the north. The mansion of Knole House was, from its construction in 1456, owned by monarchs and archbishops. From *c.* 1603 it was owned by the Sackville family, who endowed it to the National Trust in 1946. Pop. (1982 est.) 111,700.

Sevens (card game): *see* Fan Tan.

Seventeen Article Constitution, in Japanese history (AD 604), code of moral precepts for the ruling class, issued by the regent Shōtoku Taishi, which set the fundamental spirit and orientation for the subsequent Chinese-based centralized reforms. Written at a time of disunity, when Japan was divided into hereditary, semi-autonomous *uji* units, the articles laid greatest stress on the Chinese Confucian concepts of a unified state ruled by one sovereign; the employment of officials on the basis of merit, not heredity; the responsibilities of the officials to the ruled, as well as the obedience of the subjects to their rulers; and an ideally harmonious bureaucracy founded on the Confucian virtues of justice, decorum, and diligence. Adherence to the Buddhist "treasures," the Buddha, the "law," and the monasteries was also exhorted. Specific prohibitions denied local officials the power to collect taxes and exact corvée services. Most of its provisions were not put into effect until much later, and some historians claim that the constitution in its extant form is a later forgery.

1763, Proclamation of, proclamation declared by the British crown at the end of the French and Indian War in North America, mainly intended to conciliate the Indians by checking the encroachment of white settlers on their lands. After Indian grievances had resulted in the start of Pontiac's War (1763–64), British authorities determined to subdue intercolonial rivalries and abuses by dealing with Indian problems as a whole. To this end, the proclamation organized new British territories in America—the provinces of Quebec, East and West Florida, and Grenada (in the Windward Islands)—and a vast British-administered Indian reservation west of the Appalachians, from south of Hudson Bay to north of the Floridas. It forbade all white settlement on Indian territory, ordered those settlers already there to withdraw, and strictly limited future settlement. For the first time in the history of European colonization in the New World, the proclamation formalized the concept of Indian land titles, prohibiting issuance of patents to any lands claimed by a tribe unless the Indian title had first been extinguished by purchase or treaty.

Although not intended to alter western boundaries, the proclamation was nevertheless offensive to the Colonies as undue interference in their affairs. Treaties following Pontiac's War drew a more acceptable line of settlement (*see* Fort Stanwix, Treaties of), and the balance of territory north of the Ohio was added to Quebec in 1774. The proclamation, however, failed to stem the westward movement of pioneers, whose disregard of its provisions evoked decades of continued Indian warfare throughout the area.

1789, Revolution of: *see* French Revolution.

seventeenth parallel, the provisional military demarcation line established in Vietnam by the Geneva Accords (1954). The line did not actually coincide with the 17th parallel but ran south of it, approximately along the Song (river) Ben Hai to the village of Bo Ho Su and from there due west to the Laos–Vietnam border. Extending for three miles (five kilometres) on either side of the demarcation line was a demilitarized zone (DMZ), also called for by the Geneva agreement.

Although the accords stipulated that the line "should not in any way be interpreted as constituting a political or territorial boundary," the rest of the agreement was not carried out, and the 17th parallel became the practical political boundary between North and South Vietnam.

Seventh-day Adventist, member of the largest organized modern denomination of Adventism, a millennialist Christian sect founded in the United States in the 19th century. *See* Adventist.

Severian OF GABALA (fl. late 4th century—d. after 408), bishop of Gabala (now Latakia, Syria), theologian and orator, principal opponent of the eminent 4th-century Greek Church father and patriarch of Constantinople, John Chrysostom.

An accomplished speaker and writer, Severian left Gabala *c.* 401 for the Byzantine imperial capital of Constantinople, where he established a reputation for his oratory. He became a protégé of Chrysostom and was entrusted with administrative responsibility in the Greek Orthodox Church during Chrysostom's visitations to Asian Christian communities. He was accused, however, by Serapion, archdeacon of Constantinople, of undermining Chrysostom's authority and later was induced by Chrysostom to return to his Syrian diocese. Recalled to Constantinople *c.* 403 and received by Chrysostom at the insistence of Empress Eudoxia, wife of the emperor Arcadius, Severian delivered a formal address on peace in the ceremony of reconciliation.

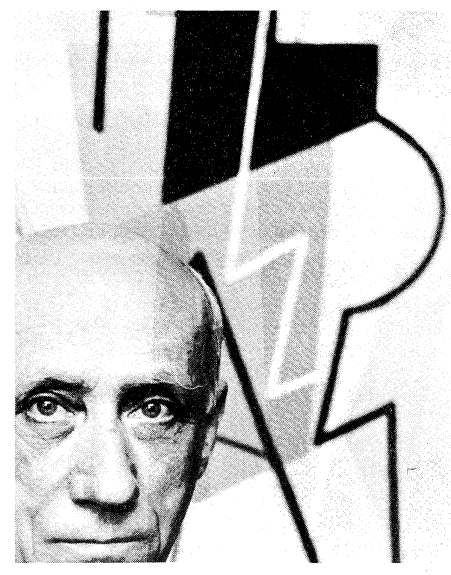
Encouraged by an imperial and ecclesiastical faction hostile to Chrysostom's strict moral reforms, Severian served as prosecutor and judge of the patriarch at the Synod of the Oak, July 403. This provincial council, prompted by Eudoxia and largely composed of Syrian and Egyptian bishops inimical to Chrysostom, convicted Chrysostom on apparently fabricated charges ranging from his having favoured the doctrines of Origen (*q.v.*) to eating lozenges in church; he was exiled to the wild frontier of Asia Minor. The vociferous popular reaction in favour of Chrysostom, together with the occurrence of an earthquake that frightened the Empress, forced Severian and his followers to flee Constantinople. The next year Severian, with a coalition of Chrysostom's enemies, arranged a second trial that succeeded in exiling the patriarch permanently (June 404) on counts of illegally resuming his patriarchal jurisdiction and of burning down his own church. Following Chrysostom's death in 407, caused by continuous harassment in exile, Severian left Constantinople for Syria.

Particularly noted as a biblical exegete of the literal-historical school of Antioch, Severian composed significant commentaries on the letters of St. Paul and a series of homilies and sermons on the first six books of the Old Testament. Ironically, early editors attributed these works to Chrysostom and included them in the patriarch's collected works. Later studies by B. Marx (1939), however, have positively identified Severian's writings. His New Testament commentaries were edited by K. Staab (1933) and by H. Emonds (1941). An imperfect Greek text, with a Latin translation, of his Old Testament homilies is given in *Patrologia Graeca* (vol. 56; 1866). Through the Latin versions of his writings, Severian affected Western preaching by his influence on the 5th-century bishop of Ravenna (Italy), Peter Chrysologus. Modern scholarship has heightened Severian's theological importance beyond his notoriety as antagonist to Chrysostom.

Severing, Carl (b. June 1, 1875, Herford, Ger.—d. July 23, 1952, Bielefeld, W.Ger.), German politician who was a leading member of the Social Democratic Party during the Weimar Republic and longtime minister of interior of Prussia (1920–26; 1930–32).

An activist trade union leader, Severing was a member of the German imperial Reichstag (parliament) from 1907 to 1912, of the postwar Weimar constituent assembly (1919), and, until the beginning of the National Socialist era, of both the Weimar Reichstag and the Prussian state diet. In 1919, as state commissioner for Westphalia, he directed the suppression of a Communist insurrection in the Ruhr. Later, he served as interior minister in the second Weimar Cabinet of Hermann Müller (1928–30). His most important work, however, was accomplished in the Prussian interior ministry, where he achieved the democratic reform of the state police force. With Prussian Premier Otto Braun, he devoted himself to preserving in Prussia, by far the largest state in Germany, a viable Socialist enclave amid the general decay of German social democracy. Forcibly ousted with his ministerial colleagues from his post by German Chancellor Franz von Papen in July 1932, he subsequently withdrew from the politics of National Socialist Germany but later resumed political activity after the fall of the Nazis in 1945.

Severini, Gino (b. April 7, 1883, Cortona, Italy—d. Feb. 27, 1966, Paris), painter whose synthesis of the styles of Futurism and Cubism was instrumental in gaining acceptance for the Futurist movement outside Italy.



Gino Severini, 1952

By courtesy of the Art Institute of Chicago; photograph, Sanford Roth

Severini began his painting career in 1900 as a student of Giacomo Balla, an Italian Pointillist who later became a prominent Futurist. Stimulated by Balla's account of the new painting in France, he moved to Paris in 1906 and met leading members of the French avant-garde, such as the Cubist painters Braque and Pi-

casso and the writer Guillaume Apollinaire. He continued to work in the Pointillist manner, however, until 1910, when the Milanese poet Marinetti drew up the first Futurist manifesto (*see* Futurism), which Severini signed.

Although he paid lip service to the official aesthetics of Futurism, Severini used the human figure as the source of the imagery and tempo in his paintings. He was especially fond of painting nightclub scenes in which he evoked the sensations of movement and sound by filling the picture with rhythmic forms and cheerful, flickering colours. "Dynamic Hieroglyph of the Bal Tabarin" (1912; Museum of Modern Art, New York City) continued the theme of night life but incorporated the Cubist technique of collage (real sequins are fixed to the dancers' dresses) and such nonsensical elements as a realistic nude riding a pair of scissors.

Only briefly, in such wartime works as "Red Cross Train" (1914; Solomon R. Guggenheim Museum, New York City), did Severini display the orthodox Futurists' glorification of war and mechanized power. Instead, he turned increasingly to an idiosyncratic form of Cubism that, nevertheless, retained decorative elements of Pointillism and Futurism, as is seen in "Spherical Expansion of Light (Centrifugal)" (1914; Riccardo and Magda Jucker Collection, Milan). But in 1921 he adopted the Neoclassical figurative style that he retained throughout the remainder of his career in many decorative panels and mosaics.

Severinus (b. Rome—d. Aug. 2, 640, Rome), pope from 638 to 640 who went unconsecrated through nearly his entire reign for declining to endorse the Byzantine emperor Heraclius' statement of faith, the *Ecthesis,* which propounded Monothelitism, the unorthodox doctrine of a single will in Christ.

Severinus was chosen *c.* Oct. 15, 638, to succeed Pope Honorius I, and legates went to Constantinople for Heraclius' confirmation of the election, which he hesitated to ratify pending Severinus' acceptance of the *Ecthesis.* The Pope refused, and his legates remained at Constantinople to deliberate on his behalf.

Meanwhile, Exarch Isaac of Ravenna, supported by Roman soldiers, occupied the Lateran and seized the church's treasure, hoping to force Severinus to conform to imperial demands. Severinus remained steadfast, and his legates eventually secured Heraclius' confirmation. Consecrated on May 28, 640, he promptly declared the orthodoxy of Christ's two natures and two wills. The condemnation of Monothelitism, carried on by his immediate successors as well, caused strained relations between Rome and Constantinople for several decades.

Severn, Welsh HAFREN, river, Britain's longest from source to tidal waters (about 180 mi [290 km]), rising near the River Wye on the northeastern slopes of Plynlimon (Welsh: Pumlumon), Wales, and following a semicircular course to the Bristol Channel and the Atlantic Ocean. It drains an area of 4,350 sq mi (11,266 sq km) with an average discharge at Bewdley of 2,170 cu ft (61.5 cu m) per second.

The river's course is at first southeasterly, descending from an elevation of 2,000 ft (600 m) at its source to 500 ft at the Welsh town of Llanidloes. There it turns sharply northeastward, following the Vale of Powys past Newtown and Welshpool. At Llanymynech the River Vyrnwy joins the Severn: the tributary headwaters are dammed to form the reservoir of Lake Vyrnwy, supplying Liverpool with drinking water. The enlarged Severn turns eastward over a plain on which it loops around the old town of Shrewsbury. Originally the river continued eastward to join the River Dee (which originates in North Wales and drains northward to the Irish Sea), but its course was blocked by ice during the Pleistocene Epoch, and its waters escaped to the southeast at Ironbridge. This course was maintained after deglaciation. The swiftly flowing current through the gorge at Ironbridge was important to the early iron industry of Coalbrookdale. Continuing southward, the Severn receives the Stour at Stourport and passes through Worcester where the cathedral stands on a cliff rising from the river's steep left bank. The Teme enters from the west below Worcester and the Avon from the northeast at Tewkesbury, a yachting and motorboat centre. At Gloucester the Severn becomes tidal and meanders to the sea. Navigation is difficult on this section and is bypassed by a ship canal (opened 1827), which leaves the estuary at Sharpness. Other canals that join the river, linking it with the Midlands region of England and with the River Thames, are virtually disused.

The estuary widens gradually between South Wales and Somerset and eventually becomes the Bristol Channel. The last railway bridge across it is the Berkeley Viaduct (3,582 ft) between Sharpness and Lydney; but the Severn Tunnel, 15 mi farther downstream, is 4½ mi long. The Severn Bridge, an impressive suspension bridge, with a 3,240-ft span, was built in the 1960s and forms part of a motorway link (M4) from London to South Wales. The atomic power station (opened 1962) on the flats at Berkeley uses Severn water for cooling purposes.

Severn River, river, northwestern Ontario, Canada, rising in the Finger Lake region of western Ontario and flowing northeast for about 610 mi (980 km) through Severn Lake to Hudson Bay. Discovered in 1631, it was originally named New Severn (after the Severn in England) by Capt. Thomas James. Although blocked by rapids, it was often used by traders as a portage route between Lake Winnipeg and Hudson Bay. Ft. Severn, a Hudson's Bay Company post established at the river's mouth in 1685, was burned in 1689 to avoid capture by the French, who rebuilt it as Fort-Thérèse. Abandoned in 1714, it was reestablished in 1759 by the British and still functions as a trading post.

Severnaya Dvina (Soviet Union): *see* Northern Dvina River.

Severnaya Golodnaya Steppe (Kazakh S.S.R.): *see* Betpak-Dala.

Severnaya Zemlya (Russian: Northern Land), also spelled SEVERNAJA ZEML'A, or SEVERNAIA ZEMLIA, archipelago, Krasnoyarsk *kray* (territory), Russian Soviet Federated Socialist Republic, in the Arctic Ocean between the Kara Sea (west) and Laptev Sea (east). Severnaya Zemlya lies immediately north of Cape Chelyuskin, the most northerly point in Siberia, from which it is separated by Vilkitsky Strait. The archipelago, which has a total area of 14,175 sq mi (36,712 sq km), consists of four large islands, Oktyabrskoy Revolyutsi Ostrov (Island), Bolshevik, Komsomolets, and Pioner, as well as a number of smaller ones. The highest point, on the first named island, reaches 3,166 ft (965 m). About 48 percent of the archipelago's area is covered by ice, which reaches a depth of up to 820 ft. The climate is severe, with winter temperatures of −22° F (−30° C) and summer temperatures of 33°–35° F; only 2½ months are free of snow. The vegetation is mainly low-lying lichens and bushes, and animal life is correspondingly limited. Severnaya Zemlya was discovered only in 1913.

Severny morskoy put (Arctic Ocean): *see* Northeast Passage.

Severnye Uvaly, also spelled SEVERNYJE UVALY, range of hills on the Russian Plain, Russian Soviet Federated Socialist Republic, forming the watershed between the left-bank tributaries of the Volga River and of the Sukhona, Yug, Vychegda, and Pechora. The hills run east–west for 375 mi (600 km), reach a maximum height of 965 ft (294 m), and consist mainly of morainic sands and clays, swampy in sections with occasional coniferous woodlands.

Severo-Kazakhstan, also spelled SEVERO-KAZACHSTAN, English NORTH KAZAKHSTAN, smallest and most northerly *oblast* (administrative region) of the Kazakh Soviet Socialist Republic, with an area of 17,100 sq mi (44,300 sq km). Lying on the southern edge of the West Siberian Plain, it is drained by the Ishim River. There are a number of shallow freshwater and saltwater lakes. The winter is long, hard, and snowy, and the summer hot. Average annual precipitation is up to 14 in. (350 mm) but varies widely from year to year. There is wooded steppe in the north and steppe in the south, and the soil is black earth.

The economy is mainly agricultural, the *oblast* being one of the major grain producers of Kazakhstan. Fodder, vegetables, flax, and sunflowers are also grown. The livestock consists mostly of sheep, cattle, and pigs. Industry primarily processes agricultural raw materials, nearly all in the capital, Petropavlovsk. Russians make up nearly two-thirds of the population, the remainder including Kazakhs, Ukrainians, and Germans. Pop. (1982 est.) 586,000.

Severo-Ossetian Autonomous Soviet Socialist Republic, also called OSETIYA, English OSSETIA, Russian Soviet Federated Socialist Republic, on the northern flank of the Great Caucasus Range. It has an area of 3,100 sq mi (8,000 sq km) and is bordered on the south by the Yugo-Ossetian (Southern Ossetian) autonomous *oblast* (administrative region) of the Georgian S.S.R., and on the north by the parallel Sunzha and Terek ranges.

The Severo-Ossetian (Northern Ossetian) A.S.S.R. is mountainous, with the Glavny (Main) Range reaching 15,682 ft (4,780 m) in Mt. Dzhimara. Other peaks over 14,000 ft are Uilpata and Tepli. Parallel to the Glavny crest range is a series of lower ranges through which the rivers have cut deep and picturesque gorges. The highest of the subsidiary ranges is the Peredovoy, on the north of the crest range. The republic lies wholly in the basin of the upper Terek and its fast-flowing tributaries, the Ardon, Gizeldon, Urukh, and Fiagdon, which emerge in the mountains and join before cutting through the Sunzha Range to the north in another deep gorge. A northern panhandle of the republic extends over the Sunzha and Terek ranges to include part of the middle Terek Plain around Mozdok.

Climate, soils, and vegetation all vary sharply with the relief. In the lowest areas there is steppe vegetation on fertile black-earth soils, which give way higher up to dense deciduous forests of oak and beech. Higher still are coniferous forests of spruce, fir, and pine, eventually giving way to alpine meadow and finally to bare rock and ice. The severity of the temperature regime and the rainfall both increase with height. In the basins precipitation is 24 in. (600 mm) a year or less; on higher areas, up to 35 in.

The Ossetians are a people of mixed Iranian-Japhetic (Caucasian) origin; their language belongs to the Iranian group of the Indo-European languages. From the 7th century BC to the 1st century AD, Osetiya came under Scythian-Sarmatian influence, which was succeeded by that of the warlike Alani, believed to be the direct ancestors of the present-day Ossetians. Later the Tatar empire of the 13th century extended its sway over Osetiya, and the Alani were forced to move into the mountainous regions. Russian coloniza-

tion began in the northern Ossetian area, especially after the establishment of the fortress of Vladikavkaz in 1784.

In addition to the Ossetians and Russians, the republic is populated by Ingush, Armenians, Georgians, and Ukrainians. The largest city is the capital, Ordzhonikidze (*q.v.*).

Industry in the republic is concentrated in Ordzhonikidze and includes the manufacture of building materials, metallurgy, and food products; there is also mining for lead, zinc, and boron. In the mountains timber exploitation, particularly of the beech forests, is important on both flanks of the Caucasus. Hydroelectric plants have been built on the Terek River at Ordzhonikidze and on the Gizeldon River.

Agriculture is concentrated on the lower slopes and near Mozdok; the irrigated fields produce wheat, corn (maize), potatoes, hemp, and fruit. Sheep and cattle are raised on the higher slopes.

Two major highways across the Caucasus pass through the Osetiya—the Georgian and Ossetian military highways, built in the 19th century during the Russian conquest of the Caucasus. A new all-weather highway to essentially replace these roads as major transport route was under construction in the late 20th century. Ordzhonikidze is also linked by highways with Grozny and the Caspian and with Rostov-na-Donu. The republic is also served by the Rostov–Baku railway. Pop. (1989 prelim.) 634,000.

Severočeský, also called SEVERNÍ ČECHY, English WESTERN BOHEMIA, *kraj* (region), northern Czech Socialist Republic, northwestern Czechoslovakia. With an area of 3,019 square miles (7,819 square km), it is the smallest of Czechoslovakia's regions. Severočeský is bounded on the north by Germany and Poland, on the east by Východočeský *kraj,* on the south by Středočeský *kraj,* and on the west by Západočeský *kraj.* The north of the region is dominated by the Krušné (Ore), České Středo, Lužické (Lusatian), and Jizerské (Jizera) mountains. Through a gap in these ranges the region's main river, the Labe (Elbe), flows north into Germany; its tributaries flow through and drain the principal lowland areas of Severočeský *kraj.*

Corn (maize) for animal feed, sugar beets, wheat, barley, hay, alfalfa, and potatoes are the main crops grown in Severočeský. Louny, Litoměřice, and Chomutov *okresy* (districts) produce about two-thirds of Czechoslovakia's hops. Apples, plums, pears, apricots, and cherries are grown around Jirkov and Litoměřice, and Litoměřice district also has vineyards. Hogs are raised mainly in the southern lowlands, while cattle, sheep, and poultry predominate in the north; dairying accounts for about two-fifths of the cattle and is centred on Chomutov, Teplice, Lovosice, and Liberec. Forests occupy about one-third of the region but are restricted mostly to the mountains; they consist of spruce, pine, and smaller stands of oak, larch, and beech. Ústí nad Labem, the region's capital, is the largest paper-milling centre; České Kamenice, Mimoň, Liberec, and Albrechtice are other lumber and paper-milling centres.

The Ohře River valley and the Mostecká Basin are Czechoslovakia's richest brown coal (lignite) areas, and major mining centres are the Most-Záluží area, Duchcov, Tušimice, Ledvice, and Užín. In the northeast some brown coal is mined at Hrádek nad Nisou in the Žitavska (Rye) Basin. Other minerals mined include tin and tungsten at Cínovec; fluorite at Moldava, Jílové, and Klášterec nad Ohří; iron ore at Měděnec and Chomutov; and kaolin clay at Kadaň and Buškovice. Limestone, sand, and gravel are quarried around Litoměřice; building stone and glass sand are quarried at Provodín; semiprecious stones are found at Třebívlice; and peat occurs in the Ore Mountains.

Severočeský is Czechoslovakia's oldest industrialized area; the traditional glass, ceramic, jewelry, and textile industries, dating back to the 18th century, are centred in the mountains. Jablonec nad Nisou, Dubí, Teplice, Ústí nad Labem, and Nový Bor and their surrounding towns are the major centres; Liberec, Litvínov, and Varnsdorf are the chief textile centres. Modern heavy industry is situated along the Ohře River in the brown coal area. Most-Záluží-Litvínov forms the largest industrial centre, with steel mills, chemical works, and an oil refinery. The Ústí nad Labem area, with chemical works, metal refineries, and factories producing machinery, transport vehicles, glass, and leather goods, is next in size. Other centres include Děčín, with engineering works, metal refining, electronics, and food-processing plants; Teplice, with zinc refining, machinery, electronics, and food-processing plants; Liberec, with engineering works, metal refining, bus assembly, carpet, silk, tapestry, and food-processing factories; Jablonec nad Nisou, manufacturing automobiles, glass, and jewelry; and Chomutov, with steel works, railway carriage, and food-processing plants.

Tourism forms an important part of Severočeský's economy. Thermal and mineral spas are located in the mountains; the best known of these, at Teplice, has thermal springs and is the country's oldest spa, founded in about 1160. Other spas are Korunní, with alkaline springs; Klášterec nad Ohří, also known for its porcelain factory (founded 1793) and castle, which are now the Museum of Bohemian Porcelain; Lázně Libverda, with carbon dioxide waters and mud baths known since the European Middle Ages; and Bílina. East of Bílina is the commune of Stadice, the legendary origin of the Přemyslid Bohemian dynasty. The Jizera Mountains in the northeast are a vacation area with camping, hiking, and water sports. On their northern flanks, near Hejnice, is located the Stolpich waterfall by the Černý Brook where Karl Maria von Weber composed his opera *Der Freischütz.* Near Děčín is found the Nové Zámky, a sandstone canyon and waterfowl reservation, and the Lysá Rock, a rare mineral reserve; another site in this area is the Panská Rock, a formation of hexagonal basalt pillars. The Děčínský Sněžník, a sandstone peak 2,379 feet (725 m), is located on the left bank of the Labe, near the Tiské Rocks, an island in the river with rock labyrinth formations. Here the Labe River flows through a gorge between the Lusatian Mountains and the Ore Mountains.

Liberec is Severočeský's chief cultural centre. The College of Mechanical Engineering and Textiles and the College of Mining, as well as the Scientific and Public Library, are located in the city. Liberec also has the North Bohemian Museum, the Museum of Fine Arts, and the Museum of Nazi Barbarism; opera, ballet, and music theatres and a large open-air theatre; a zoo; and a botanical garden with tropical and North Bohemian flora. Ústí nad Labem contains a teacher-training college and the Maxim Gorky State Scientific Library; to the south is Terezín, site of the German concentration camp Theresienstadt, now the site of a memorial to the camp's victims. North of Most, Duchcov's castle was the last residence of the Italian adventurer Casanova (1725–98), who worked as a librarian (1785–98) for the local duke. West of Liberec is the Renaissance-style Lemberk castle, which contains the 15th- to 19th-century collections of Prague's Museum of Applied Arts. In eastern Severočeský, Jablonec nad Nisou is the site of the Museum of Glass and Jewelry with collections of rare glasswork.

Severočeský has a small German minority population around Chomutov, Teplice, and Jablonec nad Nisou districts. These ethnic Germans are a remnant of the area's large pre-World War II Sudeten German population. Pop. (1988 est.) 1,188,452.

Severodonetsk, also spelled SEVERODONECK, city, Voroshilovgrad *oblast* (province), Ukrainian Soviet Socialist Republic, in the valley of the Donets River. The city was founded in 1934 as the site of a new chemical combine, part of which was evacuated eastward during World War II. In 1951 and 1958 additional chemical industries were added, based on coke, and the chemical complex has grown over the years. With Lisichansk and Rubezhnoye, it is one of the Soviet Union's major chemical centres. Pop. (1989 prelim.) 131,000.

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Severodvinsk, formerly (1938–57) MOLOTOVSK, city and seaport of Archangelsk *oblast* (province), northwestern Russian Soviet Federated Socialist Republic. It lies on the shore of the White Sea's Gulf of Dvina, at the western edge of the Northern Dvina River delta. The city was founded after the October Revolution (1917) as an outport for Archangelsk city. The city engages in shipbuilding, machine manufacturing, and timber production. A fishing fleet is based there. Pop. (1989 prelim.) 249,000.

Severomoravský, also called SEVERNÍ MORAVA, English NORTHERN MORAVIA, *kraj* (region), northeast Czech Socialist Republic, northeastern Czechoslovakia. Bordered by Jihomoravský *kraj* to the south, Východočeský *kraj* to the west, Poland to the north, and Středoslovenský *kraj* to the east, it has an area of 4,273 square miles (11,067 square km). The Hrubý and Nízky Jeseník mountains dominate northern Severomoravský *kraj,* the Orlické (Orlice) mountains occupying the northwestern part and the Moravskoslezské Beskydy ranging along the border with Středoslovenský *kraj.* The Odra (Oder) River flowing north and the Morava and Bečva rivers flowing south are the main drainage systems; their valleys constitute the lowland areas, of which the fertile plain formed by the confluence of the Morava and the Bečva is the largest. Sugar beets, wheat, barley, potatoes, oats, animal fodder, and rapeseed are cultivated in the valleys. Hops are grown around Brodek u Přerova in the southern plain. Cattle, hogs, and poultry are the principal livestock. Fruit, primarily apples, pears, and plums, is grown along the lower hills around Ostrava, Přerov, Olomouc, and Šumperk.

Czechoslovakia's largest bituminous coalfield, discovered in 1767, extends along the Odra valley from the Polish frontier south to Štramberk and Frenštát pod Radhoštěm; Ostrava, Severomoravský *kraj*'s capital, Karviná, Havířov, and Frýdek Místek are its major mining centres. Natural-gas deposits occur in the same area. To the northwest, at Mount Zlaté, Hory, copper, lead, and zinc are mined, and graphite at Malé Vrbno. Limestone, gypsum, and granite are quarried around Vápenná, Opava, Nový Jičín, Hranice-Černotín, Přerov, Předmostí, Šternberk, Vitošov, and Sněžník.

Almost two-fifths of Severomoravský *kraj* is forested; spruce, beech, oak, maple, and ash supply major saw- and paper-milling centres at Vratimov, Frýdek-Místek, Šternberk, Olšany, Jindřichov, Vrbno pod Pradědem, Krnov, and Žimrovice.

Ostrava is Czechoslovakia's second largest industrial centre after Prague. The iron and steel works, founded 1830, are the largest in the country and sprawl across Ostrava and the neighbouring cities of Třinec, Frýdek Místek, and Nový Bohumín. Ostrava also has an oil refinery, machinery and appliance industries, chemicals, electronics, transport equipment,

cement, leather, clothing, dairy, meat-packing, milling and baking plants, and a brewery. Other industrial towns include Kopřivnice, an automotive centre; Studénka, building railway cars; Odry, producing synthetic rubber; Vsetín, with machinery, electronics and glass factories; Přerov which produces cement plant equipment, chemicals, leather goods, textiles, processed meat, and beer; Olomouc, with machinery, chemicals, clothing, and food processing industries; and Opava, manufacturing chemicals, machinery, textiles and clothing, and food products. The Jeseníký-Rejvíz Nature Reserve and winter sports and hiking in the Moravskoslezské Beskydy and the Jeseník Mountains draw large numbers of tourists, as do the mineral water spas, of which the best known are Lázně Jeseník, Dolní Lípová, and Karlova Studánka.

Ostrava is Severomoravský *kraj*'s cultural centre; it has an orchestra and resident opera, ballet, and theatre companies. The State College of Mining and Metallurgy and Library, founded 1716, a teachers college, a municipal museum, and a winter sports stadium are located in the city. Southwest of Ostrava is the Tatra Technical Motor Car Museum of Kopřivnice. Sigmund Freud was born (1856) in nearby Příbor. Olomouc is a centre for the Haná Valley cultural and agricultural region; the Palacký University, a regional museum with Haná ethnographic exhibits, and the State Scientific Library are located in the city. Litovel, northwest of Olomouc, has a regional museum with Haná costumes and embroidery and prehistoric artifacts from the Mladeč Caves. The southeastern part of Severomoravský *kraj* is the cultural region of Wallachia; Rožnov pod Radhoštěm is a traditional town, now an outdoor museum, where Gobelin cloth is woven. Valašske Meziříči, 9 mi (14 km) westward, is the site of the Wallachian Open-air Museum, another city of original wooden buildings and ethnographic exhibits. Opava, northwest of Ostrava, is the cultural centre of the Silesian region, where about one-tenth of the population is Polish. The city is the birthplace of Petr Bezruč, a Czech poet, and has a memorial museum named for him; the Silesian Museum and the Special Library of the Silesian Institute of the Czechoslovak Academy of Sciences are also located in the city. The Frýdek-Místek *okres* (district) is between one-tenth and one-fourth Polish. Bruntal and Opava *okresy* (districts) are between 5 and 10 percent German, and the whole of Severomoravský *kraj* contains 5 to 10 percent Slovak minority population. Pop. (1982 est.) 1,942,676.

Severosibirskaya Nizmennost (Russian S.F.S.R.): *see* North Siberian Lowland.

Severus OF ANTIOCH (b. *c.* 465, Sozopolis, Pisidia, Asia Minor—d. 538, Xois, Egypt), Greek monk-theologian and patriarch of Antioch who was the erudite founder of a heretically leaning Byzantine sect of moderate Monophysitism (*see* Monophysites). Severus inspired this sect's ascendancy during the reigns of the emperors Anastasius I (491–518) and Justinian I (527–565). His later ecclesiastical condemnation and exile occasioned its eventual decline, particularly in Syria and Egypt.

Having studied theology in Alexandria's Neoplatonic and allegorical school of biblical interpretation and having lived as a monk in Palestine, Severus was ordained a priest by a Monophysite bishop. Having become a leading proponent of Monophysitism—which viewed Christ as comprising a single, divine nature that subsumed his humanity by a personal union—Severus went to Constantinople in 509 to answer to heresy charges. In response he wrote, *c.* 510, the *Philalethes,* a commentary on the orthodox Christological doctrine of St. Cyril, patriarch of Alexandria (412–444), whose teaching had been quoted against him.

Severus' exposition attempted to show his distinction from both poles of the Christological dispute. On one hand he rejected the orthodox formula of the general Council of Chalcedon (451), an ecumenical statement that strove to justify the belief in Christ's two-fold nature, a man–God personal relationship. Severus interpreted this teaching as Nestorian, the doctrine that Christ's humanity existed autonomously in a purely moral relationship with his divinity. On the other hand, he opposed the extreme Monophysitism of the Eutychian faction, a school that proposed Christ to be exclusively divine, with only a semblance of human nature. By these distinctions Severus fragmented the Monophysite camp.

While at Constantinople, Severus became a confidant of the emperor Anastasius and acknowledged, after a previous repudiation, the imperial decree *Henotikon,* an ambiguous Christological statement drawn up in 482 by Monophysite leaders to achieve a uniform doctrine among all Christian factions. Frustrated by the populace in the attempt to install Severus as patriarch of Constantinople, the Monophysites had Anastasius nominate him patriarch of Antioch (512), after deposing the orthodox incumbent, who subscribed to the teaching of Chalcedon and Pope Leo I (440–461). With the succession of the emperor Justin I (518–527), who enforced a uniform Christian orthodoxy throughout the empire, Severus was forced to flee to Egypt, where he organized a resistance movement to Byzantine political and ecclesiastical policy and emerged as the formulator and head of the entire Monophysite movement in Egypt (the Coptic Church) and Syria (the Jacobites). Meanwhile, he wrote tracts attacking the spokesman for extreme Monophysitism, Julian of Halicarnassus. At the beginning of Justinian I's reign, Severus regained his patriarchal office with the assistance of the empress Theodora, whose counsellor he became. On a visit to Constantinople in 535, however, in a move to consolidate Monophysite support from both patriarch and court, Severus met the combined opposition of the orthodox party and Pope Agapetus I (535–536) and was condemned by a conciliar edict of Aug. 6, 536, necessitating his flight once more into Egypt and final retirement.

Through a vast literary output, Severus manifested an exceptional knowledge of Scripture and the writings of the early Church Fathers, whose texts he reproduced profusely. He is the first Christian author known to have referred to the works of the influential 5th-century Neoplatonist Pseudo-Dionysius the Areopagite. Credited also with significant contributions to liturgical texts and hymnody, Severus established a reputation for scholarship and moral example.

Severus, Flavius Valerius (d. 307, Tres Tabernae, Germanica Superior), Roman emperor in 306 and 307.

After serving as an army officer in Pannonia (present-day western Hungary and northern Yugoslavia), Severus was appointed, on May 1, 305, caesar (junior emperor) to the emperor Constantius I Chlorus (ruled 305–306) and given control of Pannonia, Italy, and Africa. Upon Constantius' death (July 25, 306), Severus was made augustus of the West by the remaining emperor, Galerius, who controlled the East. But the new ruler became unpopular when he imposed higher taxes on the people of Rome and of Italy. On Oct. 28, 306, a revolt broke out in Rome, led by Maxentius, son of the former emperor Maximian, who had abdicated in 305. The following spring Severus marched upon Rome from Mediolanum, but his troops deserted him and he was forced to take refuge in Ravenna. He surrendered to Maximian on condition that his life be spared, but shortly afterward he was executed.

Severus, Septimius, in full LUCIUS SEPTIMIUS SEVERUS PERTINAX (b. 146, Leptis Magna, Tripolitania—d. February 211, Eboracum, Britain), Roman emperor from 193 to 211, founded a personal dynasty and converted the government into a military monarchy. His reign marks a critical stage in the development of the absolute despotism that characterized the later Roman Empire.



Septimius Severus, marble bust, found on the Palatine, Rome; in the British Museum

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

The son of an equestrian from the Roman colony of Leptis Magna, Severus entered the Senate about 173 and became consul in 190. At the time of the murder of the insane emperor Commodus on Dec. 31, 192, he was governor of Upper Pannonia (now in Austria and Hungary) and commander of the largest army on the Danube. He remained inactive while the Praetorian Guards murdered Commodus' successor, Publius Helvius Pertinax (March 193) and auctioned off the imperial title to Marcus Didius Julianus. Then on April 13 Severus was proclaimed emperor by his troops. Declaring himself the avenger of Pertinax, he marched on Rome. On June 1, Julianus was murdered.

Severus replaced the Praetorian Guard with a new 15,000-man guard from his own Danubian legions. He temporarily pacified his rival in Britain, Decimus Clodius Albinus, by naming him caesar (junior emperor). In 194 he marched east and decisively defeated another rival, Gaius Pescennius Niger, governor of Syria. Severus then headed westward to confront Albinus, who had declared himself emperor. Albinus committed suicide following his crushing defeat near Lugdunum (now Lyon, Fr.) in February 197. Returning to Rome, Severus executed about 30 of Albinus' senatorial supporters. To justify his usurpation, he declared himself the adoptive son of the emperor Marcus Aurelius (ruled 161–180) and claimed descent from the emperor Nerva (ruled 96–98). He also named Caracalla, his son by his Syrian wife, Julia Domna, as co-emperor, and thus successor. Late in 197 Severus marched east to turn back an invasion of Mesopotamia by the Parthians, and two years later Mesopotamia was annexed to the empire.

Since his power rested on military might rather than constitutional sanction, Severus gave the army a dominant role in his state. He won the soldiers' support by increasing their pay and permitting them to marry. At the same time he ignored the Senate, which declined rapidly in power, and he recruited his officials from the equestrian rather than the senatorial order.

Severus paid special attention to the administration of justice. The Italian courts outside Rome were removed from senatorial jurisdic-

tion and put under the control of the praetorian prefect. Severus drew on the advice of the renowned jurists Ulpian and Papinian in making extensive reforms of the laws.

In 208 Severus, accompanied by Caracalla and his younger son, Geta, led an army to Britain to subdue the parts of the island not under Roman rule. Severus succumbed to disease at Eboracum. With the exception of the rule of Marcus Opellius Macrinus (217–218), Severus' descendants remained in power until 235.

Severus, Sulpicius: *see* Sulpicius Severus.

Severus Alexander, also called ALEXANDER SEVERUS, in full MARCUS AURELIUS SEVERUS ALEXANDER, original name GESSIUS BASSIANUS ALEXIANUS, or ALEXIANUS BASSIANUS? (b. 208, Phoenicia—d. 235, Gaul), Roman emperor from AD 222 to 235, whose weak rule collapsed in the civil strife that engulfed the empire for the next 50 years. His maternal grandmother, Julia Maesa, was a sister-in-law of the emperor Septimius Severus (reigned 193–211).

In 218 the legions in Syria proclaimed as emperor Alexander's 14-year-old cousin, Elagabalus (Heliogabalus), who was persuaded (221) to adopt Alexander as his heir. In March 222 the Praetorian Guard—probably prompted by Julia Maesa and Alexander's mother, Julia Mamaea—murdered Elagabalus. Alexander succeeded to power without incident. During his reign the real authority was held by his grandmother (until her death in 226) and his mother. The appointment of a regency council of 16 senators provided the Senate with nominal ruling power.

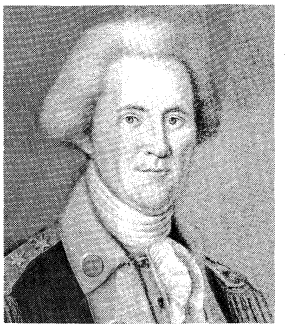
Under this regime large sections of the civilian and military populace lost faith in the government at Rome and lapsed into lawlessness. The Praetorian Guards went so far as to murder (228) their commander, Domitius Ulpianus, the chief minister of state, in the presence of the emperor and his mother.

But it was his incompetence as a military leader that was Alexander's undoing. In 230 and 231 the Persian king Ardashīr I invaded the Roman province of Mesopotamia (in modern Iraq). Alexander launched a three-pronged counteroffensive (232) and was defeated when the force under his personal command failed to advance. But the heavy losses suffered by the Persians forced them to withdraw from Mesopotamia, thereby giving Alexander an excuse to celebrate a triumph at Rome in 233. Shortly afterward the emperor was called to the Rhine (at Mainz in modern Germany) to fight the invading Germanic tribe of the Alemanni. When, on advice from his mother, he ended these operations by buying peace from the Germans, his army became indignant. Early in 235 the soldiers murdered Alexander and his mother and proclaimed Gaius Julius Verus Maximinus as emperor.

Sevier, John (b. Sept. 23, 1745, New Market, Va.—d. Sept. 24, 1815, Ft. Decatur, Mississippi Territory), American frontiersman, soldier, and first governor of the state of Tennessee.

In 1773 Sevier moved his family westward across the Allegheny Mountains to what is now eastern Tennessee. The next year he fought the Indians in Lord Dunmore's War (1773–74), and during the Revolutionary War (1775–83) he became a hero for his part in the victory over Loyalist forces in the Battle of King's Mountain (1780).

In 1784 Sevier took part in the settlers' revolt against North Carolina leading to the formation of the separate state of Franklin. He was elected its first governor, but many of the settlers were hostile to him, and by 1788 the state of Franklin had collapsed. Denounced as a disturber of the peace, he fled to the mountains. The next year he regained favour and was elected to the North Carolina Senate and later served in the U.S. House of Representatives (1789–91).



Sevier, detail of an oil painting from the studio of Charles Willson Peale; in the Tennessee State Museum, Nashville

By courtesy of the Tennessee State Museum, Nashville; from the collection of the Tennessee Historical Society

After North Carolina ceded its western territory to the new federal government (1790), Sevier was a leader among the settlers of the region, and when it was admitted to the Union (1796) as the state of Tennessee, he served as governor from 1796 to 1801 and from 1803 to 1809. He was then elected to the state senate and finally to the U.S. House of Representatives (1811), where he served until his death.

Sévigné, Marie de Rabutin-Chantal, marquise de (marchioness of) (b. Feb. 5, 1626, Paris—d. April 17, 1696, Grignan, Fr.), French writer whose letters stand as an epoch-making model for the epistolary genre.

Of old Burgundian nobility, she was orphaned at the age of six and was brought up by her uncle Philippe II de Coulanges. She had a happy childhood and was well-educated by such famous tutors as Jean Chapelain and Gilles Ménage. She was introduced into court society and the précieux world of the Hôtel de Rambouillet in Paris after her marriage in 1644 to Henri de Sévigné, a Breton gentleman of old nobility who squandered most of her money before being killed in a duel in 1651. He left his widow with two children, Françoise Marguerite (b. 1646) and Charles (b. 1648). For some years Mme de Sévigné continued in the fashionable social circles of Paris while also devoting herself to her children.

In 1669 her beautiful daughter, Françoise Marguerite, married the Comte de Grignan and then moved to Provence with him, where he had been appointed lieutenant general of that province. The separation from her daughter provoked acute loneliness in Mme de Sévigné, and out of this grew her most important literary achievement, her letters to Mme de Grignan, which were written without literary intention or ambition. Most of the 1,700 letters that she wrote to her daughter were composed in the first seven years after their separation in 1671. The letters recount current news and events in fashionable society, describe prominent persons, comment on contemporary topics, and provide details of her life from day to day—her household, her acquaintances, her visits, and her taste in reading. The letters provide little that historians cannot find information about elsewhere, but Sévigné's manner of telling her stories makes her version of current events and gossip unforgettable. Once her imagination had been caught by an incident, her sensibility and her powers as a literary artist were released in witty and absorbing narratives.

Sévigné took no literary model for her artistry. Before her, critics had held that epistolary literature should conform to certain rules of composition and should observe a unity of tone (*e.g.*, "serious" or "playful"). By contrast, Sévigné's letters demonstrate a spontaneity and a natural disorder that have a highly interesting conversational tone.

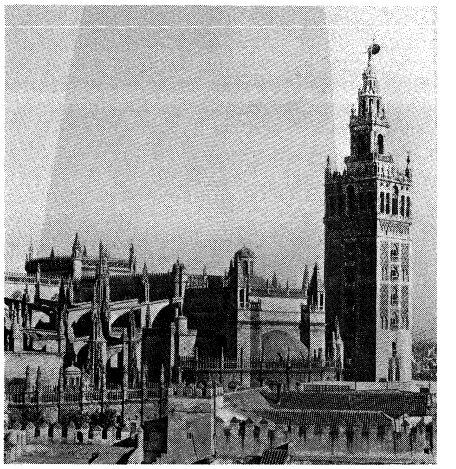
Sevilla, city, western Colombia, on an abutment of the Cordillera Central. Founded as San Luis in 1903 by Heraclio Uribe Uribe, the city was renamed for Sevilla, Spain, when it became a municipality in 1914. Gold, silver, and platinum mines are nearby, and agricultural products (beef, coffee, sugar, tobacco, cacao, bananas, cassava, and cereals) are marketed. Pop. (1985) 31,309.

Sevilla, *provincia,* one of eight *provincias* forming the *comunidad autónoma* ("autonomous community") of Andalusia, southwestern Spain. The *provincia* comprises the lower Guadalquivir River Valley and has an area of 5,406 square miles (14,001 square km). The *provincia* has varied relief; it is bordered northwest by the Morena Mountains and south and southeast by the Sub-Baetic ranges of the Algodonales and Yeguas mountains. Between these ranges is the low, undulating surface (*campiñas*) of the Guadalquivir trough. On the fertile *campiñas,* olives, cereals, and cotton are cultivated on large estates. The agricultural population along the northern course of the Guadalquivir is scattered among numerous small towns, many on ancient Roman sites, around which horticulture is practiced on small holdings, all somewhat isolated from main routes of communication.

Below Seville, the *provincia* capital, the navigable Guadalquivir forms the marshy plains of Las Marismas before entering the Atlantic Ocean. These plains are the haunt of wild fowl; bulls are pastured there, and land reclamation projects have long been in progress. Together with its agricultural wealth, the *provincia* yields copper, iron ore, and coal. The main population centres, apart from Seville, are Écija, Carmona, Marihena, Utrera, Morón de la Frontera, and Osuna. Pop. (1986 est.) 1,545,811.

Seville, Spanish SEVILLA, ancient HISPALIS, capital of the *provincia* of Sevilla, in the Andalusia *comunidad autónoma* ("autonomous community") of southern Spain, and an inland port on the Guadalquivir Estuary. It was important in history as a cultural centre, as a capital of Muslim Spain, and as a centre for Spanish exploration of the New World.

Seville has been occupied from the Paleolithic Period. It was known as Hispalis under the Romans and was a Visigoth capital until 711, when it was captured by the Moors. It was a leading cultural centre under the 'Abbādid dynasty and the subsequent Almoravid and Almohad confederations. After the Muslims were driven out in 1248 by Spanish Christians under Ferdinand III, the city rapidly rose to eminence.



The cathedral and the Giralda (right), Seville

Archive Mas, Barcelona

The discovery of America brought new prosperity to the city. Seville was granted a monopoly of overseas trade with the American colonies through the establishment in 1503 of the Casa de Contratación (House of Trade). As commerce declined in the 17th century, a strong cultural life developed. The painters Velásquez, Zurbarán, and Murillo, the sculptor Juan Martínez Montañés, and the poet Fernando de Herrera are the glories of Seville and of Spain.

In the 18th century the Bourbons stimulated an economic revival, but in the 19th century the French invasion, revolutions, and civil war halted much development. In 1847 the April Fair, an annual gala following Easter, was established. The Iberoamerican Exposition of 1929 initiated a new renaissance in Seville, and the surrounding swampland was placed under cultivation. In the 20th century the port was enlarged, and the city revived as an industrial and commercial centre.

Seville remains the seat of a bishopric and a university (founded 1502). Principal exports are wines, fruit, olives, cork, and minerals. Industries include the manufacture of tobacco, armaments, textiles, porcelain, and machinery. The Seville cathedral (built 1403–1506) is one of the largest in the world. Pop. (1982 est.) 630,912.

Seville, University of, Spanish UNIVERSIDAD DE SEVILLA, coeducational state institution of higher learning at Seville, with branches at Cadiz and Huelva. Although its origin is unclear, the school may have begun as early as 1245 under Alfonso X, King of Castile and Leon. It was established as the Major College (Colegio Mayor) in 1502, and recognized by papal bull in 1505. It received university status in 1551.

The University of Seville is one of 12 state institutions of higher learning administered by the Ministry of Education and Science of Seville Province. It has faculties in the arts and sciences, law, medicine, and engineering; also mining, forestry, and naval technology.

Şevket Paşa, Mahmud (b. 1858, Baghdad—d. June 11, 1913, Constantinople), Ottoman soldier and statesman who, in 1909, suppressed a religious uprising, forced the subsequent deposition of Sultan Abdülhamid II, and served as grand vizier (chief minister) in 1913.

Şevket graduated from the Cadet School in Istanbul as a staff captain in 1882; he served on the general staff of the Ministry of War, and in 1886 he joined a commission sent to Germany to supervise the manufacture of war matériel for the Ottoman Army. On his return he was appointed director of the Inspection and Control Department, with the rank of general.

After the Young Turk Revolution of 1908, which brought the Committee of Union and Progress to power, Şevket became commander of the 3rd Army at Salonika (Thessaloníki, now in Greece), in which capacity in 1909 he crushed a religious uprising against the Young Turk government, known as the 31st of March Incident, and deposed the Sultan, who favoured a return to absolutism. He then became the inspector general of the first three army corps and minister of war, acquiring a position of great strength.

In January 1913, when a group of army officers led by Enver Paşa overthrew the government of the Liberal Union Party and restored the Committee of Union and Progress to power, Şevket became grand vizier. He was assassinated six months later.

Sèvres, city, Hauts-de-Seine *département,* Paris region, France, a southwestern residential suburb of Paris, on the left bank of the Seine River where it loops north around the Bois de Boulogne. It is famous for the Manufacture Nationale de Sèvres, established in the area by Louis XV and Madame de Pompadour, in 1756. A museum of porcelain is located at the manufactory. Pop. (1982) 20,-184.

Sèvres, Treaty of (Aug. 10, 1920), post-World War I pact between the victorious Allied powers and representatives of the government of Ottoman Turkey. It abolished the Ottoman Empire, obliged Turkey to renounce all rights over Arab Asia and North Africa, and provided for an independent Armenia, for an autonomous Kurdistan, and for a Greek presence in eastern Thrace and on the Anatolian west coast, as well as Greek control over the Aegean islands commanding the Dardanelles. Rejected by the new Turkish nationalist regime, the Treaty of Sèvres was replaced by the Treaty of Lausanne in 1923.

Sèvres porcelain, French hard-paste, or true, porcelain as well as soft-paste porcelain (a porcellaneous material rather than true porcelain) made at the royal factory (now the national porcelain factory) of Sèvres, near Versailles, from 1756 until the present; the industry was located earlier at Vincennes. On the decline of Meissen after 1756 from its supreme position as arbiter of fashion, Sèvres became the leading porcelain factory in Europe. Perhaps the major factor contributing to its success was the patronage of Louis XV's mistress Madame de Pompadour. It was through her influence that the move was made from Vincennes to Sèvres, where she had a château, and through her that some of the foremost artists of the time, such as the painter François Boucher and the sculptor Étienne-Maurice Falconet (who directed Sèvres modelling between 1757 and 1766), became involved in the enterprise. It was after her that *rose Pompadour* was named in 1757; this was one of many new background colours developed at Sèvres, one of which, *bleu de roi* ("royal blue"; *c.* 1757), has passed into the dictionary as a universal term.



Sèvres soft-paste porcelain jardiniere decorated with flowers and cupids painted in reserves on *rose Pompadour* ground, 1761; in the Victoria and Albert Museum, London

By courtesy of the Victoria and Albert Museum, London; photograph, Wilfrid Walter—EB Inc.

One of the central preoccupations at Sèvres, in which such notable chemists as Jean Hellot were engaged, was the secret of hard-paste porcelain. Soft paste had been made at Vincennes from 1745, but the Sèvres factory did not obtain the secret of hard paste until 1761, when it was bought from Pierre-Antoine Hannong. The necessary raw materials, however, were still lacking in France; and it was not until these were found (1769) at Saint-Yrieix, in the Périgord district, that hard-paste porcelain could be produced. Thereafter a distinction was made in nomenclature between *porcelaine de France* or *vieuse Sèvres* (soft paste, or pâte tendre) and *porcelaine royale* (hard paste, or pâte dure).

Of the many styles and techniques for which Sèvres became famous, a few leading examples may be listed: white figures, either biscuit (unglazed) or rarely glazed, representing Boucher-like cupids, shepherdesses, or nymphs, nude, draped, or in contemporary dress; vessels decorated with flowers, *putti,* exotic birds, and marine subjects painted in reserves, or white spaces, on brilliantly coloured grounds, such as pink, turquoise, pea green, jonquil yellow, and royal blue; the frequent embellishment of grounds with various minute patterns in gold, such as partridge's eye (circles with dots in them), pebble (plain ovals massed together), and fish scales; reserves framed and accentuated by fine gilding in curls, scrolls, and trellis patterns; narrative scenes, from classical mythology and contemporary pastoral life; jewelled decoration, in which gilt and colours are laid on like encrusted gems. Some dinner services were decorated with naturalistic birds from the famous *Natural History of Birds* (1771) of Georges-Louis-Leclerc Buffon. Sèvres went through the gamut of 18th-century styles, including those associated with the reign of Louis XVI (1774–92).

The industry suffered greatly during the Revolution but revived in the early 19th century under the directorship of Alexandre Brongniart. After the Neoclassical and Egyptian styles of Napoleon's empire, no one distinctive style was initiated.

Sewa River, river, the most important commercial stream in Sierra Leone, West Africa. Formed by the junction of the Bagbe and Bafi rivers, which rise in the northeastern part of the country near the Guinea border, it flows 150 mi (241 km) in a south-southwesterly direction and drains an area of 5,460 sq mi (14,141 sq km). The Sewa joins the Waanje River 30 mi east-southeast of Bonthe to form the Kittam, a distributary that empties into the Atlantic via the Sherbro Strait. The Sewa's upper reaches are extensively panned for diamonds; its basin from Sumbuya northward through the area around Yengema, leased to the Sierra Leone Selection Trust, is also worked for diamonds. South of Sumbuya, the head of navigation (42 mi upstream from the confluence with the Waanje), piassava (exported for the manufacture of brooms and brushes) and swamp-rice cultivation are important commercial activities.

sewage system, the collection pipes and mains, treatment works, and discharge lines for the wastewater of a community.

A brief treatment of the history of sewage systems and the development of modern sewage-treatment methods follows. For full treatment, *see* MACROPAEDIA: Public Works.

Early civilizations often built drainage systems in urban areas to handle storm runoff. The Romans, especially, constructed elaborate systems that also drained waste water from the public baths. During the Middle Ages these systems fell into disrepair. As the populations of cities grew, disastrous epidemics of cholera and typhoid fever broke out, the result of ineffective segregation of sewage and drinking water. As the correlation between sewage and disease became apparent in the mid-19th century, steps were taken to treat wastewater. The concentration of population and the addition to sewage of manufacturing waste that occurred during the Industrial Revolution increased the need for effective sewage treatment.

Modern sewage systems fall under two categories: domestic and industrial sewers, and storm sewers. Sometimes a combined system provides only one network of pipes, sewer mains, and outfall sewers for all types of sewage. This type of system is less expensive to install in a district, but it has long been rec-

ognized that separate systems are best suited to modern metropolitan conditions. To avoid pollution, all waste water should pass through treatment plants, but it is uneconomical to build plants large enough to accept the enormously enlarged inflow from rainstorms and to treat sewage at the same time. In addition, a combined system must be made so large that it may not be able to provide adequate velocity for the dry-weather flow of the waste water alone. The preferred system provides separate sewers for human waste, which is then generally treated before discharge.

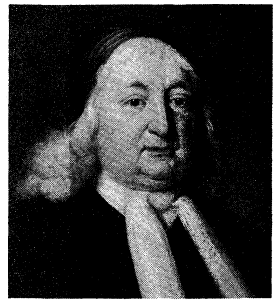
Sewer pipe is made of vitrified clay or concrete and its cross section is usually round. It is laid following street patterns, and access holes with metal covers are provided periodically for inspection and cleaning. Catch basins at street corners and along street gutters admit surface runoff of storm water and feed the storm sewers. Engineers determine the volume of sewage likely, the route of the system and the slope, or gradient, of the pipe to ensure an even flow by gravity that will not leave solids behind. In flat regions, pumping stations are sometimes needed. Under certain conditions, ventilating equipment is provided to remove corrosive gases.

Sewage treatment entails the removal of organic matter and is usually accomplished in two stages. In the first, or primary, stage sewage is first passed through large mesh screens to remove such large objects as wood, rags, and wire. It is then run through channels at a controlled velocity so that sand and ash grit is deposited on the bottom. After screening and grit removal, the sewage is passed into large tanks about 10 feet (3 metres) deep where many of the suspended solids (sludge) settle in a process called sedimentation. Two additional methods can supplement primary treatment. The Imhoff tank, developed by the German engineer Karl Imhoff, is a second compartment under the settling tank where solids are further decomposed by bacteria. Chemicals can also be added to the sewage to promote the coagulation of the finer suspended solids, so that they become heavy enough to settle in sedimentation.

The secondary treatment of sewage produces an effluent clean enough for discharge. The work of further purification is performed by microorganisms and bacterial slime, most commonly through the use of trickling and sand filters or the activated-sludge process. The organic matter remaining in sewage after solids have been removed is mainly in a dissolved state. The trickling filter is a bed of stones covered by a thin film of purifying slime through which sewage, sprayed from above, is allowed to trickle. It then runs onto a bed of sand that filters the water clean. The activated-sludge process utilizes sludge that has been allowed to breed microorganisms. The sludge is mixed with treated sewage and then aerated by jets of compressed air over a period of several hours; during this time the organic matter is oxidized by the microorganisms. Afterward the sewage is returned to settling tanks and then aerated a second time.

Sludge from both primary and secondary treatments is collected from the various tanks and hauled out to sea and dumped or buried in sanitary landfills. It may also be used, in liquid or dried-out form, as fertilizer. By placing it in digestion tanks heated to an optimal 95° F (35° C) it can be further decomposed to produce methane gas, which can be used to run the machinery of the treatment plant.

Sewall, Samuel (b. March 28, 1652, Bishopstoke, Hampshire, Eng.—d. Jan. 1, 1730, Boston), British-American colonial merchant and a judge in the Salem witchcraft trials, best remembered for his *Diary* (Massachusetts Historical Society; 3 vol., 1878–82), which provides a rewarding insight into the mind and life of the late New England Puritan.



Sewall, detail of a portrait by John Smibert; in the Museum of Fine Arts, Boston

By courtesy of the Museum of Fine Arts, Boston, bequest of William L. Barnard by exchange and the Emily L. Ainsley Fund

A graduate of Harvard College (1671), Sewall began his public career in 1679, when he was made a "freeman"—a landowner with the right to participate in the government of the colony. He was manager of the colonial printing press (1681–84), member of the Council (1684–1725), and chief justice of the Superior Court (1718–28). He was also a commissioner of the Society for the Propagation of the Gospel in New England, an overseer of Harvard College, and captain of the Ancient and Honorable Artillery Company. In 1692 he was named by Gov. William Phips as one of the special commissioners appointed to try the Salem witchcraft cases, in which 19 persons were condemned to death. Sewall was the only judge to admit the error of these decisions, standing silently in the Old South Church in Boston in 1697 while his confession of error and guilt was read aloud.

Sewall's writings include an early anti-slavery appeal, *The Selling of Joseph* (1700), *A Memorial Relating to the Kennebeck Indians* (1721), an argument for humane treatment of Indians, and unpublished verses and political and religious tracts.

Sewall Wright effect: *see* genetic drift.

Seward, city, southern Alaska, U.S., on Kenai Peninsula, at the head of Resurrection Bay. Founded in 1903 as a supply base and ocean terminus for a railway to the Yukon Valley (since 1913, the Alaska Railroad), it was named for William H. Seward, the secretary of state who negotiated the purchase of Alaska from Russia. Its ice-free port provides an important freight dock for interior Alaska. Tourism (hunting and fishing) is an economic asset, and the Silver Salmon Derby is held each August. Seward has a large vocational training facility and is the site of the University of Alaska's Institute of Marine Sciences. The city was severely damaged by the 1964 earthquake. Inc. 1912. Pop. (1980) 1,843.

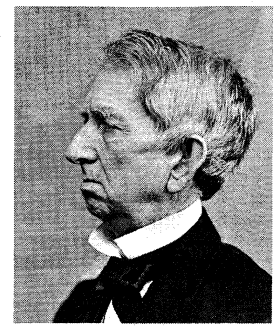
Seward, Anna (b. Dec. 12, 1747, Eyam, Derbyshire, Eng.—d. March 25, 1809, Lichfield, Staffordshire), English poet and author of a sentimental and poetical novel, *Louisa* (1784); she was popular in her day because of her rarity value as a woman poet and for her cult of sentiment.

Often called the "Swan of Lichfield," she became a member there of a literary circle that included William Hayley, Erasmus Darwin, Thomas Day, and Richard Lovell Edgeworth. Her verse was inferior, however, and she embarrassed Sir Walter Scott (with whom she had corresponded) by making him her literary executor.

Seward, William H(enry) (b. May 16, 1801, Florida, N.Y., U.S.—d. Oct. 10, 1872, Auburn, N.Y.), U.S. politician, an antislavery activist in the Whig and Republican parties before the American Civil War and secretary of state from 1861 to 1869. He is also remembered for the purchase of Alaska in 1867—referred to at that time as "Seward's Folly."

Admitted to the New York State Bar in 1822, Seward began the practice of law the following year at Auburn. He gradually developed a taste for politics and became active in the Antimasonic Party in 1828, serving in the New York Senate from 1830 to 1834. At about this time he allied himself with other opponents of the Jacksonian Democrats in forming the new Whig Party. Under this banner Seward served as governor of New York for four years (1839–43), soon becoming recognized as leader of the antislavery wing of the party.

In 1849 Seward was elected to the U.S. Senate, where the antagonism between free and slave labour became the theme of many of his speeches. During the turbulent 1850s he increasingly resisted the Whig attempt to compromise on the slavery issue, and when



William Seward, photograph by Mathew Brady, early 1860s

By courtesy of the U.S. Signal Corps

the party collapsed (1854–55), Seward joined the newly organized Republican Party, which took a firm stand against expansion of slavery into the territories. Although Seward was the recognized Republican leader, he was twice thwarted (1856, 1860) in his wish to be nominated for the presidency.

When Abraham Lincoln took office as president on the eve of the Civil War (March 1861), he promptly named Seward secretary of state. On most issues he was Lincoln's closest and most influential adviser, despite early differences over the reinforcement of Ft. Sumter, S.C., and Seward's irresponsible suggestion that a foreign war be provoked to distract the country from its civil conflict at home. Seward gradually rose to the challenge of the office and was particularly successful in preventing foreign governments from giving official recognition to the Confederacy. While he did not succeed in preventing the French occupation of Mexico or the acquisition by the Confederacy of the warship "Alabama" from England, his diplomacy prepared the way for a satisfactory adjustment of the difficulties with these powers at a later date. Although a treaty in 1862 for the suppression of the slave trade conceded to England the right to search U.S. vessels for slaves in African and Cuban waters, he secured a similar concession for U.S. war vessels from the British government. By his course in the "Trent" Affair, concerning the capture and imprisonment of two Confederate agents from a British ship, he virtually committed Great Britain to the U.S. attitude concerning the right of search of vessels on the high seas.

On April 14, 1865, nine days after he was severely injured in a carriage accident, the bedridden Seward was stabbed in the throat by Lewis Powell (alias Lewis Payne), a fellow conspirator of John Wilkes Booth, who had that night assassinated Lincoln. Seward made a remarkable recovery and retained his Cabinet post under Pres. Andrew Johnson until 1869. He chose to support Johnson's unpop-

ular Reconstruction policies and had to share some of the bitter congressional obloquy bestowed upon his chief. Seward's last act of public renown was the purchase of Alaska from Russia for $7,200,000 in 1867.

Seward Peninsula, peninsula in western Alaska, U.S., between Kotzebue Sound (north) and Norton Sound (south). It is about 180 mi (290 km) long by 130 mi wide; its average elevation is 2,000 ft (600 m). A few peaks rise above 3,000 ft; the highest is 4,720 ft in the Kigluaik Mountains in the southwest part of the peninsula. Its tip, Cape Prince of Wales on the Bering Strait, is the most westerly point of the North American continent. The city of Nome is on its south coast.

Sewell, Anna (b. March 30, 1820, Yarmouth, Norfolk, Eng.—d. April 25, 1878, Old Catton, Norfolk), British author of the children's classic *Black Beauty*.

Sewell's concern for the humane treatment of horses began early in life when she spent many hours driving her father to and from the station from which he left for work. She was crippled at a young age, and though she had difficulty walking, she could drive a horse-drawn carriage. Later, after reading an essay on animals by Horace Bushnell, she stated that one of her goals in writing was "to induce kindness, sympathy, and an understanding treatment of horses."

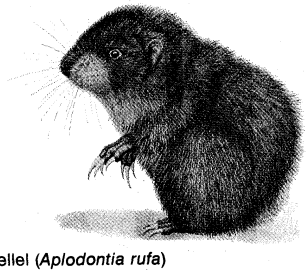
Sewell's introduction to writing began in her youth when she helped edit the works of her mother—a deeply religious, popular author of juvenile best-sellers. Sewell spent the last seven or eight years of her life—confined to her house as an invalid—writing *Black Beauty*. The book, a fictional autobiography of a gentle highbred horse, had a strong moral purpose and is said to have been instrumental in abolishing the cruel practice of using the checkrein.

Sewell, Henry (b. Sept. 14, 1807, Newport, Isle of Wight, Eng.—d. May 5, 1879, Cambridge, Cambridgeshire), British colonizer and politician who served as the first premier of New Zealand (1856) after the colony had been granted responsible government.

As a solicitor in London he became secretary and deputy chairman of the Canterbury Association for the Colonisation of New Zealand and was sent out to New Zealand in 1852. He remained in the colony, opened a solicitor's office, and became a member of the House of Representatives in 1854.

Sewell became prime minister on May 7, 1856, but he resigned on May 13 because his ministry failed to obtain sufficient support in the House. He later served as colonial treasurer and commissioner of customs (1856–59), as attorney general (1861–62), and twice as minister of justice (1864–65, 1869–72). Toward the end of his career he clashed often with Prime Minister Sir Julius Vogel over Vogel's policy of heavy borrowing for development.

sewellel, also called MOUNTAIN BEAVER (*Aplodontia rufa*), burrowing rodent of western North America generally found in well-watered, forested areas. The sewellel is the only living member of the family Aplodontidae (order Rodentia). Nocturnal and vegetarian, it digs extensive burrow systems and gathers stores of food. It is stocky, thick furred, and reddish or brown with a grayish belly. It has small eyes and ears and has almost no tail. Its length is about 30 to 46 centimetres (12 to 18 inches) and its weight about 1 to 1.5 kilograms (2.2 to 3.3 pounds). The female bears two to six young in spring, after about one month's gestation.



Sewellel (*Aplodontia rufa*)
Drawing by H. Douglas Pratt

Consult the INDEX *first*

sewing machine, any of various machines for stitching material (such as cloth or leather), usually having a needle and shuttle to carry thread and powered by treadle, waterpower, or electricity. It was the first widely distributed mechanical home appliance and has been an important industrial machine.

An early sewing machine was designed and manufactured by Barthélemy Thimonnier of France in 1841 to mass-produce uniforms for the French Army, but rioting tailors destroyed the machines. Thimonnier's design, in any event, merely mechanized the hand-sewing operation; a decisive improvement was embodied in a sewing machine built by Walter Hunt of New York City in about 1832–34 but never patented, and independently by Elias Howe of Spencer, Mass., and patented in 1846. In both machines a curved eye-pointed needle moved in an arc as it carried the thread through the fabric, on the other side of which it interlocked with a second thread carried by a shuttle running back and forth on a track. Howe's highly successful machine was widely copied, leading to extensive patent litigation and ultimately to a patent pool that included the design of Isaac Merrit Singer, the largest manufacturer. In 1860 more than 110,000 sewing machines were produced in the United States alone.

Although modern sewing machine designs have proliferated in an enormous variety, mostly for special industrial purposes, the basic operation remains unchanged. Modern machines are commonly powered by an electric motor, but the foot-treadle machine is still in wide use in much of the world. The world's largest producer is China. Japan's industry pioneered the versatile zigzag machine.

sex, the sum of features by which members of a species can be divided into two groups—male and female—that complement each other reproductively.

A brief treatment of sex follows. For full treatment, *see* MACROPAEDIA: Sex and Sexuality. *See also* Reproduction and Reproductive Systems.

Sex is not essential for reproduction. Many lower organisms, including most bacteria protozoa, can reproduce without sex. Even among the higher plants—all of which can reproduce sexually—vegetative (asexual) reproduction is common (*e.g.*, by means of tubers, runners, and bulbs).

In asexual reproduction, each offspring is identical to its single parent, except for differences arising from mutations in the genetic material. In sexual reproduction, in which each offspring receives a combination of genes from two parents, each offspring is genetically unique. Thus, populations of organisms that reproduce sexually display far more genetic diversity than do populations of organisms that reproduce asexually. The advantage of such genetic diversity is in adjusting to environmental change. The greater its genetic diversity, the more likely it is that a population will include some members that carry the genetic combinations needed to adjust to a changed environment.

Evolution has strongly favoured the development of sexual reproduction. Beginning with mechanisms for ensuring occasional genetic recombination in primitive microorganisms, sex has undergone an evolution of its own throughout the whole history of life on Earth. Elaborate patterns of behaviour, complex structures, and delicate physiological equilibriums have all been developed under the influence of natural selection, ensuring the continued existence of species with an abundant supply of new combinations of genes in each generation.

Although structural differences between male and female are not always apparent, as in many lower organisms, functional differences can always be distinguished. In the majority of species above the level of complexity of viruses and bacteria, a new individual is brought into being by the cooperation of a male and female organism, each of which contributes a special cell, a gamete, or sex cell, toward that creation; the male donates a spermatozoon, or sperm; the female, an ovum, or egg. The affinity that sperm and egg have for each other may result in their fusion (fertilization). The single-celled product, a zygote, carries its own blueprint for development derived from each of its parents.

Sexuality is not always an either–or determination. Organisms exist that produce both sperm and eggs; these, called hermaphrodites, occur naturally in many groups of lower animals. Among fungi and protozoa, sex is often found in more than two genetic forms, which are referred to as mating types. In higher animals and plants, intersexes, gynandromorphs, and sexual mosaics are not uncommon; the occurrence of such intergraded forms reflects the range of possibilities that may proceed from variable action of genetic endowment and hormonal influence.

In sexual reproduction every individual receives two sets of chromosomes—one set from each of two parents—and passes on mixtures of these chromosomes to its offspring. Thus, in each generation the genetic material is recombined in new ways. Actually, the shuffling of the hereditary determinants, or genes, is even more thorough, because during the formation of gametes (meiosis) a process of crossing over and exchange takes place between the two sets of parental chromosomes. This leads to the formation of gametes whose single set of chromosomes is actually a composite of the parental organism's maternal and paternal genes. The number of genes is so great that in a sexually reproducing population of higher organisms no two individuals (aside from those, such as identical twins, that result from a single zygote) are precisely alike. Each individual has a unique combination of genes that will not recur in populations of even many trillions of individuals.

The uniqueness of the individual is thus a consequence of sexual reproduction. The significance of sex can be fully appreciated when one compares it to the phenomenon of parthenogenesis, in which the egg regularly develops into an embryo without having been fertilized. The great biological diversity characteristic of sexually reproducing species is thus not found in parthenogenetic forms.

In the great majority of bisexual organisms some kind of genetic mechanism of sex determination is operative, causing certain zygotes to develop into males, others into females. The mechanism that controls the direction of development consists in most cases of a special pair of sex chromosomes, present in all the cells of the body. In one sex the two sex chromosomes are alike and are known as X chromosomes. In the other sex, there is a pair consisting of an X chromosome and a chromosome that differs from it genetically, known as a Y chromosome. In humans and most (but not all) groups of animals, the fe-

male will have two X chromosomes and the male will have an X and a Y chromosome. This pattern affects the development of the organism by controlling cellular metabolism and stimulating the production of hormones that trigger the development of sexual glands or organs. An excess or lack of hormones during embryological development may cause an individual to develop the superficial appearance of one sex while retaining the genetic constitution of the other sex.

The mere existence of eggs, sperm, and accessory reproductive organs does not ensure fertilization. There must also be behavioural tendencies and reactions through which the male approaches and inseminates the female or her eggs. The sexual behaviour of all species has a common function—to secure the fertilization of the egg. Species exhibit an enormous range of behaviours to carry out this objective.

sex chromosome, either of a pair of chromosomes that determine whether an individual is male or female. The sex chromosomes of human beings and other mammals are designated by scientists as X and Y. In humans the sex chromosomes comprise one pair of the total of 23 pairs of chromosomes. The other 22 pairs of chromosomes are called autosomes.

Individuals having two X chromosomes (XX) are female; individuals having one X chromosome and one Y chromosome (XY) are male. The X chromosome resembles a large autosomal chromosome with a long and a short arm. The Y chromosome has one long arm and a very short second arm. This path to maleness or femaleness originates at the moment of meiosis, when a cell divides to produce gametes, or sex cells having half the normal number of chromosomes. During meiosis the male XY sex-chromosome pair separates and passes on an X or a Y to separate gametes; the result is that one-half of the gametes (sperm) that are formed contains the X chromosome and the other half contains the Y chromosome. The female has two X chromosomes, and all female egg cells normally carry a single X. The eggs fertilized by X-bearing sperm become females (XX), whereas those fertilized by Y-bearing sperm become males (XY).

Unlike the paired autosomes, in which each member normally carries alleles (forms) of the same genes, the paired sex chromosomes do not carry an identical complement of genetic information. The X chromosome, being larger, carries many more genes than does the Y. Traits controlled by genes found only on the X chromosome are said to be sex-linked (*see* linkage group). Recessive sex-linked traits, such as hemophilia and red–green colour blindness, occur far more frequently in men than in women. This is because the male who inherits the recessive allele on his X chromosome has no allele on his Y chromosome to counteract its effects. The female, on the other hand, must inherit the recessive allele on both of her X chromosomes in order to fully display the trait. A woman who inherits the recessive allele for a sex-linked disorder on one of her X chromosomes may, however, show a limited expression of the trait. The reason for this is that, in each somatic cell of a normal female, one of the X chromosomes is randomly deactivated. This deactivated X chromosome can be seen as a small, dark-staining structure—the Barr body—in the cell nucleus.

The effects of genes carried only on the Y chromosome are, of course, expressed only in males. Most of these genes are the so-called maleness determiners, which are necessary for development of the testes in the fetus.

Several disorders are known to be associated with abnormal numbers of sex chromosomes. Turner's syndrome and Klinefelter's syndrome (*qq.v.*) are among the most common of these. *See also* X trisomy; XYY trisomy.

sex hormone, a chemical substance produced by a sex gland or other organ that has an effect on the sexual features of an organism. Like many other kinds of hormones, sex hormones may also be artificially synthesized. *See* androgen; estrogen.

Sex Research, Institute for, a nonprofit corporation affiliated with Indiana University, Bloomington, Ind., U.S., founded in 1947 under the sponsorship of the zoologist Alfred C. Kinsey (*q.v.*), with whose pioneering studies of American human sexual behaviour the institute became synonymous. It is dedicated to the scientific study of a broad range of human sexual behaviour and has attempted to establish an authoritative library of sexual behaviour, beginning in the early 1950s to gather films, art objects, diaries, personal histories, and other literary and graphic material relating to eroticism and sexual behaviour.

The first two works sponsored by the institute were *Sexual Behavior in the Human Male* (1948) and *Sexual Behavior in the Human Female* (1953), both of which were widely recognized as comprehensive and important surveys of the norms, extent, and variability of American sexual behaviour.

sex therapy, form of behaviour modification or psychotherapy directed specifically at difficulties in sexual interaction. Many sex therapists use techniques devloped in the 1960s by the Americans William Masters and Virginia Johnson to help couples with nonorganic problems that affect their sex lives, including premature ejaculation, impotence, and other forms of sexual dysfunction. In the Masters and Johnson technique, a sex history is first taken and the couple given physical examinations to rule out physical problems. Therapists then employ exercises focusing on the giving and receiving of sensual, but not necessarily sexual, pleasure to help the couple overcome anxieties about sex. Specialized treatments directed against specific sex-related problems are also used during therapy. The therapy process often takes place in an intensive marital workshop lasting for several days.

Although the Masters and Johnson approach involves both members of the couple, sex therapy can take other forms. Comarital therapy refers to the Masters and Johnson model, in which both members of the couple are treated by a team consisting of one male and one female therapist. The couple approach recognizes that sexual dysfunctions take place in the context of the interaction between two people and are not the exclusive problem of one member of the pair. Individual therapy is employed for those without cooperating partners and may involve the use of a surrogate partner or may focus on exercises that can be practiced by an individual to improve his or her sexual interactions. Group therapy, in which individuals discuss feelings about sex, is also employed for both single-sex and male–female groups.

sextant, instrument for determining the angle between the horizon and a celestial body such as the Sun, the Moon, or a star, used in celestial navigation to determine latitude and longitude. The device consists of an arc of a circle, marked off in degrees, and a movable radial arm pivoted at the centre of the circle. A telescope, mounted rigidly to the framework, is lined up with the horizon. The radial arm, on which a mirror is mounted, is moved until the star is reflected into a half-silvered mirror in line with the telescope and appears, through the telescope, to coincide with the horizon. The angular distance of the star above the horizon is then read from the graduated arc of the sextant. From this angle and the exact time of day as registered by a chronometer, the latitude can be determined (within a few hundred metres) by means of published tables.

The name comes from the Latin *sextus,* or "one-sixth," for the sextant's arc spans 60°, or one-sixth of a circle. Octants, with 45° arcs, were first used to calculate latitude. Sextants were first developed with wider arcs for calculating longitude from lunar observations, and they replaced octants by the second half of the 18th century.

sexton, church custodian charged with keeping the church and parish buildings prepared for meetings, caring for church equipment, and performing related minor duties such as ringing the bell and digging graves. The term is sometimes used interchangeably with "sacristan," denoting a church officer who is specifically in charge of the sacristy and its sacred utensils and vestments but who also may perform the duties of sexton.

Sexton, Anne, *née* HARVEY (b. Nov. 9, 1928, Newton, Mass., U.S.—d. Oct. 4, 1974, Weston, Mass.), American poet whose work is noted for its confessional intensity.

A lifelong resident of New England, Sexton studied poetry under Robert Lowell at Boston University and also worked as a model and librarian. She taught in high school and at Boston University (1970–71) and Colgate University (1971–72).

Her first book, *To Bedlam and Part Way Back* (1960), is an intense examination of her mental breakdown and subsequent recovery. *All My Pretty Ones* (1962) is also autobiographical. *Live or Die* (1966) is a further record of emotional illness. Later volumes include *Love Poems* (1969), *Transformations* (1971), and *The Book of Folly* (1972). Her last poems were published posthumously in *The Awful Rowing Toward God* (1975), *45 Mercy Street* (1976), and *Uncollected Poems with Three Stories* (1978). *No Evil Star: Selected Essays, Interviews, and Prose* was published in 1985. She died a suicide.

Sextus (ancient Roman personal name, or praenomen): *see under* gens or family name or honorific (*e.g.,* under Pompeius for Sextus Pompeius Magnus Pius), except as below.

Sextus EMPIRICUS (fl. early 3rd century), ancient Greek philosopher-historian who produced the only extant comprehensive account of Greek Skepticism in his *Outlines of Pyrrhonism* and *Against the Dogmatists.*

As a major exponent of Pyrrhonistic "suspension of judgment," Sextus elaborated the 10 tropes of Aenesidemus and attacked syllogistic proofs in every area of speculative knowledge. Almost all details of his life are conjectural except that he was a medical doctor and headed a Skeptical school during the decline of Greek Skepticism. The republication of his *Hypotyposes* in 1562 had far-reaching effects on European philosophical thought. Indeed, much of the philosophy of the 17th and 18th centuries can be interpreted in terms of diverse efforts to grapple with the ancient Skeptical arguments handed down through Sextus.

sexual dysfunction, also called PSYCHOSEXUAL DYSFUNCTION, the inability of a person to experience sexual arousal or to achieve sexual satisfaction under appropriate circumstances, as a result of either physical disorder or, more commonly, psychological problems. The most common forms of sexual dysfunction have traditionally been classified as impotence (inability of a man to achieve or maintain penile erection) and frigidity (inability of a woman to achieve arousal or orgasm during sexual intercourse). Because these terms—impotence and frigidity—have developed pejorative and misleading connotations, they are no longer used as scientific classifications, having been superseded by more specific terms; however, both terms remain in common usage, with

a variety of meanings and associations (*see* frigidity; impotence).

Sexual dysfunctions recognized by professional therapists include hyposexuality (or inhibited sexual excitement), in which sexual arousal can be achieved only with great difficulty; anorgasmia, in which a woman has a recurrent and persistent inability to achieve orgasm despite normal sexual stimulation; vaginismus, in which the woman's vaginal muscles contract strongly during intercourse, making coitus difficult or impossible; dyspareunia, in which a woman experiences significant pain during attempts at intercourse; erectile impotence, in which a man cannot sustain an erection; ejaculatory impotence (or inhibited male orgasm), in which a man cannot achieve orgasm in the woman's vagina, although he can sustain an erection and may reach orgasm by other methods; and premature ejaculation, in which the man ejaculates before or immediately after entering the vagina.

In most cases, each of these dysfunctions reflects the individual's anxiety or other negative feelings about the sex act or partner, although emotional conflicts outside the sexual relationship itself can also produce failures of sexual function. Appropriate sex therapy, designed to help the individual relax in his or her sexual role, can often overcome the anxiety and eliminate the dysfunction, although the success of such therapy varies markedly among the various dysfunctions and among individual patients. When a specific physical condition predisposes to the dysfunction, it must be treated medically; alcoholism and endocrine or neurological disorders are among the common physical causes of sexual dysfunction. Sexual dysfunctions that are secondary to more severe psychological or personality disorders may require specific psychotherapy.

sexual intercourse, also called COITUS, or COPULATION, reproductive act in which the male reproductive organ (in humans and other higher animals) enters the female reproductive tract. If the reproductive act is complete, sperm cells are passed from the male body into the female, in the process fertilizing the female egg and forming a new organism. In some vertebrates, such as fish, eggs are laid outside of the body and fertilized externally.

To accomplish internal copulation certain body and organic adaptations are necessary. In the human male, the penis serves both excretory and reproductive functions. During intercourse, the blood flow is temporarily increased and trapped in the penis so that it becomes enlarged and elevated, a condition known as erection. Erection changes the normally soft and flaccid organ to one of greater size and rigidity to permit easier penetration into the reproductive tract of the female. Sexual intercourse both culminates and terminates in orgasm, a process in which the male expels semen—containing sperm cells, which may unite with and fertilize the female egg, and a seminal plasma that contains cell nutrients, water, salts, and metabolites—into the female's vaginal canal. The male's ability to produce and secrete semen, as well as to function sexually, is dependent on the androgen hormones, which circulate in the male's body. In the female reproductive system, an external opening leads to the vagina, which in turn communicates with the uterus (or womb), a thick-walled, pear-shaped organ where the sperm fertilizes the egg and where the fetus develops. In human beings, a pattern of physiological events occurs during sexual arousal and intercourse. These events may be identified as occuring in a sequence of four stages: excitement, plateau, orgasm, and resolution. The basic pattern is similar in both sexes, regardless of the specific sexual stimulus.

In the excitement stage, the body prepares for sexual activity by tensing muscles and increasing heart rate. In the male, blood flows into the penis, causing it to become erect; in the female, the vaginal walls become moist, the inner part of the vagina becomes wider, and the clitoris enlarges. In the plateau stage, breathing becomes more rapid and the muscles continue to tense. The glans at the head of the penis swells and the testes enlarge in the male; in the female, the outer vagina contracts and the clitoris retracts.

At orgasm the neuromuscular tension built up in the preceding stages is released in a few seconds. In the woman, the vagina begins a series of regular contractions; in the man, the penis also contracts rhythmically to expel the sperm and semen (ejaculation). The succeeding resolution stage brings a gradual return to the resting state that may take several hours. In the male, the penis shrinks back to its normal size; in the female, the vagina and other genital structures also return to their pre-excitement condition. The resolution stage in men contains a refractory period of several minutes to a few hours, during which the man is incapable of further sexual arousal. Women have no such refractory period and can quickly become aroused again from any point in the resolution stage.

In some animals, such as sheep and migratory birds, copulation occurs only seasonally. During the breeding season, hormones are produced in both the male and female species that prepare their reproductive systems for copulation. In the nonbreeding seasons, the hormone levels drop so that the animals are not capable of fertilized breeding and do not have the desire to engage in copulation.

sexual reproduction: *see* reproduction.

sexually transmitted disease (STD), any disease (such as syphilis, gonorrhea, AIDS, or a genital form of herpes simplex) that is usually or often transmitted from person to person by direct sexual contact. It may also be transmitted from a mother to her child before or at birth or, less frequently, may be passed from person to person in nonsexual contact (such as in kissing, in tainted blood transfusions, or in the use of unsanitized hypodermic syringes). Sexually transmitted diseases usually affect initially the genitals, the reproductive tract, the urinary tract, the oral cavity, the anus, or the rectum but may mature in the body to attack various organs and systems. Tertiary syphilis, or paresis, for example, may affect skin, bones, the central nervous system, the heart, the liver, or other organs. Persons infected by an AIDS virus may remain outwardly healthy for years before the disease takes hold within the immune system (or, often, the disease may never arise at all).

The term venereal disease (VD), denoting any disease transmitted by sexual intercourse, lost favour in the late 20th century and was largely supplanted by the more comprehensive term sexually transmitted disease.

Sexually transmitted diseases have a long history. The best known of these diseases, syphilis (*q.v.*), is caused by the bacterium *Treponema pallidum.* Syphilis was first widely reported by European writers in the 16th century, and some medical historians assume that it was imported into Europe by explorers returning from the New World. Other authorities believe that syphilis is of ancient origin and may at one time have been mistakenly identified as leprosy. At any rate, syphilis first became widely recognized and reported about the year 1500, when a virtual epidemic swept Europe.

Urethritis is the infection and inflammation of the urethra (the passage that transmits urine from the bladder to the exterior of the body). Most cases of urethritis are in fact sexually transmitted. Urethritis that is caused by the gonococcus bacterium (*Neisseria gonorrhoeae*) is called gonorrhea (*q.v.*) and is one of the best-known sexually transmitted diseases. Gonorrhea was named by the Greek physician Galen and is thought to have been known to the ancient Chinese and Egyptians.

Syphilis and gonorrhea were long thought to be one disease. Real progress in characterizing them did not occur until the early 20th century, when their different causative microorganisms were identified and reliable diagnostic tests were developed. Effective treatment in the form of sulfa drugs and penicillin was introduced in the 1930s and '40s, and the eradication of such diseases seemed imminent. By the end of the 1950s, however, the frequency index had begun to rise again; among the many reasons cited were the tapering off of active "anti-VD" campaigns, the causative microorganisms' growing immunity to the antibiotics used in treatment, and a variety of sociological factors influencing sexual behaviour. The widespread acceptance of oral contraceptives and their supplantation of other methods of birth control were possibly linked, for a variety of reasons, to the spread of sexually transmitted diseases. Not only had the lack of oral contraceptives tended to discourage sexual promiscuity but also the older methods of condom and diaphragm had provided some protection against disease. Only with the outbreak of the AIDS epidemic did a return to the condom and "safe sex" receive new encouragement.

A disease that became especially widespread beginning in the 1960s and '70s was genital herpes (*see* herpes simplex). Herpes infections are significant not only in terms of the discomfort they cause but also for the potentially serious illness that might occur in infants born to mothers with genital herpes infections. A variety of treatments have been used for genital herpes, but none have been entirely satisfactory.

The sexually transmitted disease that caused perhaps the greatest alarm in the late 20th century was acquired immune deficiency syndrome, or AIDS (*q.v.*). From the time of its first clear identification in 1981, AIDS spread rapidly, with reported cases rising at a high rate, especially among homosexuals and intravenous drug users in the United States and western Europe and among heterosexuals in tropical Africa. The high mortality rate from AIDS and the absence of a cure or vaccine against the disease had a sobering effect on sexually permissive societies. Promiscuity tended to be more widely discouraged, and the adoption of practices presumed to constitute "safe sex" (or, rather, safer sex)—such as the use of condoms or avoiding anal intercourse—tended to be encouraged.

Nearly a score of other sexually transmitted diseases are known. All have reasonably effective drug cures. About half of all cases of urethritis that are not gonorrhea are chlamydia (*q.v.*), which is caused by an infection with *Chlamydia trachomatis.* The latter bacterium is also the infecting agent in pelvic inflammatory disease (*q.v.*) and in still another sexually transmitted disease, lymphogranuloma venereum (*q.v.*). The cause for the remaining 50 percent of nongonococcal urethral infections is not known; no organism has been definitely related.

Trichomoniasis is an infection of the urogenital tract caused by a protozoan, *Trichomonas vaginalis;* males usually have no symptoms with this infection, and only a portion of infected females have a vaginal discharge.

Candidiasis (yeast infection) is caused by *Candida albicans* (sometimes called *Monilia albicans*), which produces in women a thick, whitish vaginal discharge and causes irritation and itching in the genital area. Males may have irritation of the glans or skin of the penis. Because this yeast is ubiquitous in the environment, these infections are not always sexually acquired.

Warts occurring in the genital areas are

caused by certain types of papilloma viruses, and these types of warts can be transmitted to other people by sexual contact. Most often, genital warts are nothing more than a nuisance, but occasionally they can become so numerous or so large as to interfere with urination, bowel movements, or vaginal delivery. There is also mounting evidence that papilloma viral infections of the genital tract are a factor in the development of cancer of the cervix and possibly of the genitals themselves.

Chancroid, granuloma inguinale, and lymphogranuloma venereum are three diseases that have their highest incidence in the tropics. Chancroid, also called soft chancre, is caused by the bacterium *Haemophilus ducreyi* and resembles in appearance the primary chancre of syphilis. Granuloma inguinale is thought to be caused by a bacterium, *Calymmatobacterium (Donovania) granulomatis;* the lesion begins as a small sore but may spread to involve large areas, usually in the genital region, in a destructive, ulcerating lesion. Lymphogranuloma venereum is caused by *Chlamydia trachomatis* and begins with a frequently unnoticed bump on the genitals. Later, lymph glands in the groin enlarge and may proceed to rupture and drain purulent material. Swelling of the genitals may develop much later in the course of the disease.

All of the aforementioned diseases are spread primarily by sexual contact, but there are other diseases that are transmitted sexually only in a minority of cases. Chief among such diseases are cytomegalovirus, a viral infection that is ubiquitous in humans and is spread by various means, including sex, and the hepatitis B virus, which is spread primarily through intravenous injections and blood transfusions but which can also be transmitted sexually.

Finally, a common infestation is pediculosis pubis. The crab louse, *Pthirus pubis,* infests the hair of the pubic region, where louse eggs, or nits, are attached to the hairs. After about one week the larvae hatch, and in about two weeks they develop into mature crab lice. The lice attach themselves to the base of the hair and feed on the blood of the host. Persons become aware of the infection because they see the lice or the eggs or because intense itching develops after two or three weeks.

sexuality, the quality or state of being sexual. *See* sex.

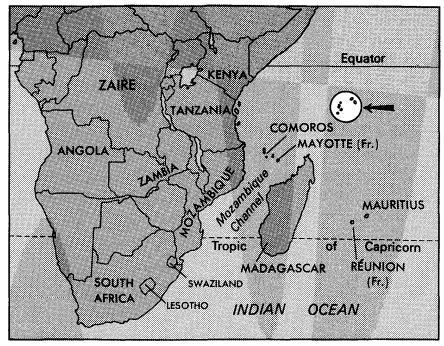
seybertite (mineral): *see* clintonite.

Seybouse, Wadi, river of northeastern Algeria, rising as the Wadi Cherf at the eastern edge of the Sétif plains just east of Aïn Beïda. Meandering north to Guelma, the river turns abruptly east and rushes through a narrow gorge in Mount Nador of the Tell Atlas to Bouchegouf and its confluence with the Wadi Mellah. The Seybouse then bends sharply northward and flows through a tree-lined valley to the Mediterranean, just south of the harbour at Annaba. Except for its estuary, which is plied by small craft in spite of shoals and varying depths, the river is unnavigable along its 145-mile (235-kilometre) length. The Seybouse flows through intensely cultivated country producing grapes and cereals. Irrigation is carried out by channels leading from the main stream directly to the fields.

Seychelles, officially REPUBLIC OF SEYCHELLES, island republic in the western Indian Ocean, consisting of about 115 islands and covering an area of 175 square miles (453 square km). The capital is Victoria. Situated between latitude 4° and 11° S and longitude 46° and 56° E, the major islands of the Seychelles are located about 1,000 miles (1,600 km) east of Kenya. The population in 1990 was estimated at 67,600.

A brief treatment of the Seychelles follows. For full treatment, *see* MACROPAEDIA: Indian Ocean Islands.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.



Seychelles

Seychelles is composed of two main island groups: the Mahé group of 40 central, mountainous granitic islands, and a second group of more than 70 outer, flat, coralline islands. The islands of the Mahé group are rocky and typically have a narrow coastal strip and a central range of hills. The overall aspect of these islands, with their lush tropical vegetation, is that of high hanging gardens overlooking silver-white beaches and clear lagoons. The coralline islands, rising only a few feet above sea level, are flat with elevated coral reefs at different stages of formation. These islands are largely waterless, and very few have a resident population. The climate is tropical-oceanic, the average annual temperature varying from 70° F (21° C) to some 90° F (32° C) at sea level. Rainfall varies greatly from island to island; on Mahé, the annual rainfall ranges from 90 inches (2,300 mm) at sea level to 140 inches (3,560 mm) on the mountain slopes. Humidity is persistently high but is ameliorated somewhat in locations windward of the prevailing southeast trade winds. Wildlife includes giant tortoises and green sea turtles.

The original French colonists on the previously uninhabited islands, and their black slaves, were joined in the 19th century by deportees from France. Asians from China, India, and Malaya arrived later in smaller numbers. Widespread intermarriage has resulted in a population of mixed descent. Nearly 90 percent of the people live on Mahé, a great number of them in the capital city, Victoria. Emigration has kept the annual population growth rate to a minimum. More than one-third of the population is less than 15 years old, and about nine-tenths is Roman Catholic. The mother tongue of most Seychellois is a creole patois, although English and French are the official languages.

Seychelles has a mixed, developing economy that is heavily dependent upon tourism. Despite a visible trade deficit and high inflation rates, the economy has experienced steady growth. The gross national product (GNP) is growing about as rapidly as the population. The GNP per capita is significantly higher than those found in most of the nearby continental African countries.

Agriculture accounts for less than one-tenth of the GNP and employs about one-tenth of the work force. The islands remain heavily dependent on imported food, while copra, cinnamon bark, vanilla, essential oils, and coconuts are produced for export. The Seychelles has a modern fishing industry that supplies both domestic and foreign markets. The extraction of guano for export has also become an established economic activity. The nation's relatively small manufacturing sector is composed largely of food-processing plants. Services account for the largest share of the GNP and employ the largest proportion of the work force. Since the opening of Mahé international airport in 1971, the tourism industry has grown rapidly, currently providing almost three-fourths of all foreign exchange. The Seychelles' main imports are petroleum products, machinery, and foodstuffs. Copra, frozen fish, and cinnamon are the most important exports, together with the reexport of petroleum products.

The Republic of Seychelles is a socialist one-party state whose 1979 constitution provides for a president as head of state and commander in chief and a unicameral People's Assembly. The president also appoints the Council of Ministers. The normal life of the legislature is four years. There is a Supreme Court and a Court of Appeal for both criminal and civil matters. The political party that dominates the republic is the Seychelles People's Progressive Front, which nominates the president, who is then subject to approval by popular vote. The main islands of the Seychelles have adequate hospitals and clinics. The basis of the school system is a free, compulsory, nine-year primary-school education. Education standards have risen steadily, and nearly all children of primary-school age attend school. Radio Seychelles is under government control, and in the mid-1980s the government launched television broadcasting to some islands. There are several daily newspapers.

The first recorded landing on the uninhabited Seychelles was made in 1609 by an expedition of the British East India Company. The archipelago was explored by the Frenchman Lazare Picault in 1742 and 1744 and was formally annexed to France in 1756. The archipelago was named Séchelles, later changed by the British to Seychelles. War between France and Britain led to the surrender of the archipelago to the British in 1810, and they were formally ceded to Great Britain by the Treaty of Paris in 1814. In 1903 the Seychelles became a crown colony. A Legislative Council with elected members was introduced in 1948. In 1970 the Seychelles obtained a new constitution, universal adult suffrage, and a governing council with an elected majority; self-government was granted in 1975 and independence in 1976 (within the Commonwealth of Nations). In 1975 a coalition government with James R. Mancham as president and France-Albert René as prime minister was formed. In 1977 René became president in a coup d'état. In 1979 René revised the constitution and claimed Tromelin Island (which France occupied since 1954 with British consent) under the Treaty of Paris. Domestic politics continued to be turbulent.

Seychelles–Mauritius Plateau, also called MASCARENE PLATEAU, submarine plateau, a very shallow, extensive ridge in the Indian Ocean forming a crescent through the Seychelles and Amirante islands. The ridge extends from 4° S to 21° S and from 54° E to 63° E. It is believed to be a small continental outlier similar to Madagascar and separated from the continent. The Seychelles islands, which rise from the ridge, are granitic in composition and are considered anomalous in an ocean basin because most oceanic rocks are basaltic in composition.

Seydlitz, Friedrich Wilhelm, Freiherr von (baron of) (b. Feb. 3, 1721, Kalkar, near Kleve, Brandenburg [Germany]—d. Nov. 8, 1773, Ohlau, Lower Silesia [now Oława, Pol.]), Prussian cavalry commander who contributed greatly to Frederick II the Great's victories during the Seven Years' War (1756–63) and made the Prussian cavalry into a force superior to any of its rivals abroad.

After serving as page at the court of the margrave Frederick William of Brandenburg-Schwedt, Seydlitz entered in 1740 the Prussian cuirassier regiment and fought in the War of the Austrian Succession. In 1753 he was entrusted by Frederick II of Prussia with the task of imparting to poor regiments

Prussian standards of perfection. Seydlitz performed this task admirably, but it was the Seven Years' War, fought between Austria and Prussia for supremacy in Germany, that brought out his true greatness. Seydlitz distinguished himself at Prague (May 1757), and his brilliant rearguard action after the Prussian defeat at Kolin (June 1757) earned him the rank of major general. He also commanded the cavalry at the battles of Rossbach (1757), Zorndorf (1758), Hochkirch (1758), Kunersdorf (1759), and Freiberg (1762).

After the Treaty of Hubertusburg (1763), Frederick promoted Seydlitz to general of cav-



Seydlitz, detail from a portrait by an unknown artist; in the parish church of Oława, Pol.

By courtesy of Bildarchiv Preussischer Kulturbesitz BPK, Berlin

alry and appointed him inspector general of Silesian cavalry. Toward the end of his life, Seydlitz, like many of his fellow commanders, fell out of favour with Frederick but was later reconciled with him.

Seyfeddin, Omer, Seyfeddin also spelled SEYFETTIN (b. 1884, Göhen, Bandirma, Ottoman Empire [now in Turkey]—d. March 6, 1920, Constantinople [now Istanbul]), short-story writer who is considered to be one of the greatest modern Turkish authors.

Seyfeddin studied in the military schools of Edirne and Constantinople and then entered the army, eventually taking part in the Balkan Wars (1912–13). After leaving the army, he devoted himself to writing and teaching. Seyfeddin wrote in a unique style and drew his stories from his personal experience, from history, and from popular traditions. His use of colloquial language gave his stories a vivid and charming quality. He was a popular and widely read author who was independent of the literary movements of his day. Seyfeddin's works cover a wide range of themes and include satires, polemical dramas, comical situations, and social commentaries. *Bahar ve Kelebekler* (1927; "Spring and the Butterflies") examines the generation gap between an old-fashioned grandmother and her more modern granddaughter, who imitates Western ways and knows nothing of her own culture. *Bomba* (1935; "The Bomb"), the story of the cruel and grisly murder of a young Bulgarian socialist when he refuses to cooperate with a group of his revolutionary compatriots, is considered Seyfeddin's masterpiece.

Seyfert galaxy, any of a class of galaxies known to have active nuclei. Such galaxies were named for the American astronomer Carl K. Seyfert, who first called attention to them in 1944. The nuclear spectra of Seyfert galaxies show broad emission lines, which are indicative of a central concentration of hot gas that is expanding at speeds of up to thousands of kilometres per second. Galaxies of this type appear normal in ordinary photographs but are extremely strong sources of infrared radiation. Moreover, many are powerful sources of radio energy and X rays as well. About 1 percent of all spiral galaxies are thought to exhibit Seyfert properties; or perhaps all spiral galaxies are Seyferts 1 percent of the time.

Seyfried, Ignaz Xaver, Ritter von (knight of) (b. Aug. 15, 1776, Vienna, Austria—d. Aug. 27, 1841, Vienna), Austrian musician who composed more than 100 stage works and much instrumental and church music that was extremely popular in his own time, although it is almost entirely absent from the modern repertoire.

Seyfried, who knew Wolfgang Amadeus Mozart, studied with Johann Georg Albrechtsberger (Ludwig van Beethoven's teacher) and Joseph Haydn, among others. He was a highly successful conductor-producer (1797–1828) of operas in Vienna and was also a music theorist of considerable reputation. He edited a collection of Albrechtsberger's works on harmony (1826) and studies in technique and composition by Beethoven (1832).

Şeyh Gâlib (Turkish poet): *see* Gâlib Dede.

Şeyhi, Sinan, Şeyhi also spelled SHEYKIH (d. 1428, Kütahya, Ottoman Empire [now in Turkey]), poet who was one of the most important figures in early Ottoman literature.

Little is known of his life. Besides being a poet, Şeyhi seems to have been a man of great learning and a disciple of the famous Turkish mystic and saint Haci (Hajji) Bayram Veli of Ankara, founder of the Bayrami order of dervishes. Şeyhi also was reputedly a skilled physician. A prolific poet, he is best known for his rendition of a popular love story in Islāmic literature, *Hüsrev ü Şirin* ("Khosrow and Shirin"). Inspired by the work of the same name by the great Persian poet Neẓāmī (d. 1209), Şeyhi's poem is written in *māsnavī* ("rhymed couplets"), and, although incomplete because of his sudden death, it is considered a masterpiece of eloquent and graceful verse. Other of his works include the lyric poems in his *Dīvān* ("Collected Poems") and a satirical narrative, *Harname* ("The Book of the Ass"). It is to *Hüsrev ü Şirin,* however, that Şeyhi owes his fame. He is considered to have introduced the classical Persian style *māsnavī* into Ottoman literature.

Seylac, also called ZEILA, town and port, extreme northwest Somalia, on the Gulf of Aden. From the 9th century to the end of the 19th, it was the most important Arab settlement on the Somali coast, serving as the centre for trade between the Christian kingdom of Ethiopia and Muslim Arabia. The trade then consisted of ivory, slaves, skins, and incense from Ethiopia and the interior, which were exchanged for cloth and metal goods from Arabia. Seylac was also an important port in the medieval kingdom of Adal. In the 19th century the town was coveted by the European colonial powers, but the completion of the railway to Addis Ababa from the port of Djibouti (about 20 miles [32 km] north of Seylac) eclipsed the value of its traditional trade routes inland. Today it is a small port equipped for handling sailing and motorized Arab dhows. Pop. (latest est.) 1,226.

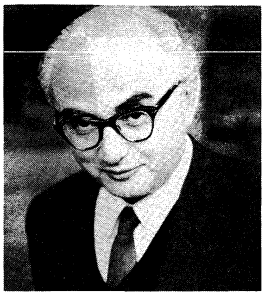
Seymour, town, central Victoria, Australia, on the Goulburn River. Founded in 1837 and proclaimed a town in 1841, it was named after Edward Adolphus Seymour, 12th Duke of Somerset and first lord of the Admiralty. The town developed as a river-crossing point. Now a focus of road (Hume and Goulburn Valley highways) and rail lines, Seymour is also the site of an auxiliary airport for Melbourne, which lies 60 miles (100 km) south. The district has cattle, sheep, and cereal farming, granite quarrying, and lumbering. Its industries include textile and gas plants, railroad workshops, and bulk petroleum storage. Puckapunyal (11 miles [18 km] west), an important military-training base during World War II, is still active. Pop. (1986) 6,510.

Seymour, town (township), New Haven county, southwestern Connecticut, U.S. It lies along the Naugatuck River near New Haven. The area was first settled in about 1678 as part of Derby on land purchased from the Pequot Indians, who called it Naugatuck. It was known successively as Rimmon (1670), Chusetown (1735) after a local Indian chief, and Humphreyville (1805) for General David Humphreys. Humphreys imported merino sheep from Spain to improve local breeds, established paper and woolen mills, and created a "model village." Other industries developed, including the first mohair plush made in the United States, which was produced there in 1880 by John Tingue. The town was incorporated in 1850 and was renamed for Thomas H. Seymour, then governor of Connecticut. Pop. (1988 est.) 13,848.

Seymour, Charles: *see* Somerset, Charles Seymour, 6th Duke of.

Seymour, David, pseudonym CHIM (b. Nov. 20, 1911, Warsaw, Pol., Russian Empire [now in Poland]—d. Nov. 10, 1956, near Suez Canal, Egypt), Polish-born American photojournalist, particularly noted for his warmly human pictures of people, especially children.

Seymour studied graphic arts in Warsaw and in 1931 went to Paris to study at the Sorbonne, where he became interested in photography. In the late 1930s he covered many important political events. His pictures of the Spanish



David Seymour

Elliott Erwitt—Magnum

Civil War, particularly the impact of the war on the civilian population of Barcelona, received widespread attention.

He came to the United States in 1939 and for three years served in the U.S. Army as a photo interpreter. He was the founder in 1947 of the Magnum photographic cooperative. The next year, on assignment for the United Nations Educational and Scientific Organization (UNESCO), he photographed children who had been physically and spiritually damaged by the war. From then until his death he traveled extensively in Europe and Israel on assignments for various publications. He was killed while covering the Arab-Israeli war.

Books of his photographs include *Children of Europe* (UNESCO, 1949); *The Vatican* (1950), text by Ann Carnahan; and *David Seymour ("Chim")* (1966), edited by Anna Fárová. A selection of his pictures is included in *The Concerned Photographer* (1968), edited by Cornell Capa.

Seymour, Edward: *see* Hertford, Edward Seymour, Earl of; Somerset, Edward Seymour, 1st Duke of.

Seymour, Horatio (b. May 31, 1810, Onondaga county, N.Y., U.S.—d. Feb. 12, 1886, Utica, N.Y.), governor of New York

and Democratic candidate for president in 1868.

Seymour was admitted to the New York bar in 1832. He then served as military secretary to Gov. William L. Marcy (1833–39), was a member of the New York Assembly (1842–46), and was elected mayor of Utica in 1842. Nominated for governor in 1850, he failed to win election but succeeded two years later. In 1854, however, he lost his bid for a second term, mainly because of his opposition to a bill prohibiting the sale of intoxicating liquor.

A conservative in national politics, Seymour advocated compromise to preserve the Union and avoid war. When war came he gave his full support to the Union cause, but opposed Lincoln's policies on emancipation, conscription, and military arrests. As governor of New York (1863–65) he felt that the draft quotas discriminated against New York City and appealed to President Lincoln to remedy the situation. When draft riots occurred in July 1863 he took measures to put down the disorders, but his conciliatory attitude toward the rioters weakened him politically.

After the war Seymour was active in the movement to rebuild the fragmented Democratic Party. In 1868 he was nominated as the Democratic candidate to run against Gen. Ulysses S. Grant; although the popular vote was fairly close, Seymour received only 80 electoral votes to Grant's 214. Seymour retired to private life, but remained active in New York state politics.

Seymour, Jane: *see* Jane Seymour.

Seymour, Lynn, original name LYNN SPRINGBETT (b. Mar. 8, 1939, Wainwright, Alta., Can.), Canadian prima ballerina.

In 1954 Seymour went to England, where she danced with the Covent Garden Opera Ballet (1956) before joining the Royal Ballet in 1957, for which her creations include The Bride (*Le Baiser de la fée;* staged by Kenneth MacMillan, 1960) and The Girl (*Les Deux Pigeons,* 1961). Although the role of Juliet (Kenneth MacMillan's *Romeo and Juliet*) was created for her, Dame Margot Fonteyn danced the première (1965).

In 1966 Seymour joined the German Opera Ballet in West Berlin, collaborating with MacMillan. Returning to the Royal Ballet, she enjoyed one of the greatest successes of her career in the principal role in Sir Frederick Ashton's *A Month in the Country* (1976). In 1978 Seymour became the Artistic Director of the Bavarian State Opera in Munich, but in early 1981 she left dance to begin a career in popular music.

Seymour (of Sudeley), Thomas Seymour, Baron (b. *c.* 1508—d. March 20, 1549), lord high admiral of England from 1547 to 1549. His political intrigues led to his execution for treason and thereby contributed to the downfall in 1549 of his elder brother, Edward Seymour, duke of Somerset, who was lord protector (regent) for the young king Edward VI.

Thomas was the fourth son of Sir John Seymour of Wolf Hall, Wiltshire. As a result of his sister Jane's marriage to King Henry VIII (ruled 1509–47) in 1536, Thomas Seymour received minor employment at the court and on diplomatic missions abroad. In 1544 he was appointed commander of the fleet stationed in the English Channel for operations against France. When his brother became protector upon the accession of Edward VI, he was created Baron Seymour of Sudeley and also made lord high admiral and a member of the Privy Council.

In 1547 Seymour married Henry VIII's widow, Catherine Parr. He soon exercised considerable influence over the young king and used his office to make illegal but profitable deals with the Channel pirates. By these and other intrigues, he sought to obtain supreme power. After his wife's death in September 1548, Seymour made clear his intention to marry Henry VIII's daughter, Princess Elizabeth (later Queen Elizabeth I, 1558–1603). The Protector, realizing the danger of having his scheming brother become an heir to the throne, acquiesced in his arrest and execution (by a bill of attainder rather than a trial). He was beheaded, and the barony ended because of the attainder.

Seymour Island, island in the Weddell Sea, lying off the coast of and near the northern tip of Graham Land (Antarctic Peninsula), east of James Ross Island and within the Antarctic territory claimed by Argentina, Chile, and the United Kingdom. It was discovered in 1843 by the British explorer James Clark Ross. In 1892 fossils of the Tertiary Age were discovered on this island, the first such discovery in Antarctica. Bones of birds probably belonging to the Miocene Age, especially of penguins, and of a cetacean were also located on the island in 1902. Together with James Ross Island, Seymour Island constitutes the largest ice-free surface known in Antarctica. It is called an "oasis" because it has extensive dry valleys with bare rock and little snow. Volcanic dust deposited within the valleys promotes the melting of any snow and ice, leading to further exposure of the rock surface. Argentina maintains a research station, called Vicecomodoro Mariambio, on the island, and a gravel-surfaced airstrip.

Seymouria, extinct genus of advanced amphibians found as fossils in Lower Permian rocks in North America (the Permian Period began 280,000,000 years ago and lasted 55,000,000 years). Named for fossil deposits near Seymour, Texas, the genus has many skeletal characteristics that are intermediate between those of amphibians and reptiles. Although *Seymouria* occurs much too late in the geologic record to have been the ancestral form of the more advanced reptiles, it possibly represents a persistent offshoot of the line that did give rise to the amphibians earlier in time.



Seymouria

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Seymouria is representative of a group of amphibians, the seymouriamorphs, that include species very specialized in habits and structural adaptations. Some seymouriamorphs pursued an almost exclusively aquatic life, whereas others, such as the genus *Diadectes,* became early terrestrial plant-eating animals. In *Seymouria,* the skull was deep and amphibian in structure. An opening was present in the roof of the skull for the pineal eye, a light-receptive organ found in primitive vertebrates. Numerous teeth grew around the margins of the jaws and several in the palate; the teeth had a complexly folded internal structure of the sort present in early amphibians. The postcranial skeleton of *Seymouria* was more reptilian than the skull. *Seymouria* was about 60 centimetres (24 inches) long, and the body was capable of being raised well off the ground in a stance more reptilian than amphibian. The structure of the vertebrae and limb girdles was reptilian.

Seyne-sur-Mer, La, town, southwestern suburb of Toulon, Var *département,* Provence-Alpes-Côte-d'Azur region of southeastern France. La Seyne is a shipbuilding centre manufacturing specialized vessels such as container ships and liquid natural gas carriers; it is located on Cap Sicié, which forms the Toulon roadstead in the Mediterranean and contains naval shipyards. Its Balaguier Fortress was built in the 17th century as part of the defenses of Toulon. A summer festival and periodic art exhibits are held there each year. Pop. (1982) 57,140.

Seysenegg, Erich Tschermak von: *see* Tschermak von Seysenegg, Erich.

Seyss-Inquart, Arthur (b. July 22, 1892, Stannern, near Iglau, Bohemia, Austria-Hungary—d. Oct. 16, 1946, Nürnberg), Austrian Nazi leader, chancellor of Austria during the days of *Anschluss* (annexation of Austria by the German Reich in 1938).

A leader of the moderate "legal" faction of the Austrian Nazis, Seyss-Inquart was appointed to the Austrian Staatsrat (federal council of state) in June 1937 in order to bring the Nazis into cooperation with the government. In February 1938, in response to German pressure, he was named minister of interior and security, a prelude to his replacement of Kurt von Schuschnigg as chancellor on March 11, 1938, the eve of *Anschluss.* Long a proponent of German–Austrian unification, he openly welcomed the incorporation of Austria into Germany that followed in the same month after the invasion by German troops.

Subsequently he served as *Reichsstatthalter* (governor) of the new Austrian provincial administration until April 30, 1939; he was later appointed deputy governor in Poland and eventually *Reichskommissar* (commissioner) of the occupied Netherlands. Following the defeat of Germany in World War II, he was tried and executed as a war criminal at Nürnberg.

Sfax (Tunisia): *see* Ṣafāqis.

Sfîntu Gheorghe, Hungarian SEPSISZENTGYÖRGY, town, capital of Covasna *judeţ* (district), east central Romania, on the Olt River. Occupied in the Middle Ages by Szekler settlers brought in to guard the eastern frontier of Transylvania, the town has a strong Hungarian tradition. The regional museum at Sf. Gheorghe contains examples of local architecture, woodwork, and craftsmanship from that period, including carved wooden doors. It also contains Dacian silver coins and other archaeological and historical material from a Daco-Roman settlement over which the town was built, as well as artifacts, among them pottery specimens, from a Neolithic settlement found at nearby Ariuşd. The town's fortified church is typical of the former frontier region of Transylvania. The modern town has some light manufacturing. Pop. (1982 est.) 56,906.

SFIO (France): *see* Socialist Party.

Sfondrato, Niccolò (pope): *see* Gregory XIV.

Sforza FAMILY, Italian family, first named Attendoli, that produced two famous soldiers of fortune and founded a dynasty that ruled Milan for almost a century.

Prosperous farmers of the Romagna (near Ravenna), the Attendoli first assumed the name Sforza (Force) with the founder of the dynasty, the condottiere Muzio Attendolo (1369–1424). Muzio's illegitimate son Francesco Sforza, also a condottiere, became duke of Milan in 1450 through his marriage to the daughter of Duke Filippo Maria Visconti.

Francesco's eldest son, Galeazzo Maria Sforza (1444–76), succeeded his father in 1466. Though traditionally characterized as despotic, extravagant, and dissolute, Galeazzo Maria was apparently a capable ruler who took an active interest in agriculture, constructed canals for irrigation and transportation, introduced the cultivation of rice, and encouraged commerce, particularly the manufacture of silk and wool. He was a patron of musicians,

artists, poets, and scholars, and himself wrote treatises on hunting. In foreign policy, however, he followed an indecisive course that ended in Milan's virtual isolation.

Galeazzo Maria was assassinated during Christmas festivities by three conspirators who vainly hoped to set the stage for a popular insurrection. But the murder left Milan to the uncertainties of the regency of his widow, Bona of Savoy, who ruled with the aid of an unpopular chancellor, Cicco Simonetta, and to the brief, troubled reign of Galeazzo's son Gian Galeazzo (1469–94), whose power was soon usurped by his uncle Ludovico the Moor.

After Ludovico was driven from power by Louis XII of France in 1499, his sons Massimiliano (1493–1530) and Francesco Maria (1495–1535) took refuge in Germany. In 1513, backed by the Swiss, Massimiliano returned to Milan. Three years later Francis I of France attacked the city. The Milanese and their Swiss allies were defeated by French and Venetian troops at Marignano, southeast of Milan, and Massimiliano yielded the duchy to Francis, retiring to Paris to live on a pension. Francesco escaped north to Trento, returning to be set up as duke of Milan in 1522 by Emperor Charles V, after the defeat of the French at the Battle of Bicocca (north of Milan). Francesco's death without heirs ended the ducal male line, and the duchy passed to Charles V and the Habsburgs.

Several other branches of the Sforza family survived, the descendants of Sforza Secondo (an illegitimate son of Francesco Sforza) becoming the counts Sforza, one of whom was the anti-Fascist statesman and foreign minister of Italy, Carlo Sforza (1873–1952).

Sforza, Carlo, Conte (Count) (b. Sept. 25, 1873, Montignoso di Lunigniana, Italy—d. Sept. 4, 1952, Rome), Italian diplomat and statesman, an exile during the Fascist era, who became a major figure in post-World War II foreign affairs.

Sforza entered the diplomatic service in 1896 and served in Cairo, Paris, Constantinople, Peking, Bucharest, Madrid, London, and Belgrade. He was undersecretary of state for foreign affairs in 1919–20 and minister for foreign affairs in 1920–21. Appointed ambassador to France in February 1922, he resigned nine months later, refusing to serve under Benito Mussolini. For nearly two decades Sforza lived abroad—in Belgium until 1939 and in the United States after 1940—as lecturer and political commentator. He returned to Italy in 1943 and held a number of ministerial and other posts until he was elected a member of the constituent assembly as a Republican in 1946. He joined the third Alcide De Gasperi cabinet in 1947 as minister of foreign affairs, retaining this position until July 1951, when he resigned because of ill health. Sforza's influence was a determining factor in the Italian ratification of the peace treaty, in Italy's joining the Organisation for European Economic Co-operation, and in its adherence to the North Atlantic Treaty.

Sforza, Francesco (b. July 23, 1401, San Miniato, Tuscany [Italy]—d. March 8, 1466, Milan), condottiere who played a crucial role in 15th-century Italian politics and, as duke of Milan, founded a dynasty that ruled for nearly a century.

The illegitimate son of a mercenary commander, Muzio Attendolo Sforza, Francesco grew up at the court of Ferrara and accompanied his father to Naples, where Muzio entered the employ of King Ladislas. Francesco later served in Muzio's company until 1424, when his father drowned in battle against an old rival, the condottiere Braccio da Montone. Francesco then took over the command, defeating and fatally wounding Braccio near L'Aquila, northeast of Rome. Entering the service of Filippo Maria Visconti, duke of Milan, Sforza fought alternately for and against him in the succeeding 20 years. During periods of uneasy truce he became betrothed (1433) to and married (1441) the duke's illegitimate daughter and only child, Bianca Maria.

In 1434 Sforza made a pact with Cosimo de' Medici, who paid him a substantial subsidy and had him appointed condottiere of Florence. Fighting for the Florentine-Venetian League against Milan in 1438, he won a battle at Lake Garda and captured Verona. Two years later he inflicted an even more crushing defeat on the Milanese at Anghiari, near Florence. In 1443 (two years after his marriage) Sforza was once more at war with his father-in-law.

The duke fell mortally ill in 1447; and, with a Venetian army threatening Milan, he called on his son-in-law for help. On his way to Milan, Sforza learned that the duke had died and had named, not him, but Alfonso of Aragon, king of Naples, as his successor. The Milanese seized the occasion to rebel and proclaimed a republic, hiring Sforza as their captain general. A three-cornered struggle then ensued among the Milanese republic, Venice, and Sforza. In 1449 Milan concluded peace with Venice behind Sforza's back, whereupon he blockaded the city, starving it into insurrection. Subsequently, on Feb. 26, 1450, he made his triumphant entry into the city as duke of Milan.

The following year Venice, Naples, Savoy, and Montferrat joined forces against Sforza, who turned to Cosimo de' Medici and concluded a Milan–Florence alliance that brought about the Peace of Lodi (1454) and permitted him to consolidate his rule over Milan. His government, though despotic, apparently was enlightened. Though Sforza was primarily a warrior, he and his children became known as patrons of the arts and enriched Milan architecturally.

Sforza, Ludovico, byname THE MOOR, Italian IL MORO (b. July 27, 1452, Vigevano, Pavia, duchy of Milan [Italy]—d. May 27, 1508, Loches, Toubrenne, Fr.), Italian Renaissance regent (1480–94) and duke of Milan (1494–98), a ruthless prince and diplomatist and a patron of Leonardo da Vinci and other artists.

Early life and assumption of power. Ludovico Sforza was the second son of Francesco Sforza, who had made himself duke of Milan. While still a child, he received the epithet *il Moro* ("the Moor") because of his dark complexion and black hair. Brought up at his father's refined court, he remained, after his father's death in 1466, in the service of the new ruler, his elder brother Galeazzo Maria.

When Galeazzo was murdered, however, in 1476, leaving the duchy to his seven-year-old son, Gian Galeazzo, Ludovico first revealed his appetite for power, plotting to win the regency from the child's mother, Bona of Savoy. The plot failed, and Ludovico was exiled but eventually, through threats and flattery, won a reconciliation with Bona and brought about the execution of her most influential adviser and chief minister, Cicco Simonetta, in 1480. Shortly afterward, he compelled Bona to leave Milan and assumed the regency for his nephew.

From that moment he entered the arena of "equilibrium politics," by which a precarious balance was maintained among the major Italian states. Taking advantage of the rivalry between these states, he established Milan's supremacy. Distrusting Venice, he remained on good terms with Florence and its Medici ruler, Lorenzo the Magnificent. He secured useful alliances with Ferdinand I, king of Naples, whose granddaughter Isabella was married in 1489 to Gian Galeazzo, and with the Borgia pope Alexander VI, through the influence of Ludovico's brother Ascanio, who



Ludovico Sforza, detail from the Sforzesca altarpiece by the Master of the Pala Sforzesca; in the Brera, Milan

Alinari—Art Resource/EB Inc.

was a cardinal. In 1491 Ludovico married Beatrice d'Este, the beautiful and cultured daughter of the duke of Ferrara. The marriage proved to be unusually harmonious, in spite of Ludovico's mistresses, and Beatrice bore him two sons, Massimiliano and Francesco, both of whom later became dukes of Milan.

With lavish but enlightened patronage of artists and scholars, Ludovico made the court of Milan the most splendid not only in Italy but in Europe. Leonardo da Vinci and the architect Donato Bramante were among the many artists, poets, and musicians who gathered in Milan. Ludovico sponsored extensive work in civil and military engineering, such as canals and fortifications. The court and the common people alike rejoiced in Ludovico's magnificent celebrations; the Milanese, however, though enjoying well-being, were increasingly burdened by taxes.

Conflicts and alliances. Resentful of the overshadowing splendour of the court of Ludovico and Beatrice, Gian Galeazzo, the rightful ruler of Milan, and his wife Isabella left Milan to establish another court at Pavia. Isabella was more outraged by Ludovico's flagrant usurpation of the ducal powers than her husband was, and she appealed to her grandfather, Ferdinand I, who intervened in 1492, ordering Ludovico to surrender control of the duchy to Isabella and Gian Galeazzo.

Ludovico refused and, fearing a war with Naples, formed an alliance with two foreign sovereigns, the emperor Maximilian I and King Charles VIII of France. For an enormous sum of money Maximilian not only bestowed upon Ludovico the title of duke of Milan in 1494, legitimizing his usurpation, but also married Bianca Maria, Gian Galeazzo's sister. Charles VIII, who was contemplating the seizure of the kingdom of Naples from Ferdinand, received Ludovico's promise of help.

The campaign of Charles VIII to conquer Naples in 1494–95 threw the whole of Italy into confusion and eventually alarmed even Ludovico himself. He joined the league led by Venice, which, in spite of Charles's initial successes, soon expelled him from Italy. Ludovico was the ultimate victor in this affair, achieving for a time maximum safety and almost unlimited power; both Gian Galeazzo and Ferdinand died in 1494, and Charles VIII himself soon became reconciled with him. Ludovico is reported to have said at the time that Pope Alexander was his chaplain, the emperor Maximilian his general, the governing Signoria of Venice his chamberlain, and Charles VIII his courier. The illusion, however, did not last long.

Ludovico's fall. Charles VIII died in 1498 and was succeeded by Louis XII, a descendant

of the first duke of Milan. Louis claimed the duchy and, with the support of Venice and a Milanese population oppressed by Ludovico's taxation, quickly conquered it. When the Milanese had in turn tired of Louis's rule, Ludovico, who sought refuge with Maximilian, tried to retake Milan with German and Swiss mercenaries. His Swiss troops, however, refused to fight for him in a crucial battle, and in April 1500 Ludovico was captured by the French while attempting to escape, disguised as a Swiss. His fall was celebrated all over Italy. He was imprisoned in the castle of Loches in Touraine, from which he tried in vain to escape. He died there, still unresigned, in May 1508.

The memory of Ludovico was clouded for centuries by Niccoló Machiavelli's accusation that he "invited" Charles VIII to invade Italy, paving the way for subsequent foreign domination. The charge was perpetuated by later historians who espoused the ideal of national independence. More recent historians, however, placing the figure of Ludovico in its Renaissance setting, have reevaluated his merits as a ruler and given a more equitable assessment of his achievement. (Al.B.)

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Sforza, Muzio Attendolo (b. May 8, 1369, Cotignola [Italy]—d. Jan. 4, 1424, Pescara), soldier of fortune who played an important role in the wars of his period and whose son Francesco became duke of Milan.

The son of Giovanni Attendolo, a prosperous farmer of the Romagna (in north-central Italy), Muzio left home in 1384 to join a mercenary band, eventually becoming squadron leader and then company commander in the service of different condottieri (mercenary captains), including the famous Alberico da Barbiano, who gave him the nickname Sforza ("Force"). In 1398 Muzio entered the employ of the Visconti, the rulers of Milan, but he soon left to fight first for Florence and then Ferrara.

Summoned to Naples in 1412 by King Ladislas, Muzio became grand constable of the kingdom. After the death of Ladislas (1414), Muzio, during the vicissitudes of the stormy reign of Queen Joan II, was at one moment presented with lands, offices, and honours and the next imprisoned and tortured. In 1424, sent by Queen Joan against an old adversary, the condottiere Braccio da Montone, in the employ of King Alfonso V of Aragon, Muzio drowned while attempting to cross the Pescara River in east-central Italy.

Sforzesco Castle, Italian CASTELLO SFORZESCO, in Milan, castle built in the 15th century by Francesco Sforza and now home of a fine art collection. Collections of the Castello Sforzesco include those of the Museum of Antique Art, of the Museum of Musical Instruments, and of the Picture Gallery. The "Rondanini Pietà," Michelangelo's unfinished last work, is there. The Picture Gallery has works by Renaissance and 17th-century Italian masters, including Andrea Mantegna, Giovanni Bellini, Filippo Lippi, Correggio, and Jacopo da Pontormo. There is also a fine collection of French and Dutch works.

sfumato (from Italian *sfumare,* "to tone down," or "to evaporate like smoke"), in painting or drawing, term designating fine



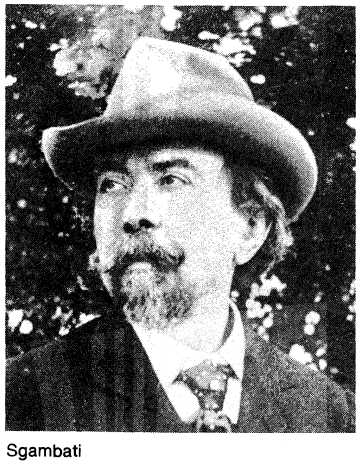
"The Virgin of the Rocks," oil painting by Leonardo da Vinci, showing the use of sfumato, 1483; in the Louvre, Paris

Giraudon—Art Resource/EB Inc.

shading that produces soft, imperceptible transitions between colours and tones. It is used most often in connection with the work of Leonardo da Vinci and his followers, who made subtle gradations, without lines or borders, from light to dark areas; the technique was used for a highly illusionistic rendering of facial features and for atmospheric effects. *See also* chiaroscuro.

Sgambati, Giovanni (b. May 28, 1841, Rome—d. Dec. 14, 1914, Rome), pianist, conductor, and composer who promoted a revival of instrumental and symphonic music in Italy during the second half of the 19th century.

A piano student of Liszt, Sgambati included in his recitals works by German composers hitherto neglected in Italy. In 1866 he formed an orchestra in Rome and conducted the first Italian performances of Beethoven's *Eroica Symphony* and Liszt's *Dante Symphony.* He also introduced Beethoven's *Emperor Concerto,* playing the solo part himself. In 1867 he helped to establish the Roman Society of the Quartet. He devoted his later years to teaching and in 1876 promoted the foundation of the first public music school in Rome. In addition to chamber music, songs, and piano pieces, Sgambati composed a *Requiem Mass,* two symphonies, and a piano concerto.



Sgambati

By courtesy of Archiv B. Schott's Sohne, Mainz, W.Ger.

Sgar-ḥbrog (China): *see* Ka-erh.

sgraffito (Italian: "scratched"), in the visual arts, a technique used in painting, pottery, and glass, which consists of putting down a preliminary surface, covering it with another, and then scratching the superficial layer in such a way that the pattern or shape that emerges is of the lower colour. During the Middle Ages, especially in panel painting and in the illumination of manuscripts, the ground was often of gold leaf. In wall painting, or mural painting, two layers of different-coloured plaster are usually employed. In stained glass, the scratching is done through a top layer of coloured glass, revealing clear glass beneath; in pottery the pattern is incised through a white or coloured slip (mixture of clay and water washed over the vessel before firing), revealing the body colour beneath. Sgraffito ware was produced by Islāmic potters and became common throughout the Middle East. The 18th-century scratch blue class of English white stoneware is decorated with sgraffito



Red earthenware plate with sgraffito decoration, Pennsylvania German, about 1805; in the Brooklyn Museum, New York

By courtesy of the Brooklyn Museum, New York, gift of Mrs. Huldah Cail Lorimer in memory of George Burford Lorimer

patterns touched with blue. Sgraffito ware was produced as early as 1735 by German settlers in colonial America.

Sgrol-ma (Buddhist goddess): *see* Tārā.

Sha-ch'e (China): *see* Yarkant.

Sha-ch'ing, Pinyin SHAQING, blade-tool culture that existed along the present region of the Great Wall in northwestern China as early as 5000 BC. The Sha-ch'ing remains were first uncovered by the Swedish geologist Johan Gunnar Andersson in 1923 in the village of Sha-ch'ing.

The artifacts of the group were mainly brick-red gritty bowls, stone tools, and large trilegged vessels of grey pottery. Evidence of bronze technology was found in smaller articles, such as bronze knives, buttons, and arrowheads. The members of the culture appear to have lived in large village settlements, which have been found to contain clay huts and well-dug storage pits. The group apparently survived until the time of the Eastern Chou dynasty (770–221 BC), coexisting with the more sophisticated cultures of historical China.

Sha-ho-tzu (China): *see* Wan-hsien.

Sha-shih, Pinyin SHASHI, city and river port in Hupeh *sheng* (province), China. It is a large city on the north bank of the Yangtze River

near the large Lake Ch'ang. It was a communications centre from a very early date, with routes leading north to Hsiang-fan, east to Han-k'ou, and west to I-ch'ang.

Sha-shih was a large city in the state of Ch'u from the 6th century BC onward. The Ch'in dynasty (221–206 BC) and their successors, the Han (206 BC–AD 220), from the 3rd century BC had a county seat there named Chiang-ling, a name retained until the 20th century. It remained a military, administrative, and commercial centre until the 19th century. Sha-shih grew in importance in the 1850s and 1860s, when occupation of many of the lower Yangtze ports by rebels during the Taiping Rebellion (1850–64) brought it new prosperity. When Sha-shih was opened to foreign trade in 1896, it began to flourish as a commercial centre and transshipment port and subsequently outstripped the neighbouring city of Ching-chou, which had suffered serious damage during the 1911 revolution. With excellent waterway communications in Hupeh, it also drew trade from much of northern Hunan province west of Lake Tung-t'ing, as well as from eastern Szechwan province, and exported quantities of cotton, grain, beans, and oilseeds.

Chiang-ling had always been the centre of a handicraft textile industry, which was developed on a large scale by the Ch'ing dynasty in the 18th century, Chiang-ling satins being especially famous. In the early years of the 20th century, a large cotton-weaving and spinning factory was set up in Sha-shih. Since 1949 this industry has been expanded on a considerable scale. The city produces large quantities of cotton yarn and finished textiles, which supply the local needs of the province and are also shipped elsewhere. Flour milling, food packing, chemical and glass manufacture, and papermaking are also important industries. Pop. (1985 est.) 213,400.

Consult the INDEX *first*

Shaaban, Robert (African writer): *see* Robert, Shaaban.

Shaanxi (China): *see* Shensi.

Shaba, formerly (until 1972) KATANGA, historic region in southeastern Zaire, central Africa, bordering Lake Tanganyika to the east, Zambia to the south, and Angola to the west. The name Shaba comes from the Swahili word for copper, and the region's mines yield most of Zaire's copper, cobalt, uranium, zinc, cadmium, silver, germanium, coal, gold, iron, manganese, and tin. The local people were utilizing those minerals before the arrival of Europeans in the 19th century. Economic development since 1900 has brought about a complex of mining and industrial towns and transportation and communications networks, which makes the region the most highly industrialized in Zaire outside of Kinshasa, the national capital. Agriculture (cotton, tobacco, corn [maize], and vegetables), livestock herding, and poultry raising are also significant. Upemba and Kundelungu national parks are in Shaba.

Katanga, as the region was called until 1972, was under Belgian colonial administration from 1885 and was the scene of much strife following independence. In 1960, led by a local politician, Moise Tshombe, and supported by foreign mining interests, Katanga seceded from the newly independent Congo (the future Zaire) and entered into a period of political confusion and bloodshed involving Congolese, Belgian, and United Nations forces. After the fighting ended in 1963, the region gradually became reintegrated into the republic, and some rebel leaders took refuge in Angola. In 1977 they unsuccessfully invaded Zaire from Angola, and unrest continued into the late 20th century.

Shabaka, also called SABACON (fl. 8th century BC), Cushite king who conquered Egypt and founded its 25th (Ethiopian) dynasty. He ruled Egypt from about 719/718 to 703 BC.

Succeeding his brother Piankhi, in Cush (in the modern Sudan), Shabaka moved north, captured Bocchoris, the second king of the 24th dynasty, and, according to tradition, burned him alive. He probably made Memphis, near Cairo, his capital and adopted the titles of the traditional Egyptian pharaohs. He contributed religious buildings at Thebes, home of Amon-Re, his dynastic god.

Following Piankhi's ideals, Shabaka fostered religious orthodoxy in Amon's cult and a return to ancient cultural themes, which characterized the 25th and 26th dynasties. He had old texts recopied and also revived the practice of pyramid burials. He was interred in a pyramid at Mount Barkal, his dynastic home between the Third and Fourth Nile cataracts.

Shabalē, Wābi- (Ethiopia–Somali): *see* Shebeli River.

Shabani (town, Zimbabwe): *see* Zvishavane.

Shabbat (Judaism): *see* Sabbath.

Shabbetai Tzevi, also spelled SABBATAI ZEBI (b. July 23, 1626, Izmir, Sughla, Ottoman Turkey—d. 1676, Dulcigno, Alb.), a false messiah who developed a mass following and threatened rabbinical authority in Europe and the Middle East.

As a young man, he steeped himself in the influential body of Jewish mystical writings known as the Kabbala. His extended periods of ecstasy and his strong personality combined to attract many disciples, and at the age of 22 he proclaimed himself the messiah.

Driven from Smyrna by the aroused rabbinate, he journeyed to Salonika, an old Kabbalistic centre, and then to Constantinople. There he encountered an esteemed and forceful Jewish preacher and Kabbalist, Abraham ha-Yakini, who possessed a false prophetic document affirming that Shabbetai was the messiah. Shabbetai then traveled to Palestine and after that to Cairo, where he won over to his cause Raphael Halebi, the wealthy and powerful treasurer of the Turkish governor.

With a retinue of believers and assured of financial backing, Shabbetai triumphantly returned to Jerusalem. There, a 20-year-old student known as Nathan of Gaza assumed the role of a modern Elijah, in his traditional role of forerunner of the messiah. Nathan ecstatically prophesied the imminent restoration of Israel and world salvation through the bloodless victory of Shabbetai, riding on a lion with a seven-headed dragon in his jaws. In accordance with millenarian belief, he cited 1666 as the apocalyptic year.

Threatened with excommunication by the rabbis of Jerusalem, Shabbetai returned to Smyrna in the autumn of 1665, where he was wildly acclaimed. His movement spread to Venice, Amsterdam, Hamburg, London, and other European and North African cities.

At the beginning of 1666, Shabbetai went to Constantinople and was imprisoned on his arrival. After a few months, he was transferred to the castle at Abydos, which became known to his followers as Migdal Oz, the Tower of Strength. In September, however, he was brought before the sultan in Adrianople and, having been previously threatened with torture, became converted to Islām. The placated sultan renamed him Mehmed Efendi, appointed him his personal doorkeeper, and provided him with a generous allowance. All but his most faithful or self-seeking disciples were disillusioned by his apostasy. Eventually, Shabbetai fell out of favour and was banished, dying in Albania.

The movement that developed around Shabbetai Tzevi became known as Shabbetaianism. It attempted to reconcile Shabbetai's grandiose claims of spiritual authority with his subsequent seeming betrayal of the Jewish faith. Faithful Shabbetaians interpreted Shabbetai's apostasy as a step toward ultimate fulfillment of his messiahship and attempted to follow their leader's example. They argued that such outward acts were irrelevant as long as one remains inwardly a Jew. Those who embraced the theory of "sacred sin" believed that the Torah could be fulfilled only by amoral acts representing its seeming annulment. Others felt they could remain faithful Shabbetaians without having to apostatize.

After Shabbetai's death in 1676, the sect continued to flourish. The nihilistic tendencies of Shabbetaianism reached a peak in the 18th century with Jacob Frank, whose followers reputedly sought redemption through orgies at mystical festivals.

Shabbona (Potawatomi chief): *see* Shabonee.

Shabelle (East Africa): *see* Shebeli River.

Shabestarī, Sa'd od-Dīn Maḥmūd (b. *c.* 1250, Shabestar, near Tabrīz, Iran—d. *c.* 1320, Tabrīz), Persian mystic whose work *Golshan-e rāz* (*The Mystic Rose Garden,* 1880) became a classic document of Ṣūfism (Islāmic mysticism).

The details of Shabestarī's life are obscure; apparently he spent most of it in Tabrīz. He grew up in an age of spiritual confusion, following the Mongol invasion of Iran, the sack of Baghdad, and the final fall of the 'Abbāsid caliphate (1258) to the Mongols. Tabrīz was a capital of the new Mongol empire, and Shabestarī's life was clearly influenced by fierce doctrinal disputes and by a struggle between Christianity and Islām for the allegiance of the Mongol rulers. His work shows a clear acquaintance with Christian doctrines, probably as a result of these disputes. In order to come to terms with the distressed status of a Muslim under heathen rule, he, like many of his contemporaries, withdrew from the outer world and sought refuge in spirituality and mysticism.

Shabestarī's *Golshan-e rāz,* written in 1311 or possibly 1317, is a poetical expression of his retreat from the temporal world. It consists of questions and answers about mystical doctrines. The work was introduced into Europe in about 1700; it soon became popular and was translated into German in 1821. European readers often regarded it as the major work of Ṣūfism, and it enjoyed a vogue among Christian followers of mystical theology who shunned ritualism and sought transcendental union with the Divine Being.

Shabonee, also spelled SHABBONA (b. *c.* 1775, near Maumee River [Ohio, U.S.]—d. July 17, 1859, Morris, Ill., U.S.), Potawatomi Indian chief, hero of a Paul Revere-style ride through northern Illinois in 1832, the purpose of which was to warn white settlers of an imminent Indian raid during the Black Hawk War.

By birth an Ottawa Indian, Shabonee married the daughter of a Potawatomi chief and succeeded him as tribal leader. Although an adherent of Tecumseh, whom he had assisted in forming an intertribal confederation, he was disinclined to violence against whites and is credited with saving many northern Illinois residents from death in the Indian massacre of August 1812. He also assumed a protective role during the Winnebago uprising of 1827. He was ill repaid for his efforts; legal maneuvers by whites deprived him of his land. Shabbona State Park in LaSalle County, Ill., established in 1906, is named in his honour.

shabunder, also spelled SHABANDAR, Persian SHĀHBANDAR, in the Malay states, the offi-

cial who supervised merchants, controlled the port, and collected customs duties. Although the title shabunder was of Persian-Arabic origin, the position itself existed on the Malay Peninsula prior to the coming of Islāmic traders.

To handle the greatly increased commerce in the 15th-century Malacca sultanate, four shabunders were appointed to oversee traders from four regions: the Malay Archipelago, China, and western and southeastern India. Usually these officials were aliens, from the country whose trade they supervised in Malacca. Because foreign trade was the basis of the sultanate's prosperity, the shabunders were important officials; they became included among the eight major chiefs who ranked just below the powerful inner Council of Four that advised the sultan. As salary, they received a significant commission on the port duties they collected.

After the decline of Malacca the office of shabunder developed in all Malayan states and continued to function until British bureaucrats took over in the late 19th century.

Shabuoth, also called PENTECOST, Hebrew SHAVUOT, in full ḤAG SHAVUOT ("Festival of the Weeks"), second of the three Pilgrim Festivals of the Jewish religious calendar. It was originally an agricultural festival, marking the beginning of the wheat harvest. During the Temple period, the first fruits of the harvest were brought to the Temple, and two loaves of bread made from the new wheat were offered. This aspect of the holiday is reflected in the custom of decorating the synagogue with fruits and flowers and in the names Yom ha-Bikkurim ("Day of the First Fruits") and Ḥag ha-Qazir ("Harvest Feast").

During rabbinic times the festival became associated with the giving of the Law at Mount Sinai, which is recounted in the Torah readings for the holiday. It became customary during Shabuoth to study the Torah and to read the Book of Ruth.

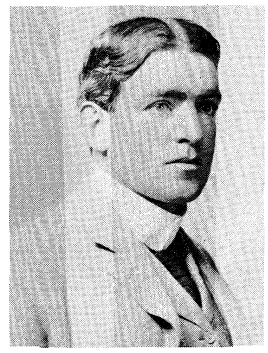
Celebration of Shabuoth occurs on the 50th day, or seven weeks, after the sheaf offering of the harvest celebrated during Passover. The holiday is therefore also called Pentecost from the Greek *pentēkostē* ("50th"). It falls on Sivan 6 (and Sivan 7 outside Israel).

shacharit, also spelled SHACHARITH (Judaism): *see* shaharith.

Shackleton, Sir Ernest Henry (b. Feb. 15, 1874, Kilkea, County Kildare, Ire.—d. Jan. 5, 1922, Grytviken, South Georgia), British Antarctic explorer who attempted to reach the South Pole.

Educated at Dulwich College (1887–90), Shackleton entered the mercantile marine service in 1890 and became a sublieutenant in the Royal Naval Reserve in 1901. He joined Captain Robert Falcon Scott's British National Antarctic (*Discovery*) Expedition (1901–04) as third lieutenant and took part, with Scott and Edward Wilson, in the sledge journey over the Ross Ice Shelf when latitude 82° 16′ 33″ S was reached. His health suffered, and he was invalided out on the supply ship *Morning* in March 1903. In January 1908 he returned to Antarctica as leader of the British Antarctic (*Nimrod*) Expedition (1907–09). The expedition, prevented by ice from reaching the intended base site in Edward VII Peninsula, wintered on Ross Island, McMurdo Sound. A sledging party, led by Shackleton, reached within 97 miles (156 km) of the South Pole, and another, under T.W. Edgeworth David, reached the area of the South Magnetic Pole. Victoria Land Plateau was claimed for the British crown. On his return Shackleton was knighted and was made a companion of the Royal Victorian Order.

In March 1914 the British Imperial Trans-Antarctic Expedition (1914–16) left England under Shackleton's leadership. He planned to



Shackleton, 1909

By courtesy of the Royal Geographical Society, London

cross Antarctica from a base on the Weddell Sea to McMurdo Sound, via the South Pole, but the expedition ship *Endurance* was beset off Caird coast and drifted for 10 months before being crushed in the pack ice. The members of the expedition then drifted on ice floes for another five months and finally escaped in boats to Elephant Island in the South Shetland Islands. Shackleton and five others sailed 800 miles (1,300 km) to South Georgia in a whale boat and then made the first crossing of the island, to seek aid. He led four relief expeditions before succeeding in rescuing his men from Elephant Island. A supporting party, the Ross Sea party led by A.E. Mackintosh, sailed in *Aurora* and laid depots as far as latitude 83° 30′ S for the use of the Trans-Antarctic party; three of this party died on the return journey.

Shackleton died at Grytviken, South Georgia, at the outset of the Shackleton-Rowett Antarctic Expedition in *Quest;* his exertions in raising funds to finance his expeditions and the immense strain of the expeditions themselves wore out his strength.

Shackleton's publications are *The Heart of the Antarctic* (1909) and *South* (1919), the latter an account of the Trans-Antarctic Expedition.

shad, any of several saltwater food fishes of the herring family (Clupeidae) that swim up rivers to spawn. Shad of the genus *Alosa* are rather deep bodied and have a notch in the upper jaw into which the tip of the lower fits. Young shad have small teeth, but the



American shad (*Alosa sapidissima*)

Painting by Karen Allan

adults are toothless. The flesh of these fishes is considered very good to eat, though bony; the eggs, or roe, are a delicacy in the United States.

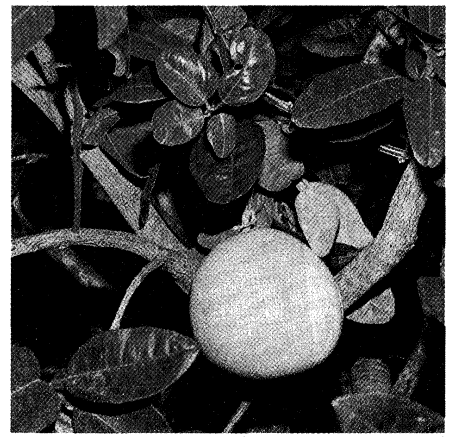
The American shad (*Alosa sapidissima*), formerly found only on the Atlantic coast from Florida to Newfoundland, was introduced into the Pacific Ocean in 1871 and now ranges from San Diego to British Columbia. It is a migratory plankton eater and evidently enters deep water in fall. A good game fish, it may be 75 cm (30 inches) long. Young shad hatch in 6 to 15 days, enter the sea in fall, and mature in about three years.

The Allis (or Allice) shad (*A. alosa*) of Europe is about 75 cm (30 inches) long and 3.6 kg (8 pounds) in weight. The twaite shad (*A. finta*) is smaller.

Other fishes known as shad and having similar life cycles are those of the genera *Caspialosa* of the Black and Caspian seas, and *Hilsa*, which range from East Africa to China.

The gizzard shads (*Dorosoma*), of both marine waters and freshwaters, have a muscular stomach and filamentous last dorsal fin rays. The Atlantic species (*D. cepedianum*), also called hickory shad and fall herring, ranges through the southern United States. Others are found in the Indo-Pacific and Australian waters. None is of particular economic value.

shaddock, also called PUMMELO (*Citrus grandis*), citrus tree of the family Rutaceae, reaching 6–13 m (20–43 feet) in height. Shaddock is allied to the orange and the lemon and is presumably native to Malaysia and Polynesia.



Shaddock (*Citrus grandis*)

Walter Dawn

The name shaddock is said to have derived from that of a captain who introduced the tree to the West Indies. The leaves are like those of the orange but have broadly winged petioles and are downy on the undersurface, as are also the young shoots. The flowers are large and white and are succeeded by very large spheroid or almost pear-shaped fruits, resembling grapefruit, lemon yellow in colour, and with a pungent, tart, but agreeable flavour. The pulp segments are either pallid or red and shell out easily. The fruit is highly prized in the Orient.

Shādhilī, ash-, in full ABŪ AL-ḤASAN ʿALĪ IBN ʿABD ALLĀH ASH-SHĀDHILĪ (b. 1196/97, Ghumàra, near Ceuta, Mor.—d. 1258, Humaithra, on the Red Sea), Ṣūfī Muslim theologian who was the founder of the order of the Shādhilīyah.

The details of ash-Shādhilī's life are clouded by legend. He is said to have been a direct descendant of the Prophet Muḥammad and to have gone blind in his youth because of excessive study. In 1218/19 he traveled to Tunisia, where his Ṣūfī teachings of ascetic mysticism aroused the hostility of the traditional orthodox Muslim theologians. Ash-Shādhilī was forced to go into exile in Egypt. He died returning from a pilgrimage to the Islāmic holy cities of Arabia. It was while he was in Egypt that he founded the Shādhilīyah order, which was destined to become one of the most popular of the mystical brotherhoods of the Middle East and North Africa and from which 15 other orders derive their origin.

Although ash-Shādhilī left no writings, certain sayings and some poetry have been preserved by his disciples.

Shādhilīyah, also spelled SHĀZILĪYAH, widespread brotherhood of Muslim mystics (Ṣūfīs), founded on the teachings of Abū al-Ḥasan ash-Shādhilī (d. 1258) in Alexandria. Shādhilī teachings stress five points: fear of God, living the sunna (practices) of the Prophet, disdain of mankind, fatalism, and turning to God in times of happiness and distress. The order, which spread throughout

North Africa and the Sudan and into Arabia, was created by disciples, as ash-Shādhilī himself discouraged monasticism and urged his followers to maintain their ordinary lives, a tradition still followed. The order has given rise to an unusually large number of suborders, notably the Jazūlīyah and the Darqāwā in Morocco and the ʿĪsāwīyah in Morocco, Algeria, and Tunisia.

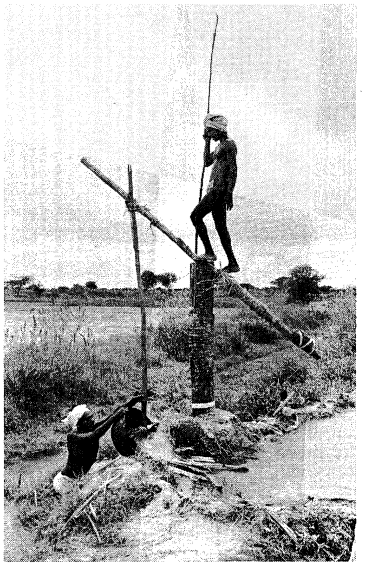
shadkhan (Hebrew: "marriage broker," or "matchmaker"), plural SHADKHANIM, one who undertakes to arrange a Jewish marriage. Such service was virtually indispensible during the Middle Ages when custom frowned on courtships and numerous Jewish families lived in semi-isolation in small communities. *Shadkhanim* were thus relied upon to gather and evaluate information on the personal qualities and background of potential spouses in order to ensure a felicitous and holy union. Their recompense, fixed by custom, was often a percentage of the dowry. In some of the larger Jewish communities of eastern Europe, the reputation of *shadkhanim* was marred by the appearance of less than sincere matchmakers who were more interested in turning a financial profit than in honest representation. This type of *shadkhan* became the subject of countless Jewish jokes. *Shadkhanim* still exist today but in greatly reduced numbers.

shadow play, type of theatrical entertainment performed with puppets, probably originating in China and on the Indonesian islands of Java and Bali. Flat images are manipulated by the puppeteers between a bright light and a translucent screen, on the other side of which sits the audience. Shadow plays are also performed in Turkey and Greece. In the 18th and 19th centuries, shadow plays called *ombres chinoises* ("Chinese shadows") achieved a limited degree of popularity, especially in France. *See also* Karagöz; ombres chinoises; wayang.

Shadrafa, ancient West Semitic benevolent deity. His name may possibly be translated as "Spirit of Healing." He was often represented as a youthful, beardless male, standing on a lion above mountains, wearing a long, trailing garment and a pointed headdress, and holding a small lion in one hand and, perhaps, a whip in the other. In representations from Palmyra, Shadrafa is shown with serpents and scorpions. He was probably equated with the beautiful youth Adonis, who was prominent during Hellenistic times. Shadrafa was worshipped in North Africa as the tutelary deity of Leptis Magna, being equated there with Liber-Dionysus.

Shadrinsk, also spelled ŠADRINSK, city and centre of Shadrinsk *rayon* (district) of Kurgan *oblast* (administrative region), Russian Soviet Federated Socialist Republic, on the Iset River and the Trans-Siberian Railroad. Founded in 1662, it was chartered in 1781 and today is a manufacturing and agricultural centre, with transport functions. Light engineering, flour milling, and sawmilling are important. Medical and teacher-training colleges are located in the city. Pop. (1983 est.) 85,000.

shaduf, also spelled SHADOOF, hand-operated device for lifting water, invented in ancient times and still used in India, Egypt, and some other countries to irrigate land. Typically it consists of a long, tapering, nearly horizontal pole mounted like a seesaw. A skin or bucket is hung on a rope from the long end, and a counterweight is hung on the short end. The operator pulls down on a rope attached to the long end to fill the bucket and allows the counterweight to raise the bucket. To raise water to higher levels, a series of shadufs are sometimes mounted one above the other. In India the device is called a *denkli,* or *paecottah.*



Villagers near Thanjāvūr in the state of Tamil Nadu, India, using a shaduf to raise water from a stream into irrigation channels serving their rice fields
By courtesy of the United Nations

Shadwell, Thomas (b. 1642?, Norfolk, Eng.—d. Nov. 19, 1692, London), English dramatist and poet laureate, known for his broad comedies of manners and as the butt of John Dryden's satire.

Educated at Cambridge and at the Middle Temple, London, after the Restoration (1660) Shadwell became one of the court wits and an acquaintance of Sir Robert Howard and his brother, Edward, both of whom he satirized in *The Sullen Lovers* (1668).

Shadwell wrote 18 plays, including a pastoral, *The Royal Shepherdess* (1669), an opera, *The Tempest* (1674), a tragedy, *Psyche* (1674–75), and a blank verse tragedy, *The Libertine* (1675). He translated Juvenal's *The Tenth Satyr* (1687) and composed bitter attacks upon John Dryden. He also instituted the new year and birthday odes when he became poet laureate.

His friendship with Dryden ended with the political crisis of 1678–79, when Shadwell espoused the Whig cause, producing *The Lancashire Witches,* which caused offense with its antipapist propaganda and attacks upon the Anglican clergy. Their feud produced three satires by each in the course of 1682, of which the best known are Dryden's *Absalom and Achitophel* and his mock-heroic verse satire, *MacFlecknoe.* The issue was partly political, partly a difference of opinion over dramatic technique, particularly Dryden's scorn for Ben Jonson's wit and Shadwell's uncritical reverence for him.

When Dryden was removed from the laureateship and the position of historiographer royal during the Revolution of 1688, Shadwell succeeded him. Shadwell continued in Jonson's style of the comedy of "humours" in many of his plays. They form a link between Jonson's art and the realistic fiction of the age of Fielding. *The Humourists* (1670) was a failure because he satirized the vices and follies of an age that did not care for generalized satire. His next play, *The Miser* (1671–72), was a rhymed adaptation of Molière that showed his gradual shift toward the wit of the comedy of manners. *Epsom-Wells* (1672) became his greatest success, being played for nearly half a century. In *The Squire of Alsatia* (1688) he presented middle-class people and villains, rascals and thieves. *Bury-Fair* (1689) showed the influence of the popular farce that was to put his fame in eclipse in his later years. His last play, *The Scowrers* (1690), was a precursor of sentimental comedy.

Shaffer, (Levin) Peter (b. May 15, 1926, London), British playwright of considerable range who moved easily from farce to the portrayal of human anguish.

Educated at St. Paul's and Trinity College, Cambridge, Shaffer first worked for a music publisher and then as a book reviewer. His first play, *Five-Finger Exercise* (1960), was a tautly constructed domestic drama that almost overnight established his reputation as a playwright. He followed it with a double bill, *The Private Ear* and *The Public Eye* (1962), before confirming his success with *The Royal Hunt of the Sun* (1964), a portrayal of the conflict between the Spanish and the Inca—"hope and hopelessness, faithlessness and faith." In 1965 Shaffer's *Black Comedy* was performed. It is an adroit farce, much of the comedy stemming from the central device of setting his actors in a supposedly pitch-black room that is flooded with light. *Equus* (1973), dealing with a mentally disturbed stableboy's obsession with horses, was a success with both the public and the critics. It was filmed in 1977. *Amadeus,* produced at the National Theatre in 1979, is a play about the rivalry between Mozart and his fellow composer Antonio Salieri. After initial critical division it won several dramatic awards for the season.

Shāfiʿī, Abū ʿAbd Allāh (Muḥammad ibn Idrīs) ash- (b. 767, Arabia—d. Jan. 20, 820, al-Fusṭāṭ, Egypt), Muslim legal scholar who played an important role in the formation of Islāmic legal thought and was the founder of the Shāfiʿīyah school of law. He also made a basic contribution to religious and legal methodology with respect to the use of traditions.

Little is known for certain of his life. He belonged to the tribe of the Quraysh, the tribe of the Prophet Muḥammad, to whom his mother was distantly related. His father died when he was very young, and he was brought up, in poor circumstances, by his mother in Mecca. He came to spend much time among the Bedouins and from them acquired a thorough familiarity with Arabic poetry. When he was about 20 he travelled to Medina to study with the great legal scholar Mālik ibn Anas. On Mālik's death in 795, ash-Shāfiʿī went to Yemen, where he became involved in seditious activities for which he was imprisoned by the caliph Hārūn ar-Rashīd at ar-Raqqah (in Syria) in 803. He was soon freed, however, and after a period of study in Baghdad with an important jurist of the Ḥanafī school, ash-Shaybānī, he went to al-Fusṭāṭ (now Cairo), where he remained until 810. Returning to Baghdad, he settled there as a teacher for several years. After some further travels, he returned to Egypt in 815/816 and remained there for the rest of his life. His tomb in al-Fusṭāṭ was long a place of pilgrimage.

During the course of his travels, ash-Shāfiʿī studied at most of the great centres of jurisprudence and acquired a comprehensive knowledge of the different schools of legal theory. His great contribution was the creation of a new synthesis of Islāmic legal thought. Most of the ideas with which he worked were already familiar, but he had the insight to structure them in a new way. Primarily he dealt with the question of what the sources of Islāmic law were and how these sources could be applied by the law to contemporary events. His book, the *Risālah,* written during the last five years of his life, entitles him to be called the father of Muslim jurisprudence.

Shāfiʿīyah, also called MADHHAB SHĀFIʿĪ, English SHAFIITES, in Islām, one of the four Sunnī schools of religious law, derived from the teachings of Abū ʿAbd Allāh ash-Shāfiʿī (767–820). This legal school (*madhhab*) stabilized the bases of Islāmic legal theory, admit-

ting the validity of both divine will and human speculation. Rejecting provincial dependence on the living *sunnah* (traditional community practice) as the source of precedent, the Shafiites argued for the unquestioning acceptance of Ḥadīth (traditions concerning the life and utterances of the Prophet) as the major basis for legal and religious judgments and the use of *qiyās* (analogical reasoning) when no clear directives could be found in the Qur'ān or Ḥadīth. *Ijmāʿ* (consensus of scholars) was accepted but not stressed. The Shāfiʿī school predominates in eastern Africa, parts of Arabia, and Indonesia.

Shafshawan (Morocco): *see* Chechaouene.

shaft coupling, in machinery, a device for providing a connection, readily broken and restored, between two adjacent rotating shafts. A coupling may provide either a rigid or a flexible connection; the flexibility may permit misalignment of the connected shafts or provide a torsionally flexible (yielding) connection, mitigating effects of shock.

A common type of rigid coupling consists of two mating radial flanges (disks) attached by key-driven hubs to the ends of the shafts and bolted together through the flanges. Alignment of the shafts is usually achieved by means of a short cylindrical projection (rabbet joint) on the face of one flange that fits snugly into a circular recess on the face of the other flange.

The chain coupling consists of two hardened-steel sprockets, one on each shaft, with a nylon or metal roller chain wrapped around the closely aligned sprockets and connected at the ends. Clearances between the sprocket teeth and the chain allow for a small amount of shaft misalignment.

For connecting shafts whose axes intersect but are inclined to one another at a larger angle than a flexible coupling can accommodate, universal joints are used. The commonest of these is the Hooke, or Cardan, joint, which consists of two yokes attached to the shaft ends and a cross-shaped connecting member. *See also* hydraulic coupling.

Shaft Graves, late Bronze Age (*c.* 1600–1500 BC) burial sites from the era in which the Greek mainland came under the cultural influence of Crete. The graves were those of royal or leading Greek families, unplundered and undisturbed until found by modern archaeologists at Mycenae. The graves, consisting of deep, rectangular shafts above stone-walled burial chambers, lie in two circles, one excavated in 1876 and the other not found until 1951. They were richly accoutred with gold and silver; carvings of chariots provide the earliest indication of chariots on the Greek mainland.

shaft seal, also called OIL SEAL, in machinery, a device that prevents the passage of fluids along a rotating shaft. Seals are necessary when a shaft extends from a housing (enclosure) containing oil, such as a pump or a gear box. A common type of shaft seal consists of an elastomer (elastic rubberlike) ring bonded to a metallic ring that is a press (tight) fit in the hole in the housing through which the shaft extends. The sealing is done by a lip on the elastomer ring that is pressed snugly around the shaft by a helically wound garter spring. When properly designed and installed, the lip rides on a film of lubricant about 0.0001 inch (0.0025 millimetre) thick. If the film gets too thick, fluid leaks; if it is too thin, the lip gets hot, and the seal may fail. Leather, synthetic rubber, and silicones are among the materials used for the sealing ring.

Shaftesbury, EARLS OF, titled English nobility, in the family Cooper, grouped below chronologically and indicated by the symbol •.

•Shaftesbury, Anthony Ashley Cooper, 1st earl of, also called (1661–72) BARON ASHLEY OF WIMBORNE ST. GILES (b. July 22, 1621, Wimborne St. Giles, Dorset, Eng.—d. Jan. 21, 1683, Amsterdam), English politician, a member of the Council of State (1653–54; 1659) during the Commonwealth, and a member of Charles II's "Cabinet Council" and lord chancellor (1672–73). Seeking to exclude the Catholic duke of York (the future James II) from the succession, he was ultimately charged with treason. Though acquitted, he fled into exile.

Early life and role in the Civil War. Cooper was born at Wimborne St. Giles, Dorset, in 1621. From his maternal grandfather, Sir Anthony Ashley, and his father, Sir John Cooper, he inherited estates in Dorset and Wiltshire, and, although some were lost through litigations during his minority, his inheritance was large enough to enable him to contemplate a career in politics at an early age. On Feb. 25, 1639, he married Margaret, the daughter of Lord Coventry, Charles I's Lord Keeper; this marriage ended with her death 10 years later. When still only 18, he had been elected to the Short Parliament (April–May) of 1640, but his election to the Long Parliament of the same year was disputed and he was not allowed to take his seat.



The 1st earl of Shaftesbury, detail of a painting from the studio of J. Greenhill, *c.* 1672–73; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Though the Civil War broke out in 1642, Cooper did not take up arms for the King until the summer of 1643, and in February 1644 he went over to the side of Parliament, dissatisfied with the political and religious influences uppermost at the Royalist Court in Oxford (the King's headquarters) at that time. He took an active part in the operations in Dorset in 1644.

There is little evidence of his activities between 1645 and 1652, other than his marriage to Lady Frances Cecil, the Earl of Exeter's sister, in 1650, and that he became a member of a commission to aid a parliamentary committee that was to examine projects for law reform. It may have been this commission membership that secured his nomination to the Barebones Parliament (July–December) of 1653. In December 1653 he helped to persuade the more conservative majority of that Parliament to resign its powers to Oliver Cromwell, the victorious Puritan leader. As a result, he was appointed to the Council of State established by the Instrument of Government that set up the Protectorate—with Cromwell as Lord Protector—and elected to the first Parliament that met under its terms, in 1654. His association with Cromwell ceased at the end of that year, however, probably because he disliked a regime that seemed increasingly more military than parliamentary.

In 1655 (his second wife had died in 1654) he married as his third wife Margaret Spencer, the niece of the Earl of Southampton, the leading Cavalier peer remaining in England after Charles's execution, but there is no evidence that he positively favoured a Royalist restoration until 1660, when every other possible political alternative had proved unsuccessful. On May 8 he was appointed one of the 12 commissioners sent by the House of Commons to Holland to invite Charles II to return, and after Charles had done so, Cooper was admitted to Charles's privy council.

Office under Charles II. From 1660 to 1673 he held office under Charles II, becoming Lord Ashley in 1661 and earl of Shaftesbury in 1672. During this period his intelligence, his capacity for business, and his ability as a speaker in the House of Lords were generally recognized, but because of his equivocal political past he was at first given only the then minor office of chancellor of the Exchequer. By the end of the 1660s, however, he had been admitted to the King's "Cabinet Council" and in 1672 he became lord chancellor—the last to preside in Chancery with no formal legal training other than a short spell in Lincoln's Inn (one of the four legal schools and societies).

His name has been associated with three particular acts of policy between 1670 and 1673: the Stop of the Exchequer of 1672, which by suspending the repayment of debt for 12 months gave Charles the use of his revenue for naval preparations; the Declaration of Indulgence of the same year; and the third Dutch war of 1672–74. The first of these is now known to have been the responsibility of Sir Thomas Clifford; the second reflected his consistent desire to secure toleration for Dissenters (religious groups that did not belong to the Church of England), though the King and Clifford intended it primarily as relief for Catholics; the third was, in Shaftesbury's mind, a natural continuation of the commercial rivalry with the Dutch.

Earlier, in 1670, he signed a sham Anglo-French treaty supposedly to reduce the commercial supremacy of the Dutch, but he was unaware that the previous secret Treaty of Dover had provided for Charles to declare himself a Catholic, a prospect he could never have condoned. In 1673 he supported the first Test Act, designed to exclude Catholics from office, and opposed the marriage of the King's brother and heir, James, duke of York, a Catholic, to another Catholic. Later in that same year, Charles, feeling that he could no longer trust his chancellor, dismissed him.

In the years that followed, Shaftesbury gradually became the most formidable politician in the Whig opposition or "Country Party," against the King and his lord treasurer, Danby, until, in 1678, a certain Titus Oates gave information about an alleged extensive Catholic plot to kill Charles and put James on the throne. This gave Shaftesbury his first real chance to acquire a wide base of support. Though he had not contrived the tale—nor did he prompt Oates to come forward at first—he realized he could exploit the situation to his own advantage. In the ensuing national panic, Shaftesbury took control of the political chaos, organized an elaborate party network, exercised great control over elections, and acquired a large following in Parliament.

The Exclusion Bill. His strategy was primarily aimed at securing the passage of the Exclusion Bill, which would keep the Catholic James from the throne, using Charles's illegitimate son, the Duke of Monmouth, a puppet of Shaftesbury, as a possible claimant to the throne. Although the bill passed in the Commons, it was rejected by the Lords because of the King's strong opposition. Shaftesbury rode to the next Parliament, at Oxford on

March 21, 1681, with an armed following, but Charles dissolved it within a week, leaving him helpless, without a following, and, as the general panic dissolved, without a cause.

He was seized on July 2, 1681, and committed to the Tower of London, but he was acquitted of the trumped-up charge of treason by a London grand jury in November. Shortly before the trial the most famous attack on him, John Dryden's satire *Absalom and Achitophel,* appeared. In the absence of another Parliament, Shaftesbury could do little more. After privately discussing the possibility of rising against the government, he fled the country in November 1682 and died in Holland in January 1683.

Shaftesbury was a man of intelligence, charm, and wide and usually enlightened interests, including those related to colonization. In 1663 he was given a grant, along with seven others, of the province of Carolina in North America and was appointed president of the Council of Trade and Foreign Plantations from 1672 to 1674. The philosopher John Locke, who helped him to draft the *Fundamental Constitutions* of Carolina and superintended the surgical operation that saved his life in 1668, was a member of his household from 1667 to 1675. Recent scholarly work on Locke has stressed the importance of his connection with Shaftesbury and has modified the impression of the Earl left by Dryden's partisan satires and other unfavourable, sometimes unjust, evaluations through history. (K.H.D.H.)

BIBLIOGRAPHY. K.H.D. Haley, *The First Earl of Shaftesbury* (1968), is an attempt to demonstrate a consistency of political outlook throughout Shaftesbury's various changes in his career. Earlier biographies are W.D. Christie, *A Life of Anthony Ashley Cooper, First Earl of Shaftesbury* (1871); and L.F. Brown, *The First Earl of Shaftesbury* (1933). The best general account of the reign of Charles II is in D. Ogg, *England in the Reign of Charles II,* 2 vol., 2nd ed. (1955). See also M. Lee, *The Cabal* (1965); and J.R. Jones, *The First Whigs* (1961). Hester W. Chapman, *Four Fine Gentlemen* (1978), includes a vivid, well-researched short biography of Shaftesbury.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

•Shaftesbury, Anthony Ashley Cooper, 3rd earl of (b. Feb. 26, 1671, London—d. Feb. 15, 1713, Naples), English politician and philosopher, grandson of the famous 1st earl and one of the principal English Deists.

His early education was directed by John Locke, and he attended Winchester College. He entered Parliament in 1695 and, succeeding as 3rd earl in 1699, attended Parliament regularly in the House of Lords for the remainder of William III's reign. He pursued an independent policy in the House of Lords as well as in the House of Commons. In July 1702 he retired from public life.

Shaftesbury's philosophy owed something to the Cambridge Platonists, who had stressed the existence in man of a natural moral sense. Shaftesbury advanced this concept against both the orthodox Christian doctrine of the Fall and against the premise that the state of nature was a state of unavoidable warfare.

Shaftesbury's Neoplatonism, his contention that what man sees of beauty or truth is only a shadow of absolute beauty or truth, dominated his attitude to religion and to the arts. During his lifetime his fame as a writer was comparatively slight, for he published little before 1711; in that year appeared his *Characteristicks of Men, Manners, Opinions, Times,* in which his chief works were assembled. The effect of this book was immediate and was felt on the Continent as well as in England; indeed, English Deism was transmitted to Germany almost entirely through translations of his writings. Pope, Joseph Butler, Francis Hutcheson, Mark Akenside, Coleridge, and Kant were among those who were to some degree affected by Shaftesbury.

•Shaftesbury, Anthony Ashley Cooper, 7th earl of, also called (1811–51) LORD ASHLEY (b. April 28, 1801, London—d. Oct. 1, 1885, Folkestone, Kent, Eng.), one of the most effective social and industrial reformers in 19th-century England; he was also the acknowledged leader of the evangelical movement within the Church of England.

He was the eldest son of Cropley Cooper, a younger brother of the 5th Earl of Shaftesbury, and of Anne, daughter of the 4th Duke of Marlborough. He became Lord Ashley when his father succeeded to the earldom in 1811, was educated at Harrow and Christ Church, Oxford, and succeeded his father as earl in 1851.

A member of the House of Commons from 1826, Ashley attacked the Reform Bill of 1832 for widening the franchise but favoured the political emancipation of Roman Catholics and the repeal in 1846 of the Corn Laws (import duties on grain). Becoming a lunacy commissioner in 1828 and commission chairman in 1834, he secured passage of the Lunacy Act of 1845, the first British statute to treat the insane as "persons of unsound mind" rather than social outcasts. He early was associated with the factory reform movement led by Richard Oastler and, in the House of Commons, by Michael Thomas Sadler; in 1833, after Sadler's defeat in an election, Ashley replaced him as parliamentary leader of the movement for shortening the working day in textile mills to ten hours. Although popularly known as Lord Ashley's Act, the Ten Hours Act of 1847 was passed while he was temporarily out of the House of Commons (January 1846–July 1847). In his working for further factory reform legislation, he was accused by the radical reformer John Bright not only of ignorance of actual working conditions in factories but also of unconcern for rural labourers, including those on the Shaftesbury estates.

By his Mines Act of 1842, Ashley excluded all women and girls and all boys under the age of 10 from underground coal-mine employment, in which he had found boys aged 4 or 5 years. While serving as a member of the short-lived General Board of Health (1848–54) and afterward, Shaftesbury (who succeeded to the earldom in 1851) insisted that the government sponsor new low-cost housing projects for urban workers and carefully inspect housing that already existed. During his 39 years as president of the Ragged Schools Union, that organization enabled about 300,000 destitute children to be educated free at what were called ragged schools or industrial feeding schools. He also served as president of the British and Foreign Bible Society, founded numerous Young Men's Christian associations and Workingmen's institutes, and financially supported missionary societies for Nonconformist faiths as well as for the Church of England.

As a staunch evangelical he viewed with alarm the growing ritualism in the Church of England and materially aided Prime Minister Benjamin Disraeli in the passage of the Public Worship Act (1874), which checked the extension of Anglo-Catholic practices.

Edwin Hodder wrote the biography *The Life and Work of the Seventh Earl of Shaftesbury* (3 vol., 1886). More recent accounts are John Lawrence Hammond and Barbara Lucy Hammond, *Lord Shaftesbury* (2nd ed., 1936), and Geoffrey F.A. Best, *Shaftesbury* (1964).



The 7th Earl of Shaftesbury, oil painting by G.F. Watts; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

shag (water bird): *see* cormorant.

Shagamu, town, Ogun State, southwestern Nigeria, on the Ibu River and the Eruwuru Stream, between Lagos and Ibadan. Founded in the mid-19th century by members of the Ijebu branch of the Yoruba people, it soon became a major market centre of the Ijebu Remo kingdom. Following the British destruction of the Ijebu trade monopoly in 1892 and their later decision to build the railway from Lagos through Abeokuta, 30 mi northwest, Shagamu declined in importance. It was not until the completion of the Lagos–Shagamu–Ibadan road in 1953 and the opening of a new road to Benin City in 1964 that the town regained some of its old significance as a trade centre.

Shagamu is Nigeria's largest collecting point for kola nuts. Although cocoa, rubber, and palm oil and kernels are also cultivated in the vicinity for export, local trade is primarily in yams, cassava, rice, corn (maize), palm produce, oranges, and onions. Cotton weaving and dyeing (with locally grown indigo) are traditional industries, but Shagamu has become best known in recent years for its thorn carvings of Nigerian scenes. A carpet industry and a cement factory (opened in 1978) form the modern sector of the economy.

Next to one of the markets are the palace and administrative buildings (for Ijebu Remo Division) of the present Yoruba *oba* ("king"). Shagamu is also served by a central mosque, Anglican and Methodist churches, public and religious teacher-training colleges, and a hospital. The town is the headquarters of the Ijebu-Remo Local Government Council. Pop. (1983 est.) 84,700.

Shagari, Shehu (Usman Aliyu) (b. *c.* 1924, Shagari, Nigeria), president of Nigeria from 1979 to 1983, leader of the National Party.

A member of the Muslim Fulani people of northern Nigeria and a descendant of a tribe that had founded his home village, Shagari studied at a secondary school in Kaduna and taught school briefly before entering politics in 1954 and being elected to the federal House of Representatives. Thereafter he held several posts and was a member of every administration after Nigeria's independence in 1960. Upon the end of military rule (1979), he was elected president of Nigeria, defeating his major rival, Chief Obafemi Awolowo, by a narrow margin.

Nigeria was badly shaken by the international economic crisis of the early 1980s. Shagari took several steps to try to strengthen the economy—cutting the budget, calling in the International Monetary Fund, and expelling 2,000,000 aliens in 1983. He won the bitterly contested presidential elections in 1983, but the state of the economy and corruption in his administration worsened, and on December 31 a military coup led by Maj. Gen. Mohammed Buhari toppled the government and Shagari was arrested.

shāh, Old Persian KHSHAYATHIYA, title of the kings of Iran, or Persia. When compounded as *shāhanshāh,* it denotes "king of kings," or emperor, a title adopted by the 20th-century Pahlavi dynasty in evocation of the ancient Persian "king of kings," Cyrus II the Great (reigned 559–*c.* 529 BC). Another related title or form of address is *padshāh,* or "lord king." The title *shāh* was also used in Afghanistan until the overturn of the monarchy in 1973 and has been used by rulers and princelings in other countries of central and southern Asia. Sometimes, as a part of a name, *shāh* was used by hereditary governors and heads of Ṣūfī orders. The son of a *shāh* is called a *shāhzāda* (literally "*shāh* son"). *See also* shahbandar.

Shah Alam, city, capital of Selangor state, West Malaysia (Malaya), about 10 mi (16 km) southwest of Kuala Lumpur, the national capital. Shah Alam was designated capital of Selangor when Kuala Lumpur, the former state capital, was declared a federal territory in 1974. The city has an industrial estate where food and tobacco products are processed and electrical machinery, cement, chemical, and textile products are manufactured. The city is the headquarters of the Institut Teknoloji MARA, founded 1956; of the Tun Abdul Razak Library, named after Malaysia's second prime minister; and of the Standards and Industrial Research Institute of Malaysia. Pop. (1980) 19,041.

Shāh ʿĀlam II, original name ʿALĪ GAUHAR (b. June 15, 1728, Delhi—d. Nov. 10, 1806, Delhi), nominal Mughal emperor of India from 1759 to 1806.

Son of the emperor ʿĀlamgīr II, he was forced to flee Delhi in 1758 by the minister ʿImād-ul-Mulk, who kept the Emperor a virtual prisoner. He took refuge with Shujāʿ-ud-Dawlah, nawab of Oudh; after his father's assassination in 1759 he proclaimed himself emperor. With the intention of seeking to capture Delhi, he demanded tribute from Bihār and Bengal and thereby came into conflict with the East India Company. After Shujāʿ-ud-Dawlah's defeat at Buxar (in Bihār state) in 1764, however, he became the company's pensioner, in return for which he legalized the company's positions in Bengal, Bihār, and Orissa (1765) by granting the right to collect revenue. Comfortably installed at the city of Allahābād, he sought Delhi, and in 1771 an agreement with the Marāthā people of western India returned it to him. During 1772–82 his minister, Najaf Khān, asserted imperial authority over the Delhi territory from the Sutlej to the Chambal rivers and from the state of Jaipur to the Ganges River. In 1788 the chief of the Rohillas (warlike Afghan tribes settled in India), Ghulām Qādir, seized Delhi and blinded Shāh ʿĀlam. He spent his last years under the protection of the Marāthā chief, Sindhia, and, after the Second Marāthā War (1803–05), of the British. With power only inside his palace, he saved more than a million rupees in his treasury. He was called "king of Delhi" by the British, who maintained him out of sentiment and issued coins bearing his name to continue the charade for 30 years after his death.

Shah diamond, yellow-tinged stone of about 89 carats that bears three ancient Persian inscriptions, indicating it was discovered before 1591, probably in the Golconda mines in India. The inscriptions are to Neẓām Shāh Borhān II, 1591; Shāh Jahān, son of Shāh Jahāngīr, 1641; and Fatḥ ʿAlī Shāh, 1826. Given to Tsar Nicholas I by Fatḥ ʿAlī Shāh in 1829, it is displayed in the Diamond Fund of the Soviet Union in Moscow.

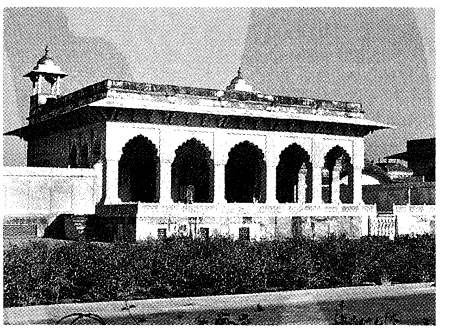
Shāh Jahān, also spelled SHĀHJAHĀN, also called (until 1628) PRINCE KHURRAM (b. Jan. 5, 1592, Lahore, India—d. Jan. 22, 1666, Āgra), Mughal emperor of India (1628–58) and builder of the Tāj Mahal.

He was the third son of Jahāngīr and a Rajput princess. Marrying in 1612 Arjūmand Bānū Baygam, niece of Jahāngīr's wife Nūr Jahān, he became, as Prince Khurram, one of the influential Nūr Jahān clique of the middle period of Jahāngīr's reign. In 1622 Shāh Jahān, ambitious to win the succession, rebelled, ineffectually roaming the empire until reconciled to Jahāngīr in 1625. After Jahāngīr's death in 1627, the support of Āṣaf Khān, Nūr Jahān's brother, enabled Shāh Jahān to proclaim himself emperor at Āgra (February 1628).

His reign was notable for successes against the Deccan states. By 1636 Ahmadnagar had been annexed and Golconda and Bijāpur forced to become tributaries. Mughal power was also temporarily extended in the northwest. In 1638 the Persian governor of Qandahār, ʿAlī Mardān Khān, surrendered that fortress to the Mughals. In 1646 Mughal forces occupied Badakhshān and Balkh. But Balkh was relinquished in 1647, and in 1649 the Persians reconquered Qandahār. In September 1657 Shāh Jahān fell ill, precipitating a struggle for succession among his four sons, Dārā Shikōh, Murād Bakhsh, Shāh Shujāʿ, and Aurangzeb. The victor, Aurangzeb, declared himself emperor in 1658 and strictly confined Shāh Jahān in the Āgra fort until his death.

Shāh Jahān is famous for his buildings, preeminently for the Tāj Mahal (*q.v.*), the tomb of Āgra of Arjumand Bānū, called Mumtāz Maḥal (mother of Aurangzeb; d. 1631), but also for his new city at Delhi, Shāhjahānābād. In religion, Shāh Jahān was a more orthodox Muslim than Jahāngīr or Akbar but a less orthodox one than Aurangzeb.

Shāh Jahān period architecture, Indian building style that flourished under the patronage of the Mughal emperor Shāh Jahān (reigned 1628–58); its crowning achievement is the magnificent mausoleum at Āgra, the Tāj Mahal (*q.v.*). The Islāmic building activity of the Shāh Jahān period is marked by a fresh emergence in India of Persian features that had been seen earlier in the tomb of Humāyūn at Delhi, begun in 1564. The use of the double dome, the recessed archway inside a rectangular fronton, the parklike surroundings, all had their first expression in the Humāyūn mausoleum and were reactivated by Shāh Jahān period builders. Symmetry and balance between the parts of a building were always stressed, while the delicacy of detail in Shāh Jahān period decorative work has seldom been surpassed. White marble was a favoured building material.



Khāṣṣ Maḥal, the private apartments of the emperor Shāh Jahān in the fort at Āgra, Uttar Pradesh, India, *c.* 1637

P. Chandra

The Tāj Mahal has won unstinting praise virtually from the time of its erection. The beauty of the structure results not only from the fine balance of its parts, which take on a new and enchanting appearance from every angle or approach, but also from the opalescent marble surface, which continually reflects subtle changes of light.

The emphasis on symmetry and balance is evident also in the second major architectural undertaking of the Shāh Jahān period, the palace-fortress at Delhi, begun in 1638. Among the notable buildings are the red sandstone-pillared Dīvān-e ʿĀmm (Hall of Public Audience) and the so-called Dīvān-e Khāṣṣ (Hall of Private Audience), which housed the famous Peacock Throne. Outside the citadel, but planned in connection with it, is the great congregational mosque, the Jāmiʿ Masjid (built 1650–56). The impressive mosque is erected on a raised foundation approached by a majestic flight of steps, with an immense courtyard in front. Also worthy of mention are the Shāh Jahān period renovations and private imperial apartments at the fort of Āgra.

Shāh-nāmeh (1010; "Book of Kings"), celebrated work of the Persian epic poet Ferdowsī, in which the Persian national epic found its final and enduring form. Written for Sultan Maḥmūd of Ghazna, the *Shāh-nāmeh* is a poem of nearly 60,000 verses, mainly based on the *Khvatay-nāmak,* a history of the kings of Persia in Pahlavi (Middle Persian) from mythical times down to the 7th century. Ferdowsī versified and updated the story to the downfall of the Sāsānid empire (mid-7th century), and for nearly 1,000 years, it has remained one of the most popular works in the Persian-speaking world.

Shāh Rokh, also called SHĀH ROKH MĪRZĀ (b. Aug. 30, 1377, Samarkand, Timurid Empire—d. March 12, 1447, Fishawand, Timurid Iran), Timurid ruler of central Asia, best known as a patron of the arts.

Shāh Rokh was the fourth son of Timur (Tamerlane), founder of the Timurid dynasty. At Timur's death in 1405, a struggle for control of his empire broke out among members of his family. Shāh Rokh gained control of most of the empire, including Iran and Turkistan, and held it until his death. The only major areas of Timur's empire outside of Shāh Rokh's control were Syria and Khuzistan.

Shāh Rokh's patronage of the arts was centred on his capital at Herāt in Khorāsān. Particularly important were the library and the school of miniature painting that developed and flourished there. One of his wives, Gawhar Shād, worked with the Persian architect Qavam ud-Din in the planning and construction of a series of magnificent public buildings.

Continuing power struggles among various members of his own family forced Shāh Rokh to undertake a number of military campaigns to ensure his power. The settlements he was able to impose were temporary, and intrafamily power struggles eventually destroyed the dynasty. *See also* Timurid dynasty.

Shāh Shojāʿ, original name SHOJĀʿ MIRZA, or SHOJĀʿ-UL-MULK, Shojāʿ also spelled SHUJĀʿ (b. 1780—d. April 1842, Kabul), shāh, or king, of Afghanistan (1803–10; 1839–42) whose alliance with the British led to his death.

Shojāʿ ascended the throne in 1803 after a long fratricidal war. In 1809 he concluded an alliance with the British against an expected Franco-Russian invasion of India but, the following year, was overthrown by his elder brother Shāh Maḥmūd and went into exile in British India. He eventually fled to Lahore, where in 1813 he attempted to obtain the assistance of the Sikh emperor Ranjit Singh by offering him the giant Koh-i-noor diamond. Ranjit Singh accepted the offer but procrastinated with his assistance, using the time instead to consolidate the Sikh Empire. Shāh Shojāʿ in 1816 left for Ludhiana and placed himself under British protection. For 23 years he engaged in a number of unsuccessful schemes to regain his throne. Finally,

in 1839, he was again placed on the throne by the British during the first Afghan War but was assassinated when the British occupation force withdrew from Kābul.

Shāh Sulṭān Husayn (Iranian ruler): *see* Ḥusayn I.

shahādah (Arabic: "testimony"), the Muslim profession of faith: "There is no god but Allah; Muḥammad is the prophet of Allah." The *shahādah* is the first of the five Pillars of Islām (*arkān al-Islām*). It must be recited by every Muslim at least once in a lifetime, aloud, correctly, and purposively, with a full understanding of its meaning and with an assent of the heart.

Shahaptin (North American Indians): *see* Sahaptin.

shaharith, also spelled SHAHARIT, SHACHARIT, or SHACHARITH, Hebrew SHAḤARIT ("dawn"), in Judaism, the first of three periods of daily prayer; the other daily services are minhah and maarib. They are all ideally recited in the synagogue so that a quorum (minyan) can be formed to pray as a corporate body representing "Israel." Shaharith is considered a substitute for the dawn sacrifice formerly offered each day in the Temple of Jerusalem, but ancient tradition credits Abraham with its institution (Genesis 22:3).

Shaharith is the most elaborate of the daily prayer services and includes at least six basic parts: (1) the morning benedictions, with biblical and rabbinic passages that serve to fulfill the minimum study of the Torah (sacred scripture) for that day; (2) a collection of biblical passages, largely from the Psalms, called "verses of song" (*pesuqe de-zimra*); (3) the Shema, the central affirmation of the unity and indivisibility of God; (4) the amidah, a series of benedictions; (5) Psalms 145 and 20 and a prayer beginning "May the Redeemer come to Zion" (*u-va le-Ẓiyyon*), which is largely made up of biblical quotations; and (6) the *'alenu* prayer, which proclaims God's choice of Israel for divine service and also proclaims the universality of God's rule over all creation.

Although these are the chief elements of shaharith, changes and variations occur. On the sabbath and on holidays and fast days, for example, there is public reading of the Torah, and on Mondays and Thursdays special penitential prayers (tahanun) are added.

shāhbandar (Malay official): *see* shabunder.

Shahdol, also spelled SAHDOL, town, northeastern Madhya Pradesh state, central India. It lies along the Murna River, about 110 miles (177 km) northwest of Bilāspur. The town is an agricultural market and is a rail and road junction. It has a government college and a law school affiliated with Awadesh Pratap Singh University. Hindu ruins situated just southeast of the town date from the 12th century.

The surrounding area consists of a portion of the former Rewa princely state and occupies the upper Son River valley between the Kaimur and Maikala ranges. Rice, millet, wheat, and sesame are the chief crops grown in the region. Pop. (1981) town, 44,342; metropolitan area, 49,631.

Shāhi FAMILY, also called SHĀHIYA, dynasty of some 60 rulers who governed the Kābul valley (in Afghanistan) and the old province of Gandhāra from the decline of the Kushān empire in the 3rd century AD. The word *Shāhi,* the title of the rulers, is related to the old Kushān form *shao,* or "king." The dynasty probably descended from the Kushāns, or Turks (Tarushkas). Nothing is recorded of the history of the long line until the last king, Lagatūrmān, who reigned at the end of the 9th century and who was thrown in prison by his minister, a Brahman named Kallar. Kallar then usurped the throne and founded a new dynasty, the Hindu Shāhi, which ruled the area at the time of Maḥmūd's invasion of India from Ghazna (modern Ghaznī, Afg.) in 1001. The Shāhis maintained a hopeless resistance against Maḥmūd's forces but fell in 1021. They were so thoroughly extinguished that 30 years later the commentator Kalhaṇa said that men wondered whether they had ever existed. The historian al-Bīrūnī also noted their disappearance and paid high tribute to their nobility of character.

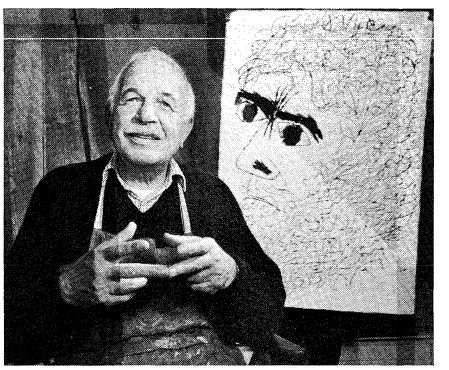
Shāhjahānpur, town, north-central, Uttar Pradesh state, northern India. It lies southeast of Bareilly, on the Deotta River, about 100 miles (160 km) northwest of Lucknow. The town was founded in 1647 and named for the Mughal emperor Shāh Jahān. It is a road and rail junction and an agricultural trade centre. Its industries include carpet weaving, distilling, sugar milling, and chemical manufacturing.

Shāhjahānpur is situated on a strip of alluvial plain extending north of the Ganges River. Crops grown in the area include rice, wheat, sugarcane, and barley. Pop. (1981) town, 185,396; metropolitan area, 205,095.

Shāhjāpur (India): *see* Shājāpur.

Shahn, Ben, byname of BENJAMIN SHAHN (b. Sept. 12, 1898, Kaunas, Russia [now in Lithuanian S.S.R.]—d. March 14, 1969, New York, N.Y., U.S.), American painter and graphic artist who used a combination of realism and abstraction in works that support various social and political causes.

Shahn emigrated with his family to New York City in 1906. In 1913–17 he was a lithographer's apprentice while attending high



Shahn, photograph by Yousuf Karsh, 1966

© Karsh from Rapho/Photo Researchers—EB Inc.

school at night. He later attended New York University, City College of New York, and the National Academy of Design in New York. Travels to Europe in 1925 and 1927 exposed him to the works of the masters.

Shahn's first major work (1931–32) was a series of paintings of the trial of the anarchists Sacco and Vanzetti. Shahn expressed his sympathy for the defendants with great emotional power and satiric bite. That series, which brought him fame, was followed in 1932–33 by another on a famous trial, this one of the labour leader Tom Mooney. In 1933 Shahn enrolled in the New York City Public Works Art Project, under which he did a series of works on the Prohibition era. From 1935 to 1938 he worked for the Farm Security Administration as an artist and photographer.

In 1938–39 Shahn and his wife, Bernarda Brysen, executed a series of panels for the lobby of the Bronx post office, New York City, a work that took the form of a geographic panorama of American life. The year 1939 was particularly fruitful for Shahn, resulting in three of his best-known pictures: "Seurat's Lunch," "Handball," and "Vacant Lot." Shahn evolved an original and distinctive use of line in his widely reproduced graphic works. Beginning in the mid-1950s, his work became more reflective and less concerned with social criticism.

Shāhpura, town, south-central Rājasthān state, northwestern India. It is a major road junction and agricultural mart. A walled town, Shāhpura was founded about 1629 and was named after the Mughal emperor Shāh Jahān, who reigned from 1628 to 1658. The town was the seat of the Rāmsanehi ("Lovers of Rāma"), a medieval sect of mendicants, and was the capital of the former princely state of Shāhpura, which became part of the state of Rājasthān in 1949. Shāhpura's industries include cotton ginning, handicraft cloth weaving and dyeing, and lacquered woodwork manufacture. The town has a college affiliated with the University of Rājasthān. Pop. (1981) 19,329.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Shahr-e Sokhta, archaeological site located south of Zābol in the Balochistān region of eastern Iran. It has yielded important information on Chalcolithic (Bronze Age) settlement in the Helmand River valley during the 3rd millennium BC. Excavation of the site in 1967 by the Centre of Archaeological Studies and Excavations of the Italian Institute for the Middle and Far East has revealed large buildings, an advanced stoneworking technique, a wide use of stamp seals, the possibility of metalworking, and a complex trade network. These discoveries indicate that the site's Chalcolithic inhabitants had a culturally advanced community with a high degree of technical specialization and a wealth of foreign contacts. Shahr-e Sokhta may have also been an important centre for the production of alabaster and sandstone vases.

Shahr Kord, city, western Iran. A developing urban centre, the city has industries producing bricks, mosaics, milled rice, woven cloth, animal feed, candy, stockings and gloves, coarse carpets and rugs, and fruit juices. A road links the city with Borūjen. It has a telegraph station, a microwave-repeater station, and a thermoelectric-power plant. Pop. (1986) 75,080.

shaikh (title): *see* sheikh.

Shailendra DYNASTY, also spelled SAILENDRA, or ÇAILENDRA, Indonesian ŚAILENDRA, or SJAILENDRA ("Lord of the Mountain"), a dynasty that flourished in Java from about 750 to 850 after the fall of the Funan kingdom of mainland Southeast Asia. The dynasty was marked by a great cultural renaissance associated with the introduction of Mahāyāna Buddhism, and it attained a high level of artistic expression in the many temples and monuments built under its rule. During the reign of one of its kings, the famous stupa of Borobuḍur (*q.v.*) was built.

Except for its legacy of monuments, little is known of the dynasty. It apparently emanated from the agricultural lowlands of interior Java but extended its real power to the northwestern coasts of the island, from which its emissaries traded with and raided the Malay peninsula and Indochina. There is a Khmer tradition of Shailendra overlordship in the latter part of the 8th century. The Shailendra dynasty was driven to Sumatra (Palembang) in the mid-9th century.

shā'ir (Arabic: "poet"), in Arabic literature, poet who in pre-Islāmic times was a tribal dignitary whose poetic utterances were deemed supernaturally inspired by such spirits as *jinn*

and shaitans. As such, his word was needed to insure the success of certain tribal activities, particularly war, grazing, and the invocation of the gods. In times of intertribal strife, the satire (*hijā'*) was the *shā'ir*'s most potent form of magic and equivalent to warfare itself.

In later times, when the supernatural associations of the *shā'ir* diminished, he became the poetic spokesman for his tribe, obliged to praise its accomplishments and abuse its enemies. His art was highly developed and respected, and the more famous poets were surrounded by *rāwī*s (reciters) who memorized their verses.

Muḥammad looked on the pre-Islāmic poets with suspicion, but, with the development of Arabic grammar and philology in the 8th century, it was their language of the desert that, once influenced by the Qur'ān, became the standard of classical Arabic literature.

shaitan, also spelled SHEITAN, Arabic SHAYṬĀN, in Islāmic myth, an unbelieving class of *jinn* ("spirits"); it is also the name of Iblīs, the devil, when he is performing demonic acts.

In the system of evil *jinn* outlined by the Arab writer al-Jāḥiẓ, the shaitans are identified simply as unbelieving *jinn.* Folklore, however, describes them as exceptionally ugly creatures, either male or female, capable of assuming human form—though their feet always remain hooves. They eat excrement and use disease as their weapon and are said to exist on the borderline between light and darkness. Indian and Syrian shaitans are described as the strongest of their class.

The exact nature of the shaitans, however, is difficult to determine. Historically, among the pre-Islāmic Arabs, they functioned as familiars, or Greek demons, providing inspiration for soothsayers and poets. In the stories of Solomon, the shaitans seem to be no more than particularly knowledgeable *jinn.* In the Qur'ān, however, they assume the role of devil, an obvious borrowing from Judaic tradition. While they are not necessarily evil, they belong to the hordes commanded by Iblīs, the devil, who is also called in Arabic *ash-Shayṭān.* He and the shaitans whisper evil suggestions into men's ears but have no real power over men. It is said that they are as close to men as their blood, but the shaitans can only tempt, and their success depends on their ingenuity. *See also* jinnī; Iblīs.

Shaivism (Hinduism): *see* Śaivism.

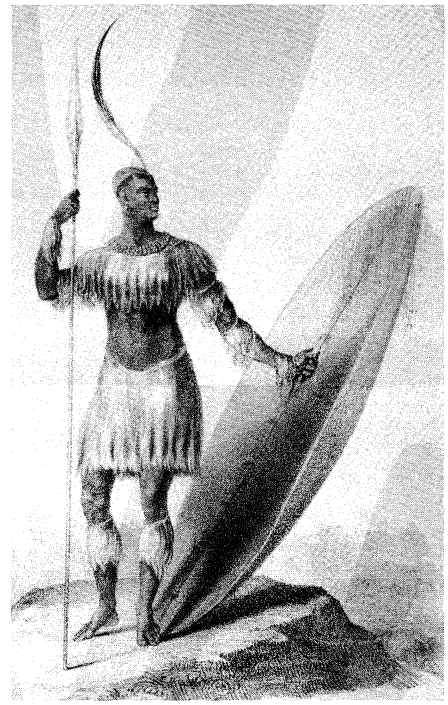
Shājāpur, also spelled SHĀHJĀPUR, town, administrative headquarters of Shājāpur district, Madhya Pradesh state, central India. The town lies just west of the Lakunda River. It was founded *c.* AD 1640 by the Mughal emperor Shāh Jahān, its name being a corruption of Shāhjahānpur. A well-preserved fort contains the palace of Tārā Bāī, a historic Marāṭhā queen. The town is a major road junction and an agricultural market; cotton ginning is the chief industry. There is a college affiliated with Vikram University. A fruit research farm is nearby.

Shājāpur district (area 2,394 sq mi [6,201 sq km]) comprises areas of the former Gwalior, Bhopāl, and Dewās princely states. It lies on the fertile Mālwa Plateau, watered by the Kāli Sindh and Newaj rivers. Cotton, millet, wheat, peanuts (groundnuts), and tobacco are the chief crops. Jaina remains are scattered throughout the district, which was transferred from Gwalior division in 1956. Pop. (1981) town, 33,969; district, 840,247.

Shaka, also spelled CHAKA, or TSHAKA (b. *c.* 1787—d. Sept. 22, 1828), Zulu chief (1816–28), founder of southern Africa's Zulu Empire, who created a fighting force that devastated the entire region.

Early life and accession. Shaka was the son of Senzangakona, chieftain of the Zulu, and Nandi, an orphaned princess of the neighbouring Langeni clan. Because his parents belonged to the same clan, their marriage violated Zulu custom, and the stigma of this extended to the child. The couple separated when Shaka was six, and Nandi took her son back to the Langeni, where he passed a fatherless boyhood among a people who despised his mother. In 1802 the Langeni drove Nandi out, and she finally found shelter with the Dletsheni, a subclan of the powerful Mtetwa. When Shaka was 23, Dingiswayo, the Mtetwa paramount chieftain, called up Shaka's Dletsheni age group for military service. For the next six years, he served with brilliance as a warrior of the Mtetwa Empire.

Senzangakona died in 1816, and Dingiswayo released Shaka from service and sent him to take over the Zulu, which, at this time, probably numbered fewer than 1,500, occupying an area on the White Umfolozi River. They were among the smallest of the more than 800 Eastern Nguni–Bantu clans, but from the day of Shaka's arrival they commenced their march to greatness. Shaka ruled with an iron hand from the outset, meting out instant death for the slightest opposition.



Shaka, lithograph by W. Bagg, 1836

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

Reorganization of the army. His first act was to reorganize the army. Like all the clans, the Zulu were armed with oxhide shields and spindly throwing spears. Battles were little more than brief and relatively bloodless clashes in which the outnumbered side prudently gave way before extensive casualties occurred. Shaka first rearmed his men with long-bladed, short-hafted stabbing assegais, which forced them to fight at close quarters. He then instituted the regimental system based on age groups, quartered at separate kraals (villages) and distinguished by uniform markings on shields and by various combinations of headdress and ornaments.

He developed standard tactics, which the Zulu used in every battle. The available regiments (known collectively as the *impi*) were divided into four groups. The strongest, termed the "chest," closed with the enemy to pin him down, while two "horns" raced out to encircle and attack the foe from behind. A reserve, known as the "loins," was seated nearby, with its back to the battle so as not to become unduly excited, and could be sent to reinforce any part of the ring if the enemy threatened to break out. The battle was supervised by *indunas,* or officers, who used hand signals to direct the regiments. An *impi* consistently covered 50 miles a day, living off grain and cattle requisitioned from the kraals it passed and accompanied by boys who carried the warriors' sleeping mats and cooking pots.

Shaka fought for extermination, incorporating the remnants of the clans he smashed into the Zulu. He first decimated the small clans in his vicinity, starting with the Langeni; he sought out the men who had made his boyhood a misery and impaled them on the sharpened stakes of their own kraal fences. In less than a year, the Zulu—and their army—had quadrupled in number. In 1817 Dingiswayo—still Shaka's overlord—was murdered, and the last restraint on Zulu expansion was removed.

Within two years, Shaka bested the only clans large enough to threaten him, the Ndwandwe and the Qwabe, and in a series of annual campaigns he then struck at and smashed the complex network of clans living to the south of the Zulu territories. By 1823 present-day Natal was a depopulated ruin of smoking kraals, and the terrified survivors had broken up tribal patterns as far away as the Cape Colony.

The Mfecane of the 1820s. Although Shaka's depredations were limited to the coastal area, they led indirectly to the Mfecane (the Crushing) that devastated the inland plateau in the early 1820s. Marauding clans, fleeing the Zulu wrath and searching for land, started a deadly game of musical chairs that broke the clan structure of the interior and left 2,000,000 dead in its wake. The Boer Great Trek of the 1830s passed through this area, succeeding only because virtually no one was left to oppose them.

The first Europeans came to Port Natal (present-day Durban) in 1824. A dozen settlers of the Farewell Trading Company established a post on the landlocked bay and soon made contact with Shaka, whose kraal Bulawayo lay 100 miles to the north. Fascinated by their ways and their artifacts, but convinced that his own civilization was much superior, he permitted them to stay. Two of the early settlers, Henry Francis Fynn and Nathanial Isaacs, became fluent Zulu linguists, and most of what is known of early Nguni history stems from their writings.

In 1827 Nandi died, and with his mother's death Shaka became openly psychotic. About 7,000 Zulus were killed in the initial paroxysm of his grief, and for a year no crops were planted, nor could milk—the basis of the Zulu diet staple—be used. All women found pregnant were slain with their husbands, as were thousands of milch cows, so that even the calves might know what it was to lose a mother.

Early in 1828 Shaka sent the *impi* south in a raid that carried the warriors clear to the borders of the Cape Colony. They had no sooner returned, expecting the usual season's rest, than he sent them off to raid far in the north. It was too much for his associates, and two of his half-brothers, Dingane and Mhlangana, together with an *induna* named Mbopa, murdered him in September of that year.

(D.R.M.)

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Shaker, member of UNITED SOCIETY OF BELIEVERS IN CHRIST'S SECOND APPEARING, celibate millenarian sect that established communal settlements in the United States. Dedicated to productive labour as well as to a life of perfection, Shaker communities flourished economically and contributed a distinctive style of architecture, furniture, and handicraft to U.S. culture.

Shakers derived originally from a small branch of radical English Quakers who had adopted the French Camisards' ritual practices of shaking, shouting, dancing, whirling, and singing in tongues. The Shaker doctrine, as it came to be known in the United States, was formulated by Ann Lee, an illiterate textile worker of Manchester, who was converted to the "Shaking Quakers" in 1758. After experiencing persecution and imprisonment for participation in noisy worship services, "Mother Ann" had a series of revelations, after which she regarded herself—and was so regarded by her followers—as the female aspect of God's dual nature and the second Incarnation of Christ. She established celibacy as a cardinal principle of the sect.

In 1774 Ann Lee came to America with eight disciples, having been charged by a new revelation to establish the millennial church in the New World. Settling in 1776 at Niskeyuna (now Watervliet), N.Y., the small group of believers benefitted from an independent revival movement that was sweeping the district and, within five years, was enlarged by several thousand converts.

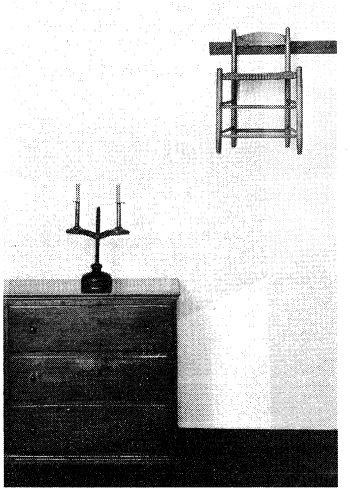
After Mother Ann's death (1784), the Shaker church came under the leadership of Elder Joseph Meacham and Eldress Lucy Wright, who together worked out the communal pattern that was to be the distinctive Shaker social organization. The first Shaker community, established at New Lebanon, N.Y., in 1787, remained the head of influence as the movement spread through New England and westward into Kentucky, Ohio, and Indiana. By 1826, 18 Shaker villages had been set up in eight states.

Although often persecuted for pacifism or for bizarre beliefs falsely attributed to them, the Shakers won admiration for their model farms and orderly, prosperous communities. Their industry and ingenuity produced numerous (usually unpatented) inventions, of which the screw propeller, Babbitt metal, a rotary harrow, an automatic spring, a turbine waterwheel, a threshing machine, the circular saw, and the common clothespin are a few. They were the first to package and market seeds and were once the largest producers of medicinal herbs. In exchanges with outsiders they were noted for their fair dealing. Shaker dances and songs are a genuine folk art, and the simple beauty, functionalism, and honest craftsmanship of their meeting houses, barns, and artifacts have had a lasting influence on American design.

The Shaker impulse reached its height during the 1840s, when about 6,000 members were enrolled in the church. It later declined, however, and by 1874 the society was advertising for members, emphasizing physical comfort as well as spiritual values. By 1905 there were only 1,000 members, and by the late 1970s only a dozen female survivors remained.

Shaker furniture, furniture designed for the religious colonies of Shakers founded in America in the last quarter of the 18th century, characterized by austerity of decoration and truth to materials. Deeply dedicated to ideals of communal living and asceticism, the Shakers designed and constructed furniture that reflected their belief that to make a thing well was in itself an act of prayer and their conviction that the appearance of a thing should follow upon its function. Each item was fashioned solely to serve its intended use, and all superfluous decorations, such as inlays and moldings, were eliminated.

Although their attitude toward design was based on religious beliefs, it anticipated in a remarkable way concepts of functionalism that became common about 100 years later. The austere Shaker chair, for example, was designed to be both sturdy and light in weight, so it could be hung on pegs installed in the walls when a room was being cleaned or to provide a large unimpeded interior space for religious services. Working in an entirely American idiom free from the European influences that affected their more ambitious contemporaries, Shaker craftsmen produced domestic furniture, usually in pine or other inexpensive local



Shaker furniture from Hancock, Mass., and New Lebanon, New York, 19th century; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York City, purchase, The Friends of the American Wing Fund, 1966

wood, marked by originality of design no less than by severity of appearance. The Shaker movement died away during the first half of the 19th century, and the colonies were dissolved. In the early 20th century there was a marked revival of interest in Shaker furniture, outstanding examples of which are to be seen in the Fruitlands Museum, Harvard, Mass., and in the Shaker Museum at Auburn, Ky.

Shaker Heights, city and southeastern residential suburb of Cleveland, Cuyahoga County, northeastern Ohio, U.S. It was planned and developed after 1900 by Oris P. and Mantis J. van Sweringen, two entrepreneurs from Buffalo, on the site of North Union, a former Shaker colony (1822–89), and was incorporated as a village in 1912. A rapid transit railroad system to downtown Cleveland has been in operation since 1920. Shaker Heights is now a restricted community of expensive homes and estates with landscaped parks and lakes (once the sites of Shaker gristmills, sawmills, and woollen mills). The Shaker Nature Center includes self-guided trails. Inc. city, 1931. Pop. (1980) 32,487.

Shakespeare, William, Shakespeare also spelled SHAKSPERE, byname BARD OF AVON, or SWAN OF AVON (baptized April 26, 1564, Stratford-upon-Avon, Warwickshire, Eng.—d. April 23, 1616, Stratford-upon-Avon), English poet, dramatist, and actor, often called the English national poet and considered by many to be the greatest dramatist of all time. His plays, written in the late 16th and early 17th centuries for a small repertory theatre, are today performed more often and in more countries than those of any other playwright.

A brief account of the life and works of William Shakespeare follows; for a full biography, *see* MACROPAEDIA: Shakespeare.

Shakespeare's early life was spent in Stratford-upon-Avon, where he almost certainly attended the local grammar school. At 18 he married a local girl, Anne Hathaway, who bore him a daughter, Susanna, and twins, Hamnet and Judith. By 1584 he had emerged as a rising playwright in London. He continued to live there, enjoying fame and prosperity as a member of London's leading theatre company, the Lord Chamberlain's Company (afterward known as the King's Men). In about 1610 he retired to his birthplace and lived as a country gentleman. His will was made in March 1616, a few months before his death. He was buried in the parish church at Stratford.

It is not known with certainty the exact order in which Shakespeare's plays were written or first produced. His earliest plays date from the 1590s, and include such comedies as *The Taming of the Shrew* (1593/94) and *Love's Labour's Lost* (1594/95); history plays based on the lives of the English kings, including *1 Henry VI* (1589/92) and *Richard III* (1592/93); and the early tragedy *Romeo and Juliet* (1594/95). These early works are influenced by prevailing contemporary dramatic conventions and artifices, but are also marked by vivid characterizations and an unprecedentedly rich and inventive use of the English language. The early plays contain ingenious puns and elaborate wordplay that lend an air of realism and immediacy to Shakespeare's somewhat artificial but carefully structured plots.

Shakespeare's plays written before the turn of the century comprise mostly comedies, including *The Merchant of Venice* (1596/97) and *Much Ado About Nothing* (1598/99), and histories such as *1 Henry IV* (1598/99) and *Julius Caesar* (1599/1600), which was the first of several plays based on the lives of figures from ancient Rome. The comedies take the mishaps of romantic courtship as their characteristic theme. The foibles of circumstance and of the would-be lovers' own characters provide the mainspring for the dramatic action. The history plays centre around struggles between individuals for supreme power in the state, and interweave the presentation of real historical events with Shakespeare's own increasingly subtle and complex dramatic characters.

In the early years of the 17th century Shakespeare produced his great tragedies, which mark both the summit of his art and one of the high points in the history of Western literature. The four principal tragedies are *Hamlet* (1600/01), *Othello* (1604/05), *King Lear* (1605/06), and *Macbeth* (1605/06). These plays examine with great psychological subtlety how personality flaws in the main characters lead almost inevitably to the tragic destruction of themselves and almost everyone around them. However, such faults as overintellectual detachment and indecision (*Hamlet*), unwarranted jealousy (*Othello*), childish willfulness and impulsiveness (*King Lear*), and vaulting, unscrupulous ambition (*Macbeth*) serve also as vehicles for profound and searching explorations of human character, morality, and spirit. These tragedies are further strengthened by complex, perfectly structured plots, and are enriched by a quality of language that is at once deeply poetical and emotionally expressive while conveying mature philosophical ideas.

Shakespeare's last plays combine elements of romance, comedy, and tragedy. *The Winter's Tale* (1610/11) and *The Tempest* (1611/12) are clearly experimental in their light-hearted and fanciful but basically tragic form. The plays differ from Shakespeare's earlier works in their resolution of the dramatic conflict through penitence and forgiveness, and in their emphasis on hope through mutual recon-

ciliation. The first collected edition of Shakespeare's plays, known as the First Folio, was printed in 1623 and contained all but one of his extant plays.

Shakespeare's sonnets were published in 1609. The dates of their composition are not known. The 154 sonnets refer cryptically to the author's relations with various persons—particularly a handsome young man, a dark woman, and a rival poet—whose identity, if they were real, remains the object of speculation. The sonnets are characterized by the expression of strong feeling within an exquisitely controlled artistic form.

Shakespeare also wrote two heroic narrative poems, *Venus and Adonis* (1593) and *The Rape of Lucrece* (1594), which is based on Ovid's *Metamorphoses* and *Fasti.* His 67-line elegy "The Phoenix and the Turtle" was published in Robert Chester's *Loves Martyr* (1601).

Shakhlin, Boris Anfiyanovich (b. Jan. 27, 1932, Ishim, Russian S.F.S.R.), Soviet gymnast who set a career record of 10 individual titles in the world championships and who also won gold medals at three successive Olympic Games.

Shakhlin graduated first from the Sverdlovsk Physical Training Technical College and was specially trained by A.S. Mishanov in Kiev. He then graduated from the Kiev Institute of Physical Culture in 1955. Shakhlin first competed internationally at the 1954 world gymnastic championships, winning the silver medal on the horizontal bar. In the 1956 Olympic Games at Melbourne, he won gold medals for the pommel horse and as a team member in the combined exercises. In the 1960 Olympic Games at Rome, he won a total of 7 medals, including the gold medal again for the pommel horse and also gold medals for the parallel bars, the vault, and individual combined exercises, as well as a silver medal for the rings and for the combined team exercises and a bronze medal for the horizontal bar. In the 1964 Olympic Games at Tokyo, he won the gold medal for the horizontal bar, silver medals for individual all-around exercises and as a member of his team, and a bronze medal for the rings.

Upon his retirement in 1966 Shakhlin had won 10 individual and 3 team titles in the world championships in a 12-year career and had won more gold medals than any other athlete in Olympic and world-championship competition. Shakhlin was an international judge from 1968 and vice president of the Technical Committee of the International Federation of Gymnastics. He was a member of the Communist Party from 1964 and was awarded the Order of Lenin.

Shakhty, also spelled ŠACHTY, formerly (until 1920) ALEKSANDROVSK-GRUSHEVSKY, city, Rostov *oblast* (province), western Russian Soviet Federated Socialist Republic. It lies along the upper Grushevka River, 47 miles (75 km) northeast of Rostov-na-Donu. Shakhty developed in the early 19th century as a coal-mining centre and became a city in 1881. It is now the main city of the eastern end of the Donets Coal Basin and is surrounded by many pits and their smouldering waste heaps. (The city's name means "pits" in Russian.) The coal is of high quality, and production is about 85 percent anthracite; coking coal is also mined.

In the southern suburb of Kamenolomni there are stone quarries. Among Shakhty's other industries are iron casting, canning, brewing, and footwear and clothing manufacture. The city also has a polytechnic institute. Pop. (1986 est.) 223,000.

Shakhtyorsk, also spelled SHAKHTIORSK, or ŠACHT'ORSK, formerly (until 1953) KATYK, city, Donetsk *oblast* (province), Ukrainian Soviet Socialist Republic. Shakhtyorsk is a mining town on the Donets Coal Basin and has mines that produce high-quality anthracite coal. The town also has enriching plants and produces building materials. Inc. 1953. Pop. (1986 est.) 72,000.

Shaki, formerly SAKI, town, Oyo State, western Nigeria. It lies near the source of the Ofiki River (the chief tributary of the Ogun River), about 40 miles (60 km) from the Benin border. Originally part of the Oyo Empire, Shaki became a Yoruba refugee settlement after the destruction in 1835 of Old Oyo (Katunga), 70 miles (113 km) east-northeast, by Muslim Fulani conquerors. By the early 1860s the Yoruba Mission had established an Anglican church in the town.

Modern Shaki is an exporter of cotton, swamp rice, teak, and tobacco. The flue curing of tobacco, which is sent to the cigarette factory at Ibadan, 98 miles (158 km) southeast, has been important in the area since 1940. Swamp rice was first grown there by an experimental station in 1945. Indigo is grown in the area for local dyeing, and the town is a traditional centre of cotton weaving. Yams, cassava, corn (maize), sorghum, beans, shea nuts, and okra are grown for subsistence. Cattle raising is increasing in importance, and there is a government livestock station. Shaki has a government hospital. A 1,600-foot (488-metre) inselberg (isolated hill) rises above the surrounding savanna. Pop. (1983 est.) 125,-800.

shaking palsy: *see* Parkinson's disease.

Shakkū (Buddhist reformer): *see* Shinran.

Shakspere, William: *see* Shakespeare, William.

Shaktism, also spelled ŚĀKTISM, worship of the Hindu supreme goddess, Shakti (Sanskrit: "power," or "energy"). Shaktism is, together with Vaiṣṇavism and Śaivism, one of the major forms of modern Hinduism and is especially popular in Bengal and Assam. Shakti is conceived of either as the paramount goddess, or as the consort of a male deity, generally Śiva.

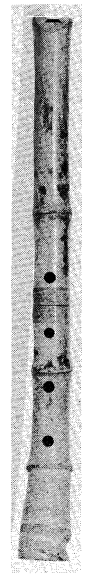
People of spiritual disposition worship Shakti as the divine will, the divine mother who calls for absolute surrender. Yogis consider Shakti as the power, lying dormant within the body as a coiled serpent (*kuṇḍalinī*), that must be aroused and realized to reach liberation. Shaktism is inseparably related to Tantric Hinduism (*q.v.*), a system of practices for the purification of both mind and body.

In popular worship the goddess Shakti is known by many names; some authorities consider most female deities in Hinduism to be her different manifestations. She may be referred to simply as Devī (goddess). In her beneficent aspect she is known variously as Umā, Pārvatī, and Ambikā. In her fierce, destructive aspect she is represented as the black Kālī, the demon-destroying Durgā, and the goddess of smallpox, Śītalā. The goddess is also worshiped as the gracious Lakṣmī, who is the consort of Vishnu.

Consult the INDEX *first*

shakuhachi, a Japanese end-blown bamboo flute that was originally derived from the earlier Chinese *hsiao.* The *shakuhachi*'s blowing end is cut obliquely outward, and a small piece of ivory or bone is inserted at the edge so that subtle varieties of tone colour can be produced. The bell (flared end) consists of the trunk of the bamboo plant with its root ends. The body is naturally or artificially bent above the bell for aesthetic reasons.

The instrument's name is derived from its original length—one shaku (11.93 inches [30.3 cm]) and eight (Japanese *hachi*) *sun* (1.2 inches [3 cm])—but it actually comes in many



Shakuhachi
K.B.S. Photo

lengths. Normally it has four finger holes plus a thumbhole. Its repertoire is solo and chamber music.

shale, any of a group of fine-grained, laminated sedimentary rocks consisting of silt- and clay-size particles. Shale is the most abundant of the sedimentary rocks, accounting for roughly 70 percent of this rock type in the crust of the Earth.

A brief treatment of shales follows. For full treatment, *see* MACROPAEDIA: Minerals and Rocks.

Shales are often found with layers of sandstone or limestone. They typically form in environments where muds, silts, and other sediments were deposited by gentle transporting currents and became compacted, as, for example, the deep-ocean floor, basins of shallow seas, river floodplains, and playas. Most shales occur in extensive sheets several metres thick, though some develop in lenticular formations.

Shales characteristically consist of at least 30 percent clay minerals and substantial amounts of quartz. They also contain smaller quantities of carbonates, feldspars, iron oxides, fossils, and organic matter. Some organic-rich shales, called oil shales, contain kerogen (a chemically complex mixture of solid hydrocarbons derived from plant and animal matter) in large enough quantities to yield oil when subjected to intense heat.

Shales typically have a laminated structure and are fissile—*i.e.,* they exhibit a tendency to split into thin layers that are usually parallel to the bedding plane surface. Such physical properties as permeability and plasticity are largely dependent on the grain sizes of the constituent minerals. Shales' colour is determined primarily by composition. In general, the higher the organic content of a shale, the darker its colour. The presence of hematite and limonite (hydrated ferric oxide) gives rise to reddish and purple colouring, while mineral components rich in ferrous iron impart blue, green, and black hues. Calcareous shales (those having a large percentage of calcite), on the other hand, are light gray or yellowish.

Shales are commercially important, having many applications in the ceramics industry in particular. They are a valuable raw material for tile, brick, and pottery and constitute a major source of alumina for Portland cement. In addition, advances in recovery methods

may one day make oil shale a practical source for liquid petroleum.

shale oil, petroleum extracted from oil shale by means of destructive distillation. This process breaks down a waxy organic matter called kerogen that is contained in the shale and thereby releases oil, gas, water, and residual carbon. The oil obtained from oil shale cannot be refined by the methods that have been developed for crude oil, however, because shale oil is deficient in hydrogen and contains excessive amounts of nitrogen and sulfur compounds. To render shale oil usable, it must be hydrogenated and then chemically treated to remove the nitrogen and sulfur impurities.

Shale-oil extraction processes were first patented in 1694 in Great Britain, but no commercial plants were built until 1838 in France and 1850 in Scotland. Shale oil recovery operations were conducted on a limited scale in Australia, Brazil, and the United States during the 19th century, and in China, Estonia, New Zealand, South Africa, Spain, Sweden, and Switzerland in the early 20th century. By mid-century, however, shale oil output declined sharply because of high processing costs and the discovery of large supplies of easily accessible crude oil. But rises in the price of crude oil in the 1970s stimulated renewed interest in shale oil. Ways of improving recovery methods are being developed in an effort to make shale oil competitive in price with crude oil.

Under present technology shale oil is recovered by either of two processes. One involves mining and crushing oil shale, and then transporting the rock to a processing plant where it is heated in special retorts to temperatures of about 500° C (932° F). The intense heat releases oil vapours from the rock, which liquefy in a series of condensers. The other process involves in situ extraction. In this technique an oil shale deposit is fractured with explosives, after which a mixture of gas and air is pumped into the deposit and ignited to heat the rock. The ensuing pyrolysis of the shale produces oil vapours which, upon condensing, are pumped out much like crude oil.

Shalik (king of Egypt): *see* Salitis.

shallot (*Allium ascalonicum*), mildly aromatic herb of the lily family (Liliaceae) or its bulbs, which are used like onions to flavour foods, particularly meats and sauces. The shallot is a hardy, bulbous perennial that is closely related



Shallot (*Allium ascalonicum*)
Walter Chandoha

to onion and garlic and is probably of Asiatic origin. Its leaves are short, small, cylindrical, and hollow. The flowers are lavender or red, in a compact umbel. The bulbs are small, elongated, and angular and develop in clusters on a common base, much like the garlic plant. The bulbs are less than 2 inches (5 cm) long and about 1 inch (2.5 cm) in diameter; they are mild in flavour. The plant's leaves are also sometimes eaten when green. Shallots are planted early in spring and grow in any good garden soil; the bulbs are harvested in the autumn. The so-called shallot that is marketed extensively as green spring onions is in fact a form of onion.

Shalmaneser, Assyrian SHULMANU-ASHARIDU ("Shulman Is Chief"), name of Assyrian kings grouped below chronologically and indicated by the symbol •.

• **Shalmaneser I** (fl. 13th century BC), king of Assyria (reigned 1274–45 BC) who significantly extended Assyrian hegemony.

While the Hittites warred with Egypt, Shalmaneser invaded Cappadocia (in eastern Asia Minor) and founded an Assyrian colony at Luha. By the defeat of Shattuara of Hani and his Hittite allies and by raids on Carchemish, Irridi, and the Kashiari Hills (all in the region around the borders of northern Iraq, northeastern Syria, and southeastern Turkey), Shalmaneser reopened Assyria's main northwestern trade routes. At his capital, Ashur, he built a palace and restored one of the temples. His buildings at Nineveh and at Calah (modern Nimrūd), the latter of which he founded, have been partially excavated.

• **Shalmaneser III** (fl. 9th century BC), king of Assyria (reigned 858–824 BC) who pursued a vigorous policy of military expansion.

Although he conducted campaigns on the southern and eastern frontiers, Shalmaneser's main military effort was devoted to the conquest of North Syria. His progress was slow. In 853 BC he fought a coalition formed by the kings of Hamath, Damascus, and Israel in a huge-scale but indecisive battle, and he did not penetrate the west until the coalition had broken up.

In 841 BC he defeated Hazael and, after failing to capture Damascus itself, marched to the Mediterranean coast where he received tribute from Tyre, Sidon, and Samaria. The submission of the latter is shown on the "Black Obelisk" (from Nimrūd, now in the British Museum) where "Jehu, son of Omri" bows before Shalmaneser. By 832 Cilicia had been invaded, Tarsus captured, and the region made an Assyrian dependency. The remaining campaigns of Shalmaneser's reign were led by Shalmaneser's army commander against Sardur I and the Mannai. Before the king died in 824 BC, civil war broke out between a son, Ashur-danin-apal, and his heir, Shamshi-Adad V. Shalmaneser rebuilt a palace and ziggurat at Nimrūd. His wars were commemorated both on palace reliefs there and on the gates of the temple at Balawat.

• **Shalmaneser V** (fl. 8th century BC), king of Assyria (reigned 726–721 BC) who subjugated ancient Israel and undertook a punitive campaign to quell the rebellion of Israel's king Hoshea (II Kings 17).

None of his historical records survive, but the King List of Babylon, where he ruled as Ululai, links him with Tiglath-pileser III, whose son he may have been. When King Hoshea of Israel rebelled (II Kings 17), Shalmaneser marched via Bit-Adini to besiege Samaria and attack Tyre. For three years he laid siege until "he broke the resistance of Shamara'in" (Samaria). However, he died shortly before the capture of the city, which was claimed by his successor, Sargon II.

Shalom Aleichem: *see* Sholem Aleichem.

Shalosh Regelim (Judaism): *see* Pilgrim Festivals.

shama, any of certain magpie-robin species. *See* magpie-robin.

shamal, hot and dry, dusty wind from the north or northwest in Iraq, Iran, and the Arabian Peninsula. In June and July it blows almost continuously, but usually under 50 kilometres (about 30 miles) per hour. The wind causes great dust storms, especially in July, when Baghdad may experience five or more such storms. The shamal is part of a widespread flow toward a low-pressure centre over Pakistan.

shaman (from Tunguso-Manchurian *šaman,* "he who knows"), in the religious systems of Siberian and Ural-Altaic peoples and in certain analogous systems of other peoples worldwide, believed to have the power to heal the sick and to communicate with the world beyond.

A brief treatment of the shaman follows. For full treatment, *see* MACROPAEDIA: Sacred Offices and Orders: *Shamanism.*

Although the most complete expression of shamanism is found in the societies of the Arctic and Central Asian regions, the phenomenon is not limited to those areas. It is encountered, for example, among cultures in Southeast Asia and Oceania and among many North American aboriginal groups. A distinction should be made, however, between the religions dominated by a shamanistic ideology and shamanistic techniques (as is the case with Siberian and Indonesian religions) and those in which shamanism constitutes a supplementary phenomenon (for example, African religions).

The shaman is medicine man, priest, and psychopomp; that is to say, he cures sicknesses, directs communal sacrifices, and escorts the souls of the dead to the other world. He is able to do all this by virtue of his techniques of ecstasy, *i.e.,* by his power to leave his body at will during a trancelike state. In Siberia and in northeastern Asia a person becomes a shaman by hereditary transmission of the shamanistic profession or by "election." More rarely a person can become a shaman by his own decision or upon the request of the clan, but self-made shamans are regarded as weaker than those who inherit the profession or who are elected by a supernatural agency. In North America, on the other hand, the voluntary "quest" for shamanistic powers constitutes the principal method of selection. No matter how the selection takes place, a shaman is recognized as such only after a series of initiatory trials and the receipt of instructions from qualified masters.

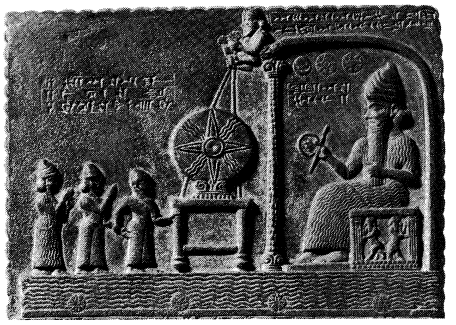
The most important function of the shaman in all cultures is healing. Since sickness is thought of as a loss of the soul, the shaman must determine first whether the soul of the sick individual has strayed from the body or has been stolen by demons and is imprisoned in the other world. In the former case the shaman captures the soul and reintegrates it in the body of the sick person. The latter case necessitates a descent to the netherworld, and this is a complicated and dangerous enterprise. Equally stirring is the voyage of the shaman to the other world to escort the soul of the deceased to its new abode; the shaman narrates to those present all the vicissitudes of the voyage as it goes on.

As a rule the shaman has several auxiliary spirits at his disposal, but he is not possessed by them. The spirits help him to find the soul of the sick person, and sometimes they accompany him in his ecstatic voyages. In certain regions the shaman ultimately becomes possessed by his auxiliary spirits, and he becomes their mouthpiece; but the possession is a secondary phenomenon found especially in those regions where shamanism is mingled with other magical and religious conceptions and techniques.

Shamanism is the mystical experience that is characteristic of primitive religions. The "flight" of the shaman to heaven during initiation or ritual sacrifice can be regarded as the most ancient expression of mystical experience known to mankind. But the shaman

is not only a mystic. He is just as much the guardian (and largely the creator) of the traditional lore of the tribe. The narrations of his adventurous descents to the netherworld and of his ascents to heaven constitute the material of popular epic poetry among many groups.

Shamash (Akkadian), Sumerian UTU, in Mesopotamian religion, the god of the sun, who, together with the moon god, Sin (Sumerian: Nanna), and Ishtar (Sumerian: Inanna), the goddess of Venus, formed an astral triad of divinities. Shamash was the son of Sin.



Shamash, seated in his temple and facing his emblem (the solar disk), and worshipers, bas-relief from Sippar, about 870 BC; in the British Museum

By courtesy of the trustees of the British Museum

Shamash, as the solar deity, exercised the power of light over darkness and evil. In this capacity he became known as the god of justice and equity and was the judge of both gods and men. (According to legend, the Babylonian king Hammurabi received his code of laws from Shamash.) At night, Shamash became judge of the underworld.

Shamash was not only the god of justice but also governor of the whole universe; in this aspect he was pictured seated on a throne, holding in his hand the symbols of justice and righteousness, a staff and a ring. Also associated with Shamash is the notched dagger. The god is often pictured with a disk that symbolized the Sun.

As the god of the sun, Shamash was the heroic conqueror of night and death who swept across the heavens on horseback or, in some representations, in a boat or chariot. He bestowed light and life. Because he was of a heroic and completely ethical character, he only rarely figured in mythology, where the gods behaved all too often like mortals. The chief centres of his cult were situated at Larsa in Sumer and at Sippar in Akkad. Shamash's consort was Aya, who was later absorbed by Ishtar.

shamash (Judaism): *see* shammash.

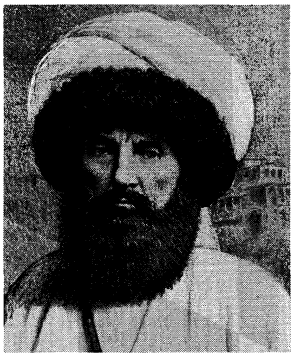
Shamash-shum-ukin (fl. 7th century BC), crown prince of Babylon, son of Esarhaddon and brother of Ashurbanipal, the last of the great kings of Assyria. He led a coalition of Arabic tribes against Ashurbanipal, but, after being starved out by his brother's siege of Babylon (684 BC), he capitulated. According to tradition, Shamash-shum-ukin committed suicide by making a pyre of his palace, treasury, and concubines.

Shāmil, also spelled SHĀMYL, SCHĀMIL, or SCHĀMYL (b. 1797?, Gimry, Dagestan [now Dagestan A.S.S.R.]—d. March 1871, Medina?, Arabia), leader of Muslim Dagestan and Chechen mountaineers, whose fierce resistance delayed Russia's conquest of the Caucasus for 25 years.

The son of a free landlord, Shāmil studied grammar, logic, rhetoric, and Arabic, acquired prestige as a learned man, and in 1830 joined the Murīdīs, a Ṣūfī (Islāmic mystical) brotherhood. Under the leadership of Ghāzī Muḥammad, the brotherhood had become involved in a holy war against the Russians, who had formally acquired control of Dagestan from Iran in 1813. After Ghāzī Muḥammad was killed by the Russians (1832) and his successor, Gamzat Bek, was assassinated by his own followers (1834), Shāmil was elected to serve as the third imam (political-religious leader) of Dagestan.

Establishing an independent state in Dagestan (1834), Shāmil reorganized and enlarged his Chechen and Dagestan forces and led them in extensive raids against the Russian positions in the Caucasus region. The Russians sent a fresh expedition against Shāmil in 1838; although it captured Ahulgo, the mountaineers' main stronghold, Shāmil escaped. Neither that nor subsequent expeditions were able to defeat Shāmil, despite their successful penetration into his territory and their conquests of his forts and towns.

In 1857 the Russians determined to suppress Shāmil, whose reputation had spread throughout western Europe and whose exploits had become legendary among his own people. Sending large, well-equipped forces under generals N.I. Evdokimov and A.I. Baryatinsky, they started operations from all sides; their military successes, coupled with the increasing exhaustion of Shāmil's followers, resulted in the surrender of many villages and tribes to the Russians. After the invaders successfully stormed Shāmil's fortress at Vedeno (April 1859), he and several hundred of his adherents withdrew to Mount Gunib. On Sept. 6 (Aug. 25, Old Style), 1859, Shāmil, recognizing the futility of continuing to fight the overwhelming Russian armies that surrounded him, finally surrendered and effectively ended the resistance of the Caucasian peoples to Russian subjugation. Shāmil was taken to St. Petersburg and then was exiled to Kaluga, south of Moscow. With permission from the Russian tsar, he made a pilgrimage to Mecca in 1870.



Shāmil, detail of a lithograph by V.F. Timm, 1859

Novosti Press Agency

Shamir, Yitzḥak, original name YITZḤAK JAZERNICKI, also spelled YEZERNITZKY, YIZERNITSKY, or YSERNITZKY (b. Oct. 15, 1915, Ruzinoy, Pol., Russian Empire), Polish-born Zionist leader and prime minister of Israel in 1983–84 and 1986–90 (in alliance with Shimon Peres of the Labour Party) and from 1990.

Shamir joined the Beitar Zionist youth movement as a young man and studied law in Warsaw. He emigrated to Palestine in 1935 and enrolled as a student at the Hebrew University in Jerusalem. There he joined the Irgun Zvai Leumi (IZL) underground movement; and in 1940, following a split in the IZL on questions of policy, he joined the Israel Freedom Fighters (IFF), a terrorist group later known as the Stern Gang (after its founder, Abraham Stern).

Following the death of Stern, Shamir played a central part in reorganizing the Sternist Central Committee. Shamir was arrested by the British-mandate authorities in 1941 and 1946. After his second escape from internment, he made his way to France, where he was granted asylum. He returned to Israel in May 1948 and then served as a Mossad secret-service operative in Europe until 1965. After engaging in private commerce for a time, he joined Menachem Begin's Herut movement, which in 1973 joined with other smaller parties to form the Likud. In March 1975 Shamir was elected chairman of the party executive of Herut. First elected to the Knesset (Israeli parliament) in 1973, he became speaker of the Knesset after the Likud's electoral victory in 1977.

Prime Minister Begin appointed Shamir to be Israel's minister of foreign affairs in March 1980. In September 1983 the Likud Party elected Shamir to succeed the retiring Begin as its new leader, but he lost the prime ministry in the indecisive elections of July 1984. In September 1984 Shamir, the Likud hardliner, and Shimon Peres, head of the Labour Party, formed a makeshift coalition government in which Peres served as prime minister for the first half of a 50-month term and Shamir served as deputy prime minister and foreign minister; the roles were reversed for the second 25 months, and Shamir thus assumed the office of prime minister in October 1986. After similarly indecisive elections in 1988, the Likud and Labour parties formed another coalition government, with Shamir as prime minister. In 1990, after his government fell, Shamir eventually succeeded in forming his own coalition government (without Labour), including several representatives of ultraconservative groups.

shamisen (musical instrument): *see* samisen.

Shammai HA-ZAKEN ("the Elder"), (b. *c.* 50 BCE—d. *c.* 30 CE), one of the leading Jewish sages of Palestine in his time. With the sage Hillel, he was the last of the *zugot* ("pairs"), the scholars that headed the Great Sanhedrin, the Jewish high court and executive body.

Little is known about Shammai's life. He became *av-bet-din* ("presiding justice") of the Great Sanhedrin during the time that Hillel was nasi (president). Like Hillel, he was a member of the Pharisees, a scholarly religious party with popular backing (as opposed to the Sadducees, a group of priestly aristocrats). Shammai is best remembered for the school, Bet Shammai ("House of Shammai"), that he founded. His school, which advocated a strict, literal interpretation of Jewish law, competed with that of Hillel (Bet Hillel), which advocated more flexible interpretations. Shammai is cited in the Talmud and its commentaries in such a way as to emphasize his austere views. Bet Shammai opposed the Bet Hillel "principle of intention," which holds that the legal consequences of a man's act must be partly based on his intention.

The two schools lasted until the second century AD. Bet Shammai encouraged the Zealots, a Jewish sect that fought Roman rule. For a time, the strict interpretations of Bet Shammai found more favour within the Jewish community than did those of Bet Hillel. In AD 90, however, an assembly that met in Jabneh (an ancient biblical city near the site of the Israeli settlement of Yibna) ruled that the views of Bet Hillel were authoritative.

shammash, also spelled SHAMASH, or SHAMMAS (Hebrew: "servant"), plural SHAMMASHIM, SHAMASHIM, or SHAMMASIM, salaried sexton in a Jewish synagogue whose duties now generally include secretarial work and assistance to the cantor, or hazan, who directs the public service.

The ninth light of the candelabrum (menorah) used on Ḥanukka is also called shammash, because its flame is used to light the other candles.

Shamokin, city, Northumberland county, east-central Pennsylvania, U.S. It lies along Shamokin Creek. Founded in 1835 by the coal speculators John C. Boyd and Ziba Bird, it was early known as Boyd's Stone-Coal Quarry, Boydtown, and New Town. The present name, selected by Boyd, is a derivation of an Indian word meaning "place of horns." Shamokin developed as an anthracite coal-mining centre, reaching its peak after the 1840s. It suffered extensive fire damage in 1872. Following the decline of the coal industry, the city's economy diversified to include the manufacture of textiles, shoes, kitchen cabinets, and cellulose products. Pop. (1986 est.) 9,850.

shamrock, any of several similar-appearing trifoliate plants—*i.e.,* plants each of whose leaves is divided into three leaflets. Plants called shamrock include the wood sorrel (*Oxalis acetosella*) of the family Oxalidaceae, or any of various plants of the pea family (Fabaceae), including white clover (*Trifolium repens*), suckling clover (*T. dubium*), and black medic (*Medicago lupulina*). According to Irish legend, St. Patrick, patron saint of Ireland, first chose the shamrock as a symbol of the Trinity of the Christian church because of its three leaflets bound by a common stalk. Wood sorrel is shipped from Ireland to other countries in great quantity for St. Patrick's Day.

The shamrock pea (*Parochetus communis*), a creeping legume with bicoloured blue and pink flowers, is grown in pots and in hanging baskets.

Shams-ud-Dīn Iltutmish: *see* Iltutmish.

Shamva, town, northeastern Zimbabwe. It was originally called Abercorn, and its present name was derived from a Shona word meaning "to become friendly." Located at the site of a sandstone reef that once yielded large quantities of gold, the town is overshadowed by giant mine dumps at the foot of Shamva Mountain, which is conspicuous because of the huge gash running almost through it. Shamva was the scene of what was probably the first strike (1927) by African workers in what was then Rhodesia. The town serves as a local market centre, and, after the discovery of a large nickel deposit, mining again became significant. Pop. (1982) 28,002.

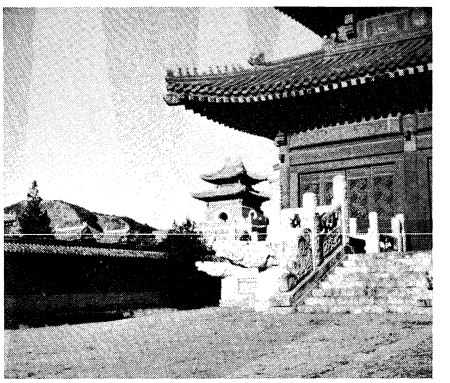
Shāmyl (Caucasian leader): *see* Shāmil.

Shan, a Tai (*q.v.*) people who live primarily in eastern and, to a lesser extent, northern Myanmar (Burma). The Shan are the second largest minority group in Myanmar, making up nearly one-tenth of the nation's total population. In the late 20th century they numbered about 3,000,000. Their language, Shan, belongs to the Tai linguistic group, and the Shan are thus linguistically related to the Thai people of Thailand and to the Lao of Laos. Most Shan, however, with the exception of those living in the relatively isolated easternmost strip of Myanmar, are closer culturally to the Burman people.

The Shan are Theravada Buddhists and have their own written language and literature. The area where most of them live, the Shan Plateau, is seamed by low mountains and masses of broken, forested hills. Although much of their territory thus consists of uplands, the Shan live primarily in the valleys and stretches of plain between the uplands. The surrounding hill country is occupied by aboriginal tribes who live in economic symbiosis with the Shan. The Shan economy is based almost entirely on rice farming where irrigation is available. Shifting (slash-and-burn) cultivation is practiced otherwise, and this has resulted in considerable deforestation. The Shan carried on a considerable trade for centuries with the Burman who live to the west in the Irrawaddy River valley and with the Chinese to the north in Yunnan. Shan society was traditionally divided into a class of farmer commoners and a hereditary nobility who furnished both local chiefs and the ruling head of the Shan state.

The Shan are extremely conscious of their ethnic identity. The Shan dominated much of Myanmar from the 13th to the 16th century. After their power declined, there were more than 30 small Shan states, most of which paid tribute to the Myanmar kings; under the British the Shan states were ruled by hereditary chiefs, subject to the crown. In 1922 most of the states joined the Federated Shan state, which had considerable local autonomy. Like the other states in Myanmar, however, Shan state lost much of its autonomy under the constitution of 1974. Since then the Shans have frequently been at odds with the Myanmar government over the issue of local autonomy. Several armed Shan separatist groups were formed in the 1960s, although by the late 20th century their principal interest had apparently become the illegal production and export of opium from areas near the border with Thailand, an area that is sometimes called the Golden Triangle.

Shan-hai-kuan, Pinyin SHANHAIGUAN, town in eastern Hopeh *sheng* (province), China, on the coast of the Gulf of Chihli (Po Hai). Now a place of minor importance, Shan-hai-kuan until the 17th century was a strategic place



The Eastern Mausoleum, tomb of the Manchu empress Tz'u-hsi, near Shan-hai-kuan, China
Julian Schuman

that played a major role in the defense of the Peking area from the northeastern approach. Shan-hai-kuan ("Pass Between the Mountains and the Sea") was the place at which the route from Peking into Manchuria (now known as the Northeast) passed through a narrow defile along the coast and where, at the same time, the Great Wall of China reached the coast.

The town was known from the 6th century on as Lin-yü-kuan, and, after the conquest of the northeastern part of Hopeh by the Khitan in the early 10th century, it became a *xian* (county) called Ch'ien-min Hsien, a name it retained until the 13th century. The name Shan-hai-kuan was first given it under the Ming dynasty (1368–1644). During the Manchu conquest at the end of Ming times, Shan-hai-kuan prevented the Manchu armies from overrunning the Peking area; and its capture by the Manchus in 1644 began the final Ming collapse. In 1737 it became a county seat (Lin-yü Hsien); but it lost this status in the 20th century, when the rise of nearby Ch'in-huang-tao took away much of its importance, while the Manchurian trade, which had previously passed through Shan-hai-kuan to Peking, was diverted to Dairen (now Talien), in Liaoning province. Shan-hai-kuan's capture by Japanese forces operating in southern Manchuria (January 1932) placed that entire region under Japanese control and helped set the strategic stage for the establishment of the Japanese-sponsored puppet regime of Manchukuo. Pop. (mid-1970s est.) fewer than 10,000.

Shan language, language spoken in the northern and eastern states of Myanmar (Burma) and belonging to the Southwestern group of the Tai language family of Southeast Asia. It is spoken by the Shan people. Like the other Tai languages, Shan is largely monosyllabic in word form and makes use of tones to distinguish between otherwise identically pronounced words. Although closely related to Thai (Siamese) and Lao (Laotian), Shan differs from them in being more strictly monosyllabic and in borrowing many words from Burmese. Shan is written in an alphabet derived from the Burmese writing system. This alphabet, with its lack of both vowel and tone markers, was inadequate and difficult to read even for a Shan speaker until these defects were corrected by a series of orthographic reforms culminating in 1955.

Shan Plateau, crystalline massif forming the eastern part of Myanmar (Burma) and forming part of the Indo-Malayan mountain system. The plateau occupies the country between the deep trench of the Salween River to the east and the upper course of the Irrawaddy River to the west. The average elevation of the plateau is between 2,500 and 4,000 feet (750 and 1,200 m). It is seamed and ribbed by mountain ranges that split up and run into each other. The mountain ranges have an average elevation of between 4,000 and 5,000 feet (1,200 and 1,500 m), with some peaks rising to more than 8,000 feet (2,400 m). The ranges are interspersed with masses of broken hills which formerly were heavily forested but which have been extensively denuded because of the shifting (slash-and-burn) cultivation practiced by some of the local inhabitants. In between these uplands are valleys and rolling plains which are covered with grass or which are farmed for rice. The rocks in the northern part of the Shan Plateau are the source of rubies, sapphires, and other gems for which Myanmar has long been famous. The plateau is the country's principal source of lead, zinc, and silver and is an area of major teak forests.

Shan-t'ou (China): *see* Swatow.

Sha'nabi, Mount ash-, Arabic JABAL ASH-SHA 'NABĪ, also spelled DJEBEL CHAMBI, mountain (5,064 feet [1,544 m]) that is the highest in Tunisia. It is part of a spur of the Tabassah (Tebéssa) Mountains, which are part of the Saharan Atlas Mountains. The mountain lies near the Algerian border, 6 miles (10 km) west-northwest of al-Qaṣrayn (Kasserine).

Shandong (Chinese province): *see* Shantung.

Shane THE PROUD: *see* O'Neill, Shane.

Shang DYNASTY, Pinyin SHANG, the first recorded Chinese dynasty for which there is both documentary and archaeological evidence. The Shang dynasty was the reputed successor to the quasi-legendary first, or Hsia, dynasty. The dates given for the founding of the Shang dynasty vary from about 1760 to 1520 BC; dates for the dynasty's fall also vary from 1122 to 1030 BC. The period of the dynasty's rule has traditionally been dated 1766–1122 BC. The latter part of the Shang dynasty, from the reign of P'an-k'ang on, is also called the Yin dynasty. Shang China was centred in the North China Plain and extended as far north as modern Shantung province and westward through present Honan province. The kings of the Shang are believed to have occupied several capitals one after another, one of them possibly at Chengchow, where there are rich archaeological finds, but they settled at An-yang in the 14th century BC. The king appointed local governors, and there was an established class of nobles as well as the masses, whose chief labour was in agriculture. The king is-

sued pronouncements as to when to plant crops, and the society had a highly developed calendar system with a 360-day year of 12 months of 30 days each. It was in this period that Chinese writing began to develop, and the symbol for "moon" was—as it remains—that also for "month." The calendar took cognizance of both lunar and solar cycles; and, when it became necessary to adjust the basically lunar year to the seasonal reality of the solar year, intercalary months were added.

Musical instruments had evidently come down from the Hsia or whatever society preceded the Shang, for the early instruments of the latter were well developed and included a clay ocarina, tuned chimes of stone, and bells and drums of bronze. The word for drum, *ku,* appeared in inscriptions. (Legend traces the origin of pipes of bamboo earlier, even before the mythical Hsia.)

The architects of the Shang period built houses of timber over rammed-earth floors, with walls of wattle and daub and roofs of thatch. Tombs were dug in clay, and their walls show traces of paintings that strongly resemble some of the ornamentation and animal shapes reflected in the outstanding bronzework of the period. The earliest bronzes of the Shang were primitive, but a course of development is evident that culminates in elegant ceremonial objects as well as a substantial range of cooking and serving dishes and various utensils and ornaments. There was a three-legged *li* for cooking, and into it could be fitted a bronze *hsien,* a dish with a pierced bottom to function as a steamer. Serving bowls were often stemmed, and pouring vessels had long spouts; these and numerous other vessels were often richly decorated.

Pottery objects were abundant, and Shang potters made fired-clay sectional molds for casting bronzes. They also used clay molds to imprint decorations into clay vessels—whose shapes in many cases clearly inspired designs in bronze. Some of the pottery gives evidence of possibly having been shaped on a potter's wheel. Pottery included dishes and bowls in a white glaze for ceremonial and ritual use, as well as black pottery and a rich brown glaze for more mundane purposes.

Jade carving became quite advanced during the Shang dynasty; ceremonial weapons of jade were made, as well as jade fittings for actual weapons. Jade figurines included both human and animal shapes, carved in the round in careful detail. Many of these have been found in tombs of the period. Other funerary art ran a gamut in size from tiny objects of jade or carved bone and ivory (sometimes inlaid with turquoise) to chariots of lacquered wood. Larger sculptures in marble followed animal motifs.

No literature as such survives from the Shang, but quite numerous records and ceremonial inscriptions and family or clan names exist, carved into or brushed onto bone or tortoise shells. Three kinds of characters were used—pictographs, ideograms, and phonograms—and these records are the earliest of writing in China.

Shang-ch'iu, also called (locally) CHU-CHI, Pinyin SHANGQIU, or ZHUJI, city, eastern Honan Province (*sheng*), China. It is a county-level municipality (*shih*) and the administrative centre of Shang-ch'iu Prefecture (*ti-ch'ü*). Situated in the middle of the North China Plain, it is at the junction between the north–south route from Chi-nan (Tsinan) in Shantung Province to the central section of the Yangtze River (Ch'ang Chiang) and the routes from Cheng-chou and the northwest to Suchow to the east and Nan-ching (Nanking) to the southeast.

Two places are called Shang-ch'iu—the modern municipality and the old county seat of the same name, which lies a few miles to the southwest. The old town has a long history. In the Ch'un-ch'iu period (770–476 BC) it was the walled capital of the state of Sung. It became the seat of Sui-yang County in 220 BC. Its name and status subsequently underwent various changes until AD 589, when its name was changed to Sung-ch'eng and it became the administrative seat of Sung-chou Prefecture. In the early 10th century it became the headquarters of the Kuei-te Army of the Southern T'ang (937–975/976) dynasty. Sung-chou (Shang-ch'iu) was a canal port on the New Pien Canal from 607 onward. Under the Sung dynasty (960–1279), when the capital was transferred to K'ai-feng, some 80 mi (130 km) to the west, it became a supply base. In 1005 it was made a superior prefecture (*fu*), named Ying-t'ien, and in 1014 it became the subsidiary southern capital. In 1130, under the occupation of the Juchen, it became known as Kuei-te Superior Prefecture. At the beginning of the Ming dynasty (1368–1644) its significance was reduced by the construction of the Grand Canal (Ta Yün-ho) farther east, and it was demoted to a simple prefecture (*chou*) named Kuei-te, which was subordinate to K'ai-feng Superior Prefecture. It again became a superior prefecture as Kuei-te Fu in 1545 and retained this status until the foundation of the republic (1911).

The modern Shang-ch'iu Municipality was originally a market town, some miles northeast of Kuei-te, called Chu-chi. It outstripped the old Shang-ch'iu (Kuei-te) in importance, largely as a result of the construction of the Lunghai Railway, which made it a major regional commercial and collecting centre for the agricultural produce of the area, such as grain, beans, cotton, and raw silk. It is the focus of a dense road network and has good rail links. The city has developed a variety of small-scale industries, including flour milling, tobacco manufacture, oil pressing, and food processing. Pop. (1980 UN est.) 305,000.

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Shang-hsien, Pinyin SHANG XIAN, city in southeastern Shensi Province (*sheng*), China. It is a county (*hsien*) seat and the administrative centre of Shang-lo Prefecture (*ti-ch'ü*). Shang-hsien is situated some 55 mi (90 km) southeast of Hsi-an (Sian [Ch'ang-an]) at the southern end of one of the few passes across the Tsinling Shan (mountains), on the headwaters of the Tan Chiang (river), a tributary of the Han Chiang.

Since ancient times the city of Shang-hsien has been an important communication centre on the route from the ancient capital district around Sian to the Middle Yangtze River area. Its earliest historical name was Shang-lo, a domain under the state of Chin in the 7th century BC. Under Ch'in rule it became a county (*hsien*) from the 5th century BC onward, keeping the name Shang-lo until AD 266. Its modern name, Shang-hsien, first appears in the middle of the 6th century AD. It was the seat of a prefectural administration except during the Ming dynasty (1368–1644), when from 1368 to 1477 it was demoted to county status. From 1477 to 1727 it was administratively dependent on Sian, but in 1727 it again became an independent prefecture. In 1912 it reverted to county status once more.

The city takes its name (*shang,* "merchant") from the long-established reputation of its people as traders, many of them being engaged in trade in other areas of China. The surrounding area is not particularly rich but produces wheat, kaoliang (a variety of grain sorghum), cotton, indigo, and timber. There are also some minor coal deposits, and papermaking is a local industry. Cotton textiles are also manufactured. Pop. (mid-1970s est.) 10,000–50,000.

Shang-jao, Pinyin SHANGRAO, city, northeastern Kiangsi Province (*sheng*), China. It is a county-level municipality (*shih*) and the administrative centre of Shang-jao Prefecture (*ti-ch'ü*), located in the Hsin Chiang (river) and Lo-an Chiang valleys east and south of the P'o-yang Hu (lake). Shang-jao city is situated on the Hsin Chiang, about 110 mi (180 km) east of Nan-ch'ang, the provincial capital, and is on the main rail and highway route from Nan-ch'ang to the coastal ports of Hang-chou and Shanghai.

Shang-jao has been an important route centre throughout historical times. The county was founded in the mid-3rd century AD and, except at brief intervals, remained a county seat until the 20th century. In 758 the T'ang dynasty (618–907) upgraded it to be the seat of a prefecture, Hsin-chou (named after the river). It retained this name until the Ming dynasty (1368–1644), when it became the seat of the superior prefecture (*fu*) of Kuang-hsin. Its strategic importance as the western entry to the Fu-ch'un Chiang (Ch'ien-t'ang Chiang) Valley and southern Kiangsu has always been great, and one of the crucial battles in the Mongol conquest of South China was fought there in 1275. The city, however, remained little more than a regional commercial centre until the construction of the Chekiang–Kiangsi railway in 1937, when it became a railhead for goods from northwestern Fukien Province en route to Hang-chou and Shanghai. This function was largely lost with the construction of other rail links in 1957.

Shang-jao is mainly a commercial centre, with little industry except for the production of paper and processing of tea. Pop. (mid-1970s est.) 50,000–10,000.

Shang K'o-hsi, Pinyin SHANG KEXI (d. 1676, China), Chinese general whose attempt to retire in 1673 resulted in large-scale rebellion.

Originally a Ming dynasty general, in 1634 he transferred his loyalty to the Manchu kingdom of Manchuria, which was encroaching on China from the northeast. By 1644, when the Manchus conquered China and proclaimed the Ch'ing dynasty (1644–1911/12), Shang was one of the leading Ch'ing generals. In 1649 he was given the title *p'ingnan wang* ("prince who pacifies the south") and sent to conquer the southern province of Kwangtung. When he completed this task, he was made governor of the area with full civil and military authority.

In 1673 Shang successfully petitioned the Emperor for permission to retire, and preparations were made to bring Kwangtung under central control. Wu San-kuei (1612–78), another Ch'ing general who also had been made governor of a southern province, became alarmed. Fearing his power also would be restricted, Wu rebelled and was joined by a third southern general.

Shang remained loyal, but his eldest son put his father under arrest and joined the rebels. (The ensuing war, known as the Revolt of the Three Feudatories, was not suppressed until 1681.) Unable to control his son, Shang attempted suicide. He failed, but his health was destroyed and he died soon after. Altogether, he had 23 sons, most of whom were loyal Ch'ing officials—11 became generals and 3 became state councillors.

Shang Shu (ancient Chinese text): *see* Shu Ching.

Shang Yang, Pinyin SHANG YANG, original name (Wade-Giles romanization) KUNG-SUN YANG (d. 338 BC, China), Chinese statesman and thinker whose successful reorganization of the state of Ch'in paved the way for the eventual unification of the Chinese empire by the Ch'in dynasty (221–206 BC). Shang Yang

believed that the integrity of a state could be maintained only with power and that power consisted of a large army and full granaries.

Entering into the service of Duke Hsiao, head of the state of Ch'in, Shang Yang replaced the feudal division of the country with a system of centrally appointed governors. He instituted compulsory military service, a new system of land division and taxation, and insisted on strict and uniform administration of the law. He is also said to have forced all persons into "productive occupations," such as farming or soldiering (but not commerce), and to have set up a system of mutual spying among the people. When he fell into disgrace in 338, he was tied to two chariots and torn apart.

The work *Shang Chün shu* ("Book of the Lord of Shang") probably contains writings and ideas of Shang Yang, although the exact authorship of the book is in doubt. It is one of the major works of the highly pragmatic and authoritarian Legalist school of Chinese philosophy.

Shanghai, also spelled SHANG-HAI, city, major seaport, and an industrial and commercial metropolis of the People's Republic of China, situated on the East China Sea coast between the mouth of the Yangtze River (north) and Hangchow and Yü-p'an bays (south).

The following article treats briefly the modern city of Shanghai. Fuller treatment is provided in the following MACROPAEDIA articles. For history and contemporary life, *see* Shanghai. For additional perspective on the city in its national and regional context, *see* China.

Shanghai was the first Chinese port to be opened to trade with the West and long dominated the nation's commerce. Since the Communist revolution, it has become the chief industrial centre in the nation. After defeat by Britain in the Opium War (1842), China was forced to open Shanghai to European trade and concessions. Foreign powers expropriated territory in the city and forced a European imprint on the city's growth. The government has made many physical changes in the city in an attempt to rid it of the legacies of its past and create a purely Chinese urban area.

The city is also the administrative seat of the *shih* (province) of Shanghai, which is bordered by Kiangsu Province on the north and west and by Chekiang Province on the south. In addition to the city of Shanghai, the *shih* includes nine mainland counties (*hsien*) and approximatley 30 islands in the mouth of the Yangtze and offshore to the southeast in the East China Sea. The largest island, Ch'ungming, is the 10th county in the greater Shanghai Municipality.

The mainland portion of Shanghai city lies on an almost level deltaic plain with an average elevation of 10 to 16 ft (3 to 5 m) above sea level. The climate of Shanghai is moderated somewhat by its proximity to the sea. The average July temperature is 80° F (27° C), and the January average is 37° F (3° C). The average annual precipitation is 45 in. (1,143 mm), with June the wettest month and December the driest. Air pollution has become a problem in Shanghai, but the location of industry and new construction away from the central city has alleviated this situation somewhat.

Because of the government policy to develop integrated residential and industrial complexes in the suburban areas, little development has occurred in the downtown area, and pre-World War II buildings that once housed diplomatic missions and foreign commercial concerns still stand. The area south and west of the confluence of the Su-chou and Huang-p'u rivers has a gridlike street pattern reflecting the influence of the British concessionaires who originally developed the area. Many hotels and the central administrative office of Shanghai are located near the eastern border of this section.

Other districts have their own distinct patterns and features. The Hung-K'ou district lies to the north and east of the Su-chou Ho. Previously developed by American and Japanese concessionaries, it is now an important industrial area known for its shipyards and factories. The old Chinese city, which features a random and serpentine street layout, was once surrounded by a 3-mi- (5-km-) long wall that has since been replaced by two streets. Principally a residential area, western Shanghai is the site of the Sino-Soviet Friendship Palace, a permanent industrial-exhibition hall. The southwestern district of Hsu-hui, formerly Ziccawei, was a centre of Christian missionary activity in the 17th century.

Shanghai's large and highly skilled work force, broadly based scientific establishment, tradition of producer cooperation, and excellent transportation and communications facilities have all contributed to the city's stature as the leading industrial centre in China. This industrial establishment produces a great variety of capital and consumer goods, including specialized dies, lathes, electronic assembly equipment, watches, cameras, radios, fountain pens, glassware, leather goods, stationery products, and hardware. The well-established chemical and petrochemical industries serve as a basis for the production of plastics, synthetic fibres, and other products. Textile manufacturing is also significant.

Shanghai is China's leading centre of higher education. The area has numerous universities and several technical and higher education institutes. Many factories sponsor their workers in work–study colleges that prepare them for more highly skilled jobs. Research and development are conducted at the Shanghai branch of the Chinese Academy of Sciences.

Museums, historical sites, and scenic gardens are some of the many cultural attractions in Shanghai. Extensive collections of sculpture and pictorial art are featured at the Shanghai Museum of Art and History, and the Shanghai Revolutionary History Memorial Hall displays photographs and objects relating to Shanghai's history. Folk operas, dances, plays, story readings, and other performances are put on at the Ta Shih-chieh (Great World). Cultural features of the old Chinese city include the 16th-century Yu-Yüan garden and the Former Temple of Confucius.

Benefitting from its dual role as a sea and river port, Shanghai has developed into China's major transportation centre. Shanghai harbour has been divided into numerous districts, each equipped to handle specific types of commodities and vessels. An extensive inland waterway network connects the area with major cities in the bordering provinces. Two major railway lines, the Hu-ning line from Nanking and the Hu-han-jung line from the port of Ning-po, terminate in Shanghai. The Hung-ch'iao International Airport is the major air terminal serving Shanghai, with the older Lung-hua airport used primarily for domestic flights. Area municipality, 2,383 sq mi (6,185 sq km). Pop. (1982 prelim.) city, 5,597,972; municipality, 11,859,748.

Shanghai Museum, Wade–Giles romanization SHANG-HAI PO-WU KUAN, Pinyin SHANG-HAI BOWUGUAN, in Shanghai, one of the finest collections of art in China, a museum founded in 1952 and arranged in chronological order, showing the evolution of art. It is on three levels—the first floor is devoted to the Neolithic Era, the second to the Ch'in and Han periods, and the third to the Sung period. Items on display include bronzes, weapons, cauldrons, utensils and tools; ceramics from the Neolithic era to the present include examples of Lung-shan Black Pottery. There are life-size terracotta statues of a horse and two warriors from the large number of figures found in 1974 near the tomb of the Ch'in emperor, Shih Huang-ti (Zin Shi Huangdi) in Sian. Pottery from the Tang dynasty and some fine blue and white Ming vases are also exhibited. The third floor has an interesting exhibit devoted to the tools used in painting and calligraphy, with some scrolls from the T'ang, Sung, Yüan, Ming, and Ch'ing dynasties. There is an exhibition of present-day crafts from different provinces, including jade, silver filigree, cloisonné, lacquer, and ivory ware.

Shangqiu (China): *see* Shang-ch'iu.

Shangri-La, presidential retreat established in rural Maryland, U.S., by Pres. Franklin D. Roosevelt in 1942 and renamed Camp David (*q.v.*) in 1953.

Shangxian (China): *see* Shang-hsien.

Shankar, Ravi (b. April 7, 1920, Benares, India), Indian musician, player of the sitar, composer, and founder of the National Orchestra of India, influential in stimulating Western appreciation of Indian music. As a member of the dance troupe of his brother Uday, he studied music and dance and toured extensively in India and Europe.

At the age of 18 Shankar gave up dancing and for the next seven years studied the sitar (a long-necked stringed instrument of the lute family) under the noted musician Ustad Allauddin Khan. After serving as music director of All-India Radio from 1948 until 1956, he began a series of European and U.S. tours. In 1962 he founded the Kinnara School of Music in Bombay and then (1967) in Los Angeles. During 1970–71 he taught at the California Institute of the Arts, Valencia. In 1969 his autobiography, *My Life, My Music,* was published.

Shankar, Uday (b. Dec. 8, 1900, Udaipur, India—d. Sept. 26, 1977, Calcutta), major dancer and choreographer of India whose adaptation of Western theatrical techniques to traditional Hindu dance popularized the ancient art form in India, Europe, and the United States.

Shankar began formal art training in Bombay in 1917 and two years later studied at the Royal College of Art in London. During the 1920s he danced with the ballerina Anna Pavlova and created two dances, *Hindu Wedding* and the duet *Radha and Krishna,* for inclusion in her program *Oriental Impressions.* Returning to India in 1929 Shankar formed his own dance company. His troupe toured Europe in 1930 and from 1932 until the 1960s regularly appeared in the United States. In 1938 he founded the Uday Shankar India Culture Centre in Almora, Uttar Pradesh. (The school for dance, drama, and music closed during World War II but reopened in 1965 in Calcutta.) Together with his brother, the sitarist Ravi Shankar, he explored classical and folk dance and created dance dramas that included social comment. Although Shankar's work was criticized by adherents of traditional Indian dance, his supporters included such eminent Indians as the poet Rabindranath Tagore.

Shaṅkara (Hindu philosopher): *see* Śaṅkara.

Shannon, River, the longest river in Ireland, rising in northwestern County Cavan and flowing for about 161 mi (259 km) in a southerly direction to enter the Atlantic Ocean via a 70-mi estuary below Limerick city. It drains an area of 6,060 sq mi (15,695 sq km). As the main river draining the central lowland of Ireland, it is surrounded by marshes and bogs for much of its course and widens at various points into lakes, many with islands.

The source of the Shannon is generally considered to be the pools at the foot of Tiltinbane Mountain. After a few miles it enters

Lough Allen and then flows south through a wide belt of marshes and water meadows. It is crossed by a bridge at Leitrim and at Carrick-on-Shannon, above which it is joined by the Boyle from the west. From north of Carrick south to Roosky, it flows through a landscape dominated by hills of glacial drift (drumlins) interspersed with bogs and marshes. Near Termonbarry, at Richmond Harbour, the river is joined by the Royal Canal; and at Lanesborough it enters Lough Ree.

The bridge at Athlone is 15 mi from the next at Shannonbridge, where the Suck, the largest tributary, joins the main river. At Shannon Harbour the river is joined by the Grand Canal. About 15 mi south it reaches Lough Derg at Portumna, and its waters feed the Ardnacrusha hydroelectric power station, using the fall of 109 ft (33 m) from lake to sea level. A fish ladder at the outlet of Lough Derg allows salmon to pass upriver to spawn. From Limerick the river enters its long estuary, in which shipping has dwindled since the 19th century and in which some of the large reclaimed areas have been used for Shannon International Airport, located near the estuary of the River Fergus in County Clare.

In the early part of the 19th century, the Shannon was a vital link in the waterways of Ireland. From 1755 the Grand Canal was constructed across the central lowland, reaching the Shannon in 1804. From 1789 to 1817 the Royal Canal was constructed from the north side of Dublin through Mullingar to the Shannon, but it was not so successful as was the Grand Canal, and it was sold to a railway company in 1846. At that time steamers used the Shannon between Killaloe and Richmond Harbour, and horsedrawn boats went on the canal from Killaloe to Limerick. There were passenger services along the canals from 1780 onward, but they ceased in the 1850s because of rail competition. The Shannon steamboats survived as a tourist attraction until World War I. Since the 1950s a steamer service has been a holiday attraction, and many parts of the river are used for pleasure craft.

Shansi, Wade–Giles romanization SHAN-HSI, Pinyin SHANXI, *sheng* (province) of northern China, bounded by the provinces of Hopeh to the east, Honan to the south and southeast, and Shensi to the west, and by the Inner Mongolian Autonomous Region to the north.

The article that follows is a summary of significant detail about the Chinese province of Shansi; for additional detail about its geography, history, economy, and culture, *see* MACROPAEDIA: China.

Evidence exists that certain cereal plants were cultivated in Shansi as early as the 5th to 3rd millennium BC. Since ancient times the province has held a strategic position as a gateway to the fertile plains of Hopeh and Honan and has also served as a buffer zone between China proper and the Mongolian and Central Asian steppes. A key route for military and trading expeditions, it was also one of the major avenues for the entrance of Buddhism into China from India. Through various dynasties Shansi's political status varied with the relative strength or weakness of the Chinese central government. Commercial aggressiveness produced a class of Shansi bankers and merchants in the 18th and 19th centuries who were famous throughout China. After the overthrow of the Ch'ing dynasty in 1911/12, the Shansi warlord Yen Hsi-shan ruled as an absolute dictator until the end of World War II. During the Sino-Japanese War (1937–45), the Japanese developed coal resources and expanded heavy industry in Shansi. After Communist forces assumed control of Shansi in 1949, agricultural and handicrafts cooperatives established at former Communist mountain bases were instrumental in revitalizing the province's economy. The provincial capital, T'ai-yüan, is located in the centre of Shansi.

Most of the province is composed of a vast plateau that lies at average elevations of between 1,000 and 3,000 feet (300 and 900 metres) above sea level. Shansi is surrounded by mountains. The Huang Ho (river) flows through a mountain gorge from north to south and forms the western border with Shensi province. Shansi has a semi-arid climate. Winter droughts and summer hailstones and flooding are familiar conditions.

Most of the population lives in agricultural villages, and most are of Han origin and speak the Northern Mandarin dialect of Chinese. Small minority ethnic groups include Chinese Muslims, some Mongols, and Manchus.

The two major urban areas are T'ai-yüan, the capital and leading industrial and mining complex; and Ta-t'ung, a mining and rail transport centre near the borders of Hopeh Province and the Inner Mongolian Autonomous Region.

Shansi is important for its vast reserves of coal and iron and for its production of cotton for export. Its reserves of both anthracite and high-grade coking coal have supported the development of heavy industry. Major mining operations are located at Ta-t'ung, Hsi-shan, Yang-ch'uan, Fen-hsi, and Hsien-kang. Another 150 smaller coal mines are located throughout the province. Iron ore is also mined and the largest titanium and vanadium deposits in China are located near Fen-hsi. Also mined are silver, zinc, and copper; salt is produced in the southwest.

Most industry is concentrated in the T'ai-yüan–Yü-tz'u region. Industries include iron and steel, heavy machinery, industrial chemicals, and chemical fertilizers, as well as cement, paper, textiles, milled flour, and wine.

Agricultural production is limited by a short growing season and widespread erosion. Where possible, winter wheat, millet, soybeans, corn (maize), and some tobacco and peanuts (groundnuts) are cultivated. However, Shansi is China's largest provincial producer of cotton, and sesame is grown both for its oil seeds and for its fibre.

There are three major rail lines; long-distance, all-weather roads are few. Waterways are little used for freight traffic. Area 60,700 sq mi (157,200 sq km). Pop. (1983 est) 25,460,000.

Shantiniketan (India): *see* Śantiniketan.

Shantou (China): *see* Swatow.

Shantung, Wade–Giles romanization SHANTUNG, Pinyin SHANDONG, north coastal *sheng* (province) of the People's Republic of China facing the Yellow Sea opposite Korea. The province consists of two distinct segments: the Shantung Peninsula and an inland zone bounded by the provinces of Hopeh to the north and west, Honan to the southwest, and Anhwei and Kiangsu to the south.

The article that follows is a summary of significant detail about the Chinese province of Shantung; for additional detail about its geography, history, economy, and culture, *see* MACROPAEDIA: China.

A Neolithic culture existed on the peninsula as early as the 3rd millennium BC. By the Spring and Autumn period (770–476 BC), Shantung had become a centre of political and military activity. One of the small southern Shantung states was Lu, the birthplace of Confucius and Mencius. Beginning in the Six Dynasties period (AD 220–589) Shantung became North China's leading maritime centre and retained that position for centuries to come. In the 19th century erosion and flood problems in the province's agricultural areas were intensified by shifts in the course of the Huang Ho (river). In a series of devastating floods in 1855, hardships and food shortages increased, resulting in substantial emigration of Shantung peasants to Manchuria and Inner Mongolia. In the closing decade of the 19th century the province came under German, British, and Japanese influence. After World War I the Japanese compelled the Chinese to recognize their renewed occupation and maintained it until 1922. During the Sino-Japanese War (1937–45) the Japanese suffered one of their most serious defeats at Shantung in 1938. The province did not come under Chinese Communist control until 1948. The provincial capital is Tsinan.

Shantung's inland zone covers roughly two-thirds of the province's total area and includes a hilly central region centred on the famous T'ai Shan mountain complex. A fertile and intensely cultivated area surrounds the central mountains on the north, west, and south and forms part of the Huang Ho Basin and the North China Plain. The Huang Ho flows from southwest to northeast through the province before emptying into the Gulf of Chihli. In contrast, the peninsula, with its indented coastline, is an entirely upland area, which has traditionally depended on fishing, mining, and port-related activities. Shantung is characterized by a continental climate with cold winters and hot, dry summers. However, there is variation between the peninsular and inland zones. The interior areas are subject to severe winter and spring dust storms, sometimes followed by droughts and frequent summer floods. It is also not unusual for rivers to freeze for extended periods during the winter months. The peninsula has a milder climate, although sea fog and high humidity are common.

Shantung's population is predominantly Northern Mandarin-speaking and of Han Chinese origin. There are small concentrations of Chinese Muslims in various parts of the province. More than nine-tenths of the people live in a rural setting. The two largest cities are Tsingtao and Tsinan, followed by the Tzu-po conurbation, a leading mining and industrial zone.

Shantung has a diversified agricultural and industrial economy. The leading food crops are wheat, soybeans, *kaoliang* (sorghum), spiked millet, corn (maize), and sweet potatoes. The major cash crops are cotton, tobacco, peanuts (groundnuts), and fruit. The large peanut grown in the province is well suited for pressing, making Shantung a leading manufacturer of peanut cooking oil. Common fruits grown include peaches, pears, apricots, apples, grapes, persimmons, and dates. Sericulture (silkworm raising) has been carried out in Shantung for hundreds of years.

The province has a thriving ocean fishing industry, with trawlers and smaller fishing craft operating out of more than 70 ports around the peninsula and off the Huang Ho delta. Leading ports are Tsingtao, Chefoo, Wei-hai, Shih-tao, and Lung-k'ou. The catch consists mainly of eels, herring, gizzard-shad, fish roe, and several varieties of shrimp and crab.

Shantung also conducts extensive mining activities. Coal, iron ore, bauxite, gold, and oil are all mined; salt is produced on both the north and south coasts of the peninsula.

Tsingtao, the major manufacturing centre, has a large textile industry, a locomotive works, and industrial chemical, tire, and machine-tool factories, and has long been famous for its beer. Tsinan—renowned for its silks, precious stones, and handicrafts—also manufactures trucks, agricultural machinery, machine tools, precision instruments, industrial chemicals, paper, and textiles. Other industry is carried on in Tzu-po and Wei-fang.

Railways are Shantung's chief means of transport. Highways, most unpaved, in every district serve as feeder routes to the railways. Inland water transport is limited. Area 59,300 sq mi (153,600 sq km). Pop. (1983 est.) 74,940,000.

Shantung Peninsula, Wade–Giles romanization SHAN-TUNG PAN-TAO, Pinyin SHANDONG BANDAO, peninsula in eastern China, occupying the east section of Shantung Province (*sheng*) and extending northeastward beween the Gulf of Chihli and the Yellow Sea. The terrain is hilly, with elevations around 600 ft (180 m) but rising to 3,707 ft in the Lao Shan (mountains). Fishing for croakers, hairtails, herring, and prawns is economically important. Low tidal beaches are used as salt fields or as breeding grounds for mollusks; grain is grown on the narrow plains along the coast; and apples, grapes, pears, and tea (on the south side of the peninsula) are raised in the hills. Iron ore, magnesite, and gold are abundant. Some of China's best ports are located along the peninsula's rocky, indented coast. Tsingtao, a major port and manufacturing centre (textiles, tires, and railroad cars and locomotives) is on the southeast side and Yen-t'ai, on the north, produces clocks and wine.

Shantung question, at the Versailles Peace Conference, ending World War I, in 1919, the problem of whether to transfer to Japan the special privileges held by imperial Germany in the northeastern Chinese province of Shantung. The final decision to validate the transfer produced a tremendous outcry in China and resulted in an outpouring of Chinese nationalist sentiment.

In 1898, when the imperialist powers were rushing to extract concessions from the weakened Ch'ing dynasty, Germany obtained the use of Chiao-chou Wan, a bay on the southern coast of the Shantung Peninsula, and the right to construct a naval base, Tsingtao, there. After World War I began, Japan joined the Allies and took over German interests in the peninsula. At the same time (1915) it presented China with a list of 21 demands, including Chinese recognition of Japan's special position in Shantung. Since its Western friends were preoccupied with Germany, China had no choice but to accept the Japanese demands, but it expected the Versailles Peace Conference to restore Shantung.

The Japanese and the other powers, however, had made secret treaties in which Japan agreed to second other nations' claims to German possessions in other parts of the world in return for support on the Shantung issue. The Chinese warlord government secretly agreed to Japanese terms in return for a loan, and the Shantung question was decided in favour of Japan.

Many Chinese, particularly students, impressed by Woodrow Wilson's statements on self-determination and world democracy before the conference, were stunned by the conference's decision. Students organized a mass demonstration on May 4, 1919. The intellectual revolution then going on in China was renamed the May Fourth Movement (*q.v.*), and this iconoclastic reform movement eventually brought about the replacement of traditional Chinese ways with Western ideas and methods.

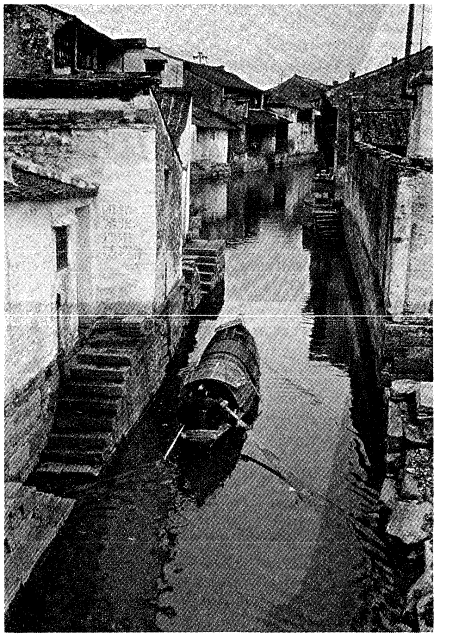
shanty, also spelled CHANTEY, or CHANTY (from French *chanter*, "to sing"), English-language sailors' work song dating from the days of sailing ships, when manipulating heavy sails, by means of ropes, from positions on the deck constituted a large part of a sailor's work. The leader, or shantyman, chosen for his seamanship rather than his musical talent, stood at the leading position on the rope, while the sailors crouched along the rope behind him. The shantyman would intone a line of a song and the group respond in chorus, heaving on the rope at a given point in the melody. The shantyman was one of the crucial members of the ship's crew, and it was said that "a good shantyman was worth four extra hands on the rope." He selected a song of appropriate type and speed for the task, and, by improvising verses, he could spin the song out for as long as needed; shanty texts are thus far more fluid than published versions indicate.

Shanty texts reflect the realities of the sailors' lives, from bad food to captains' virtues and flaws and stories of easy women. The tunes were drawn from ballads and other familiar melodies.

There were three principal types of shanties: short-haul, or short-drag, shanties, simple songs sung when only a few pulls were needed; halyard shanties, for jobs such as hoisting sail, in which a pull-and-relax rhythm was required (*e.g.*, "Blow the Man Down"); and windlass, or capstan, shanties, which synchronized footsteps in jobs such as hoisting anchor (*e.g.*, "Shenandoah," "Rio Grande," "A-Roving").

Most of the shanties before the 19th century are of British origin, most of those from the 19th are American. Shanty singing declined in the late 19th and early 20th century, when steam-powered ships replaced sailing vessels.

Shao-hsing, Pinyin SHAOXING, city in northeastern Chekiang Province (*sheng*), China. It is a county (*hsien*) seat and the administrative centre of Shao-hsing Prefecture (*ti-ch'ü*). Shao-hsing is situated in the centre of



The canal in Shao-hsing, Chekiang Province, China
Andrew J. Watson

the eastern half of the coastal plain south of Hang-chou Wan (bay), on the Che-tung Canal, which joins Ning-po to the east with Hsiao-shan on the estuary of the Ch'ien-t'ang Chiang (river) to the west, and on the Ning-po–Hang-chou railway, which follows the same route.

It is an ancient city; in the 7th century BC it was the capital of the state of Yüeh, which was later annexed by the state of Ch'u. In 221 BC it became a part of the Ch'in empire and was under the commandery of K'uai-chi. The seat of this commandery was transferred to Shao-hsing in AD 129. With the reunification of China by the Sui dynasty in 589, it became the seat of a prefecture (*chou*), Yüeh, which name it retained until 1131, when, after the fall of the Northern Sung dynasty in 1127, it became the superior prefecture (*fu*) of Shao-hsing.

Apart from being an administrative centre of medium rank, Shao-hsing was the commercial centre of a rich and productive area that was drained and irrigated from very early times. Much of the area yields two crops of rice a year. Cotton, jute, and rapeseed are widely cultivated. The hill area south of the city is an old, established tea-growing district, producing P'ing-shui tea, the history of which can be traced at least to the 7th century. Another traditional industry is wine making. The chief wine-making centre is some 7½ mi (12 km) west of the city. Before World War II, Shao-hsing had minor industries, producing cotton, silk, lacquer, paper, and tinfoil, all on a comparatively small scale.

After 1949 and particularly in the mid-1950s, these handicraft industries were modernized. Wine making is now carried on in large modern wineries. Modern tea-curing, oil-extracting, rice-polishing, and flour-milling plants were also built, and a ceramic industry was begun. In the late 1950s a steelworks was set up in the city.

The area is rich in relics of the past, with innumerable burial sites and with many other sites connected with famous figures from Shao-hsing's past. It also has a museum devoted to the writer Lu Hsün (1881–1936), who was also a native. Pop. (1980 est.) 100,000.

Shao K'ang-chieh (Chinese philosopher): *see* Shao Yung.

Shao-kuan, also called SHAOCHOU, or CH'Ü-CHIANG, Pinyin SHAOGUAN, SHAOZHOU, or QUJIANG, city in northern Kwangtung Province (*sheng*), China. Shao-kuan is a prefecture-level municipality (*shih*) and the administrative centre of Shao-kuan Prefecture (*ti-ch'ü*). The city is situated on the Pei Chiang (river) where it is formed by the junction of the Wu Shui (river), flowing southeast from the borders of Hunan, and the Chen Shui, flowing southwest from the borders of Kiangsi Province. Shao-kuan thus commands not only the principal overland route from Canton to central and northern China but also the major route via the river systems into Hunan and the other route via the Mei-ling Kuan (pass) into Kiangsi. It thus remained a major transportation centre both when the Hunan route predominated (*i.e.*, before the 6th century and after the construction of the Han-kou–Canton railway in 1937, which passes through Shao-kuan) and when the Kiangsi route was more important during the intervening centuries.

The name Shao-kuan (meaning "customs barrier at Shao") derives from its importance in medieval times as a centre of interregional trade. The name Ch'ü-chiang properly belongs to the county, which has its seat in the city. The county was founded under the Han dynasty (206 BC–220 AD) in the 1st century BC. It became the seat of a commandery in AD 265 and received the name Shao Prefecture (*chou*) in 618. During the Ming (1368–1644) and Ch'ing (1644–1911/12) periods, it was a superior prefecture (*fu*) named Shao-chou and reverted to county status in 1912. Its greatest period of prosperity was in the 18th and early 19th centuries, when Canton monopolized all foreign commerce, and trade by the overland route was at its height. After the Taiping Rebellion (1850–64), which badly affected this and neighbouring areas in the early 1850s, the trade diminished. Shao-kuan again experienced a period of somewhat artificial growth during the Sino-Japanese War (1937–45), when it became the provincial capital after the Japanese occupation of coastal Kwangtung cities in 1938.

Shao-kuan remains primarily a commercial and communication centre; the timber, livestock, tobacco, tung oil, and other natural products of the mountains of northern Kwangtung are collected there, and manufactures from Canton are shipped through it into Kiangsi. A small coalfield is in operation in the area, and the surrounding mountainous districts are rich in minerals, particularly iron ore, tungsten, and antimony. Under the Second Five-Year Plan (1958–62), there

were ambitious designs for the development of Shao-kuan as a centre of heavy industry. In 1958 the completion of a heavy machinery plant (capable of producing metallurgical equipment for iron and steel plants, as well as cranes and docking equipment) was reported. Pop. (mid-1970s est.) 100,000–300,000.

Shao-yang, also called PAO-CH'ING, Pinyin SHAOYANG, or BAOCHING, city in central Hunan Province (*sheng*), China. It has been a county-level municipality (*shih*) since 1953 and is the administrative centre of Shao-yang Prefecture (*ti-ch'ü*), which covers the middle basin of the Tzu Shui (river). It is 19 mi (30 km) northeast of Shao-yang Hsien, the former market town of T'ang-tu-k'ou, which became the county seat when Shao-yang became a municipality.

A county named Chao-ling Hsien was established at Shao-yang in the 2nd century BC. In the mid-3rd century AD it became the seat of a commandery called Shao-ling Chün, and in 589 reverted to the status of a county under its modern name Shao-yang. Under the T'ang dynasty (618–907) it became the seat of a prefecture, Shao Chou, and, under the Sung dynasties (960–1279), was promoted in 1225 to be a superior prefecture, Pao-ch'ing Fu. It retained its name until 1912, when it became a county, Shao-yang Hsien, and for some years thereafter was known as Pao-ch'ing Hsien.

The city is at the centre of an extensive highway network covering central Hunan, has a rail connection to Chu-chou and Ch'ang-sha, and has good river transport to the Tung-t'ing Hu (lake) and to the Yangtze River. It is the chief collecting point for grain, beans, cotton, and other agricultural products from the surrounding plain, and for timber and forestry products from both the upper valley of the Tzu Shui, and the Hsüeh-feng Shan (mountains) to the west.

Shao-yang has traditionally been a centre for handicrafts, making iron pots, fine bamboo carvings, writing brushes, and paper. Since 1949 there has been some modern industrial development. There is a large hydroelectric plant at Chen-ch'i to the northwest. Shao-yang has a large paper mill, produces coal, and has factories making automobile accessories and other products. Pop. (mid-1970s est.) 100,000–300,000.

Shao Yung, Pinyin SHAO YONG, also called (Wade–Giles romanization) SHAO K'ANG-CHIEH, or SHAO YAO-FU (b. 1011, Kung-ch'eng, China—d. 1077, Honan), Chinese philosopher who greatly influenced the development of the Idealist school of Neo-Confucianism. Shao Yung's mathematical ideas also influenced the 18th-century European philosopher Gottfried Wilhelm Leibniz in the development of a binary arithmetical system; *i.e.*, one based on only two digits.

Originally a Taoist, Shao refused all offers of government office, preferring to while away the hours in a humble hermitage outside Honan, conversing with friends and engaging in mystical speculation. He became interested in Confucianism through his study of the great Confucian Classic and work of divination, the *I Ching* ("Classic of Changes"). Through the *I Ching,* Shao developed his theories that numbers are the basis of all existence. To him, the spirit that underlies all things could be comprehended if one understood the division of the different elements into numbers. But unlike most previous Chinese numerologists, who usually preferred the numbers two or five, Shao believed the key to the world hinged on the number four; thus the universe is divided into four sections (Sun, Moon, stars, and zodiac), the body into four sense organs (eye, ear, nose, and mouth), and the Earth into four substances (fire, water, earth, and stone). In a similar way, all ideas have four manifestations, all actions four choices, and so forth.

Although this complicated system was outside the basic concerns of Confucianism and exercised only a peripheral influence on the development of Chinese thought, what was important was the basic theory behind the system; there is an underlying unity to existence, which can be grasped by the superior man who understands its basic principles. The idea that the underlying principle behind the unity of the universe exists in man's mind as much as in the universe was the basis of the Idealist school of Neo-Confucianism. Moreover, Shao brought into Confucianism the Buddhist idea that history consists of series of repeating cycles. These cycles, known to Buddhists as Kalpas, were called *yüan* by Shao and reduced from an astronomical length to a comprehensible duration of 129,600 years. This theory was later accepted by all branches of Neo-Confucianism and made part of the official state ideology by the 12th-century Sung scholar Chu Hsi.

Shaochou (China): *see* Shao-kuan.

Shaoxing (China): *see* Shao-hsing.

shape-note hymnal, also called PATENT-NOTE HYMNAL, or BUCKWHEAT-NOTE HYMNAL, U.S. hymnal incorporating many folk hymns and utilizing a special musical notation. The seven-note scale was sung not to the syllables do–re–mi–fa–sol–la–ti but to a four-syllable system carried with them by early English colonists: fa–sol–la–fa–sol–la–mi. Differently shaped note heads were used for each of the four syllables: mi (♀), la, or law (♈), fa, or faw (♇), and sol (♂). The notation of the music was normal except that the note heads of the shape-note system replaced the regular ones. The singer read the music by following the shapes of the note heads, although someone unfamiliar with the system could read the notes according to their placement on the staff.

The hymns normally appear in three-part or, less often, four-part harmonizations. Traditional rules of European harmony are consistently disregarded, giving rise to a spare, vigorous style in which the movement of the individual melodic lines is of primary importance. The melody is normally in the tenor part. Melodies are drawn from folk hymns, religious ballads, revival spirituals (*see* spiritual), hymns of 18th- and early 19th-century Americans, and, to a lesser extent, popular hymns and anthems of European composers.

The shape-note tradition waned in New England around 1815, pressured by urban trends toward Europeanized music, but it thrived in the Midwest and South. Important hymnals from this period were John Wyeth's *Repository of Sacred Music, Part Second* (1813) and Ananias Davisson's *Kentucky Harmony* (1816).

Only in the 1880s did the shape-note system decline. Still in use among shape-note singers, who often meet in annual singing conventions, are William Walker's *Southern Harmony* (1835; 7th ed. 1854) and Benjamin Franklin White and E.J. King's *Sacred Harp* (1844; 7th ed. 1960), both of which use four shapes. Walker's *Christian Harmony* (1866) used his own seven-shape system.

shaped poetry: *see* pattern poetry.

shaper, metal-cutting machine in which the workpiece is usually held in a vise or similar device that is clamped to a table and can be manually operated or power driven at right angles to the path of a chisel-like cutting tool with only one cutting edge held on the end of a reciprocating ram. A moving table feeds the workpiece in small, discrete increments at the end of each stroke of the tool, and a scalloped but essentially flat surface is generated on the workpiece. The adjustable mounting of the tool permits the cutting of grooves and the generation of surfaces at almost any angle to one another.

The rams on most shapers reciprocate horizontally. Shapers with vertical rams are known as slotters, or die shapers, and are frequently provided with rotary tables. Means are provided on all shapers for varying the length of stroke and speed of the ram.

Shapiro, Karl (Jay) (b. Nov. 10, 1913, Baltimore), U.S. poet and critic whose verse ranges from passionately physical love lyrics to sharp social satire.

Educated at the University of Virginia and Johns Hopkins University, Shapiro first came to critical attention in 1942 with *Person, Place and Thing,* a celebration of his world. *V-Letter and Other Poems* (1944) won the Pulitzer Prize for poetry in 1945. His later works include other volumes of poetry—notably *Poems of a Jew* (1958) and *White-Haired Lover* (1968)—and several works of literary criticism—such as *Beyond Criticism* (1953), *In Defense of Ignorance* (1960), and *The Poetry Wreck* (1975). Shapiro was consultant in poetry to the Library of Congress (1946–47) and editor of *Poetry* magazine (1950–56). From 1956 he also taught at the universities of Nebraska, Illinois, and California. *Collected Poems, 1948–1978* was published in 1978.

Shapley, Harlow (b. Nov. 2, 1885, Nashville, Mo., U.S.—d. Oct. 20, 1972, Boulder, Colo.), U.S. astronomer who deduced that the Sun lies near the central plane of the Galaxy some 30,000 light-years away from the centre.



Shapley

By courtesy of the Niels Bohr Library, American Institute of Physics, New York

In 1911 Shapley, working with results given by Henry N. Russell, began finding the dimensions of stars in a number of binary systems from measurements of their light variation when they eclipse one another. These methods remained the standard procedure for more than 30 years. Shapley also showed that Cepheid variables cannot be star pairs that eclipse each other. He was the first to propose that they are pulsating stars.

Shapley joined the staff of the Mt. Wilson Observatory, Pasadena, Calif., in 1914. Utilizing the 60-inch reflecting telescope at Mt. Wilson, he made a study of the distribution of the globular clusters in the Galaxy; these clusters are immense, densely packed groups of stars, some containing as many as 1,000,000 members. He found that of the 100 clusters known at the time, one-third lay within the boundary of the constellation Sagittarius. Utilizing the newly developed concept that variable stars accurately reveal their distance by their period of variation and apparent brightness, he found that the clusters were distributed roughly in a sphere whose centre lay in Sagittarius. Since the clusters assumed a spherical arrangement, it was logical to conclude that they would form themselves about the centre of the Galaxy; from this conclusion and his other distance data Shapley deduced that the Sun lies at a distance of 50,000 light-years from the centre of the Galaxy; the number was later corrected

to 30,000 light-years. Before Shapley, the Sun was believed to lie near the centre of the Galaxy. His work, which led to the first realistic estimate for the actual size of the Galaxy, thus was a milestone in galactic astronomy.

In addition to his studies of the Galaxy, Shapley studied the neighbouring galaxies, especially the Magellanic Clouds, and found that galaxies tend to occur in clusters, which he called metagalaxies. Shapley became professor of astronomy at Harvard University, later director of Harvard College Observatory (1921–52), and was made director emeritus and Paine Professor of Astronomy at Harvard in 1952. His works include *Star Clusters* (1930), *Flights from Chaos* (1930), *Galaxies* (1943), *The Inner Metagalaxy* (1957), and *Of Stars and Men* . . . (1958).

Articles are alphabetized word by word, not letter by letter

Shāpūr, Latin SAPOR, Pahlavi SHAH-PUHR, Greek SAPORES, name of Sāsānian kings of Persia, grouped below chronologically and indicated by the symbol •.

• **Shāpūr I,** Latin SAPOR, Arabic SĀBŪR (d. AD 272), Persian king of the Sāsānian dynasty who consolidated and expanded the empire founded by his father, Ardashīr I. Shāpūr continued his father's wars with Rome, conquering Nisibis (modern Nusaybin, Tur.) and Carrhae (Harran, Tur.) and advancing deep into Syria. Defeated at Resaina (now in Turkey) in 243, he was able, nevertheless, to conclude a favourable peace in 244. In 256 he took advantage of the internal chaos within the Roman Empire and invaded Syria, Anatolia, and Armenia; he sacked Antioch but was repulsed by the emperor Valerian. In 260, however, Shāpūr not only defeated Valerian at Edessa (modern Urfa, Tur.) but captured him and



Shāpūr I, coin, 3rd century; in the British Museum

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

kept him a prisoner for the rest of his life. The capture of Valerian was a favourite subject of Sāsānian rock carvings. Shāpūr does not appear to have aimed at a permanent occupation of the eastern Roman provinces; he merely carried off enormous booty both in treasure and in men. The captives from Antioch were forced to build the city of Gondēshāpūr, later famous as a centre of learning. Using the same captives, who excelled the Persians in technical skill, he built the dam at Shūshtar known from that time as the Band-e Qeyṣar, Dam of Caesar.

Shāpūr, no longer content to describe himself as "king of kings of Iran," as his father had done, styled himself "king of kings of Iran and non-Iran"—that is, of non-Persian territories as well. He appears to have tried to find a religion suitable for all of the empire, showing marked favour to Mani, the founder of Manichaeism. Inscriptions show that he also founded Zoroastrian fire temples and sought to broaden the base of the newly revived Zoroastrian religion by the addition of material derived from both Greek and Indian sources.

• **Shāpūr II,** byname SHĀPŪR THE GREAT (b. AD 309—d. 379), 10th king of the Sāsānian Empire of Persia, who withstood Roman strength by astute military strategy and diplomacy and brought the empire to the zenith of its power.

Early life and accession. The name Shāpūr, meaning "son of a king," was common in the Sāsānian period and was often given to sons other than princes. Numerical designations were not used to distinguish kings of the same name; instead, the family genealogy was cited. Thus, in one inscription, Shāpūr styles himself,

> the Mazdāh-worshipping god Shāpūr, king of kings of Iran and non-Iran, who is a scion of the Gods, the son of Hormizd (Ormizd II), the grandson of Narses.

According to tradition, his father died before Shāpūr was born, and the child was proclaimed king by the Persian nobility at his birth in 309, in preference to his brothers. After a regency, he apparently took the realm into his own hands in 325 at the age of 16.

A contemporary account describes his appearance and courage in battle:

> And he himself, mounted on his charger, and being taller than the rest, led his whole army, wearing instead of a crown a golden figure of a ram's head inlaid with jewels; being also splendid from the retinue of men of high rank and of different nations which followed him . . . He rode up to the gates [of Amida]; escorted by the cohort of his royal guard; and while pushing on more boldly, so that his very features might be plainly recognized, his ornaments made him such a mark for arrows and other missiles, that he would have been slain, if the dust had not hindered the sight of those who were shooting at him; so that after a part of his robe had been cut off by a blow of a javelin, he escaped to cause vast slaughter at a future time.

Persecution of Christians. In 337 Shāpūr sent his forces across the Tigris River, the uneasy frontier, to recover Armenia and Mesopotamia, which his predecessors had lost to the Romans. Until 350 conflict raged in northern Mesopotamia, with neither side a clear-cut victor. Shortly after 337, Shāpūr took an important policy decision. Although the state religion of the Sāsānian Empire was Mazdaism (Zoroastrianism), Christianity flourished within its boundaries. The Roman emperor Constantine the Great had granted toleration to Christians in 313. With the subsequent Christianization of the empire, Shāpūr, mistrustful of a potential force of a fifth column at home while he was engaged abroad, ordered the persecution and forcible conversion of the Christians; this policy was in force throughout his reign.



Shāpūr II, gold coin, 4th century; in the British Museum

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

In 358 he was ready for a second encounter with Rome and sent an ambassador to the emperor Constantius II, bearing presents and a letter wrapped in white silk. This letter read, in part,

> I Sapor, king of kings, partner of the stars, brother of the sun and the moon, to Constantius Caesar my brother send much greeting . . . Because . . . the language of truth ought to be unrestrained and free, and because men in the highest rank ought only to say what they mean, I will reduce my propositions into a few words . . . Even your own ancient records bear witness that my ancestors possessed all the country up to the Strymon and the frontier of Macedonia. And these lands it is fitting that I who (not to speak arrogantly) am superior to those ancient kings in magnificence, and in all eminent virtues, should now reclaim. But I am at all times thoughtful to remember that, from my earliest youth, I have never done anything to repent of.

When Constantius politely refused to hand over these lands, Shāpūr marched into northern Mesopotamia, this time with marked success. In 363, however, the emperor Julian led a huge army into Persia, creating havoc and advancing to the very gates of Ctesiphon on the Tigris, a major Sāsānian city. Julian was mortally wounded in a skirmish, and his successor, Jovian, was compelled to accept an ignominious 30 years' truce and surrender of five Roman provinces.

Conquest of Armenia. Shāpūr then turned his attention to Armenia. He defeated its pro-Roman ruler and attempted to force Zoroastrianism on the country. The Romans, however, regained their influence in Armenia, and a precarious balance between Romans and Persians existed from about 374. For five years, Armenia was weakened by internecine strife, and one of Shāpūr's last acts was to win it over by discreet gifts. Shāpūr's death in 379 left Persia with its territory considerably augmented: he had pacified the eastern frontier and gained control over Armenia; the Persian Empire had never been stronger. But war with Rome had become habitual and eventually undermined the strength of the Sāsānians.

As did the other great rulers of his line, Shāpūr considered himself an heir of the great Achaemenid Empire and strove to renew its glory. Indeed, his letter to Constantius contains a distant echo of the wording of the inscriptions of Darius I the Great, the Achaemenid ruler, when he writes of his devotion to truth and righteousness. Shāpūr was called a god, and he lived up to this exalted status, becoming irascible, even violent, when individuals summoned to his presence appeared to pay insufficient respect to his awesome majesty.

The figure of Shāpūr survives. A large silver plate has a scene in relief that shows him hunting lions with bow and arrow, and countless silver coins portray his face in profile. At Bishāpūr in southwestern Iran, a tremendous rock-cut relief depicts him seated on a throne and witnessing a triumph of his army: in the top row he is flanked by nobles of the court, and the lower row contains soldiers who present captives and trophies of victory.

(D.N.W.)

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Shaqing (Chinese culture): *see* Sha-ch'ing.

Sharaf ad-Dīn ʿAlī Yazdī (b. Yazd, Iran—d. 1454, Yazd), Persian historian, one of the greatest of 15th-century Iran.

Little about his early life is known. As a young man he was a teacher in his native

Yazd and a close companion of the Timurid ruler Shāh Rokh (1405–47) and his son Mīrzā Ibrāhīm Sulṭān. In 1442/43 he became the close adviser of the governor of Iraq, Mīrzā Sulṭān Muḥammad, who lived in the city of Qom. His patron, however, attempted a revolt against the reigning Shāh Rokh, and Sharaf ad-Dīn was fortunate enough to be cleared of any complicity. He was granted permission to return to his native city, where he lived until his death. The work for which he is best known is the *Ẓafernāmeh* (1424/25; *The Book of Victory*). It is a history of the world conqueror Timur (Tamerlane; 1370–1405) and was probably based on the history of the same name by Nizam ad-Dīn Shami, a work written at Timur's request.

Sha'rānī, ash-, original name 'ABD AL-WAHHĀB IBN AḤMAD (b. 1492, Cairo—d. 1565, Cairo), Egyptian scholar and mystic who founded an Islāmic order of Ṣūfism.

Throughout his life Sha'rānī was influenced by the pattern of his education. His introduction and exposure to Islāmic learning were limited; his formal education was concerned with the *'ulūm al-wahb* ("gifted knowledge of the mystic"), as opposed to a traditional and rigorous study of Islāmic sciences. He attempted to seek the middle ground between the rigid learning and legalism of the *'ulamā'* (the theologians of Islām) and the mystics' pantheism and pursuit of spirituality. He consistently ignored distinctions and niceties within the major schools of Islāmic law, as well as the marked differences between the various Ṣūfī orders. This approach antagonized the orthodox among the *'ulamā'* and the Ṣūfīs, and he was persecuted for his beliefs and doctrines and forced to maintain himself by practicing the craft of a weaver.

Sha'rānī criticized the *'ulamā'* for their legal rigidity, neglect of duties, mock learning, and inability to come to terms with the social problems of Egyptian society. He believed that the distinctions between the schools of Islāmic law were socially divisive and advocated instead a unified approach to the law, using the best elements of each school. He castigated many of the Ṣūfī orders as being corrupt and believed that their practices were contrary to the Sharī'ah—the body of Islāmic legal doctrines that regulated society.

Sha'rānī founded a Ṣūfī order known as ash-Sha'rawīyah and attempted to select the best elements from the diverse and often conflicting world of the Ṣūfīs and the *'ulamā'* for its operating principles. The order was housed in a well-endowed *zāwiyah,* a kind of monastery, and had attached to it a school for the training of law students; it also provided care for the needy and for travelers. Unlike most Ṣūfī orders, it had practical aims and eschewed esoteric pursuits or sham spirituality.

Sha'rānī was unsystematic in his thoughts; his writings demonstrate confusion as well as originality. Although his mysticism was not influenced by pantheism, he found it possible to defend the pantheism of the 13th-century mystic Ibn al-'Arabī. The bulk of Sha'rānī's writing was concerned with traditional learning. Of special interest is his *ṭabaqāt,* a biographical dictionary of mystics, and his autobiography, *Laṭā' if al-Mīnan.* Upon his death he was succeeded by his son 'Abd ar-Raḥmān as head of the order. 'Abd ar-Raḥmān was more concerned with temporal matters, however, and the order declined, though it remained popular until the 19th century.

Sharavati River, river in western Karnātaka (formerly Mysore) state, southern India, rising in the western Ghāts and flowing for 60 miles (95 km) in a northwesterly direction to the Arabian Sea at Honāvar. About 18 miles (29 km) upriver from its mouth, the Sharavati attains a breadth of 230 feet (70 m) before it makes a sudden 830-foot (250-metre) drop, splitting into four scenic cataracts known as Jog Falls (*q.v.*). The Mahatma Gandhi Hydroelectric Power Station and the Sharavati Valley Project, a few miles downstream (east) of the cataract, generate much of the electricity for Karnātaka state.

sharecropping: *see* tenant farming.

Shari River (Africa): *see* Chari River.

Sharī'ah, the fundamental religious concept of Islām, namely its law, systematized during the 2nd and 3rd centuries of the Muslim era (8th–9th century AD).

A brief treatment of Sharī'ah follows. For full treatment, *see* MACROPAEDIA: Islām, Muḥammad and the Religion of.

The formulation of the Sharī'ah rests on four bases (*uṣūl*):

1. The Qur'ān (*q.v.*).
2. The sunna ("the way") of the Prophet as recorded in the Tradition, or Hadīth (*q.v.*).
3. The *ijmā',* or universal agreement, which has been materially perhaps the most important factor in defining what the Qur'ān and the sunna mean (*i.e.,* in formulating the doctrine and practice of the Muslim community) but which itself has curiously remained the least clearly formulated religious institution of Islām. Its full nature and implications have never been adequately analyzed either in medieval Islām or by modern scholarship.

Two important points must be borne in mind. First, although this is not inherent in the concept itself, *ijmā',* in the premodern Islāmic usage, has always had reference to the past, near or remote, and does not denote a contemporaneous agreement. In the modern Muslim usage of the term, however, *ijmā'* has come to mean a democratic institution opposed to traditional authority. Second, and consequently, far from working as a monolithic principle of unique standardization, *ijmā'* came to operate as a principle of toleration of different traditions within Islām.

4. The fourth principle of the Sharī'ah formulation, known as *qiyās,* or analogical reasoning, is the genuine basis of interpretation and thought (*ijtihād*) in Islām. It is this which makes progressive *ijmā'* possible. Its earlier form was personal thought and opinion (*ra'y*), which was criticized by many eminent traditional authorities as "arbitrary."

There are four sciences known as the sciences of the Sharī'ah: the prophetic Tradition (Ḥadīth), the Qur'ānic exegesis (*tafsīr*), theology (*kalām*), and law (*fiqh*). The first two are the materials for theology and law. In the four schools of law, the Ḥanafī, the Mālikī, the Shāfi'ī, and the Ḥanbalī, which took shape early—during the first two centuries of Islām—law and theology were a unity and were not separated, although theology at that time was merely a statement of the doctrine. As a result of increased exposure to other religious systems, a cleavage occurred between the law and the doctrine, and the former, which ideally presupposed the latter as its base, came not only to be an independent discipline but to claim for itself the title of the science of the Sharī'ah par excellence and was even identified with the Sharī'ah itself. Thus *fiqh,* which originally meant an understanding of the entire range of the faith, came to be applied to law alone.

Sharī'ah differs fundamentally from Western law in that it is not, in theory, man-made but rather grounded in divine revelation. Among modern Muslim countries, Saudi Arabia retains the Sharī'ah as the law of the land, secular as well as religious, but the westernized civil codes of most other Muslim countries have departed from the precepts of Sharī'ah when this was deemed unavoidable.

sharif, Arabic, SHARĪF ("noble," or "high-born"), plural ASHRĀF, Arabic title of respect, restricted, after the advent of Islām, to members of Muḥammad's clan of Hāshim—in particular, to descendants of his uncles al-'Abbās and Abū Ṭālib and of the latter's son 'Alī by Muḥammad's daughter Fāṭimah. In the Hejaz (western coast of Arabia), the title of sharif is said to have been further restricted to the descendants of Ḥasan, the elder son of 'Alī and Fāṭimah. Sharifs originally were heads of prominent families in a town. Later they supplied the local semiautonomous rulers of Mecca and Medina, especially when the cities were under the suzerainty of Baghdad and Cairo, while after the establishment of Ottoman rule, the Ottomans normally recognized the senior representative of the sharifs as prince of Mecca.

Shāriqah, ash- (Arabic: "The Eastern"), English SHARJAH, constituent emirate of the United Arab Emirates (formerly Trucial States, or Trucial Oman). Some of ash-Shāriqah's interior boundaries are only presumptive, but its main portion is an irregularly shaped tract, oriented northwest–southeast, stretching about 60 miles (100 km) from the Persian Gulf (northwest) to the central inland region of the Oman promontory (southeast). Ash-Shāriqah also has three coastal enclaves on the eastern, or Gulf of Oman, side of the promontory; they are, from north to south, Dibā (ownership of which is shared with al-Fujayrah emirate and the sultanate of Oman), Khawr Fakkān, and Kalbā. Because of the extreme political fragmentation in the region, ash-Shāriqah, including its enclaves, has common boundaries with each of the six other emirates of the union, as well as with the sultanate of Oman. The area is approximately 1,000 square miles (2,600 square km); the capital and chief settlement is ash-Shāriqah town, situated on the Persian Gulf.

The Qawāsim, the ruling dynasty of ash-Shāriqah, were the principal leaders of the Persian Gulf pirates from the early 18th century; from their bases at ash-Shāriqah town and, more particularly, Ras al-Khaimah town, they raided shipping of all flags with impunity and even threatened Bushire (Bushehr), then Britain's main base in the area, on the eastern (Persian, or Iranian) coast of the Gulf of Oman. The chief pirate leader was Sulṭān ibn Ṣaqr, sheikh of ash-Shāriqah (reigned 1803–66). The British fleet succeeded in defeating the pirates (1820), razed Ras al-Khaimah town, and made the Persian Gulf sheikhs sign the General Treaty of Peace (1820), a maritime truce (1835), and the Perpetual Maritime Truce (1853). Under the terms of the Exclusive Agreement (1892), ash-Shāriqah's foreign relations were placed in British hands. The 19th-century treaties, in general, were concerned with preserving the peace at sea, and Britain did not interfere with the warlike Qawāsim's attempts to take Abu Dhabi (1825–31; 1833–34).

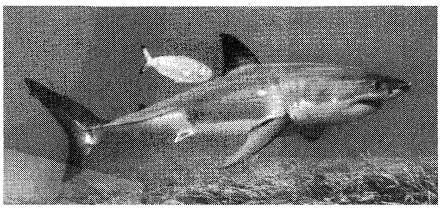
The port of ash-Shāriqah town was long an important strategic and commercial centre in the gulf. Britain recognized its political significance by stationing a native agent (later succeeded by a British agent) as their "residency agent" in the Persian Gulf there from 1823. As the port at ash-Shāriqah town silted up and Dubayy town became the chief port of the Trucial Coast, the political agent was moved to Dubayy town in 1954; a separate agency was set up in Abu Dhabi town in 1961, for Abu Dhabi affairs only. The entire system of British protection ended in December 1971, when Britain left the Persian Gulf and the newly independent United Arab Emirates came into being.

Prior to independence Iran asserted its claim to the ash-Shāriqah island of Abū Mūsā, in the open gulf northwest of ash-Shāriqah town, and landed troops there. A subsequent agreement between Iran and ash-Shāriqah promised that both flags would fly over the island, settled

the question of possible future oil discoveries in the area (where ash-Shāriqah had granted a concession), and provided for an Iranian subsidy to ash-Shāriqah. Nevertheless, this, and a less-satisfactory settlement of the Iranian claim to Greater and Lesser Ṭunb islands with neighbouring Ras al-Khaimah emirate, led to some Arab states severing diplomatic relations with Iran and Britain.

Modernization in ash-Shāriqah has been largely confined to the capital, ash-Shāriqah town. New buildings have been constructed, a deepwater port (including modern container terminals and cold-storage facilities) built, light industries are being expanded, and the town has an international airport. Ash-Shāriqah town is connected by paved road with Ras al-Khaimah town and Abu Dhabi town. The exclave of Khawr Fakkān on the Gulf of Oman has an active trade, especially in gold-smuggling to India; it is the seat of the union's fisheries research station. In 1964–72 a large portion of ash-Shāriqah's revenue came from commemorative stamps, printed almost solely for philatelic purposes. Pop. (1985 prelim.) 268,723.

shark, any of the cartilaginous fishes (class Chondrichthyes [Selachii]) characterized by a



Great white shark (*Carcharodon carcharias*)
Al Giddings/Ocean Images, Inc.

pointed snout extending forward and over a crescentic mouth set with sharp triangular teeth and also characterized by paired, largely lateral gill slits, well-defined eyes, pointed fins, a muscular, upturned tail, and toothlike scales. It has no swim bladder. There are an estimated 200 to 250 living species of sharks, taxonomically grouped into one or more orders according to different authorities. Several larger kinds can be dangerous to humans; smaller ones, called topes, hounds, and dogfishes, are fished commercially.

Description and habits. Shark species are often similar in appearance and nondescript in colour, varying from cream to gray, brown, yellow, slate, or blue, often patterned with spots, bands, marblings, or protuberances. Their vernacular names indicate colours in living species, such as the blue (*Prionace*), the white (*Carcharodon*), and the lemon (*Negaprion*). Young tiger sharks (*Galeocerdo*) have a barred pattern of dark spots. The whale sharks (*Rhincodon*) and basking sharks (*Cetorhinus*), which may reach 15 m (50 feet) and weigh several tons, are harmless giants that subsist on plankton strained from the sea through modified gill rakers. All other sharks prey on small sharks, fish, squid, octopuses, shellfish, and, in some species, trash. The largest among them is the voracious 12-metre (40-foot) great white shark, or man-eater, which attacks seals, sea turtles, large fish, and occasionally people. The more sluggish Greenland shark (*Somniosus*) of cold, deep waters, while half the size of the white shark, reputedly feeds on seals, large fish, whales, and even swimming reindeer. Normally, sharks feed on fish, often attacking in schools; open-ocean species such as the mackerel, mako, and thresher sharks frequently feed near the surface and are much sought-after by rod-and-reel sportsmen. Beautifully streamlined and powerful swimmers, these open-ocean sharks are adept at feeding on fast tuna, marlin, and the like. Bottom-feeding species are stout, blunt-headed forms, tending to more sluggish habits; the shellfish eaters have coarse, pavementlike, crushing teeth. The oddest-looking sharks are the hammerheads (*Sphyrna*), whose heads resemble double-headed hammers and have an eye on each stalk.

Fertilization in sharks is internal, the male introducing sperm into the female by means of special copulatory organs (claspers) derived from the pelvic fins. The young in most species hatch from eggs within the female and are born alive.

The origin of sharks is obscure, but their geological record goes back to Devonian period (408 to 360 million years ago). Fossil shark-fish appeared in the Middle Devonian epoch, becoming the dominant vertebrates of the Carboniferous period (360 to 286 million years ago), when a great warmth reduced the subarctic and subantarctic to insignificant polar rings. Modern sharks appeared in the Early Jurassic and by the Cretaceous had expanded into present-day families. A giant predator, the 15-metre (50-foot) *Carcharodon megalodon,* became extinct in the Tertiary. Overall, evolution has modified shark morphology very little except to improve the feeding and swimming mechanisms. Shark teeth are highly diagnostic of species, both fossil and modern.

Geographical ranges are not well known; extensive movements are related to reproductive or feeding activities or to seasonal environmental changes. Tagging returns from large sharks on the East Coast of the United States indicate regular movements between New Jersey and Florida. A tagged spiny dogfish (*Squalus*) was recovered after traveling about 1,600 km (1,000 miles) in 129 days; a leopard shark (*Triakis*) after 47 days moved only about 3 km (2 miles). Some members of the *Carcharhinus* genus enter fresh waters, principally the Zambezi, Ganges, Euphrates, and Tigris; lesser rivers in Asia, Australia, tropical South America, Central America, and the southern United States; and Lakes Nicaragua and Yzabal (Guatemala). Riverine sharks, while small to medium-sized, are exceptionally voracious and bold.

Shark behaviour. Information in the second half of the 20th century on shark ecology and individual and group actions provided a better insight into their behaviour. Because large sharks feed on lesser ones, the habit of segregation by size appears vital to their survival; in a uniform grouping, dominance between various species is apparent in feeding competition, suggesting a definite nipping order. All sharks keep clear of hammerheads, whose maneuverability, enhanced by the rudder effect of the head, gives them swimming advantage over other sharks. Sharks circle their prey, disconcertingly appearing out of nowhere and frequently approaching from below. Feeding behaviour is stimulated by numbers and rapid swimming when three or more sharks appear in the presence of food; activity progresses from tight circling to rapid crisscross passes. Under strong feeding stimuli, excitement can intensify into cannibalistic feeding, or "shark frenzy," in which injured sharks, regardless of size, are devoured. Sharks may abstain from food for long periods and in captivity may refuse to feed. Feeding is inhibited in large males during courtship and in gravid females while on the nursery grounds. Areas selected for giving birth are usually free of large sharks. In locating food, the shark uses primarily the chemical senses, particularly the olfactory. Visual acuity is adapted to close and long-range location and to distinguishing moving objects more by reflection than by colour, in either dim or bright light. Pit organs over the body serve as distance touch-receptors, responding to displacement produced by sound waves. Irregularly pulsed signals below 800 hertz will bring sharks rapidly to a given point, suggesting acoustic orientation from considerable distances.

Biting habits vary with feeding methods and dentition. Sharks with teeth adapted to shearing and sawing are aided in biting by body motions including a rotation of the body, twisting movement of the head and body, or rapid vibration of the head. In coming to position, the shark protrudes its jaws, erecting and locking the teeth in position. The long tail of the thresher shark is used on schooling fish feeding on the surface.

Hazards to humans. In Australia, New Zealand, South Africa, and elsewhere along coasts exposed to the shark nuisance, public beaches often have lookout towers, bells and sirens, or nets, as protection against the shark hazard. Since 1937, meshing has been employed off Australian beaches to catch sharks, using gill nets suspended between buoys and anchors, parallel to the beach and beyond the breaker line. The nets enmesh sharks from any direction; and, even while touching neither the surface nor the bottom and spaced well apart, the nets give simple, effective control. Continuous, permanent fencing of steel mesh or barricades is false security, however, unless patrolled daily; such fencing has been penetrated, with fatal results.

The most feared species is the great white shark, whose erratic presence in the U.S. coastal waters has given rise to particularly distressing attacks in Buzzard's Bay, Mass., off the New Jersey shore, and, with most frequency, along the California coast. Other sharks involved in attacks on humans are the tiger, bull, oceanic white tip, blue, and hammerhead.

Of course, the larger the shark, the more formidable the attack, but several small specimens can be equally hazardous, a fact well attested to by wartime sea survivors. Attacks occur when sharks are hungry, harrassed, or, in some cases, defending territory. It had previously been thought that attacks were limited to waters with temperatures higher than about 21° C (70° F) and that the greatest hazard thus existed in the tropics and, during the summer months, in the temperate zones; it had also been noted that the majority of attacks occur in shallow water near the shore. More recently, however, it has been suggested that these conditions merely reflect the fact that most swimmers prefer warm water and swim from shore rather than from boats. Attacks have occurred in the chilly waters of the higher latitudes. There is evidence that most incidents take place in late afternoon, when human activity coincides with that of sharks, which usually feed at dusk and after dark. Provocation is heightened by the sight of bright and contrasting swimsuits (though black wetsuits may make the wearer look like a seal and thus attract white sharks), by the sight of uneven skin tanning, by the presence of speared fish or bait in the water, by the presence of blood from wounds or menstruation, by the occurrence of underwater noises, and by the presence of deep channels, sandbars, or reefs. Most injuries occur on the lower limbs and buttocks. Injury may also occur when a swimmer is inadvertently cut by the pectoral fin of a passing shark. It has been estimated that there are about 100 attacks per year. About 25 percent of these are fatal, largely owing to hemorrhage and shock (usually controllable through first-aid measures). No effective individual protective measures for the safety of swimmers have been developed. It should be noted, however, that shark attacks are much less frequent than other aquatic mishaps.

Shark Bay, inlet of the Indian Ocean, Western Australia, sheltered on the west by Bernier, Dorre, and Dirk Hartog islands, Peron Peninsula bisects the bay. Geographe Channel forms the bay entrance north of Bernier Island; the principal port is Carnarvon, at the mouth of

the Gascoyne River. Explored in 1616 by the Dutch navigator Dirk Hartog, the bay was named (1699) by the pirate William Dampier for its numerous sharks. Pearling, once important, has given way to fishing (prawns, crayfish, whiting, snapper). Salt extraction is a significant industry, and sheep graze on the shore. Shark Bay shire bounds the bay to the south and southeast.

Sharkey, Jack, byname of JOSEPH PAUL ZUKAUSKAS (b. Oct. 26, 1902, Binghamton, N.Y., U.S.), American world heavyweight-boxing champion from June 21, 1932, when he defeated Max Schmeling in 15 rounds at Long Island City, N.Y., until June 29, 1933, when he was knocked out by Primo Carnera in six rounds in New York City.

Sharkey, who named himself for a former leading heavyweight, Sailor Tom Sharkey, was, like his prototype, a sailor before entering the ring. He became prominent in 1926–27 with victories over championship contenders Harry Wills, Mike McTigue, and Jim Maloney. He was perhaps at his best in a controversial defeat by Jack Dempsey in New York City, July 21, 1927; Dempsey knocked Sharkey out in the seventh round while Sharkey was protesting an alleged foul blow.

In his first chance at the heavyweight championship, in 1930, Sharkey lost to Schmeling on a foul. His subsequent victory over Schmeling was unpopular, many observers thinking that the loser deserved the honours. Sharkey's loss of the title was also a matter of controversy: Carnera was widely believed to be backed by gangsters, who were suspected of fixing the fight. Sharkey retired from the ring in 1936. From 1924 to 1936 he had 55 bouts, winning 38, 15 by knockouts.

Sharkia (Egypt): *see* Sharqīyah, ash-.

sharksucker (fish): *see* remora.

Sharm ash-Shaykh, also spelled SHARM EL-SHEIKH (Sinai, Egypt): *see* Ra's Naṣrānī.

Sharman, Bill, byname of WILLIAM WALTON SHARMAN (b. May 25, 1926, Abilene, Texas, U.S.), American professional basketball player noted for his skills as a free-throw shooter and as a long-range field-goal marksman.

After graduation from the University of Southern California, Los Angeles (1950), Sharman played minor-league baseball before beginning his basketball career. He first played basketball with the Washington Capitols (1950–51). In his 10 seasons (1951–52 through 1960–61) with the Boston Celtics of the National Basketball Association (NBA), he averaged 17.8 points a game in regular play (12,665 points in 710 games) and 18.5 points in championship play-offs (1,446 points in 78 games). He established NBA career records for free-throw shooting average in regular seasons (.883, with 3,143 successful throws in 3,557 attempts; record later broken) and play-off series (.911, with 370 of 406). His average of .932 (342 of 367) in 1958–59 was an NBA record for a single season. In the play-offs following that season, he set another NBA standard with 56 consecutive successful free-throw attempts. Sharman was named to the NBA All-Star first team in three successive seasons (1956–59) and to the second team in 1953, 1955, and 1960.

After his retirement as a player, Sharman became a coach in professional basketball. He directed the Cleveland Pipers to the American Basketball League (ABL) title in 1961–62, the Utah Stars to the American Basketball Association (ABA) title in 1970–71, and the Los Angeles Lakers to the NBA title in 1971–72 and was named NBA coach of the year in 1972. He retired as a coach in 1976 and became general manager of the Lakers. Sharman was elected to the Basketball Hall of Fame in 1975 and was the author of *Sharman on Basketball Shooting* (1965).

Sharon, city, Mercer county, western Pennsylvania, U.S. It lies along the Shenango River at the Ohio border, 14 miles (23 km) northeast of Youngstown. It is part of an industrial area that includes Sharpsville, Farrell, and Wheatland. The original settlement developed about 1802 around a gristmill. It was laid out in 1815 and was probably named after the biblical plain.

The Sharon Furnace, which was built following the completion of the Lake Erie extension of the Pennsylvania Canal in 1844, became the nucleus of an important steel industry in the city. The manufacture of electric transformers and steel-based products constitute the basic economic activity. The Shenango Valley campus of Pennsylvania State University opened (1965) in Sharon. Buhl Park, the Shenango Dam and Reservoir, and the Shenango Recreation Area are located nearby. Inc. borough, 1841; city, 1918. Pop. (1988 est.) city, 16,260; Sharon MSA, 122,400.

Sharon, town (township), Windsor county, eastern Vermont, U.S. It lies along the White River, 29 miles (47 km) northeast of Rutland, and is surrounded on three sides by high hills. Founded in the 1730s during the religious revival known as the Great Awakening, it received its biblical name from Sharon, Conn., and was chartered in 1761.

A small lumbering-farming community, Sharon is known as the birthplace of Joseph Smith, founder of the Mormon faith, who was born Dec. 23, 1805, on an isolated farm in the township. His birthplace is marked by a monolith of polished Barre granite 38.5 feet (12 m) high, each foot representing a year of his life (he died June 27, 1844). The site is accessible by road from Royalton, about 2 miles (3 km) north of the Sharon town line. Pop. (1986 est.) 1,020.

Sharon, Ariel, byname ARIK SHARON (b. 1928, Kefar Malal, Palestine [now in Israel]), Israeli general and politician whose earlier military achievements were overshadowed by political controversy and the events of the 1982 Israeli invasion of Lebanon.

Sharon received military training early in life, becoming part of a Jewish defense force that protected kibbutzim (collective-farming settlements) from raids by Bedouins and neighbouring Arab villages. During the Israeli war of independence in 1948, he led one of the crack units and, after the war, was involved in intelligence and reconnaissance work and was in command of a controversial attack on Jordan in 1953. During the 1956 Suez war, Sharon captured the Mitla pass in the Sinai Peninsula, again garnering praise for his military ability and criticism for his ruthlessness. After the war he studied military theory at Staff College in Camberley, Eng., and law at Tel Aviv University, graduating with a law degree in 1966. He was made a major general in 1967, a few months before the 1967 war, in which he recaptured the strategic Mitla pass in a lightning-quick assault. Resigning from the Israeli army in July 1973, he was recalled for the October 1973 war. He spearheaded the Israeli counterattack westward across the Suez Canal into Egypt.

Amid charges of impulsiveness, uncontrollability, and dogmatism, Sharon made many enemies and was kept from the top army position that his military exploits might otherwise have gained him. He was instrumental in the formation of Likud in September 1973 and became a member of the Knesset (Parliament) that year. He was adviser (1975–77) to Prime Minister Yitzhak Rabin before joining Prime Minister Menachem Begin's Likud administration in 1977 as minister of agriculture in charge of settlements. In that position he was one of the most outspoken advocates of Jewish settlement in occupied Arab territories. Begin appointed him minister of defense in June 1981, and he was the principal architect of Israel's 1982 invasion of Lebanon, a war that brought worldwide censure of Israel. After Lebanese Christians committed massacres at two Palestinian refugee camps in Israeli-occupied Beirut, Israel set up a commission of inquiry to determine responsibility. While finding Sharon not directly responsible for the massacres, the commission found him indirectly responsible for failing to take action to prevent the bloodshed. Sharon resigned (1983) as minister of defense, although he remained a member of the Cabinet and a leading figure of Likud.

Sharon, Plain of, Hebrew HA-SHARON, section of the Mediterranean coastal plain, and the most densely settled of Israel's natural regions. Roughly triangular, extending about 55 miles (89 km) north-south from the beach at Mount Carmel to the Yarqon River at Tel Aviv-Yafo, the plain is bounded on the east by the Carmel range and by the hill country of Samaria. The Sharon's coast, like that of most of Israel, has no major indentations; sand dunes are common. The name occurs several times in the Old Testament; it is commonly derived from the Hebrew *yashar,* "straight," or "flat." The Septuagint (Greek Old Testament), however, sometimes gives the rendering of "copse," or "thicket." This is in agreement with historical sources, which attest to dense forests there from antiquity through the 18th century.

As a key section of the Via Maris, the ancient route from Egypt to the Fertile Crescent (the relatively well-watered lands arcing around the Syrian Desert, from Palestine on the west to the Tigris-Euphrates valley on the east), the Plain of Sharon has been inhabited since remote antiquity. Caves with house-urn burials dating to the Chalcolithic period in Palestine (the transitional stage between the Neolithic and Bronze ages; 4th millennium BC) have been found near the city of Ḥadera. The plain is mentioned in inscriptions of the Egyptian pharaoh Thutmose III (18th dynasty; reigned 1504–1450 BC). It is also found in the list of cities and kings conquered by Joshua (Josh. 12:18), though certain identification of the reference, "Lasharon," has not been made. Although the Sharon is mentioned only once in the New Testament (Acts 9:35), it is frequently referred to in rabbinic literature, often with allusions to its fertility.

The plain has been the main land invasion route of Palestine from the south throughout the ages, down to Napoleon (1799), and the British under Field Marshal Allenby (1917–18); the unsuccessful attacks of the Egyptians in the Arab-Israeli War (1948–49), though aimed at the plain, did not succeed in reaching it.

By the end of the 19th century, the forests had disappeared, and the plain was sparsely populated by Bedouin and village Arabs. Because of the low relief, the numerous small streams and wadis in the area formed swamps in the winter rainy season; malaria was endemic. Modern settlement of the Plain of Sharon was undertaken as part of the Zionist movement to resettle the agricultural lands of Palestine. The first settlement (1890) was at Ḥadera. The red sandy soils (*hamra*) of the Sharon were particularly suited for citrus fruits; the first orchard was planted at Ḥadera in 1894. With the acquisition of further tracts of land, new settlements were set up, and the acreage under citrus and mixed crops, especially truck crops, increased considerably. About a third of the agricultural area is devoted to citrus farming; the rest mostly to fodder, cotton, and vegetables. Viticulture is practiced in the north, while poultry raising has become a specialty in the south. Vineyards cover the Tanninim River (Naḥal Tanninim) valley.

By the early 1930s, the Sharon had become the most densely settled area of Jewish Palestine. This was recognized by the plans for partition of the country drawn up by the British Royal (Peel) Commission (1937), Palestine Partition (Woodhead) Commission (1938), and, later, by the United Nations Special Committee on Palestine (UNSCOP; 1947). While the boundary proposals of these bodies differed radically, they all envisaged the Plain of Sharon as the core area of any proposed Jewish state. Since Israeli independence (1948), the pace of industrialization and urbanization has quickened. Chief cities of the plain are Netanya, Herzliyya, Ḥadera, and Kefar Sava (*qq.v.*). Many of the smaller settlements have light industries. Tourism is important throughout; the ancient ruins of Caesarea and Dor are of special interest.

Many writers on biblical geography, as well as some modern Israeli experts, consider the Plain of Sharon proper to extend only as far north as the Naḥal Tanninim (Hebrew: Crocodile River; the former Arabic Nahr az-Zarqah). This streamlet enters the Mediterranean about 18 mi south of the Carmel promontory. These authorities sometimes call the narrow northern extension of the plain, between the Naḥal Tanninim and Mt. Carmel, the Plain of 'Atlit or the Plain of Dor.

Sharp, Cecil (James) (b. Nov. 22, 1859, London—d. June 23, 1924, London), English musician noted for his work as a collector of English folk song and dance.

Sharp was educated at Uppingham School and Cambridge University. In 1882 he emigrated to Australia, where he practiced law and became associate to the chief justice of South Australia. In 1889 he changed his career from law to music and became assistant organist of Adelaide cathedral and codirector of the Adelaide College of Music. In 1892 he returned to England and was music master at Ludgrove Preparatory School (1893–1910) and principal of the Hampstead Conservatory (1896–1905).



Cecil Sharp

By courtesy of the English Folk Dance and Song Society

In 1903 Sharp discovered that an unsuspected wealth of native folk song survived in England. Although work in this field had already begun, the publication of Sharp's collection of five series of *Folk Songs from Somerset* (1904–09) and of his study *English Folk Song: Some Conclusions* (1907; 3rd ed. rev. by M. Karpeles, 1954) led to a new, widespread interest in English folk music. In 1905 he began also to collect English folk dances. In 1911 he founded the English Folk Dance Society (later to be amalgamated with the Folk-Song Society); he demonstrated and taught annually at the Vacation School of Folk Song and Dance at Stratford-upon-Avon; and he initiated the teaching of folk song and dance in English schools.

Between 1916 and 1918 Sharp three times visited the Appalachian Mountains in the United States to collect songs of English origin. His other published works include *English Folk-Songs from the Southern Appalachians*, with Olive Dame Campbell (1917; enlarged and edited by M. Karpeles, 1932; rev. ed., 1960); *English Folk Songs* (1921; reprinted 1959); *The Morris Book* (5 parts; 1907–13); *The Country Dance Book* (6 parts; 1909–22); and *Sword Dances of Northern England* (5 parts; 1911–13).

Cecil Sharp House in Regent's Park Road, London, was established in 1930 in his honour for the preservation and teaching of folk song and folk dance.

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Sharp, Granville (b. Nov. 21 [Nov. 10, old style], 1735, Durham, Durham, Eng.—d. July 6, 1813, Fulham, London), English scholar and philanthropist, noted as an advocate of the abolition of slavery.

Granville was apprenticed to a London draper, but in 1758 he entered the government ordnance department. A diligent student of Greek and Hebrew, he published several treatises on biblical criticism, one of which, *Remarks on the Uses of the Definitive Article in the Greek Text of the New Testament*, gave rise to a controversy on account of the proposition, known as "Granville Sharp's canon," which bore on the Unitarian doctrine. His fame rests, however, on his untiring efforts for the abolition of slavery.

In 1767 he became involved in litigation with the owner of a slave called Jonathan Strong, in which it was decided that a slave remained in law the chattel of his master even on English soil. Sharp devoted himself to fighting this judgment both with his pen and in the courts of law; and finally it was laid down in the case of James Sommersett that a slave becomes free the moment he sets foot on English territory.

Sharp advocated the cause of the American colonies, supported parliamentary reform at home and the legislative independence of Ireland, and agitated against the press-gang. In 1787 he founded a society for the abolition of slavery, and he was a joint founder of the British and Foreign Bible Society and the Society for the Conversion of Jews.

sharpbill (*Oxyruncus cristatus*), bird of wet forests in scattered localities from Costa Rica to Paraguay. It is usually considered the sole member of the family Oxyruncidae (order Passeriformes), which is closely related to the tyrant flycatchers (Tyrannidae). The sharpbill is a 16-centimetre (6½-inch) bird with short legs, longish wings and tail, and sharply pointed bill. It is plain greenish brown above and pale yellowish to white below, with dark spots and bars; the midcrown has a low crest of red feathers. The elongated nostrils are covered with a flap, as in the tapaculos. Its sharp bill probes the bark of trees.



Sharpbill (*Oxyruncus cristatus*)

Drawing by H. Douglas Pratt

Heliobletus contaminatus, of the ovenbird family (Furnariidae), is also called sharpbill, or sharp-billed tree hunter. Inhabiting east central South America, it creeps over tree trunks in search of insects.

Sharpe, Sir Alfred (b. May 19, 1853, Lancaster, Lancashire, Eng.—d. Dec. 10, 1935, London), English adventurer and colonial administrator who helped establish the British Nyasaland Protectorate (now Malawi) and obtain portions of central East Africa (now in Zambia) for the British Empire.

Sharpe went to the Shire Highlands, south of Lake Nyasa, in 1887 to hunt elephant and trade in ivory but immediately became involved in a war with Arab slave traders. When Nyasaland was made a protectorate in 1889, Sharpe set out to enlist African allegiance to British colonization. He succeeded to the west, in all of what is now Zambia, and almost succeeded in Katanga, now in Zaire. During this period (1889–95) Sharpe explored and mapped Lake Mweru (in Zambia), the northern parts of Zambia, and Katanga. He was appointed vice consul of Nyasaland Protectorate in 1891 and governor in 1897. He retired from the colonial service in 1910.

Sharpeville, black township, south central Transvaal, South Africa, a suburb of Vereeniging. It was the scene of racial troubles in 1960 when the militant Pan-Africanist Congress launched a non-violent campaign for the abolition of South Africa's pass laws. Participants were instructed to surrender their reference books (passes) and invite arrest. On March 21 some 20,000 Africans gathered near a police station in Sharpeville to demonstrate against the pass laws. They began stoning police and their armoured cars. The police opened fire on the crowd with submachine guns and there were heavy casualties. The official total was 67 Africans dead and 186 wounded, 48 women and children being among the victims. Reports of this incident, one of the first and most violent major episodes of the 1960s racial strife in South Africa, helped focus international criticism on South Africa's apartheid policy. Pop. (1972 est.) 42,000.

Sharpey-Schafer, Sir Edward Albert, original name EDWARD ALBERT SCHÄFER (b. June 2, 1850, Hornsey, near London—d. March 29, 1935, North Berwick, East Lothian, Scot.), English physiologist and inventor of the prone-pressure method (Schafer method) of artificial respiration adopted by the Royal Life Saving Society.

The first holder of the Sharpey Scholarship (1871) at University College, London, he studied with William Sharpey there, qualifying in medicine. (In 1918 to perpetuate the name of his teacher he prefixed it to his own.) Upon graduation he remained with the college in teaching and research, going to the University of Edinburgh (1899–1933) as professor of physiology. His demonstration with



Sharpey-Schafer, bronze medal by C. d'O Pilkington Jackson

By courtesy of the National Portrait Gallery, London

George Oliver in 1894 of the existence of epinephrine stimulated research on hormones. Sharpey-Schafer received many honours, including the presidency of the British Association for the Advancement of Science (1912) and a knighthood (1913).

Sharpsburg, Battle of (American Civil War): *see* Antietam, Battle of.

Sharqī, al-Jabal ash- (Lebanon): *see* Anti-Lebanon Mountains.

Sharqīyah, ash-, also spelled SHARKIA, *muḥāfaẓah* (governorate) of the eastern Nile Delta, Lower Egypt, touching the Mediterranean Sea just west of Suez. It has an area of 1,610 sq mi (4,180 sq km), and in the northeast includes a part of the large Buḥayrat al-Manzilah (Lake Manzala), a brackish coastal lagoon. Its chief port is al-Manzilah, at the head of a branch railway from al-Manṣūrah on the Damietta Branch of the Nile.

Before it was split up during the medieval Fāṭimid period, the territory included ad-Daqahlīyah and other Nile Delta districts; al-Qalyūbīyah was separated in AD 1315, at which time it was renamed ash-Sharqīyah (The Eastern). In the Middle Ages the area witnessed numerous Coptic and Arab uprisings, and it has served as an invasion route for foreign armies. Bilbays, a former capital of ash-Sharqīyah and a medieval fortress town, lies in the southeast, 30 mi (50 km) northeast of Cairo. During the 19th century, Bilbays was supplanted as capital by az-Zaqāzīq, a rail centre 13 mi (22 km) to the north-northwest.

The flat, alluvial *muḥāfaẓah* supports a variety of irrigated crops, including cotton, corn (maize), rice, wheat, soybeans, peanuts (groundnuts), sesame, and citrus fruits. Ducks and chickens are raised, and Lake Manzala supports fishing. Fish farming has also been introduced. Land reclamation has brought about 4,200 ac (1,700 ha) into cultivation around Lake Manzala and Wādī Tūmīlat. Population densities average about 1,900 persons per sq mi (750 per sq km). Industries in the *muḥāfaẓah* include food processing, beer brewing, and electrical components manufacturing. Several irrigation canals cross the *muḥāfaẓah*, including the Sharqīyah, which partly follows the bed of the old Pelusiac channel of the Nile. The major east–west canal is the Tur'at al-Ismā'īlīyah (Ismailia Canal), linking Ismailia on the Suez Canal with az-Zaqāzīq through Wādī Tūmīlat. It follows the course of a canal ordered dug by the 26th-dynasty pharaoh Necho (reigned 610–595 BC) and renewed by the Achaemenian king Darius I (died 486 BC) and later by Roman and Islāmic rulers. Pop. (1983 est.) 3,167,000.

Sharqīyah, ash-, English EASTERN, formerly AL-HASA, *minṭaqah* (province) and region, eastern Saudi Arabia. The province includes most of the desert Rub' al-Khali (the Empty Quarter) and extends southward from a neutral zone jointly administered with Kuwait to indefinite borders with Yemen (Aden) and Oman. It is bounded by Kuwait on the north, the Persian Gulf on the east, and ar-Riyāḍ *minṭaqah* on the west. Ash-Sharqīyah *minṭaqah* consists mainly of an undulating plain covered with sand and gravel and is characterized by scattered dry wadis and *sabkhahs* (salt marshes). In the north of ash-Sharqīyah *minṭaqah* lies the rocky Summam plain, but toward the east the terrain changes to flat lowlands marked by numerous fertile oases; al-Hasa is a large oasis in the centre of the province. The Persian Gulf coast is mostly shallow with coral reefs.

In the late 18th century, the Wahhābīs, a Muslim puritanical group, conquered the province. After their defeat in 1818 and until World War I, the *minṭaqah* came under a loose Ottoman sovereignty that was interrupted by the periodic return of Wahhābī control. The Wahhābī leader, Ibn Sa'ud, incorporated al-Hasa oasis into his expanding principality of an-Najd before World War I.

The Eastern province represents one of the four main geographical regions of the country and comprises the principal petroleum producing areas of Saudi Arabia. The wealth produced from extensive oil deposits, discovered in the 1930s, transformed ash-Sharqīyah into one of the Kingdom's most progressive provinces. Many oilfields, including al-Ghawār (among the world's largest), are operated by the Arabian Oil Company. The petroleum is shipped from Ras Tanura via the Trans Arabian Pipeline (Tapline) to Sidon, Lebanon. Major towns in the province include ad-Dammam, the provincial capital, the largest petroleum centre in the nation, and a major port on the Persian Gulf; al-Hasa, the largest oasis in the Kingdom; al-Hufūf, the former capital of the Eastern province; al-Mubarraz, an agricultural centre; and the oil centres of aẓ-Ẓahrān and al-Qaṭīf. A railway, completed in the 1950s, links ad-Dammam with aẓ-Ẓahrān, al-Hufūf, and Riyadh. Aẓ-Ẓahrān has an international airport. Pop. (1974) 770,000.

Sharshal (Algeria): *see* Iol.

Shasta, Mount, peak (14,162 ft [4,317 m]) of the Cascade Range in the Shasta-Trinity National Forest, northern California, U.S., 77 mi (124 km) north of Redding. An impressive double-peaked extinct volcano, it dominates the landscape (a vast panorama of tumbled mountains and valleys) for a hundred miles and is a main feature of the Whiskeytown-Shasta-Trinity National Recreation Area. It has steam vents and several glaciers (which feed the McCloud, Sacramento, and Shasta rivers) on its slopes which are popular with skiers and climbers. The first white man to see the mountain was Peter Skene Ogden who named it in 1827 for the local Sastise (Shastan) Indians; E.D. Pearce made the first ascent in 1854. A highway has been built up the slopes to 8,000 ft; Mount Shasta city (Inc. 1905) is at the southwestern base.

Shastan, a group of Indian peoples speaking related languages of the Shastan family of Hokan stock and living in the highlands of interior northern California, in the basins of the Upper Klamath and the Scott and Shasta rivers. Their principal subdivisions are the Shasta, New River Shasta, Konomihu, and Okwanuchu. Formerly included with the Shastans but now often classified separately are the Achomawi and Atsugewi (*q.v.*).

The culture of the Shastans was similar to that of the Yurok (*q.v.*), though much poorer, for their mountainous villages were generally confined to narrow ridges of canyons, and the food supply was less plentiful.

Like the Yurok and Karok, the Shastans subsisted largely on acorns and salmon and traded with other northern Californians using such currency as dentalium shells and scarlet woodpecker scalps. They also had similar villages and dwellings but seem to have built the communal sweat house in each village largely only because, by imitation, they thought it was necessary to have one. Most men put up their own individual makeshift sweat lodges when so inclined. In social organization the Shastans, like neighbouring peoples, lived in villages, rather loosely led. They believed generally in guardian spirits and in the powers of shamans, or medicine men, to cure illnesses through ritual.

Shastri, Lal Bahadur (b. Oct. 2, 1904, Mughalsarai, India—d. Jan. 11, 1966, Tashkent, Uzbek S.S.R.), Indian statesman, prime minister of India (1964–66) after Jawaharlal Nehru.

A member of Mahatma Gandhi's Non-cooperation Movement against British government in India, he was imprisoned for a short time (1921). Upon release he studied in the Kāśī Vidyāpīṭha, a nationalist university, where he graduated with the title of *shastri* ("learned in the scriptures"). He then returned to politics as a follower of Gandhi, was imprisoned several times, and attained influential positions in the Congress Party of the state of the United Provinces, now Uttar Pradesh.

Shastri was elected to the legislature of the United Provinces in 1937 and 1946. After Indian independence, Shastri gained experience as minister for home affairs and transport in Uttar Pradesh. He was elected to the central Indian legislature in 1952 and became union minister for railways and transport. He gained a reputation as a skillful mediator after his appointment to the influential post of minister for home affairs in 1961. Three years later, on Jawaharlal Nehru's illness, he was appointed minister without portfolio, and after Nehru's death he became prime minister in June 1964.



Shastri
Camera Press

Shastri was criticized for failing to deal effectively with India's economic problems, but won great popularity for his firmness on the outbreak of hostilities with neighbouring Pakistan (1965) over the disputed province of Jammu and Kashmir. He died of a heart attack after signing a "no-war" agreement with Pres. Ayub Khan of Pakistan in Soviet Central Asia and was succeeded as prime minister by Indira Gandhi, Nehru's daughter.

shaṭḥ, plural SHAṬAḤAT, in Ṣūfī Islām, divinely inspired statements that Ṣūfīs utter in their mystical state of *fanā'* (passing away of the self). The Ṣūfīs claim that there are moments of ecstatic fervour when they are overwhelmed by the divine presence to such a degree that they lose touch with worldly realities. In such moments they utter statements that may seem incoherent or blasphemous if taken literally but are perfectly understood by fellow Ṣūfīs who have shared the same experiences. *Shaṭaḥāt,* Ṣūfīs warn, must be interpreted allegorically.

Muslim legalists naturally tended to brand as heresy all Ṣūfī *shaṭaḥāt* that did not conform to Islāmic teachings, and many Ṣūfīs suffered persecution on this account. The mystic al-Ḥallāj, for example, was persecuted and finally executed for his famous cry, "I am the Truth." Since "the Truth" is one of the names of God, legalists interpreted the utterance as a blasphemous claim to divinity. Ṣūfī defenders of al-Ḥallāj argued that in his mystical state he found himself in union with God.

Since the state of mystical trance is normally of short duration, *shaṭaḥāt* rarely exceed six or seven words. The Ṣūfīs, however, regard all their writings, and particularly their poetry, as possessing an element of *shaṭḥ*. For this reason it also must be interpreted allegorically. Among often quoted *shaṭaḥāt* are:

"For the perfect lover, prayer becomes impiety" (al-Ḥallāj).

"Praise be to me. How great is my majesty!" (Bāyazīd al-Besṭāmī, d. 874).

"I am the proof of God." "Divine omnipotence has a secret; if it is revealed there is an end of the prophetic mission" (Ibn Sahl at-Tustarī, d. 896).

"Ritual acts are only impurities" (ash-Shiblī, d. 945).

"In my robe there is only God" (Ibn Abī al-Khayr, d. 1048).

"The slave is the Lord and the Lord is the slave; how can one tell which of the two is the debtor?" (Ibn al-'Arabi, d. 1240).

Shāṭi', Wādī ash-, valley in south-central Libya. The valley extends between Wanzarīk town on the west and Umm al-'Abīd town on the east for a distance of about 87 miles (140 km). Wādī ash-Shāṭi' has one of the largest iron-ore deposits in the world; it was discovered in 1943, and, although it is suitable for strip mining, it is not high-grade ore. Manganese reserves also have been detected, and millet is grown in the valley.

Shaṭṭārīyah, Ṣūfī (Muslim mystic) order deriving its name from either a 15th-century Indian mystic called Shaṭṭārī or the Arabic word *shāṭir* ("breaker"), referring to one who has broken with the world.

Most Muslim mystics emphasize the servantship of man and the lordship of God, the fana ("dissolution") of self and the *baqā'* ("subsistence") of God. The Shaṭṭārīyah, on the contrary, stress the self, personal deeds, personal attributes that make a person godlike, and personal union with God. They maintain that fana would imply two selves, one that is to be annihilated and another that is to be readied for the final stage of the vision of God; and that such duality is opposed to the tawhid ("unity") on which Ṣūfism is based. They also reject the Ṣūfī practice of *mujāhadah* ("struggle with the carnal self"), saying that excessive focusing on the self distracts from the more important goals of knowledge of God through personal experience and ultimate union.

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Shaughnessy (of Montreal and Ashford), Thomas George Shaughnessy, 1st Baron (b. Oct. 6, 1853, Milwaukee—d. Dec. 10, 1923, Montreal), Canadian railway magnate.

Born the son of Irish immigrants, he began railway service at the age of 16 out of Milwaukee and in 1882 joined the staff of the Canadian Pacific Railway as general purchasing agent. In 1891 he was appointed its vice president, and from 1899 to 1923 he was either president or chairman and also director of all the allied lines. His tenure corresponded with the greatest expansion in the railroad's history, with shipping and other industries being added to the company's enterprises. He was knighted in 1901 and created a baron in 1916.

Sha'ul (Israeli king): *see* Saul.

Shauqi, Aḥmad (Arab author): *see* Shawqī, Aḥmad.

Shavante, also spelled XAVANTE, Brazilian Indian group speaking Shavante, a language of the Macro-Ge language family. The Shavante, who number about 3,000, live in the southeastern corner of Mato Grosso state, between the Rio das Mortes and the Araguaia River, in a region of upland savannah laced with narrow bands of forest running alongside the rivers. The Shavante and the closely related Sherente (*q.v.*) at one time lived along the Tocantins River in Goias state, but pressure from Brazilian settlers in the 1840s caused the Shavante to move to their present home.

The Shavante successfully defended their new territory against outsiders and lived in relative isolation until the 1930s, when they gained sudden notoriety in the wake of their fierce resistance to the new wave of settlers and government agents who were trying to bring central Brazil into the mainstream of Brazilian culture and economy.

Traditionally, the Shavante were nomadic hunters and gatherers who lived in temporary horseshoe-shaped villages on the savannah and cultivated corn (maize), beans, and pumpkins on seasonally visited garden plots. They hunted tapir, deer, wild pigs, and birds and gathered roots, nuts, and honey.

Shavuot (Jewish festival): *see* Shabuoth.

Shaw, Anna Howard (b. Feb. 14, 1847, Newcastle upon Tyne, Northumberland, Eng.—d. July 2, 1919, Moylan, Pa., U.S.), American minister, lecturer, and, with Susan B. Anthony, one of the chief leaders of the National American Woman Suffrage Association, founded in 1890.

Her immigrant parents (of Scottish descent) brought her to the United States when she was four, and she grew up in Lawrence, Mass., and on a farm near Big Rapids, Mich. A precocious child, she began teaching in a frontier schoolhouse when she was 15; in 1870 she delivered her first sermon and in 1871 was licensed as a Methodist preacher. From 1873 to 1875 she studied at Albion College, Albion, Mich., and in 1878 graduated from the divinity school of Boston University, the only woman in her class. She then sought a permanent appointment over a congregation, but the New England Conference of the Methodist Episcopal Church not only refused to ordain her because of her sex but also revoked her license to preach. She thereupon turned to the Methodist Protestant Church and was ordained as that church's first woman minister in 1880. In the next few years she preached, gave lectures on temperance and woman suffrage, and secured an M.D. from Boston University (1886).

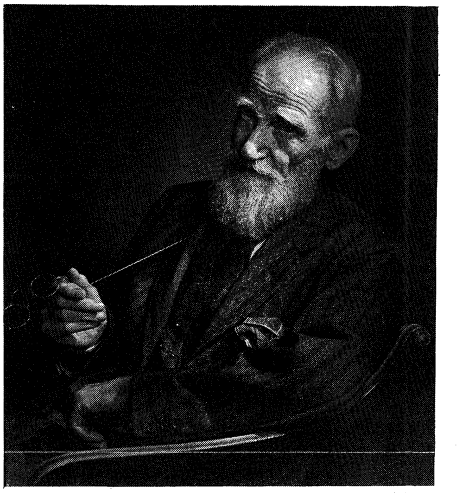
In 1885 she resigned her pastorates and took up full-time the cause of suffrage and temperance. In 1892, when Susan B. Anthony became president of the newly formed National American Woman Suffrage Movement (a merger of two previous associations), Shaw became vice president (1892–1904) and later (1904–15) served as president. Throughout the period she was a familiar figure in demonstrations, conferences, congressional hearings, and lecture circuits, speaking in every state of the Union. She also performed home-front war work (1917–18) and received the Distinguished Service Medal.

Shaw, Artie, byname of ARTHUR ARSHAWSKY (b. May 23, 1910, New York City), American clarinetist and popular bandleader of the 1930s and '40s. He was one of the few outstanding jazz musicians whose commitment to jazz was uncertain.

Shaw began playing in high school and turned professional in 1925. The first signs of indecision became apparent in the early 1930s, when he retired from music for a year. In 1935, at a New York swing concert, he played one of his own compositions accompanied by a string quartet. A jazz and dance band with a string section followed, but in 1937 he re-formed his band along more conventional lines and a year later became internationally known through his recording of Cole Porter's "Begin the Beguine."

From 1939 Shaw lived alternately in Mexico and the United States, experimenting occasionally with small jazz combos that he called the "Gramercy Five" regardless of membership. While several public comebacks followed, including leadership of a U.S. Navy orchestra, he dissociated himself from jazz almost totally after the early 1950s. An oft-married man of some wit, he wrote a revealing autobiography, *The Trouble with Cinderella* (1952).

Shaw, George Bernard (b. July 26, 1856, Dublin—d. Nov. 2, 1950, Ayot St. Lawrence, Hertfordshire, Eng.), Irish comic dramatist, literary critic, and Socialist propagandist, winner of the Nobel Prize for Literature in 1925.



George Bernard Shaw, photograph by Yousuf Karsh
Karsh—Woodfin Camp and Associates

Early life and career. George Bernard Shaw was the third and youngest child (and only son) of George Carr Shaw and Lucinda Elizabeth Gurly Shaw. Technically, he belonged to the Protestant "ascendancy"—the landed Irish gentry—but his impractical father was first a sinecured civil servant and then an unsuccessful grain merchant, and George Bernard grew up in an atmosphere of genteel poverty, which to him was more humiliating than being merely poor. At first tutored by a clerical uncle, Shaw basically rejected the schools he then attended, and by age 16 he was working in a land agent's office.

Shaw developed a wide knowledge of music, art, and literature as a result of his mother's influence and his visits to the National Gallery of Ireland. In 1872 his mother left her husband and took her two daughters to London, following her music teacher, George John Vandeleur Lee, who from 1866 had shared households in Dublin with the Shaws. In 1876 Shaw resolved to become a writer, and he joined his mother and elder sister (the younger one having died) in London. Shaw in his 20s suffered continuous frustration and poverty. He depended upon his mother's pound a week from her husband and her earnings as a music teacher. He spent his afternoons in the British Museum reading room, writing novels and reading what he had missed at school, and his evenings in search of additional self-education in the lectures and debates that characterized contemporary middle-class London intellectual activities.

His fiction failed utterly. The semiautobiographical and aptly titled *Immaturity* (1879; published 1930) repelled every publisher in London. His next four novels were similarly refused, as were most of the articles he submitted to the press for a decade. Shaw's initial literary work earned him less than 10 shillings a year. A fragment posthumously published as *An Unfinished Novel* in 1958 (but written 1887–88) was his final false start in fiction.

Despite his failure as a novelist in the 1880s, Shaw found himself during this decade. He became a vegetarian, a Socialist, a spellbinding orator, a polemicist, and tentatively a playwright. He became the force behind the newly founded (1884) Fabian Society, a middle-class Socialist group that aimed at the transformation of English society not through revolution but through "permeation" (in Sidney Webb's

term) of the country's intellectual and political life. Shaw involved himself in every aspect of its activities, most visibly as editor of one of the classics of British Socialism, *Fabian Essays in Socialism* (1889), to which he also contributed two sections.

Eventually, in 1885 the drama critic William Archer found Shaw steady journalistic work. His early journalism ranged from book reviews in the *Pall Mall Gazette* (1885–88) and art criticism in the *World* (1886–89) to brilliant musical columns in the *Star* (as "Corno di Bassetto"—basset horn) from 1888 to 1890 and in the *World* (as "G.B.S.") from 1890 to 1894. Shaw had a good understanding of music, particularly opera, and he supplemented his knowledge with a brilliance of digression that gives many of his notices a permanent appeal. But Shaw truly began to make his mark when he was recruited by Frank Harris to the *Saturday Review* as theatre critic (1895–98); in that position he used all his wit and polemical powers in a campaign to displace the artificialities and hypocrisies of the Victorian stage with a theatre of vital ideas. He also began writing his own plays.

First plays. When Shaw began writing for the English stage, its most prominent dramatists were Sir A.W. Pinero and H.A. Jones. Both men were trying to develop a modern realistic drama, but neither had the power to break away from the type of artificial plots and conventional character types expected by theatregoers. The poverty of this sort of drama had become apparent with the introduction of several of Ibsen's plays onto the London stage around 1890, when *A Doll's House* was played in London; his *Ghosts* followed in 1891, and the possibility of a new freedom and seriousness on the English stage was introduced. Shaw, who was about to publish *The Quintessence of Ibsenism* (1891), rapidly refurbished an abortive comedy, *Widowers' Houses,* as a play recognizably "Ibsenite" in tone, making it turn on the notorious scandal of slum landlordism in London. The result (performed 1892) flouted the threadbare romantic conventions that were still being exploited even by the most daring new playwrights. In the play a well-intentioned young Englishman falls in love and then discovers that his prospective father-in-law's fortune and his own private income derive from exploitation of the poor. Potentially this is a tragic situation, but Shaw seems to have been always determined to avoid tragedy. The unamiable lovers do not attract sympathy; it is the social evil and not the romantic predicament on which attention is concentrated, and the action is kept well within the key of ironic comedy. The same dramatic predispositions control *Mrs. Warren's Profession,* written in 1893 but not performed until 1902 because the lord chamberlain, the censor of plays, refused it a license. Its subject is organized prostitution, and its action turns on the discovery by a well-educated young woman that her mother has graduated through the "profession" to become a part-proprietor of brothels throughout Europe. Again, the economic determinants of the situation are emphasized, and the subject is treated remorselessly and without the titillation of fashionable comedies about "fallen women." As with many of Shaw's works, the play is, within limits, a drama of ideas, but the vehicle by which these are presented is essentially one of high comedy.

Shaw called these first plays "unpleasant," because "their dramatic power is used to force the spectator to face unpleasant facts." He followed them with four "pleasant" plays in an effort to find the producers and audiences that his mordant comedies had offended. Both groups of plays were revised and published in *Plays Pleasant and Unpleasant* (1898). The first of the second group, *Arms and the Man* (performed 1894), has a Balkan setting and makes lighthearted, though sometimes mordant, fun of romantic falsifications of both love and warfare. The second, *Candida* (performed 1897), was important for English theatrical history, for its successful production at the Royal Court Theatre in 1904 encouraged Harley Granville-Barker and J.E. Vedrenne to form a partnership that resulted in a series of brilliant productions there. The play represents its heroine as forced to choose between her clerical husband—a worthy but obtuse Christian Socialist—and a young poet who has fallen wildly in love with her. She chooses her confident-seeming husband because she discerns that he is actually the weaker. The poet is immature and hysterical but, as an artist, has a capacity to renounce personal happiness in the interest of some large creative purpose. This is a significant theme for Shaw; it leads on to that of the conflict between man as spiritual creator and woman as guardian of the biological continuity of the human race that is basic to *Man and Superman.* In *Candida* such speculative issues are only lightly touched on, and this is true also of *You Never Can Tell* (performed 1899), in which the hero and heroine, who believe themselves to be respectively an accomplished amorist and an utterly rational and emancipated woman, find themselves in the grip of a vital force that takes little account of these notions.

The strain of writing these plays, while his critical and political work went on unabated, so sapped Shaw's strength that a minor illness became a major one. In 1898, during the process of recuperation, he married his unofficial nurse, Charlotte Payne-Townshend, an Irish heiress and friend of Beatrice and Sidney Webb. The apparently celibate marriage lasted all their lives, Shaw satisfying his emotional needs in paper-passion correspondences with Ellen Terry, Mrs. Patrick Campbell, and others.

Shaw's next collection of plays, *Three Plays for Puritans* (1901), continued what became the traditional Shavian preface—an introductory essay in an electric prose style dealing as much with the themes suggested by the plays as the plays themselves. *The Devil's Disciple* (performed 1897) is a play set in New Hampshire during the American Revolution and is an inversion of traditional melodrama. *Caesar and Cleopatra* (performed 1901) is Shaw's first great play. In the play Cleopatra is a spoiled and vicious 16-year-old child rather than the 38-year-old temptress of Shakespeare's *Antony and Cleopatra.* The play depicts Caesar as a lonely and austere man who is as much a philosopher as he is a soldier. The play's outstanding success rests upon its treatment of Caesar as a credible study in magnanimity and "original morality" rather than as a superhuman hero on a stage pedestal. The third play, *Captain Brassbound's Conversion* (performed 1900) is a sermon against various kinds of folly masquerading as duty and justice.

International importance. In *Man and Superman* (performed 1905) Shaw expounded his philosophy that humanity is the latest stage in a purposeful and eternal evolutionary movement of the "life force" toward ever-higher life forms. The play's hero, Jack Tanner, is bent on pursuing his own spiritual development in accordance with this philosophy as he flees the determined marital pursuit of the heroine, Ann Whitefield. In the end Jack ruefully allows himself to be captured in marriage by Ann upon recognizing that she herself is a powerful instrument of the "life force," since the continuation and thus the destiny of the human race lies ultimately in her and other women's reproductive capacity. The play's nonrealistic third act, the "Don Juan in Hell" dream scene, is spoken theatre at its most operatic and is often performed independently as a separate piece.

Shaw had already become established as a major playwright on the Continent by the performance of his plays there, but, curiously, his reputation lagged in England. It was only with the production of *John Bull's Other Island* (performed 1904) in London, with a special performance for Edward VII, that Shaw's stage reputation was belatedly made in England.

Shaw continued, through high comedy, to explore religious consciousness and to point out society's complicity in its own evils. In *Major Barbara* (performed 1905), Shaw has his heroine, a major in the Salvation Army, discover that her estranged father, a munitions manufacturer, may be a dealer in death but that his principles and practice, however unorthodox, are religious in the highest sense, while those of the Salvation Army require the hypocrisies of often-false public confession and the donations of the distillers and the armourers against which it inveighs. In *The Doctor's Dilemma* (performed 1906), Shaw produced a satire upon the medical profession (representing the self-protection of professions in general) and upon both the artistic temperament and the public's inability to separate it from the artist's achievement. In *Androcles and the Lion* (performed 1912), Shaw dealt with true and false religious exaltation in a philosophical play about early Christianity. Its central theme, examined through a group of early Christians condemned to the arena, is that one must have something worth dying for—an end outside oneself—in order to make life worth living.

Possibly Shaw's comedic masterpiece, and certainly his funniest and most popular play, is *Pygmalion* (performed 1913). It was claimed by Shaw to be a didactic drama about phonetics, and its anti-heroic hero, Henry Higgins, is a phonetician, but the play is a humane comedy about love and the English class system. The play is about the training Higgins gives to a Cockney flower girl to enable her to pass as a lady and is also about the repercussions of the experiment's success. The scene in which Eliza Doolittle appears in high society when she has acquired a correct accent but no notion of polite conversation is one of the funniest in English drama. *Pygmalion* has been both filmed (1938), winning an Academy Award for Shaw for his screenplay, and adapted into an immensely popular musical, *My Fair Lady* (1956; motion-picture version, 1964).

Works after World War I. World War I was a watershed for Shaw. At first he ceased writing plays, publishing instead a controversial pamphlet, "Common Sense About the War," which called Great Britain and its Allies equally culpable with the Germans and argued for negotiation and peace. His anti-war speeches made him notorious and the target of much criticism. In *Heartbreak House* (performed 1920), Shaw exposed, in a country-house setting on the eve of war, the spiritual bankruptcy of the generation responsible for the war's bloodshed. Attempting to keep from falling into "the bottomless pit of an utterly discouraging pessimism," Shaw wrote five linked plays under the collective title *Back to Methuselah* (1922). They expound his philosophy of creative evolution in an extended dramatic parable that progresses through time from the Garden of Eden to AD 31,920.

The canonization of Joan of Arc in 1920 reawakened within Shaw ideas for a chronicle play about her. In the resulting masterpiece, *Saint Joan* (performed 1923), the Maid is treated not only as a Catholic saint and martyr but as a combination of practical mystic, heretical saint, and inspired genius. Joan, as the superior being "crushed between those mighty forces, the Church and the Law," is the personification of the tragic heroine; her death embodies the paradox that humankind fears—and often kills—its saints and heroes and will go on doing so until the very higher moral qualities it fears become the general

condition of man through a process of evolutionary change. Acclaim for *Saint Joan* led to the awarding of the 1925 Nobel Prize for Literature to Shaw (he refused the award).

In his later plays Shaw intensified his explorations into tragicomic and nonrealistic symbolism. For the next five years, he wrote nothing for the theatre but worked on his collected edition of 1930–38 and the encyclopaedic political tract "The Intelligent Woman's Guide to Socialism and Capitalism" (1928). Then he produced *The Apple Cart* (performed 1929), a futuristic high comedy that emphasized Shaw's inner conflicts between his lifetime of radical politics and his essentially conservative mistrust of the common man's ability to govern himself. Shaw's later, minor plays included *Too True to Be Good* (performed 1932), *On The Rocks* (performed 1933), *The Simpleton of the Unexpected Isles* (performed 1935), *Geneva* (performed 1938), and *In Good King Charles's Golden Days* (1939). After a wartime hiatus, Shaw, now in his 90s, produced several more plays, including *Farfetched Fables* (performed 1950), *Shakes Versus Shav* (performed 1949), and *Why She Would Not* (1956), which is a fantasy with only flashes of the earlier Shaw.

Impudent, irreverent, and always a showman, Shaw used his buoyant wit to keep himself in the public eye to the end of his 94 years; his wiry figure, bristling beard, and dandyish cane were as well-known throughout the world as his plays. When his wife, Charlotte, died of a lingering illness in 1943, in the midst of World War II, Shaw, frail and feeling the effects of wartime privations, made permanent his retreat from his London apartment to his country home at Ayot St. Lawrence, a Hertfordshire village in which he had lived since 1906. He died there in 1950.

The most significant British playwright since the 17th century, George Bernard Shaw was more than merely the best comic dramatist of his time, for some of his greatest works for the stage—*Caesar and Cleopatra,* the "Don Juan in Hell" episode of *Man and Superman, Major Barbara, Heartbreak House,* and *Saint Joan*—have a high seriousness and prose beauty unmatched by his stage contemporaries. His development of a drama of moral passion and of intellectual conflict and debate, his revivifying the comedy of manners, his ventures into symbolic farce and into a theatre of disbelief helped shape the theatre of his time and after. A visionary and mystic whose philosophy of moral passion permeates his plays, Shaw was also the most trenchant pamphleteer since Swift; the most readable music critic in English; the best theatre critic of his generation; a prodigious lecturer and essayist on politics, economics, and sociological subjects; and one of the most prolific letter writers in literature. By bringing a bold critical intelligence to his many other areas of interest, he helped mold the political, economic, and sociological thought of three generations.

BIBLIOGRAPHY. *Autobiography. Sixteen Self Sketches* (1949), collects and revises some earlier pieces and adds several new ones; *Shaw: An Autobiography,* 2 vol., ed. by Stanley Weintraub (1969–70), creates a patchwork autobiography from Shaw's myriad memoir writings and asides and includes as appendix his last will and testament. *Biography.* Archibald Henderson, *George Bernard Shaw* (1911; rev. and augmented, 1932 and 1956); Frank Harris, *Bernard Shaw* (1931); Hesketh Pearson, *Bernard Shaw* (1943, augmented 1961); St. John Ervine, *Bernard Shaw* (1956); Allan Chappelow (ed.), *Shaw: The Villager and Human Being* (1961); B.C. Rosset, *Shaw of Dublin: The Formative Years* (1964); Stanley Weintraub, *Private Shaw and Public Shaw* (1963), and *Journey to Heartbreak: The Crucible Years of Bernard Shaw, 1914–18* (1971); Janet Dunbar, *Mrs. G.B.S.* (1963); J.P. Smith, *The Unrepentant Pilgrim* (1965); Michael Holroyd, *The Genius of Shaw* (1979); Arnold Silver, *Bernard Shaw: The Darker Side* (1982).

Criticism. Early works include H.L. Mencken, *George Bernard Shaw: His Plays* (1905); G.K. Chesterton, *George Bernard Shaw* (1909, augmented 1935); Julius Bab, *Bernard Shaw* (1910, rev. 1926; in German); and P.P. Houe, *Bernard Shaw: A Critical Study* (1915). Later criticism includes E. Strauss, *Bernard Shaw: Art and Socialism* (1942); Stephen Winsten (ed.), *G.B.S. 90* (1946); Eric Bentley, *Bernard Shaw* (1947); William Irvine, *The Universe of G.B.S.* (1949); C.E.M. Joad, *Shaw* (1949); Alick West, *George Bernard Shaw: A Good Man Fallen Among Fabians* (1950); Desmond MacCarthy, *Shaw* (1951); A.H. Nethercot, *Men and Supermen,* 2nd ed. rev. (1966); Raymond Mander and Joe Mitchenson, *A Theatrical Companion to Shaw* (1954); J.B. Kaye, *Bernard Shaw and the Nineteenth-Century Tradition* (1958); R.M. Ohmann, *Shaw: The Style and the Man* (1962); Martin Meisel, *Shaw and the Nineteenth-Century Theatre* (1963); J.I.M. Stewart, in *Eight Modern Writers* (1963); D.P. Costello, *The Serpent's Eye: Shaw and the Cinema* (1965); Louis Crompton, *Shaw the Dramatist* (1969); B.F. Dukore, *Bernard Shaw, Director* (1971); and Margery Morgan, *The Shavian Playground* (1972).

Shaw, Henry Wheeler (humorist): *see* Billings, Josh.

Shaw, Lemuel (b. Jan. 9, 1781, Barnstable, Mass., U.S.—d. March 30, 1861, Boston), chief justice of the Supreme Judicial Court of Massachusetts (1830–60), who left an indelible mark on the law of the commonwealth and significantly contributed to the structure of American law.

Shaw was educated at Harvard, studied law privately, was admitted to the bar in 1804 in New Hampshire, and entered upon private practice. He was extremely successful and became a prominent figure in the public life of the commonwealth. He drafted the first municipal charter for Boston in 1822 virtually without precedents to guide him and in 1830 accepted the appointment as chief justice of Massachusetts. His decisions on that bench played a formative part in the development of both Massachusetts and national jurisprudence. He is particularly remembered for two opinions. In *Commonwealth* v. *Hunt* (1842) his ruling in favour of a striking labour union provided the first major precedent for removing labour unions from the province of the law of conspiracy. In *Roberts* v. *City of Boston* (1849), his ruling upholding the city's segregated schools was later reflected in the U.S. Supreme Court's "separate but equal" doctrine in *Plessy* v. *Ferguson* (1896), but its more immediate effect was to stimulate the passage in Massachusetts of the only 19th-century American desegregation law.

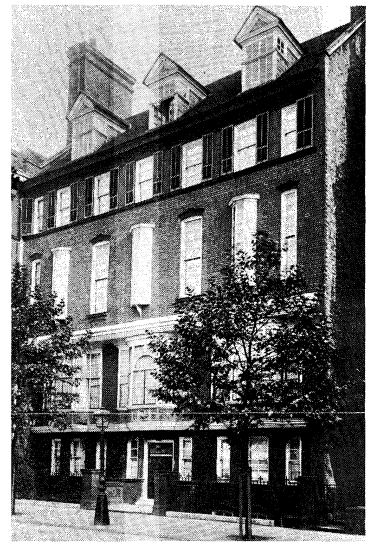
Judge Shaw was a fellow and an overseer of Harvard, and he was the father-in-law and major financial supporter of novelist Herman Melville.

Articles are alphabetized word by word, not letter by letter

Shaw, Sir (William) Napier (b. March 4, 1854, Birmingham, Warwickshire, Eng.—d. March 23, 1945, London), English meteorologist whose introduction of the millibar, a unit of measurement of air pressure, and the tephigram, a graph of temperature changes, contributed to the development of modern meteorology.

Shaw taught physics at the University of Cambridge from 1877 to 1906. He was elected to the Royal Society in 1891 and in 1900 became secretary of the Meteorological Council, the governing body of the Meteorological Office. He instigated the reorganization of this office and served as director from 1905 to 1920. He was knighted in 1915. From 1920 to 1924 he was the first professor of meteorology at the Royal College of Science of the Imperial College of Science and Technology, London. One of his more noteworthy works is *Manual of Meteorology* (1926–31).

Shaw, Richard Norman (b. May 7, 1831, Edinburgh—d. Nov. 17, 1912, London), architect and urban designer important for his residential architecture and for his role in the English Domestic Revival movement.



Old Swan House, Cheyne Walk, Chelsea, London, designed by Richard Norman Shaw, 1876

By courtesy of National Monuments Record, London

After an apprenticeship to William Burn, Shaw attended the architectural school of the Royal Academy in London. He subsequently entered the office of G.E. Street, beginning an independent practice in 1862. Several of his early buildings were done in collaboration with his partner W.E. Nesfield (the partnership was dissolved in 1868). He became a full member of the Royal Academy in 1877.

Essentially an eclectic architect, Shaw worked in styles ranging from Gothic Revival (as in the church at Bingley, Yorkshire; 1864–68) to Neo-Baroque (as in the Piccadilly Hotel, London; 1905–08) based on 17th-century English Palladian architecture. The latter became the accepted style for British government buildings in the '20s and '30s. Shaw's elegant town houses rely primarily on his very individual adaptation of 18th-century styles that he called "Queen Anne." His charmingly picturesque country houses derive from a study of regional developments in the English manorial style of the 16th century and are carried out with a marked respect for the differing nature of local materials. Characteristic examples are Glen Andred (1866–67) and Wispers (1876), both in Sussex, and Adcote (1877) in Shropshire. His town houses are best seen in London, among the most important being Lowther Lodge (1873), Kensington; Shaw's own house (1875), Hampstead; and Old Swan House (1876), Chelsea. The publication of Shaw's domestic designs carried his influence outside England and was an element in the development of the American Shingle style.

In the field of town planning, the garden suburb laid out by Shaw in 1876 at Bedford Park (on the western side of London) was the first of its kind and was influential on the future development of suburban planning.

Shaw, Robert (Lawson) (b. April 30, 1916, Red Bluff, Calif., U.S.), American choral and orchestral conductor.

Shaw graduated in 1938 from Pomona College, Claremont, Calif., where he directed the Glee Club. In 1941 he founded the Collegiate Chorale in New York, and led it until 1954. He was director of the choral departments

of the Berkshire (Mass.) Music Center (1942–45) and the Juilliard School in New York City (1946–50). He founded the Robert Shaw Chorale in 1948 and toured internationally with the group until 1966. During the 1940s Shaw became known as a leading choral conductor in the United States. His innovation of seating a choir in quartets (rather than in four separate sections) in order to secure a richer blend of sound has become a standard device. He recorded a diverse repertoire ranging from George Frideric Handel to Igor Stravinsky and including black spirituals and popular pieces as well. As a choral conductor, Shaw introduced standards of performance previously unattained in the United States.

Beginning in 1953 with a four-year tenure conducting the summer concerts of the San Diego Symphony, Shaw turned increasingly to orchestral conducting, serving as associate conductor with the Cleveland Orchestra under George Szell (1956–67) and conductor of the Atlanta Symphony Orchestra (1967–88), where he expanded the orchestra's program to include ballet, oratorios, chamber music, educational concerts, and special telecasts.

Shaw, Robert (b. Aug. 9, 1927, Westhoughton, Lancashire, Eng.—d. Aug. 28, 1978, Tourmakeady, Ire.), popular English actor, also known as a novelist and playwright.

Shaw began his career with the Shakespeare Memorial Theatre, Stratford-upon-Avon, and performed in *Macbeth, Cymbeline, Henry VIII,* and other Shakespeare plays, touring Australia with the company in 1949–50. With the Old Vic company (1951–52), he continued primarily in Shakespearean roles. In 1955 Shaw began playing contemporary roles, including one in his own play *Off the Mainland* (1956) and the role of Sergeant Mitchem in *The Long and the Short and the Tall* (1959). He first performed in America in 1961 in Harold Pinter's *The Caretaker.*

Shaw made his first notable film appearance in the James Bond film *From Russia with Love* (1964). His reputation in motion pictures was enhanced by his appearances in the screen adaptation of *The Caretaker* (1963) and in *The Luck of Ginger Coffey* (1964), *Battle of the Bulge* (1965), and *A Man for All Seasons* (1966). He later appeared in such popular films as *The Sting* (1973), *Jaws* (1975), and *The Deep* (1978). Of his written works, perhaps the most notable is his novel *The Man in the Glass Booth* (1967), subsequently adapted by Shaw into a successful stage play, which was later filmed.

Shaw, T.E. (British Arabist): *see* Lawrence, T(homas) E(dward).

Shaw, (Warren) Wilbur (b. Oct. 31, 1902, near Indianapolis, Ind., U.S.—d. Oct. 30, 1954, near Peterson, Ind.), American automobile-racing driver who won the Indianapolis 500 three times—1937, 1939, and 1940—and was president of the Indianapolis Speedway (1945–54). He first entered the Memorial Day classic in 1927, when he finished fourth. He placed second in the race in 1933, 1935, and 1938. Shaw retired from racing in 1941. He was killed in an airplane crash.

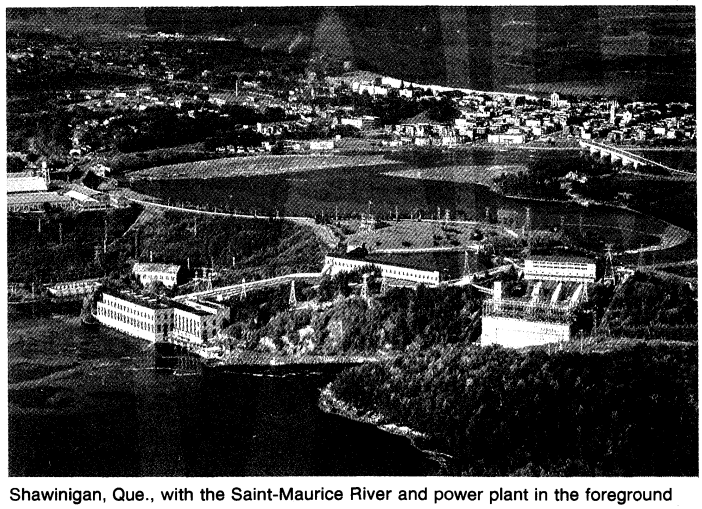
Shawia, also spelled CHAOUÏA, Berber ethnic and linguistic group of the Aures Plateau region of the Atlas Mountains of northeastern Algeria. The Shawia speak one of four major Algerian Berber dialects.

The Shawia practice cereal agriculture in the uplands and pastoral nomadism and horticulture in the oases along the edge of the desert, migrating between the two areas. The Shawia have only limited interactions with the urbanized Arabic-speaking Algerian population, to whom they are a tribal minority. Nominally Sunnite Muslims, most Shawia have only rudimentary knowledge of the textually oriented practices of Middle Eastern Islām.

Traditionally, Shawia interaction with outsiders was limited to trade with settled Berber groups, particularly with their Kabyle neighbours, who speak a closely related dialect, and to seasonal employment in the Arabic-speaking areas of the Maghrib. Organized according to clan divisions, Shawia villages in the uplands are occupied only in the summer months of the migration cycle.

Although their isolation from the centre of Algerian power prevented them from playing a larger role, the Shawia strongly opposed the French in the Algerian revolution in the 1950s, reflecting an awareness of national issues that suggests a continued integration of the Shawia into mainstream Algerian culture as it adjusts to the emergence of Algeria as a significant oil-exporting nation.

Shawinigan, formerly SHAWINIGAN FALLS, city, Trois-Rivières ("Three Rivers") region, southern Quebec province, Can., on the Saint-Maurice River. Lying near Shawinigan Falls, 19 miles (30 km) northwest of Trois-Rivières city, Shawinigan was founded about 1900, when an aluminum smelter and a paper and pulp mill were established there. The city became one of the province's important industrial centres, with plants manufacturing chemicals, aluminum, pulp and paper, textiles, clothing, abrasives, and plastics. The Canadian Pacific and Canadian National railways, several highways, and an airport serve Shawinigan and neighbouring Shawinigan South (Shawinigan-Sud) and Grand-Mère. A two-year college, originally (1943) affiliated with Laval University, offers programs in science and engineering. Inc. village, 1901; town, 1920; city, 1921. Pop. (1986) 21,470.



Shawinigan, Que., with the Saint-Maurice River and power plant in the foreground
George Hunter

Shawinigan Falls, French CHUTES SHAWINIGAN, waterfall on the Saint-Maurice River near Shawinigan in Trois-Rivières ("Three Rivers") region, south-central Quebec province, Can., about 19 miles (30 km) above Trois-Rivières city. The most powerful falls in the province, they have a drop of about 165 feet (50 m). A hydroelectric plant built at the site in 1903 was later expanded to provide power for the cities of Montreal and Quebec and for local industries. The falls were named from an Algonkian word meaning "crest," because an early portage near the falls led over a rocky crest.

shawl, square, oblong, or triangular protective or ornamental article of dress worn, generally by women, over the shoulders, neck, or head. It has been a common article of clothing in most parts of the world since antiquity. The period of the 19th century up to the 1870s, when the fashion silhouette changed, was known as the "shawl period" because women in Europe and America wore shawls with almost all their clothing. At the beginning of that century, shawls were a necessity in a fashionable woman's wardrobe because dresses were thin and décolleté; it was a sign of gentility to wear a shawl gracefully.



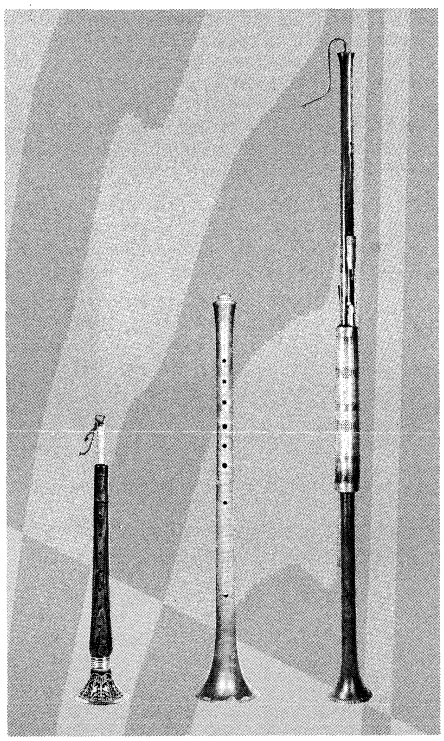
Woman wearing a Paisley shawl, "Madame Gaudibert," oil painting by Claude Monet, 1866; in the Louvre, Paris
Giraudon—Art Resource/EB Inc.

Oriental shawls first appeared in Europe after Napoleon's return from the Egyptian campaign in 1798. The most popular import was the cashmere shawl produced in the valley of Kashmir in India and made from the fine fleece of the Tibetan goat. In order to meet the 19th-century woman's demand for shawls, the Paisley shawl—machine-made in Scotland—was produced; it was an adaptation, rather than an imitation, of the Oriental shawl. In Latin countries, shawls are frequently worn by the peasantry and can exemplify local textile art.

shawm (from Latin *calamus,* "reed"; Old French: *chalemie*), double-reed wind instrument of Middle Eastern origin, a precursor of the oboe. Like the oboe, it is conically bored; but its bore, bell, and finger holes are wider, and it has a wooden disk (called a pirouette,

on European shawms) that supports the lips and, on Asian instruments, holds them away from the reed. The tone, intended for open air, is powerful.

It appeared near the beginning of the Christian Era and was widely disseminated by Islāmic influence. Numerous varieties (including the Indian *shahnāʾī* and *nāgasuram,* the Chinese *suo-na,* or *so-na,* and the Balkan and Middle Eastern *zurla* and *zurna*) are still played from Morocco eastward and in Islāmic areas of West Africa. They are generically called either shawms or oboes.



(Left to right) Indian *shahnāʾī;* German treble shawm, 16th century, in the Musée Instrumental du Conservatoire Royal, Brussels; and great bass shawm, *c.* 1600, in the Musikinstrumenten-Museum, Berlin

By courtesy of (left) Heras Institute, St. Xavier's College, Bombay, (centre) the Musee Instrumental, Brussels, (right) the Musikinstrumenten-Museum, Berlin; photograph, (centre) Anthony Baines

The shawm was introduced into Europe during the Crusades and was widely used in dance and ceremonial music. Instruments of various pitches, from treble to great bass, were constructed in the 16th century. Though it declined in Europe after the 17th century, it survived in Spain, modernized with complete keywork, as the *tenora* (tenor) and *tiple* (treble), which lead the bands for the sardana, the national dance of Catalonia. Its compass is about two octaves.

Consult the INDEX *first*

Shawn, Ted, byname of EDWIN MYERS SHAWN (b. Oct. 21, 1891, Kansas City, Mo., U.S.—d. Jan. 9, 1972, Orlando, Fla.), innovative American modern dancer and cofounder of the Denishawn school and company.

A former divinity student, Shawn was introduced to dance as therapy after an illness. Soon after beginning his dance career, he met and married Ruth St. Denis in 1914; together they founded Denishawn. Shawn taught and promoted many different ethnic and theatrical styles of dance and, with St. Denis, choreographed the Denishawn company's entire repertoire. He and St. Denis ended both their marital and their professional association in 1931, though they never divorced. From 1933 to 1940 he built a group of male dancers, for whom he choreographed numerous dances, including *Labor Symphony, Olympiad,* and *Kinetic Molpai.* By drawing from such sources as labourers' movements, dances of American Indians, and U.S. folk and popular dance, he was able to create a vigorous, masculine dance technique that greatly enhanced the attraction of dance as a career for men.

In 1933 he founded Jacob's Pillow Dance Festival near Lee, Mass., as a summer residence and theatre for his dancers. After the group's dissolution, Shawn developed Jacob's Pillow into an internationally important dance centre. Although his own choreography was generally nonballetic, he believed that dance as a whole is composed of many valid styles and so presented ballet as well as modern and ethnic dancers at Jacob's Pillow. Shawn continued to make occasional appearances as a dancer, reviving his solos, choreographing new ones, and performing in works created for him by Myra Kinch, notably *Sundered Majesty* (1954), based on Shakespeare's *King Lear.* He also lectured extensively and wrote several books. A biography, *Father of American Dance,* by Walter Terry was published in 1976.



Shawn in *Frohsinn*

Pictorial Parade—EB Inc.

Shawnee, an Algonkian-speaking North American Indian tribe whose first known home was the central Ohio River Valley. Closely related in language and culture to the Fox, Kickapoo (*qq.v.*), and Sauk, the Shawnee were also influenced by a long association with the Seneca and Delaware. During the summer the Shawnee lived in bark-covered houses grouped into large villages near fields in which women cultivated maize (corn). The primary male occupation was hunting. In winter the village broke into small family groups, which moved to hunting camps. Each village had a large council house that was also used for such religious ceremonies as the ritual purification of warriors. Other important ceremonies included the spring bread dance, held when the fields were planted; the green corn dance, marking the ripening of crops; and the autumn bread dance. The Shawnee comprised five major divisions, and within these were named patrilineal clans. The position of civil chief was generally hereditary; war chiefs were chosen for their bravery, skill, and experience.

In the 17th century the Shawnee were driven from their home by the Iroquois, scattering into widely separated areas. Some settled in what is now Illinois and others in the Cumberland Valley, while one group moved to the southeast. After 1725 the tribe united again in the region of Ohio, where they formed the principal barrier to the advance of white settlers. Following their defeat by Gen. Anthony Wayne at the Battle of Fallen Timbers and the failure of Tecumseh (*q.v.*) to unite the Indians of the Ohio Valley, they broke into three independent branches (Absentee, Eastern, and Cherokee Shawnee) that eventually settled in different parts of Oklahoma. In the late 20th century the Shawnee numbered over 2,000.

Shawnee, city, Johnson County, northeastern Kansas, U.S., southwestern suburb of Kansas City. The Shawnee Indians made their headquarters there in 1828, when it was known as Gum Springs. The nearby Shawnee Methodist Mission and Indian Manual Labor School (1839) served twice during 1854–56 as the temporary territorial capital of Kansas and has been partially restored. The first newspaper in Kansas (1835), the *Shawnee Sun,* was printed in the Shawnee language at the Baptist Mission, 2 mi (3 km) east. From 1855 to 1858, Shawnee was the county seat. The city is mainly residential but is also a shipping point for the surrounding farming and dairying area. Inc. city, 1922. Pop. (1980) 29,653.

Shawnee, city, seat of Pottawatomie County, central Oklahoma, U.S., on the North Canadian River, east-southeast of Oklahoma City. Founded in 1891, when the area was opened to white settlement, it was named for the Shawnee tribe, whose reservation and trading post were nearby. The railroad arrived in 1895, and the city prospered with the oil boom of the 1920s. Farming, stock raising, oil production, and small diversified industries are basic to the economy. Shawnee is the seat of Oklahoma Baptist University (1910) and St. Gregory's College (1915). It was the home of Dr. Brewster Higley, who wrote "Home on the Range." Jim Thorpe, the Indian athlete, was born nearby. Inc. 1894. Pop. (1980) 26,506.

Shawneetown, city, seat (1812) of Gallatin County, southern Illinois, U.S., 10 mi (16 km) below the confluence of the Wabash and Ohio rivers. The area was settled at the beginning of the 1800s. A land office was opened in 1812, and Shawneetown became the gateway to Illinois for settlers from the east, as well as a trading and financial centre. The state's first bank opened in Shawneetown in 1812, and the state's second newspaper, the *Illinois Immigrant,* began publication there in 1818. At the time of Illinois statehood (1818), Shawneetown and Kaskaskia (*q.v.*) were considered to be the two most important settlements in the state.

Floods repeatedly devastated the area, and after the flood of 1937 the state began to move the buildings of Shawneetown four miles to the west. Some inhabitants refused to move, however, and in 1956 the remaining section of the original settlement was incorporated as Old Shawneetown. The area is now a state historic site. Shawnee National Forest is to the south and west. Pop. (1980) 1,841.

Shawqī, Aḥmad, Shawqī also spelled SHAUQI (b. 1868, Cairo—d. Oct. 13, 1932, Cairo), the *amīr ash-shuʿarāʾ* ("prince of poets") of modern Arabic poetry and pioneer of the Arabic poetical drama.

A member of a family attached to the khedivial court, Shawqī was sent by the khedive to France to study at Montpellier and Paris universities. On his return the path of quick promotion lay open to him, and by 1914 he was the leading literary figure in Egypt. He spent 1914–19 in exile in Spain but on his return continued to dominate the Egyptian literary scene. In 1927 he was proclaimed *amīr ash-shuʿarāʾ.*

Shawqī was a prolific poet with a fine command of rhyme and diction, his themes ranging from conventional eulogy to poetic plays following such Western models as Shakespeare, Corneille, and Racine. While his efforts at im-

itating the ancient Arabic poets were unsuccessful, he adapted traditional poetic metres to dramatic dialogue in several poetic plays, such as *Masraʿ Kulyubatarah* ("The Fall of Cleopatra").

Shaw's Garden (St. Louis, Mo., U.S.): *see* Missouri Botanical Garden.

Shay, Ephraim (b. July 17, 1839, Huron County, Ohio, U.S.—d. April 19, 1916, Harbor Springs, Mich.), American inventor of the so-called Shay type of geared steam locomotive, widely used in the Americas, Australia, and East Asia on logging and mining railroads and in other circumstances requiring relatively small locomotives to move heavy trains at low speeds over rough terrain.

Previously a physician in Ohio and a Union Army engineer in the American Civil War (1861–65), Shay was the proprietor of a sawmill in Wexford County, Mich., when he devised his locomotive. The first Shay was built at Cadillac, Mich., about 1877; the last, at Lima, Ohio, in 1945. Beginning with Shay contracts, the Lima Machine Works (afterward Lima Locomotive Works) eventually became one of the world's most important constructors of conventional steam locomotives.

shaykh (Arabic title): *see* sheikh.

Shaykh al-Akbar, Ash- (Muslim mystic): *see* Ibn al-ʿArabī.

Shaykh Bahāʾī: *see* ʿĀmilī, Muḥammad ibn Ḥusayn Bahāʾ ad-Dīn, al-.

Shays, Daniel (b. *c.* 1747, Hopkinton, Mass.?—d. Sept. 29, 1825, Sparta, N.Y., U.S.), American officer (1775–80) in the U.S. War of Independence and later leader of Shays's Rebellion (*q.v.*).

Born to parents of Irish descent, Shays grew up in humble circumstances. At the outbreak of the American Revolution he responded to the call to arms at Lexington and served 11 days (April 1775). He served as second lieutenant in a Massachusetts regiment from May to December 1775 and became captain in the 5th Massachusetts Regiment in January 1777. He took part in the Battle of Bunker Hill and in the expedition against Ticonderoga, and he participated in the storming of Stony Point and fought at Saratoga. In 1780 he resigned from the Army, settling in Pelham, Mass., where he held several town offices.

Prosperity reigned in America at the signing of the peace (1783) but was soon transformed into an acute economic depression. Property holders—apparently including Shays—began losing their possessions through seizures for overdue debts and delinquent taxes and became subject to debtor's imprisonment. Demonstrations ensued, with threats of violence against the courts handling the enforcements and indictments. Shays emerged as one of several leaders of what by chance came to be called Shays's Rebellion (1786–87), and after it was over he and about a dozen others were condemned to death by the Supreme Court of Massachusetts. In 1788 he petitioned for a pardon, which was soon granted.

At the end of the rebellion Shays had escaped to Vermont. Afterwards he moved to Schoharie County, N.Y., and then, several years later, farther westward to Sparta, N.Y. In his old age, he received a federal pension for his services in the Revolution.

Shays's Rebellion (August 1786–February 1787), uprising in western Massachusetts in opposition to high taxes and stringent economic conditions. Armed bands forced the closing of several courts to prevent execution of foreclosures and debt processes. In September 1786 Daniel Shays and other local leaders led several hundred men in forcing the Supreme Court in Springfield to adjourn. Shays led a force of about 1,200 men in an attack (January 1787) on the federal arsenal at Springfield, which was repulsed. Pursued by the militia, on February 4 he was decisively defeated at Petersham and fled to Vermont. As a result of the rebellion, the Massachusetts legislature enacted laws easing the economic condition of debtors.

shayṭān (Islāmic myth): *see* shaitan.

Shāzilīyah (Islām): *see* Shādhilīyah.

Shcharansky, Anatoly Borisovich, Hebrew name NATAN (b. Jan. 20, 1948, Donetsk, Ukrainian S.S.R.), Soviet dissident, a human-rights advocate imprisoned (1977–86) by the Soviet government and then allowed to go to Israel.

Shcharansky's father was a Communist Party member in the Ukraine, working for a time on the party newspaper; and Shcharansky himself was a Komsomol member as a youth. He studied mathematics and computer programming at the Moscow Physical-Technical Institute (1966–72) and then worked in Moscow as a computer specialist for the Institute of Oil and Gas. A Jew, he applied in 1973 for permission to emigrate to Israel but not only was refused but also was harassed by the KGB and, in 1975, discharged from his job. With an excellent command of English, he became a spokesman for the dissidents and refusniks in contacting Western correspondents to publicize their cause. On March 15, 1977, he was arrested by the KGB, accused of treason and espionage, and tried *in camera* and sentenced to 13 years in prison and hard-labour camps. He was released in a prisoner exchange with the West on Feb. 11, 1986, and settled in Israel. (Several months later his mother, brother, and brother's family were allowed to emigrate.)

His wife, *née* Natalya Stiglitz, had also applied for a visa to go to Israel and was allowed to emigrate a day after their marriage in 1974. She adopted the Hebrew name Avital and, until his release, championed his cause from Jerusalem and in her travels abroad. A biography is Martin Gilbert's *Shcharansky: Hero of Our Time* (1986).

Shchedrin, N.: *see* Saltykov, Mikhail Yevgrafovich, Graf.

Shchekino (Russian S.F.S.R.): *see* Shchyokino.

Shchelkovo (Russian S.F.S.R.): *see* Shchyolkovo.

Shchepkin, Mikhail Semenovich (b. Nov. 17 [Nov. 6, old style], 1788, near Belgorod, Kursk province, Russia—d. Aug. 23 [Aug. 11, old style], 1863, Yalta, Russia), possibly the most influential actor of 19th-century Russia, known for his sensitive and realistic acting. Konstantin Stanislavsky considered him the first master of dramatic Naturalism.

Shchepkin was born a serf and began acting in amateur productions on the estate as a child. After attending public school he joined the Kursk theatre as an understudy in 1805, moving up, in 1808, to be a permanent member of the troupe, primarily in comedy roles. He soon discovered another actor using a new, more subtle acting style. This technique of realistic detail and understatement required years of study, training, and persistence before Shchepkin perfected it. By 1821 he was on the verge of stardom, but he was still a serf, and it took a concerted effort by his supporters to buy his freedom.

In 1823 he joined the Maly (Little) Theatre in Moscow, where he dominated actors and dramatists alike for the next 40 years. He was friendly with Alexandr Pushkin, Ivan Turgenev, and other writers (frequently commissioning plays to suit his new technique) and promoted a new generation of realistic actors, including Prov Sadovsky and Vladimir Davydov. Shchepkin's greatest acting successes were in Shakespearean roles and in such character parts as the mayor in Nikolay Gogol's *Revizor* (*The Inspector General*).

Shcherbakov (1946–57), also called (1957–84) RYBINSK (Russian S.F.S.R.): *see* Andropov.

Shcherbatov, Mikhayl Mikhaylovich (b. July 22, 1733, Moscow—d. Dec. 12, 1790, Mikhailovskoye), Russian ideologue, historian, and aristocratic commentator on Russian political and social developments in the 18th century.

Shcherbatov was the son of a former governor-general of Moscow and a member of one of the oldest aristocratic families in Russia, and he received a private education. His first published works were seven articles and translations that appeared between 1759 and 1761 in the *Articles and Translations for Use and Amusement,* Russia's first scientific and literary journal that had been founded by Prince M.V. Lomonosov in 1755. These early works paradoxically combine the ideas of the Enlightenment with the pessimistic estimate of human nature and social progress that prompted Shcherbatov to support a strong, even absolutist state authority.

In 1767 the nobility of the Yaroslavl district elected Shcherbatov to the commission for the drafting of the new legal code, which was to be the high point of his public career. His major legislative proposal called for the repeal of Peter I's reforms that had given the privilege of rank over that of birth. It received avid support from the old nobility but was strongly opposed (and defeated) by the newer gentry that had attained ennoblement by state service in the years since Peter's reign. Shcherbatov remained a lifelong advocate of the monopolization of power by a hereditary ruling class, as well as a strong defender of serfdom on the grounds of its necessity to the state.

In 1768 he was named imperial historian. His *History of Russia from the Earliest Times,* which appeared during 1770–1791 in seven volumes, was the first serious attempt to produce a scholarly narrative of Russian history based on original sources. Although Shcherbatov's *History* was later criticized as the work of a reactionary, its incorporation of old chronicles and legal documents proved invaluable to later Russian historians.

Shcherbatov's vision of the ideal state is embodied in his *Journey to the Land of Ophir* (*Puteshestvie v Zemlyu Ofirskuyu,* 1784), a utopian fantasy depicting a Russia in which Peter I's westernizing reforms have been reversed and the nobility and the serfs are confirmed in what Shcherbatov viewed as their "natural" (and inherently unequal) relations to each other. His most celebrated work in the West, *On the Corruption of Morals in Russia,* appeared in 1797. Although reflecting his melancholic and ailing disposition, it was a fine example of the outraged erudition for which he was known, as well as an unrivaled account of contemporary Russian social life and conservative thought.

Shcherbatskoy, Fyodor Ippolitovich (b. Sept. 11 [Aug. 30, old style], 1866, Kielce, Russian Poland—d. March 18, 1942, Borovoye Akmolinskoy oblast, Kazakhstan S.S.R.), foremost Western authority on Buddhist philosophy, whose most important work was the influential *Buddhist Logic,* 2 vol. (1930–32).

Educated in comparative linguistics, Sanskrit literature, and Indian philosophy, Shcherbatskoy spoke fluently and wrote with ease in six European languages. He also possessed an extraordinary mastery of Sanskrit that won him the respect of Indian scholars as well as those of Europe.

Around 1900, while he was in Mongolia and India, Shcherbatskoy's study of Buddhist logic and metaphysics, particularly the logic

of the philosopher Dharmakirti, led to his first major work, *Teoriya poznaniya i logika po ucheniyu posdneyshikh buddhistov* (1903; "Theory of Knowledge and Logic According to the Later Buddhists"), which formed the basis of his great work on logic. The second part of the *Teoriya,* on perception and deduction, appeared in 1909. Professor of Indian literature at the University of St. Petersburg (now Leningrad) from 1904, he wrote another major work, *Conception of Buddhist Nirvana* (1927), in reaction to the Belgian scholar Louis de La Vallée-Poussin's radical *Nirvâna* (1925). Other works include *The Central Conception of Buddhism and the Meaning of the Word "Dharma"* (1923).

Shcherbinovka (Ukrainian S.S.R.): *see* Dzerzhinsk.

Shchuchinsk, also spelled ŠČUČINSK, city, Kokchetav *oblast* (administrative region), Kazakh Soviet Socialist Republic, on Lake Shchuchye. Founded in 1828 as a Cossack settlement, it is the centre of a large agricultural area as well as a health resort and the railway station for the leading Kazakhstan health resort, Borovoye, which is 15 mi (25 km) away. In the vicinity are the Kazakh Forestry Research Institute and a noted arboretum. Pop. (1974 est.) 46,000.

Shchukin, Boris Vasilevich (b. April 17 [April 5, old style], 1894, Moscow—d. Oct. 7, 1939, Moscow), Russian stage and motion-picture actor, particularly well known for his portrayals of Lenin.

Shchukin grew up in Kashira and studied at the technical institute in Moscow. After serving in the military in World War I, he went to work for the railroad in Kashira; but his real love was the theatre, and in 1920 he was admitted to Yevgeny Vakhtangov's dramatic group in Moscow. He played in comedy and tragedy in his nearly 20 years at the Vakhtangov Theatre, including the starring role in *Turandot* (1922) and triumphs as Stepan in Nikolay Gogol's *Zhenitba* ("Marriage"), Polonius in Shakespeare's *Hamlet,* and Bulychov in Maksim Gorky's *Yegor Bulychov.* His greatest role, however, was Lenin in Nikolay Pogodin's *Chelovek s ruzyom* (1937; "Man with a Gun") and in two motion pictures, *Lenin v Oktyabre* (1937; "Lenin in October") and *Lenin v 1918* (1939; "Lenin in 1918"). He was named People's Artist of the U.S.S.R. in 1936.

Shchyokino, also spelled SHCHEKINO, or ŠČOKINO, city and centre of a *rayon* (district), Tula *oblast* (administrative region), Russian Soviet Federated Socialist Republic. Coal mining began there in 1870, exploiting the lignite (brown coal) of the Moscow coalfield; chemical concerns, the product of foreign investment, were soon established. Today, as well as having a continuing coal industry, Shchyokino has an important chemical-industry complex, based largely on natural gas piped from Stavropol. Pop. (1983 est.) 70,000.

Shchyolkovo, also spelled SHCHELKOVO, or ŠČOLKOVO, city and centre of a *rayon* (district), Moscow *oblast* (administrative region), western Russian Soviet Federated Socialist Republic, on the Klyazma River a few miles northeast of Moscow. Shchyolkovo was renowned from the 18th century as a centre of handicraft silk weaving, and today it remains a centre of various textile industries. The city also has important chemical, metalworking, and engineering industries. Pop. (1983 est.) 104,000.

She Chi, Pinyin SHE JI (Chinese: Earth and Millet), ancient Chinese compound patron deity of the soil and harvests. China's earliest legendary emperors are said to have worshipped She (Earth), for they alone had responsibility for the entire earth and country. This worship was meant to include the five spirits of the earth that resided in mountains and forests, rivers and lakes, tidelands and hills, mounds and dikes, and springs and marshes. Later Chinese emperors worshipped the gods of the soil as a more particularized cult than that offered to sovereign earth. The ceremony took place inside the Forbidden City, Peking, on an altar covered with soil of five colours.

Since ordinary people had no part in this sacrifice, they gradually created such gods as Hou Chi (*q.v.*) to protect their land and grain. Small communities, or even single families, thus also came to have their local gods or T'u-ti (*q.v.*). Throughout the country countless small shrines or temples were constructed, each with two images. Originally meant to represent the god of soil (She) and the god of grain (Chi), these images eventually were considered man and wife.

The great Han dynasty emperor Kao Tsu (reigned 206–195 BC) was but one of many Chinese rulers who encouraged the local populace to sacrifice to their particular T'u-ti, even though the limited jurisdiction of these gods placed them under the authority of Ch'eng Huang, the spiritual magistrate of the city.

She-hsien, formerly (until 1912) HUI-CHOU, Pinyin SHEXIAN or HUIZHOU, county (*hsien*) seat in Hui-chou Prefecture (*ti-ch'ü*), southeastern Anhwei Province (*sheng*), China. It is a communications centre in the Hsin-an Chiang (river) Valley, at a point where the natural route from Hang-chou on the coast of Chekiang Province and Shanghai into northern Kiangsi Province joins two routes across the Huang Shan (mountains) into the Yangtze River Valley.

She-hsien first became the administrative seat of a prefecture (*chou*), She, in 593, but the county (*hsien*) can be traced back to the end of the 3rd century BC. Until the 12th century it was commonly known as Hsin-an or as She-chou. It received the name Hui-chou in 1121. Later, under the Ming (1368–1644) and Ch'ing (1644–1911) dynasties, it became a superior prefecture (*fu*), Hui-chou. In 1912 it reverted to a county under its old name of She-hsien, but the former name, Hui-chou, is still commonly used both for the town itself and for the surrounding district.

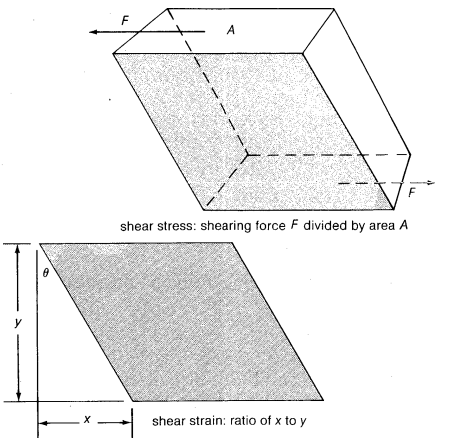
Hui-chou played a particularly notable role in Chinese commerce until the 19th century. Local merchants, most of their fortunes founded from participation in the salt monopoly, began to play a national role in trade from the 16th century onward. Often using joint capital raised from within their group, they exerted their influence in every branch of commerce. From the 16th to the 18th century they dominated the rice and tea trade, the lumber business, and the silk and cotton textile trade. They also engaged in ceramics and iron manufacturing and were pawnbrokers and moneylenders. Colonies of merchants were to be found from Hopeh Province in the north to Kwangtung Province in the south. In the great canal port of Linch'ing, situated on the Grand Canal (Ta Yünho) in Shantung Province, 90 percent of the merchants in the early 17th century were from Hui-chou. They were also engaged in overseas trade with Siam (modern Thailand) and Japan. Toward the end of the 18th century, they began to transfer their capital from the salt monopoly into pawnbroking and banking. During the 19th century, however, their place was gradually taken by the Shanghai banks run by merchants from Ning-po and Shaohsing, both in Chekiang. Modern She-hsien has retained little importance, but the many ancient mansions surviving in its vicinity are a reminder of its former style of life. Pop. (mid-1970s est.) 10,000–50,000.

She Huang-ti (Chinese emperor): *see* Wang Mang.

She Ji (in Chinese mythology): *see* She Chi.

shear modulus, numerical constant that describes the elastic properties of a solid under the application of transverse internal forces such as arise, for example, in torsion, as in twisting a metal pipe about its lengthwise axis. Within such a material any small cubic volume is slightly distorted in such a way that two of its faces slide parallel to each other a small distance and two other faces change from squares to diamond shapes. The shear modulus is a measure of the ability of a material to resist transverse deformations and is a valid index of elastic behaviour only for small deformations, after which the material is able to return to its original configuration. Large shearing forces lead to flow and permanent deformation or fracture.

Mathematically the shear modulus is equal



Cubic volume distorted by shearing force

to the quotient of the shear stress divided by the shear strain. The shear stress, in turn, is equal to the shearing force F divided by the area A parallel to and in which it is applied, or F/A. The shear strain or relative deformation is a measure of the change in geometry and in this case is expressed by the trigonometric function, tangent (tan) of the angle θ (theta), which denotes the amount of change in the 90°, or right, angles of the minute representative cubic volume of the unstrained material. Mathematically, shear strain is expressed as $\tan\theta$ or its equivalent, by definition, x/y. The shear modulus itself may be expressed mathematically as

$$\text{shear modulus} = \frac{\text{shear stress}}{\text{shear strain}} = \frac{F/A}{x/y}.$$

This equation is a specific form of Hooke's law of elasticity. Because the denominator is a ratio and thus dimensionless, the dimensions of the shear modulus are those of force per unit area. In the English system the shear modulus may be expressed in units of pounds per square inch (usually abbreviated to psi); the common SI units or newtons per square metre (N/m^2). The value of the shear modulus for aluminum is about 3.5×10^6 psi, or 2.4×10^{10} N/m^2. By comparison, steel under shear stress is more than three times as rigid as aluminum.

shear stress, force tending to cause deformation of a material by slippage along a plane or planes parallel to the imposed stress. The resultant shear is of great importance in nature, being intimately related to the downslope movement of earth materials and to earthquakes (*q.v.*). Shear stress may occur in solids or liquids; in the latter it is related to fluid viscosity.

shear wave, transverse wave that occurs in an elastic medium when it is subjected to periodic shear. Shear is the change of shape,

without change of volume, of a layer of the substance, produced by a pair of equal forces acting in opposite directions along the two faces of the layer. If the medium is elastic, the layer will resume its original shape after shear, adjacent layers will undergo shear, and the shifting will be propagated as a wave. The velocity (v) of a shear wave is equal to the square root of the ratio of shear modulus (G), a constant of the medium, to density (ρ) of the medium, $v = \sqrt{G/\rho}$.

Both shear (transverse) and compressional (longitudinal) waves are transmitted in bulk matter. Shear waves travel at about half the speed of compressional waves (*e.g.,* in iron, 3,200 metres per second compared to 5,200 metres per second). Shear waves must besmall compared to the cross-sectional area of the medium, and hence narrow rodsand bars cannot support shear waves because the transverse motion in them is too large. The shear-wave velocity in a crystal varies according to the direction of propagation and the plane of polarization (i.e., plane of vibration) because of the variation of shear modulus in a crystal.

Shearer, Moira, original name MOIRA SHEARER KING (b. Jan. 17, 1926, Dunfermline, Fife, Scot.), Scottish ballerina and actress best known for her performance as the suicidal ballerina in the ballet film *The Red Shoes* (1948).



Moira Shearer in *The Sleeping Beauty,* 1953
Houston Rogers

Shearer studied at the Sadler's Wells (later the Royal Ballet) School and with Nicholas Legat in London; danced with the International Ballet in 1941; and joined the Sadler's Wells Theatre Ballet in 1942. In 1944 she was promoted to the rank of ballerina and danced leading parts in such classical ballets as *The Sleeping Beauty, Coppélia, Swan Lake,* and *Giselle.* She also created important roles in several of Frederick Ashton's ballets, notably the title role in *Cinderella* (1948). Other celebrated performances were in the premieres of DeValois' *Promenade* (1943), Helpmann's *Miracle in the Gorbals* (1944) and Massine's *Clock Symphony* (1948).

Shearer began her film career by portraying a ballerina in *The Red Shoes.* She also appeared in *Tales of Hoffmann* (1951), *The Man Who Loved Redheads* (1955), and *Black Tights* (1962; film version of four ballets by Roland Petit). She played Titania in *A Midsummer Night's Dream* at the 1954 Edinburgh International Festival of Music and Drama and performed at the original London and Bristol Old Vic theatres, which she joined in 1955, in the title role of Shaw's *Major Barbara.* In later acting roles Shearer played Madame Ranevskaya in *The Cherry Orchard* at the Royal Lyceum in Edinburgh in 1977, and in 1978 she appeared as Judith Bliss in *Hay Fever,* also at the Royal Lyceum. During the 1970s and 80s she gave lecture tours and recitals internationally, including poetry and prose recitals at the Edinburgh Festivals in 1974 and 1975.

shears, any of numerous large or large-bladed scissors, usually designed for cutting specific materials. *See* scissors.

shearwater, any member of more than a dozen species of long-winged oceanic birds belonging to the family Procellariidae (order Procellariiformes), which also includes the fulmars and the petrels. Typical shearwaters are the 12 to 17 species of the genus *Puffinus,* drab, slender-billed birds 35–65 centimetres (14–26 inches) in length. The common name shearwater describes the birds' habit of gliding on stiff wings along the troughs of waves. The name is sometimes also applied to the skimmers, an unrelated oceanic bird family (*see* skimmer).

Shearwaters nest in burrows on offshore islands and coastal hills in the North Atlantic, eastern South Atlantic, Mediterranean, and throughout most of the Pacific. Colonies may number hundreds of thousands of pairs, and at night, when the calling adults move in and out of the burrows, the din is deafening. A single egg is incubated in turn by the male and female, and the chick is raised by both parents.

Some of the most widespread *Puffinus* species are:

Sooty shearwater (*P. griseus*): length about 50 cm (19½ in.), wingspread about 85 cm (33 in.). Breeds near Australia, New Zealand, southern South America; winters in offshore waters of Atlantic and Pacific.

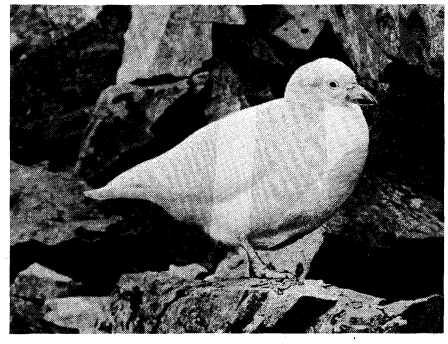
Common shearwater (*P. puffinus*): length 30–37 cm (11¾–14½ in.); several races given local names. Manx shearwater (*P. p. puffinus*) breeds in eastern North Atlantic; Newell's (*P. p. newelli*) in Hawaiian Islands; other races breed in the Mediterranean and in the waters around New Zealand.

Slender-billed or short-tailed shearwater (*P. tenuirostris*), called muttonbird in Australia and whalebird in Alaska; length 40 cm (15½ in.), breeds on islands in Bass Strait, Australia, and in Tasmania; remainder of year spent circumnavigating the Pacific; harvested in large numbers for meat and oil.

sheath-tailed bat, also called SAC-WINGED BAT, any bat of the family Emballonuridae, suborder Microchiroptera. Sheath-tailed bats are found worldwide in tropical and subtropical regions. Their common name refers to the way in which the tail protrudes from a sheath in the membrane attached to the hind legs. Sac-winged bat, another name for the emballonurids, refers to the glandular sacs in the wing membranes of several genera.

Sheath-tailed bats are about 4–10 centimetres (1½–4 inches) long without the 0.6–3-cm tail, and they weigh about 5–30 grams (⅙–1 ounce). They are usually black, brown, or gray, and some are striped or mottled. They shelter in relatively open places, such as shallow caves. Among the 12 genera and 50 species of the family are the sac-winged bats (*Saccopteryx*), which are white-striped bats of Central and South America; ghost bats (*Diclidurus*), which are white or white and gray bats, also of the New World; and tomb bats (*Taphozous*), which are swift-flying bats found from Africa through southern Asia to Australia.

sheathbill, either of two species of shorebirds comprising the genus *Chionis,* family Chionidae, the only bird family confined to South Polar regions. It is named for the rough, horny sheath around the base of its bill shielding its nostrils. The sheathbill is an aggressive predator on the eggs and young of penguins, petrels, and terns; otherwise it scavenges the feces and afterbirths of seals and the offal around whaling stations. The short, stout bill has pimply skin at the base, the eyes are pink rimmed, and the short, thick legs and unwebbed feet are blue gray. The snowy sheathbill (*C. alba*), 40 centimetres (16 inches) long, has a yellow bill. The lesser sheathbill (*C. minor*) is black billed and slightly smaller. Sheathbills may be seen hundreds of miles at sea but are usually encountered along shore, in small parties. Fearless of man, they fight among themselves with their wings, which are equipped with sharp spurs. Two or three eggs are laid in a rock crevice. Usually only one chick survives.



Snowy sheathbill (*Chionis alba*)
Niall Rankin—Eric Hosking

sheathed bacteria, group of microorganisms found widely in nature in slow-running water, many species of which are attached to submerged surfaces. They are characterized by a filamentous arrangement of cells enclosed in a sheath. The sheaths of *Leptothrix, Crenothrix,* and *Clonothrix* are variously encrusted or impregnated with iron or manganese oxides, depending upon the water.

One of the best known sheathed bacteria is *Sphaerotilus natans,* a common species, which in polluted water has thin and colourless sheaths and in unpolluted water, containing iron, has yellow-brown iron-encrusted sheaths that often grow into long slimy tassels.

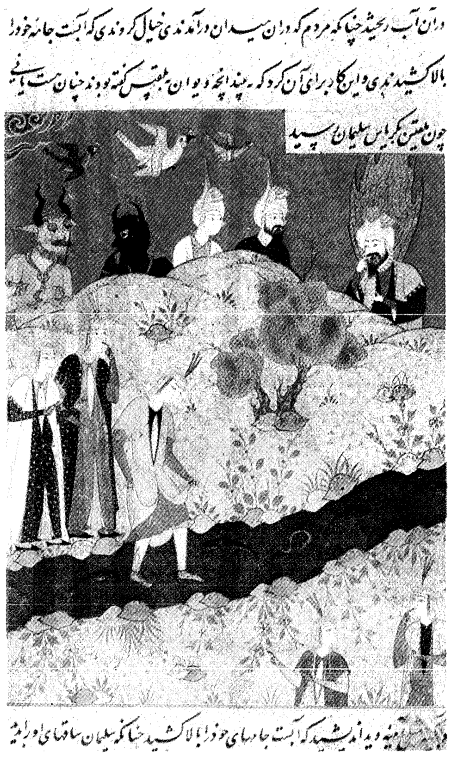
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Sheba (ancient state): *see* Saba'.

Sheba, Queen of, Arabic BILQĪS, Ethiopian MAKEDA (fl. 10th century BC), according to Jewish and Islāmic traditions, ruler of the Kingdom of Saba' (or Sheba) in southwestern Arabia. In the Old Testament account of the reign of King Solomon, she visited his court at the head of a camel caravan bearing gold, jewels, and spices. The story provides evidence for the existence of important commercial relations between ancient Israel and Arabia. According to the Bible, the purpose of her visit was to test Solomon's wisdom by asking him to solve a number of riddles.

The story of Bilqīs, as the Queen of Sheba is known in Islāmic tradition, appears in the Qur'ān, though she is not mentioned by name, and her story has been embellished by Muslim commentators; the Arabs have also given Bilqīs a southern Arabian genealogy, and she is the subject of a widespread cycle of legends. According to one account, Solomon, having heard from a hoopoe, one of his birds, that Bilqīs and her kingdom worshipped the Sun, sent a letter asking her to worship God. She replied by sending gifts, but, when Solomon proved unreceptive to them, she came to his court herself. The King's demons, meanwhile,

fearing that he might be tempted into marrying Bilqīs, whispered to him that she had hairy legs and the hooves of an ass. Solomon, being curious about such a peculiar phenomenon, had a glass floor built before his throne, so that Bilqīs, tricked into thinking it was water, raised her skirts to cross it and revealed that her legs were truly hairy. Solomon then ordered his demons to create a depilatory for the queen. Tradition does not agree as to whether



Solomon and Bilqīs, miniature from a manuscript in the Bodleian Library, Oxford, 1552 (MS. Ouseley Add. 24, folio 127v)

By courtesy of the curators of the Bodleian Library, Oxford; photograph, Thomas, Oxford

Solomon himself married Bilqīs or gave her in marriage to a Hamdānī tribesman; she did, however, become a believer.

The story of Sheba, which was probably derived from Jewish tradition, also appears among the Persians, where she is considered the daughter of a Chinese king and a peri. According to Ethiopian tradition, Sheba (called Makeda) married Solomon, and their son, Menelik I, founded the royal dynasty of Ethiopia.

Shebeli River, also spelled SHIBELI, Amharic WĀBI-SHABALĒ, Italian UEBI SCEBELI, Somali SHABELLE, river in eastern Africa, rising in the Ethiopian Highlands and flowing south through the arid Ogaden Plateau. The Shebeli River crosses into Somalia north of Beletwene (Beled Weyne) and continues south to Balcad, about 20 miles (32 km) from the Indian Ocean, turning southwest there. During heavy-rain periods in Ethiopia, the Shebeli River joins the Juba (Giuba), and the combined waters then flow to the Indian Ocean. In drier years the Shebeli disappears in a series of marshes and sand flats northeast of the Juba confluences. The river's total length is 1,130 miles (1,820 km). The region through which the Shebeli flows is occupied by Somalis, Bantu-speaking people, and Oromo. Cultivation has largely replaced pastoral nomadism in the river's lower basin, and the bananas grown along the southern reaches of the Shebeli and the Juba make up a large portion of Somalia's export trade.

Sheberghān, also spelled SHEBIRGHAN, town, northern Afghanistan. Sheberghān is situated 80 miles (130 km) west of Mazār-e Sharīf, along the banks of the Safīd River. It is surrounded by irrigated agricultural land, and it lies on a main east–west road through northern Afghanistan. Sheberghān was once the capital of an independent Uzbek khanate that was allotted to Afghanistan by the 1873 Anglo-Russian border agreement. Pop. (1982 est.) 19,969.

Shebin el-Kom (Egypt): *see* Shibīn al-Kawm.

Shebirghan (Afghanistan): *see* Sheberghān.

Sheboygan, city, seat (1836) of Sheboygan County, eastern Wisconsin, U.S. The city lies along Lake Michigan at the mouth of the Sheboygan River, 57 miles (92 km) north of Milwaukee. Established as a fur-trading post in 1818 by William Farnsworth, it was settled as a lumbering village in 1835; cooperage became a thriving business. The city's Chippewa Indian name means "wind" or "rumbling underground," referring to the falls upriver. German immigrants played a significant role in the city's cultural and economic development. An active Great Lakes port, Sheboygan is a diversified industrial centre that manufactures enamelware, furniture, plastics, clothing, transportation utilities, and machinery. The city is also noted for its bratwurst and cheese. It is the seat of Lakeland College (1862) and a University of Wisconsin centre (1933). Sheboygan Indian Mound Park, which contains 18 burial mounds (500–750 AD) of the Woodland Indians, is a state historic site in the city. Inc. village, 1839; city, 1853. Pop. (1986 est.) city, 47,879; metropolitan area (MSA), 102,-700.

Shebshi Mountains, mountain range in eastern Nigeria, extending approximately 100 miles (160 km) in a north–south direction between the Benue and Taraba rivers. Its Dimlang (Vogel) Peak is the highest point (6,700 feet [2,042 m]) in Nigeria, rising above the central highland area. Numerous tributaries of the Benue River, including the Kam, Fan, Sonko, Belwa, and Ini rivers, rise on its wooded upper slopes.

Set in an isolated and sparsely populated savanna area, the mountains are inhabited mainly by subsistence farmers of the Chamba, Daka (Dakka), Mumuye, and Kam groups, who predominantly practice traditional indigenous religions. Sorghum and millet are the staple crops grown on the mountains' slopes, and goats and poultry are raised.

Shechem (Israeli-occupied Jordan): *see* Nābulus.

Shechina (Judaism): *see* Shekhina.

Shedal: *see* Luzzatto, Samuel David.

Shedd Aquarium, in full JOHN G. SHEDD AQUARIUM, one of the largest indoor aquariums in the world. The public facility was founded in 1930 in Chicago with funds donated by John Graves Shedd, a prominent local businessman. It contains more than 200 exhibition tanks, housing in excess of 5,000 specimens of 560 species of fishes (both freshwater and marine) and other aquatic animals from around the world. The total water capacity is more than 2,000,000 l (450,000 gallons). A special display called the Coral Reef Exhibit features an enormous tank that circulates 340,000 l (90,000 gallons) of seawater per hour and contains more than 300 Caribbean marine animals, including nurse sharks, sea turtles, moray eels, and numerous rare and colourful varieties of fish. Besides providing such exhibits, the aquarium sponsors a variety of educational programs for persons of all ages.

sheefish, also called INCONNU, species of whitefish (*q.v.*).

Sheehan's syndrome, also called POSTPARTUM PITUITARY NECROSIS, insufficiency of pituitary hormones (hypopituitarism) following pregnancy and childbirth, caused by destruction of cells of the anterior pituitary gland by oxygen starvation following childbirth. The condition may also result from septic shock, burn shock, or a massive hemorrhage of any kind. Once the most common cause of hypopituitarism in women, Sheehan's syndrome has become less common with improvements in obstetric practice.

In women giving birth, damage to the anterior pituitary may result from a drop in blood pressure caused by blood loss during and after delivery; the hypophyseal arteries, which supply the pituitary gland, go into spasm, temporarily cutting off the blood supply to the gland and killing some of its tissue. As long as at least 30 percent of the gland continues to function, no insufficiency of pituitary hormone will occur. If the damage is more extensive, however, symptoms of hypopituitarism—chiefly the loss of secondary sex characteristics—appear shortly after delivery. Clinical manifestations of the syndrome include inability to produce milk, loss of axillary and pubic body hair, and failure to resume menstruation. Supplements of pituitary hormones correct the condition, restoring ovulation and stimulating the secretion of estrogenic hormones.

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Sheeler, Charles (b. July 16, 1883, Philadelphia—d. May 7, 1965, Dobbs Ferry, N.Y., U.S.), American painter who is best-known for his precise renderings of industrial forms in which abstract, formal qualities were emphasized.

He studied at the School of Industrial Art in Philadelphia and then at the Pennsylvania Academy of Fine Arts. He contributed six paintings, mainly still lifes, to the New York Armory Show of 1913.

To make a living, Sheeler turned to photography about 1912. Initially he worked on assignments from Philadelphia architects. He moved to New York City in 1919 and the next year collaborated with the photographer Paul Strand, on a film, *Mannahatta,* a study of the buildings of the city. During the early 1920s he received recognition for both his paintings and his photography. In 1927 he made an outstanding series of photographs of the Ford Motor Company's plant at River Rouge, Mich. This assignment was followed in 1929 by a series on the Chartres cathedral, France.

In 1929 he painted one of his best-known pictures, "Upper Deck" (Fogg Art Museum, Cambridge, Mass.), which has been acclaimed for its pristine, geometric surfaces. "Rolling Power" (1939; Smith College Museum of Art, Northampton, Mass.), another major work, emphasized the abstract power of the driving wheels of a locomotive. Sheeler also treated architectural subjects in his abstract-realist style. His later works tended toward a less literal rendering of their subjects.

She'elot u-Teshubot (Jewish literature): *see* responsa.

sheep, ruminant (cud-chewing) mammal of the genus *Ovis*. The sheep is usually stockier than its relative the goat; its horns, when present, are more divergent; it has scent glands in its face and hind feet; and the males lack the beards of goats. Sheep usually have short tails. In all wild species of sheep, the outer coat takes the form of hair, and beneath this lies a short undercoat of fine wool that has been developed into the fleece of domesticated

Breeds of domesticated sheep

name and type	distribution	appearance	characteristics
Cheviot (wool)	originally England and Scotland	small, hornless, woolless heads, legs	produce medium-weight fleeces
Columbia (wool and meat)	developed U.S., since 1912	large, white-faced, hornless	high wool yield; mutton acceptable
Corriedale (wool and meat)	developed N.Z., now also U.S.	white-faced, hornless	bright, soft fleeces; good quality lambs
Cotswold (wool and meat)	originally England, now also U.S.	large, white-faced, hornless	coarse, curly fleece; acceptable mutton
Debouillet (wool and meat)	developed U.S.	bare-faced, horned or hornless	fine wool; acceptable mutton
Dorset, or Dorset Horn (wool and meat)	developed England, now U.K., U.S., Australia	medium-sized, white-faced, horned	small wool yield; out-of-season lambs
Hampshire (mostly meat)	developed England, now widespread in U.S.	large, hornless, dark faces, legs	superior mutton breed; limited wool
Karakul (wool)	Asia, Africa, Europe, U.S.	medium-sized, fat-tailed	coats of very young lambs called Persian Lamb
Leicester (wool)	originally England, now in U.K. and North America	massive body, white-faced, broad-backed	heavy fleece
Lincoln (wool)	Australia, N.Z., North and South America	world's largest sheep, hornless	coarse long wool is used chiefly for carpets
Merino (wool)	Spain, Australia, North America	horned or hornless, heavily-wooled head	excellent, fine, soft, fleeces
Montadale (meat and wool)	developed U.S., 1930s	hornless; white hair sometimes spotted	mutton sheep, also produces heavy fleece
Oxford (wool)	developed England, now in North America	hornless; gray nose, ears, lower legs	outstanding wool producer
Panama (wool)	developed U.S., about 1912	white-faced, hornless and large	hardy, large fleeces of white wool
Rambouillet (mostly wool)	developed France from 18th century	smooth-bodied, horned or hornless	lambs mature rapidly
Romeldale (wool and meat)	developed U.S., after 1915	medium-sized, hornless, white-faced	heavy fleeces and quick-maturing lambs
Romney (mostly meat)	originally England, now N.Z., North America, Australia	hornless with white face and legs	mostly raised for mutton; wool coarse
Shropshire (meat and wool)	originally England, now also in U.S.	deep brown ears and muzzles	excellent mutton; wool of medium fineness
Southdown (meat and wool)	originally England, now N.Z., Australia, North America	hornless with small, rounded body	raised for mutton; fleece is short
Suffolk (meat and wool)	developed England, now also in U.S.	black-faced, large, hornless	fine mutton breed; acceptable wool
Targhee (meat and wool)	developed U.S., after 1926	medium-sized, hornless, white-faced	good mutton; fleece of long-staple wool

sheep. Male sheep are called rams, the females ewes, and immature animals lambs. Mature sheep weigh from about 80 to as much as 400 pounds (35 to 180 kg).

A sheep regurgitates its food and chews the cud, thus enabling its four separate stomach compartments to throughly digest the grasses and other herbage that it eats. The animals prefer grazing on grass or legume vegetation that is short and fine, though they will also consume high, coarse, or brushy plants as well. They graze plants closer to the root than do cattle, and so care must be taken that sheep do not overgraze a particular range. Sheep are basically timid animals who tend to graze in flocks and are almost totally lacking in protection from predators. They mature at about one year of age, and many breed when they reach the age of about one and a half years. Most births are single, although sheep do have twins on occasion. The lambs stop suckling and begin to graze at about four or five months of age.

Sheep were first domesticated from wild species of sheep at least 5000 BC, and their remains have been found at numerous sites of early human habitation in the Middle East, Europe, and Central Asia. Domesticated sheep are raised for their fleece (wool), for milk, and for meat. The flesh of mature sheep is called mutton; that of immature animals is called lamb. There were estimated to be more than 1,000,000,000 sheep in the world in the late 20th century. The major national producers are Australia, the Soviet Union, New Zealand, China, India, the United States, South Africa, Argentina, and Turkey. Countries that have large areas of grassland are the major producers.

Domestic sheep differ from their wild progenitors and among themselves in conformation, quantity and quality of fleece, colour, size, milk production, and other characteristics. Most breeds of domesticated sheep produce wool, while a few produce only hair, and wild sheep grow a combination of wool and hair. Several hundred different breeds of sheep have been developed to meet environmental conditions influenced by latitudes and altitudes and to satisfy human needs for clothing and food. Breeds of sheep having fine wool are generally raised for wool production alone, while breeds with medium or long wool or with only hair are generally raised for meat production. Several crossbreeds have been developed that yield both wool and meat of high quality, however. Of the more than 200 breeds of sheep in the world, the majority are of limited interest except in local areas. Those breeds of substantial importance are described in the table above. For articles on individual breeds of sheep, *see* Cheviot; Hampshire; Karakul; Merino; Rambouillet; Shropshire.

sheep rock, also called SHEEPBACK (rock formation): *see* rôche moutonnée.

sheepkill: *see* lambkill.

sheep's bit (*Jasione montana*), annual to biennial herb of the bellflower family (Campanulaceae), bearing clustered heads of blue flowers. The plants grow scattered in sandy or acid fields or meadows, and they also grow on cliffsides. Sheep's bit is native to Europe and has been introduced into eastern North America.



Sheep's bit (*Jasione montana*)
C. Foord—EB Inc.

The narrow-lobed, starry flowers of sheep's bit mass in globes 2.5 cm (1 inch) in diameter in which the outside flower circles open first. The short, thick anthers are united at the base. A closely related perennial species, *J. perennis,* has flower heads that are 5 cm (2 inches) across and also has broader leaves. It is limited to southern Europe.

sheepshead (*Archosargus probatocephalus*), popular edible sport fish in the family Sparidae (order Perciformes), common in Atlantic and Gulf of Mexico waters of the southern North American coast. Although once prevalent in the New England to Chesapeake Bay area, the species has inexplicably become very rare.

Sheepsheads are characteristically large fish with compressed bodies and high foreheads. The body colour is silver with broad, dark vertical bands that are most distinct in juveniles. The large flat teeth are used for crushing and grinding not only crustaceans but also mollusks such as clams and oysters. Adult sheepsheads commonly range in length from 60 to 75 cm (2 to 2½ feet). Some specimens have been known to exceed 1 m (3 feet) and weight more than 11 kg (25 pounds).

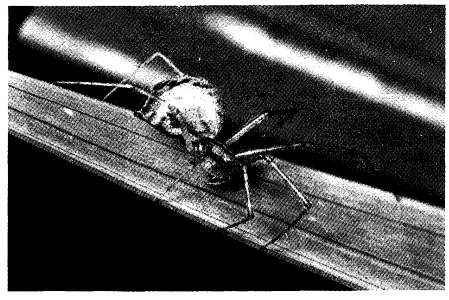
sheet (geology): *see* sill.

sheet erosion, detachment of soil particles by raindrop impact and their removal downslope by water flowing overland as a sheet instead of in definite channels or rills. A more or less uniform layer of fine particles is removed from the entire surface of an area, sometimes resulting in an extensive loss of rich topsoil. Sheet erosion commonly occurs on recently plowed fields or on other sites having poorly consolidated soil material with scant vegetative cover.

There are two stages of sheet erosion. The first is rain splash, in which soil particles are knocked into the air by raindrop impact. A hundred tons of particles per acre may be dislodged during a single rainstorm. In the second stage, the loose particles are moved downslope, commonly by sheetflooding. Broad sheets of rapidly flowing water filled with sediment present a potentially high erosive force. Generally produced by cloudbursts, sheetfloods are of brief duration, and they commonly move only short distances. On relatively rough surfaces, sheetflooding may give way to rill wash, in which the water moves in a system of enmeshed microchannels, which eventually become larger and develop into gullies.

sheet moss, species of carpet moss (*q.v.*).

sheet-web weaver, any member of the family Linyphiidae (order Araneida), a rather common group of spiders numbering about 2,000 species. They occur worldwide. Most are less than 6 millimetres (¼ inch) in length and are seldom seen. Their webs are flat and sheetlike



Sheet-web weaver (*Linyphia montana*)
John Markham—Bruce Coleman Inc./EB Inc.

or dome-shaped. The spider is found usually on the lower side of the web. The hammock spider (*Linyphia phrygiana*), native to North America, builds a hammock-shaped web.

Sheffield, district (city), metropolitan county of South Yorkshire, England, covering 142 sq mi (368 sq km) in the Pennine highlands, where several streams in deeply cut valleys converge to form the River Don.

From medieval times, local iron ore was smelted with charcoal. Smiths and probably cutlers were pursuing their crafts as early as the 14th century, using the excellent local sandstone, Millstone Grit, for grindstones. Later, the rapid streams were used for power, and by the 18th century Sheffield had a monopoly of the English cutlery trade. Modern metallurgical innovations included the establishment of a works by Henry Bessemer, who had invented (1856) a method of making inexpensive steel in large quantities, and Sheffield became world famous for steel. Today pig-iron production has ceased, but steelworks using electric arc furnaces have prospered. Food processing and clothing manufacture are also important.

The city is situated in a highland cul-de-sac and required tunnels to make it easily accessible by rail. It is now served by modern roads and is the major shopping and cultural centre in South Yorkshire. The university, dating from 1897 and chartered as the University of Sheffield in 1905, is especially known for its programs in metallurgy. Pop. (1981) city, 477,257; (1984 est.) district, 540,500.

Sheffield, city, Colbert County, northwestern Alabama, U.S. On the south bank of the Tennessee River in the Muscle Shoals region, it forms with Florence, Tuscumbia, and the city of Muscle Shoals a four-city metropolitan area. Sheffield began as a trading post in 1815, and in 1816 Andrew Jackson (later U.S. president) made speculative land purchases for an "industrial city." After 1933 power supplied by the Wilson Dam led to its further development. Named for Sheffield, Eng., it has built a diversified industrial economic base. Inc. 1885. Pop. (1982 est.) 11,460.

Sheffield, John: *see* Buckingham and Normanby, John Sheffield, 1st duke of.

Sheffield plate, in metalwork, articles made of copper coated with silver by fusion. The technique was discovered about 1742 by Thomas Boulsover, a Sheffield (Yorkshire, Eng.) cutler, who noted that the combination of fused silver and copper retained all the ductility possessed by both metals and acted as one in response to manipulation.



Sheffield plate chamber candlestick by Matthew Boulton, *c.* 1820; in the Sheffield City Museum, Sheffield, South Yorkshire

By courtesy of Sheffield City Museum; Mottershaw Photography

Sheffield plate was produced as follows. An ingot of copper, slightly alloyed with zinc and lead, was covered on both top and bottom with a sheet of silver and fired. When the silver began to melt, the ingot was removed from the furnace, cooled, and rolled. The edges of pieces made were rolled over to hide the copper that was visible when the sheet was cut. At first Boulsover produced only buttons, but his former apprentice, Joseph Hancock, later applied the process to other articles.

The production of fused plate was not restricted to Sheffield alone. In 1762 Matthew Boulton began producing Sheffield plate at Soho, Birmingham, and various workshops in London, Nottingham, and Dublin, and factories in several European countries and North America made pieces by Boulsover's method. After 1830, "German silver," nickel alloyed with copper and zinc, often replaced copper as the base metal. With the introduction of plating by electrolysis in the 1840s, the production of Sheffield plate declined and by the 1870s had all but ceased.

This type of metalware, admired for its soft, glowing, gray lustre, was principally used in making utensils and vessels for the preparation, serving, and eating of food. Design and workmanship were early brought to a very high level. Many of the early pieces were impressed with hallmarks resembling those used on silver—a practice prohibited by an injunction obtained in 1773 by London silversmiths. In 1774, however, Sheffield plate makers were again authorized to use marks that bore the name of the maker and a distinctive device.

About 30 years after its disappearance as a commercial commodity, Sheffield plate became a collector's item. Demand soon exceeded supply and a number of manufacturers began to make new pieces, reproducing original designs by electroplating on copper. This falsification provoked the Sheffield Cutlers Company in 1911 to establish through the British courts that the term Sheffield plate could be applied only to articles made by the process of fusion—now an internationally accepted definition. Genuine Sheffield plate that has been worn through to the copper by hard use and later electroplated is usually accepted as authentic.

Shehu Ahmadu Lobbo, Shehu also spelled SEKU, or CHEIKOU, Lobbo also spelled LOBO, also called HAMAD BARI, or AHMADU HAMMADI BUBU, Arabic name AḤMAD IBN MUḤAMMAD IBN ABŪ BAKR IBN SAʿĪD (b. 1775—d. 1844), Fulani Muslim leader in West Africa who established a theocratic state in the Macina region of what is now Mali.

Influenced by the teachings of the Islāmic reformer Usman dan Fodio (*q.v.*), he began a holy war (*jihād*) in 1818 or possibly as early as 1810; he defeated the forces of the pagan Fulani and Bambara chiefs and established a capital at Hamdallahi. His rule extended to the cities of Timbuktu and Djénné, where he had the great mosque destroyed because it offended his fundamentalist Islāmic views. The rule of his family continued under his successors, Ahmadu II and Ahmadu III, until the latter was defeated by al-Ḥajj ʿUmar in 1862.

sheikh, also spelled SHEIK, SHAIKH, or SHAYKH, Arabic SHAYKH, Arabic title of respect dating from pre-Islāmic antiquity; it strictly means a venerable man of more than 50 years of age. The title sheikh is especially borne by heads of religious orders, heads of colleges, such as al-Azhar University in Cairo, chiefs of tribes, and headmen of villages and of separate quarters of towns. It is also applied to learned men, especially members of the class of ulamas (theologians), and has been applied to anyone who had memorized the whole Qur'ān, however young he might be.

Shaykh al-jabal ("the mountain chief") was a popular term for the head of the Assassins and was mistranslated by the crusaders as "the old man of the mountain." By far the most important title was *shaykh al-islām,* by the 11th century given to eminent ulamas and mystics and by the 15th century open to any outstanding mufti (canonical lawyer). In the Ottoman Empire use of this title was restricted by Süleyman I (1520–66) to the mufti of Istanbul, who, equal in rank to the grand vizier, was head of the religious institutions that controlled law, justice, religion, and education. Because of his right to issue binding *fatwās* (Islāmic legal opinions), this official came to wield great power. In 1924, under the Turkish Republic, the last vestiges of the institution were abolished.

Sheikh Abade (Egypt): *see* Antinoöpolis.

Sheikhupura (Pakistan): *see* Shekhupūra.

sheitan (Islāmic myth): *see* shaitan.

Shekhina, also spelled SHEKHINAH, SHECHINA, or SCHECHINA (Hebrew: "Dwelling," or "Presence"), in Jewish theology, the presence of God in the world. The designation was first used in the Aramaic form, *shekinta,* in the interpretive Aramaic translations of the Old Testament known as Targums, and it was frequently used in the Talmud, Midrash, and other postbiblical Jewish writings. In the Targums it is used as a substitute for "God" in passages where the anthropomorphism of the original Hebrew seemed likely to mislead. Thus, belief in the transcendence of God was safeguarded. In many passages Shekhina is a reverential substitute for the divine name.

In rabbinic literature the Shekhina is associated with several other religious and theological terms. It is said that the Shekhina descended on the tabernacle and on Solomon's Temple, though it is also said that it was one of the five things lacking in the Second Temple. The glory of God that filled the tabernacle (Exodus 40:34) was thought of as a bright radiance, and the Shekhina is sometimes similarly conceived.

There is also an affinity between the Shekhina and the Holy Spirit, though the two are not identical. Both signify some forms of divine immanence, both are associated with prophecy, both may be lost because of sin, and both are connected with the study of the Torah. Certain medieval theologians viewed the Shekhina as a created entity distinct from God (the divine "light," or "glory").

Shekhupūra, also spelled SHEIKHUPURA, town and district, Lahore division, Punjab Province, Pakistan. The city, the district headquarters, is connected by road and rail with Sargodha and Lahore. An industrial centre, it has a fertilizer factory. Historical sites include a ruined fort of the Mughal emperor Jahāngīr (completed 1619) and the residence of one of Ranjit Singh's queens. It has a government college affiliated with the University of the Punjab.

Shekhupūra district (area 2,301 sq mi [5,960 sq km]) consists of a flat stretch of country known as the Bar tract, which is irrigated by the Chenāb Canal system. Cultivation has been extended by tube wells from the Upper Rechna Project of the Chaj Doāb Scheme. Chief crops include rice, wheat, cotton, corn (maize), and millet. The district has rice mills and a freshwater fish farm. In the southeastern corner of the district is Asarur, site of an ancient city dating from the 1st century BC. Pop. (1981) town, 141,168; district, 2,110,428.

Sheki, also spelled ŠEKI, formerly (until 1968) NUKHA, city, Azerbaijan Soviet Socialist Republic, situated on the southern slopes of the Great Caucasus Range. Sheki, one of the oldest cities in Azerbaijan, was a trading centre on the road to Dagestan. In the 18th and 19th centuries it was the capital of the khanate of Sheki, which was ceded to Russia in 1805; the last khan died in 1819. The numerous buildings of historic interest include the palace, mosques, and baths. The city has some light industry, including silk weaving. Pop. (1985 est.) 53,000.

Shelburne, town, seat of Shelburne county, southwestern Nova Scotia, Canada, on the

mouth of the Roseway River, at the head of Shelburne Harbour, 160 mi (257 km) southwest of Halifax. Early French explorers called it Port Razoir which was anglicized as Port Roseway. After permanent settlement by United Empire Loyalists in 1783, the place was renamed to honour the earl of Shelburne, then British prime minister. The town is now a shipbuilding, fish-curing and packing, lumbering, and stone-quarrying centre. Manufactures include racing yachts, boating equipment, and furniture and wood products. The Ross-Thomson House, built in 1783, serves as a Loyalist museum. Pop. (1981) 2,303.

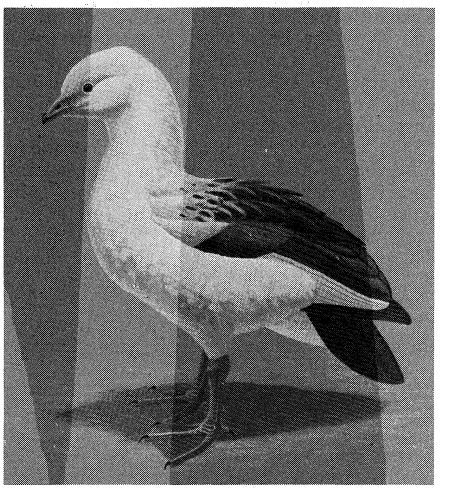
Shelburne, William Petty-Fitzmaurice, 2nd earl of: *see* Lansdowne, William Petty-Fitzmaurice, 1st marquess of.

Shelby, city, seat (1842) of Cleveland County, in the Piedmont region of southwestern North Carolina, U.S. Settled after 1760, it was chartered in 1843 and named for Col. Issac Shelby, Revolutionary War hero of the Battle of Kings Mountain (10 mi [16 km] southeast), site of a national military park. The arrival of the railways in the 1870s stimulated development. Textiles became its chief industry, later supplemented by diverse manufacturing. Cleveland County Technical Institute was opened there (1965). Thomas Dixon, author of *The Clansman*, on which David W. Griffith based his epic movie *The Birth of a Nation* (1915), was a native of Shelby. Inc. city, 1929. Pop. (1980) 15,310.

Shelbyville, city, Shelby County, central Indiana, U.S., on the forks of the Big Blue and Little Blue rivers, 30 mi (48 km) southeast of Indianapolis. Laid out in 1822 as the county seat, it was named for Issac Shelby, Revolutionary War hero and the first governor of Kentucky. The state's first railroad, completed in 1834 in Shelbyville, was a horse-drawn conveyance on wooden tracks put into operation by Judge W.J. Peasley. The city is an agricultural trade centre in the heart of the state's corn belt and has some light manufactures, notably electrical and heating equipment, glass fibre, and paper-plastics. It was the home of Charles Major, the noted Indiana author, and of Thomas A. Hendricks, U.S. vice president (1885) and governor of Indiana. Inc. 1850. Pop. (1980) 14,989.

Shelbyville, city, seat (1809) of Bedford County, south central Tennessee, U.S., on the Duck River, 53 mi (85 km) southeast of Nashville. Laid out in 1810, it was named for Col. Isaac Shelby, an Indian fighter and Revolutionary War leader of a force of riflemen against the British at Kings Mountain (1780). It developed as a trading centre for the agricultural produce of the river valley. Civil War sites include the spot at the town's western outskirts where Gen. Leonidas Polk's Confederate corps took up a defensive position (1863) before withdrawing to Tullahoma and the knoll just east of the town where Capt. James J. Andrews' Federal raiders assembled (1862) before their attempt to disrupt the Western and Atlantic Railroad. Shelbyville, in a bluegrass region, is a horse breeding and training centre and holds the annual Tennessee Walking Horse National Celebration in August. Light manufactures include clothing, pencils, plastics, and truck transmissions. Inc. 1819. Pop. (1980) 13,530.

sheldgoose, any of the larger members of the duck tribe Tadornini, family Anatidae (*q.v.*; order Anseriformes). The smaller members of the tribe are called shelducks. Sheldgeese inhabit tropical and subtropical regions, worldwide. They are small-billed and rather long-legged, with upright stance; some have bony spurs—formidable weapons—at the wing bend. Typically they show white wing patches and are more or less finely black-barred below. They



Andean goose (*Chloëphaga melanoptera*)
Painting by John P. O'Neill

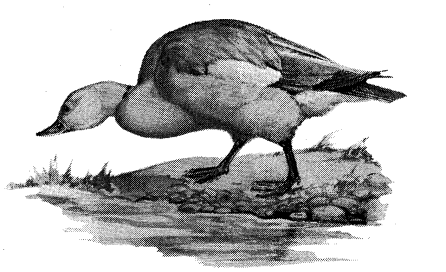
are not true geese, though they resemble them in some anatomic features.

Among the sheldgeese are several South American species of *Chloëphaga*—the kelp goose (*C. hybrida*); the Magellan goose (*C. picta*); the Andean goose (*C. melanoptera*)—and the Orinoco goose (*Neochen jubatus*). African sheldgeese include the spur-winged goose (*Plectropterus gambensis*) and the Egyptian goose (*Alopochen aegyptiacus*).

Sheldon, Charles Monroe (b. Feb. 26, 1857, Wellsville, N.Y., U.S.—d. Feb. 24, 1946, Topeka, Kan.), preacher and inspirational writer famous as the author of the best-selling novel *In His Steps.*

Sheldon was educated at Brown University and Andover Theological Seminary. In 1889 he founded the Central Congregational Church in Topeka, Kan. He read series of stories to his evening congregation that proved popular when printed. The most successful series, *In His Steps*, concerned the inhabitants of a town who pledged themselves to live for a year as Jesus would live. First published serially in 1896 and in book form in 1897, *In His Steps* was for 60 years the largest selling book in the United States after the Bible, with sales estimated at more than 8,000,000 copies. *Charles M. Sheldon: His Life Story* (1925) is an autobiography. From 1920 to 1925 Sheldon edited the *Christian Herald.*

shelduck, also called SHELDRAKE, any of the smaller members of the duck tribe Tadornini, family Anatidae (*q.v.*; order Anseriformes). The larger members of the tribe are sheldgeese. Short-billed ducks of somewhat gooselike build, with long legs and upright stance, shelducks are found the Old World.



Ruddy shelduck (*Casarca ferruginea*)
Painting by Alan P. Nielsen

The common shelduck (*Tadorna tadorna*) of Europe and Asia is black and white with reddish chest band; the drake has a knob on his red bill. The ruddy shelduck (*Casarca ferruginea*), ranging from northern Africa and Spain to Mongolia, is orangish, with pale head and white wing patches. Drakes of most shelduck species have melodious whistling calls and are aggressive the year around. In the European species the hen is solitary at the nest—commonly in a rabbit burrow—and lays smooth eggs.

In North America a merganser (*q.v.*) is sometimes called a sheldrake.

Shelepin, Aleksandr Nikolayevich (b. 1918, Voronezh, Russia), Soviet government official who led the Komsomol (Young Communist League) (1952–58), served as head of the Committee for State Security (KGB) (1958–61), and was a member of the Communist Party Politburo (1964–75). Thought to have played a role in Khrushchev's ouster in 1964, he later made an unsuccessful bid for power on his own.

Shelepin joined the Communist Party in 1940 and rose rapidly in both the party and the Soviet government. Appointed first secretary of the Komsomol's central committee in 1952, he directed the mobilization of hundreds of thousands of youths for Khrushchev's ambitious Virgin Lands Program, aimed at the economic development of Central Asia. Long regarded as an ally of Khrushchev, Shelepin became chairman of the KGB in 1958. As he was not originally from the security branches, this has been viewed as an attempt by Khrushchev to curb the police apparatus and bring it more firmly under party control. At the 21st party congress in 1959, Shelepin vigorously denounced the "anti-party group" that had opposed Khrushchev in the mid-1950s; and in 1962 he was appointed chairman of the powerful new Committee of Party and State Control.

After Khrushchev's downfall in 1964, Shelepin, thought to represent a hard-line faction in the party, joined the party Presidium. But his position slowly eroded during the Brezhnev era and finally in 1975 he was dropped from the Politburo (formerly the Presidium) and was not re-elected to the Central Committee at the 25th party congress.

Shelford, Victor Ernest (b. Sept. 22, 1877, Chemung, N.Y., U.S.—d. Dec. 27, 1968), zoologist and animal ecologist whose pioneering studies of animal communities helped to establish ecology as a distinct discipline. His *Animal Communities in Temperate America* (1913) was one of the first books to treat ecology as a separate science.

In 1933 Shelford began a study at the University of Illinois of the correlations between population changes of animals and environmental changes. He made many reports on cyclic changes in animal populations. With Frederic E. Clements in 1939 he published *Bio-ecology,* in which he developed the concept of the biome for the predominant vegetation, with its animal inhabitants, that characterizes a large geographic area. His widely known book, *The Ecology of North America* (1963), summarized the major biomes, which include tundra, coniferous forest, deciduous forest, grassland, and desert.

Shelford was the first president of the Ecological Society of America (1916). He was educated at the University of Chicago (Ph.D., 1907) and spent most of his career at the University of Illinois.

Sheliff River (Algeria): *see* Chelif, Oued.

Shelikhov, Gulf of, also spelled ŠELICHOV, Russian ZALIV SHELIKHOVA, gulf of the Russian Soviet Federated Socialist Republic, a northward extension of the Sea of Okhotsk lying between the Siberian mainland on the west and the Kamchatka Peninsula on the east. It extends northward for 420 mi (670 km) and has a maximum width of 185 mi. The average depth of the sea here is 330–490 ft (100–150 m), though at maximum it reaches 1,624 ft. The coasts are largely rugged, except in

the southeast. From December until May the gulf is closed by ice. To the north of the gulf, the Taygonos Peninsula divides its waters into the Bays of Gizhiga and Penzhina. The tidal ranges in these bays are among the greatest in the world and there has been discussion of developing tidal power sites here; especially at Penzhina Bay. The gulf is named after the Russian merchant-explorer G.I. Shelikhov.

shell, variously, an artillery projectile, a cartridge case, or a shotgun cartridge. The artillery shell was in use by the 15th century, at first as a simple container for metal or stone shot, which was dispersed by the bursting of the container after leaving the gun. The addition of a powder charge soon followed; until the 18th century such shells were used only in high-angle fire, *e.g.,* in mortars, and confined almost entirely to land warfare. In the 19th century, shells were adopted for direct-fire artillery, notably in the form of the shrapnel (*q.v.*).

Modern high-explosive artillery shells consist of a shell casing, a propelling charge, and a bursting charge; the propelling charge is ignited by a primer at the base of the shell and the bursting charge by a fuse in the nose. An armour-piercing shell has a hollow pointed nose to act as windshield and a heavy, blunt armour-piercing cap and steel core, with the bursting charge located in the base of the projectile. In some high-velocity types, a tungsten carbide core is used. Steel has generally supplanted brass for cartridge cases.

In rifle, pistol, and machine-gun ammunition, the word shell usually signifies the casing, ordinarily of brass, that contains the propulsive charge and in which the bullet is seated at the neck, with the primer in an open cup at the opposite end. In shotgun ammunition, however, the shell is the entire cartridge, including shot, powder, primer, and case. The case is usually of paper or plastic fitted into a brass base that contains the primer cup.

To make the best use of the Britannica, consult the INDEX *first*

shell atomic model, simplified description of the structure of atoms. Electrons (negatively charged fundamental particles) in atoms are thought of as occupying diffuse shells in the space surrounding a dense positively charged nucleus. The first shell is closest to the nucleus. The others extend outward from the nucleus and overlap one another. The shells are sometimes designated by capital letters beginning with *K* for the first shell, *L* for the second, *M* for the third, and so forth. The maximum number of electrons that can occupy shells one through seven are, in sequence, 2, 8, 18, 32, 50, 72, 98. The lightest element, hydrogen, has one electron in the first shell. The heaviest elements in their normal states have only the first four shells fully occupied with electrons and the next three shells partially occupied. *See* electronic configuration.

Chemical properties of atoms are explained in terms of how the shells are occupied with electrons. For example, helium (atomic number 2) has a full first shell; neon (atomic number 10), with eight electrons in its outermost shell, has a full first and second shell. Other atoms that have eight electrons (*see* octet) in their outermost shell, even though it is not full, chemically resemble helium and neon in their relative stability and inactivity.

shell collecting, practice of finding and usually identifying the shells of mollusks, a popular avocation, or hobby, in many parts of the world. These shells, because of their bright colours, rich variety of shapes and designs, and abundance along seashores, have long been used for ornaments, tools, and coin. Aristotle and Pliny the Elder wrote extensively about them. In the ruins of ancient Pompeii and in a crypt in a Mayan pyramid in Yucatán, shells were found that may be the remains of ancient collections.

Shell collecting as it is understood today, however, on the same plane as coin, stamp, and china collecting, is of more recent origin, reaching its apex in England during the late 18th and early and middle 19th centuries. This was the period of the burgeoning Pacific and China trade; new islands were being discovered, and the shells found there were first imported as curiosities, later as specimens for the collectors among the newly rich merchant princes. This period reached its highest point in the 1850s and '60s, when shell auctions became a common occurrence and relatively high prices were paid for particularly rare and perfect specimens. There followed a period of relative decline, probably because many formerly rare shells suddenly became common as their haunts were discovered and exploited. Nevertheless, shells are so strikingly interesting and beautiful in themselves that the hobby was rapidly revived.

The shell itself is the exoskeleton (external skeleton) of a soft-bodied animal that secretes it to serve as protection as well as support for its various organs. The animal is bound securely to the shell and generally cannot survive separation from it. After a mullusk has died other marine animals may become occasional inhabitants of the shells. Such an animal is the hermit crab, which makes use of the shell as a temporary abode. Most marine mollusks are able to shut themselves off completely from their watery world when they find themselves in danger, by closing their aperture by a horny or calcareous door, or operculum. The careful collector makes it a point to preserve the door with the shell in his collection.

The rarest, the most valuable, and in many senses the most beautiful shells are those that are found in the sea, but large numbers of species live only on land or in freshwater. Outstanding shells include those of the various members of the families Cypraeidae (cowrie shells), Conidae (cone shells), Volutidae (volute shells), and Muricidae (rock shells). One of the rarest and most desirable single species is *Conus gloriamaris,* the glory of the sea. This is a handsome cone shell, which is very rare. This shell always commands a very good price on the market, and it is the only shell known to have been stolen from a large museum.

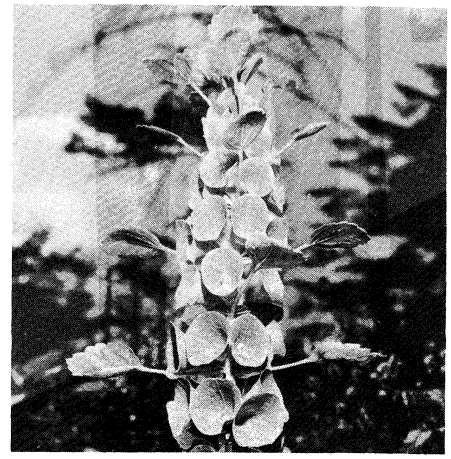
Shells need little service to be stored. Once the shell is reasonably well cleaned and provided with a complete label, it can remain unaltered for years in a drawer or cabinet.

Most collectors tend to specialize, since there are about 100,000 shell species known. Some limit themselves to particular localities. Such specialists frequently contribute valuable scientific data on exact locality and life habits of many mollusks. Some collectors gather only specimens of the single species of a shell that typifies a particular genus. Such a collection is a valuable lesson in taxonomy and evolution and gives an insight into the entire field of conchology, the study of shells.

The equipment of the shell collector includes some sort of tool to scrape away the sand or leaves; a knife to detach rock clingers from their perches; a hammer and chisel to remove rock borers from their nests; a sieve to strain out specimens from shallow water; a notebook to record locality and ecological data; and a library of books on shells to aid identification.

shell flower: *see* tiger-flower.

shell flower, also called BELLS OF IRELAND (*Molucella laevis*), plant with leafy spikes of cuplike green calyxes surrounding small, white, fragrant corollas within. The flowers are two-lipped and tubular, typical of the mint family (Lamiaceae), order Lamiales.



Shell flower (*Molucella laevis*)
Walter Dawn

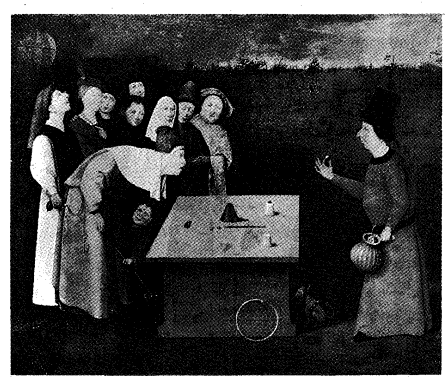
The shell flower is native to western Asia and is widely grown as a garden curiosity. The spikes are borne on stems nearly one metre (three feet) tall.

shell game, also called CUPS AND BALLS TRICK, oldest and most popular of the tricks traditionally performed by a conjurer. To begin the trick, the performer places a bead or ball (often a pea) under one of three inverted cups (or half-shells). As the cups are rearranged on a flat surface, the ball is made to "jump" invisibly from one cup to another, or to "multiply." The basis for the illusion is a secret additional ball that, by skilled manipulation, is put under one cup while the known ball is removed as secretly from another cup. The manipulative work is aided by the distracting conversation, or patter, of the conjurer.

In ancient Greece and later in different countries, pebbles, or other small objects, were used for the trick instead of balls. The shape and type of cup used also varied. Descendants of Roman conjurers used the cylindrical boxwood measures instead of cups, and a popular old Italian term for magic was *giuoco di bussolotti*, "the game with the measures."

A usual adjunct of equipment for cups and balls was a bag with strings that was tied around the waist of the conjurer, like an apron. It was not only a serviceable way to carry the properties of the trick but it was a handy place for the conjurer secretly to hide and retrieve the balls. Throughout Europe the conjurer's pocket apron was the badge of the profession of conjuring, and *Taschenspieler*, "pocket player," became the common term for magician in German.

Middle Eastern, South Asian, Southeast Asian, and East Asian conjurers performed the shell game exactly as European magicians did, except, because of the difference in clothing, the pocket apron was never needed by



"The Conjurer," an oil painting by Hieronymus Bosch illustrating the shell game; in the Musée Municipal, Saint-Germain-en-Laye, Fr.
Giraudon—Art Resource/EB Inc.

Oriental magicians, who could hide the ball in their often voluminous sleeves or in the folds of their robe. The trick persists in the United States as a sleight-of-hand gambling game, a pea being used under a nutshell, hence the name shell game.

shell ginger (plant): *see* shellflower.

shell mound, also called KITCHEN MIDDEN, in anthropology, prehistoric refuse heap, or mound, consisting chiefly of the shells of edible mollusks intermingled with evidence of human occupancy. Midden living, found throughout the world, first developed after the retreat of the glaciers and the disappearance of large Pleistocene animals hunted by prehistoric man. Primitive peoples who adopted these hunting–collecting economies became more established; thus, the oldest pottery of northern Europe, eastern North America, and Central America occurs in shell mounds.

Many shell mounds have been examined, especially on the eastern coast of Denmark, where they may have been used year-round. Investigation showed that these mounds belonged to the late Mesolithic Ertebølle culture (*c.* 4000–2500 BC) and contained the remains of quadrupeds, birds, and fishes apparently used as food by prehistoric human inhabitants. Moreover, the mounds also contained full-sized remains of the common oyster and other mollusks, which at present cannot live in the brackish waters of the Baltic except near its entrance, the inference being that the shores where oysters flourished were open to the salt sea at the time the mounds were made. The mounds also yielded numerous flint implements as well as small pieces of coarse pottery.

Middens of the British Isles, France, Italy, Spain, Portugal, and North Africa also generally date from late Mesolithic–early Neolithic period (*c.* 4000–2000 BC). In southern Africa and northern Japan, where Neolithic cultures endured longer, midden accumulations continued until the coming of iron; and in the Pacific islands they accumulated until recently. In the Americas, middens are represented by radiocarbon dates of 5000–2000 BC from Panama and eastern North America. Middens of South America and California probably antedate 2000 BC. As in the Old World, midden living persisted outside the higher civilizations, continuing until the European conquest.

shell nuclear model, description of nuclei of atoms by analogy with the Bohr atomic model of electron energy levels. In the shell nuclear model the constituent nuclear particles are paired neutron with neutron and proton with proton in nuclear energy levels that are filled, or closed, when the number of protons or neutrons equals 2, 8, 20, 28, 50, 82, or 126, the so-called magic numbers that indicate especially stable nuclei. The unpaired neutrons and protons account for the properties of a particular species of nucleus as valence electrons account for the chemical properties of the various elements. The shell model accurately predicts certain properties of normal nuclei, such as their angular momentum; but for nuclei in highly unstable states, the shell model is no longer adequate and must be modified or replaced by another model, such as the liquid-drop model, collective model, compound-nucleus model, or optical model.

Shell Oil Company, major U.S. oil company that is the principal American subsidiary of the Royal Dutch/Shell Group (*q.v.*), a giant Dutch and British oil conglomerate.

shell parakeet, also called BUDGERIGAR, popular species of parakeet (*q.v.*).

shell shock: *see* combat fatigue.

shell star, any star surrounded by an extensive expanding shell or ring of gas that produces a peculiar pattern of absorption and emission lines in the star's spectrum. Shell stars are all hot (spectral type B). The shells of some stars are apparently stable, whereas others disappear over a period of years, in some cases being replaced by new shells.

shellac, commercial resin marketed in the form of amber flakes, made from the secretions of the lac insect, a tiny scale insect, *Laccifer lacca* (*see* lac). Shellac is a natural thermoplastic; that is, a material that is soft and flows under pressure when heated but becomes rigid at room temperature. This property makes it useful either by itself or in combination with such fillers as flaked mica and asbestos in manufactured molding compositions, used for producing molded articles such as buttons.

Shellac is an ingredient in many products, including abrasives, sealing wax, hair sprays, and cake glazes. It was formerly used, along with fine clay or other filler, to mold phonograph records, but, after the early 1930s, synthetic thermoplastics, particularly vinyl resins, gradually replaced it.

Alcohol solutions of shellac, also called simply shellac, are used as varnishes for priming and finishing furniture, floors, and various wood articles and as an intermediate in nitrocellulose lacquers. Alkali emulsions of shellac are used to make self-polishing waxes, stiffeners for felt hats, cements, and sealers.

Shelley, Mary Wollstonecraft (b. Aug. 30, 1797, London—d. Feb. 1, 1851, London), writer best known as the author of *Frankenstein.*

The daughter of William Godwin and Mary Wollstonecraft Godwin, she was the second wife of Percy Bysshe Shelley (1792–1822) and apparently came as near as any woman could to meeting his requirements for his life's partner: "one who can feel poetry and understand philosophy." After his death in 1822 she published his *Posthumous Poems* (1824) and edited his *Poetical Works* (1839), with long and invaluable notes, and his prose works, such as *Essays, Letters from Abroad,* etc., in 1840. Her *Journal* is a rich source of Shelley biography, and her letters are an indispensable adjunct.



Mary Wollstonecraft Shelley, detail of an oil painting by R. Rothwell, 1841; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Frankenstein, or The Modern Prometheus (1818) is perhaps the most widely known novel of terror. Her second, historical novel, *Valperga: or, The Life and Adventures of Castruccio, Prince of Lucca* (1823), is considered to be for literary style her best work. For long, however, *The Last Man* (1826) was ranked in popular esteem as her best novel. In this and later novels—*The Fortunes of Perkin Warbeck* (1830) excepted—she made use of her rich early life by portraying Shelley, Byron, Emilia Viviani (the inspiration of Shelley's *Epipsychidion*), and E.J. Trelawny, as well as real episodes from her experience. Her travel books have been of continuing interest: *History of a Six Weeks' Tour* (1817) recounts the continental tour following her elopement with Shelley in July 1814 and their summer near Geneva in 1816; *Rambles in Germany and Italy in 1840, 1842, and 1843* appeared in 1844. F.L. Jones edited her letters (1944) and her journal (1947). There are biographies by R.G. Grylls (1938) and E. Nitchie (1953).

Shelley, Percy Bysshe (b. Aug. 4, 1792, Field Place, near Horsham, Sussex, Eng.—d. July 8, 1822, at sea off Livorno, Tuscany), English Romantic lyric poet. Most of his poetry was written after he settled in Italy in 1818 and includes *Prometheus Unbound, The Cenci,* "Adonais," and such lyrical verse as "To a Skylark" and "The Cloud." He was drowned in a boating accident.



Percy Bysshe Shelley, oil painting by Amelia Curran, 1819; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Childhood and education. Shelley was the eldest son of Timothy Shelley (baronet, 1815), one of the wealthiest of the landed gentry, a Whig member of Parliament, and a follower of the Duke of Norfolk.

Shelley attended Syon House Academy, Brentford, Middlesex. Then came four years at Eton College, and in October 1810 he took up residence at Oxford as a member of University College.

On the first evening in the college dining hall Shelley met another beginning student, Thomas Jefferson Hogg, of a well-established family at Norton, Yorkshire. Shelley and Hogg took an instant mutual liking and spent their days and evenings together, to almost the entire exclusion of others. They talked, walked, read, and studied philosophy and inevitably were regarded as oddities. They were both eccentrics and shared each other's enthusiasms and extravagances.

They were happy with their studies and were greatly shocked when they were expelled by their college, for "contumaciously refusing" to answer any questions about a brief pamphlet called "The Necessity of Atheism" that they had written and sent to the bishops and archbishops and the heads of the colleges. The friends left the university together, on March 26, 1811, for London. At their fathers' insistence, however, they soon separated, though Shelley put up a stiff resistance and capitulated only after significant concessions had been made.

Shelley became acquainted with Harriet Westbrook through his sisters Mary and Hellen, who attended the same school at Clapham. The beautiful 16-year-old Harriet agreed with Shelley's radical views and gave him the companionship and encouragement the lonely radical needed. Shelley's love for

her appears to have been ardent and sincere when they were married in a civil ceremony at Edinburgh, on Aug. 29, 1811. During his vacation Hogg joined them in Scotland, then they returned with him to York, where he was studying law. Hogg attempted to seduce Harriet, who told Shelley. The poet instantly fled the city with his wife.

Years in the Lake District. The Shelleys settled at Keswick, in the Lake District, hoping to meet the older poets William Wordsworth, Samuel Taylor Coleridge, and Robert Southey, but they had to content themselves with the latter, whose liberalism and poetry Shelley had ardently admired. He was disappointed, however, when he found Southey to be a conservative who uttered platitudes about morals, religion, politics, and the errors of youth and immaturity.

Shelley discovered that the philosopher William Godwin was still alive and on Jan. 3, 1812, he wrote, introducing himself, and on the 16th he sent a colourful sketch of his life. He mentioned that at Eton he had read Godwin's masterpiece, *An Enquiry Concerning Political Justice* (1793), which had become his master guide. To the end of his life he read it with the highest regard for its ideas and veneration for the intellectual powers of its author. No book had ever so completely furnished another great writer with his principal ideas.

Shelley's intellectual life grew in his association with Godwin, whom he finally got to know personally on Oct. 4, 1812, and those to whom Godwin introduced him in Ireland and England. He also came to know the youthful Thomas Love Peacock, a thorough classicist and poet who became famous for his short satirical novels. Peacock became one of Shelley's closest friends, and it was he more than anyone else who turned Shelley to a serious study of the Classical writers.

Shelley had not neglected poetry. He had written enough to make a short volume and a long poem entitled *Queen Mab,* which was finished in February 1813.

Queen Mab sums up poetically this practical reforming phase of Shelley's life. Biographically the poem is of great importance, and no other poem is so complete an expression of all of Shelley's principal ideas. He wished to have it published, but no publisher would risk the danger of prosecution. He therefore printed it privately and distributed copies among his friends.

Harriet was not happy with their acquaintances and was often away from home. In fact, a dangerous estrangement between Shelley and Harriet, which began in 1813, was growing, so that by April 1814, the possibility of a separation existed. The birth of their daughter Ianthe rather aggravated than improved the situation. Then, on May 5 or 6, 1814, Shelley met Godwin's 16-year-old daughter Mary, who had come home after a protracted stay in Scotland—and they fell instantly in love. Mary was pretty, highly intellectual, and accustomed to unconventional thought, being the child of the famous women's rights advocate Mary Wollstonecraft and the philosopher Godwin.

Elopement with Mary Godwin. The two eloped on July 28, 1814, and accompanied by Claire Clairmont, who knew French, they toured France and Switzerland for six weeks but had to return home (down the Rhine and through Holland) because of lack of funds. From Troyes, Fr., Shelley wrote a letter to Harriet inviting her to join them.

In London, Shelley had to go into hiding for a while to avoid arrest, and on November 30 Harriet gave birth to his son Charles Bysshe. Through these harrowing months, which included the frequent shifting of lodgings, Shelley and Mary were nevertheless happy. They read incessantly, enjoyed the company of Thomas Hogg, now pursuing his law studies in London, and were buoyed up by their love for each other. Comparative peace came to them upon the death of Shelley's grandfather, Sir Bysshe, on Jan. 6, 1815. Most of Shelley's ruinous debts were paid, and the sum of £1,000 a year settled upon him.

On August 3, Shelley and Mary took a pleasant cottage at Bishopsgate, near the entrance to Windsor Park, where they often had the company of Peacock, who lived at Marlow. Late in the summer, Shelley made a boat trip up the Thames, stopping at Oxford and getting as far up the now shallow stream as Lechlade. When he returned he produced his first great poem, *Alastor, or, The Spirit of Solitude,* published with a few short poems early in 1816.

On Jan. 24, 1816, Mary gave birth to their son William at Bishopsgate; August 16 found them in a cottage on the shores of Lake Geneva, Switzerland. Just above them, Lord Byron occupied the Villa Diodati, famous because Milton had stayed there in 1639. Mutual visits, animated conversations, and excursions on the water led to daily intimacy. Especially notable is the 10-day trip around the lake taken by the poets. Unfortunately, what might have been a most gratifying friendship was complicated by the birth of a daughter, fathered by Byron, to Claire Clairmont on Jan. 12, 1817; she was named Allegra by Byron.

On returning to England in September, Shelley took lodgings at Bath, where on December 15 he learned that Harriet had taken her own life by drowning. Her death was a terrible shock to Shelley, and he was denied possession of his two children by the Lord Chancellor, which intensified his suffering. On Dec. 30, 1816, at St. Mildred's Church and in the presence of Godwin, he married Mary Wollstonecraft Godwin.

It was at this time that James Henry Leigh Hunt became a beloved and lifelong friend of Shelley, to whom he now gave the assistance he so desperately needed: deep personal sympathy, a refuge in his home at Hampstead, intellectual stimulation, new friends, zeal for the liberal causes to which Shelley was devoted, and encouragement as a poet. Equally important to Shelley was Hunt's publication on Dec. 1, 1816, of a short article on "Young Poets" that included Shelley. Hunt was Shelley's chief defender against personal attack and criticism of his poetry; hence, Shelley had good reason to address Hunt, as he often did, as his dearest friend.

In February 1817 the Shelleys settled in Albion House, Marlow, Buckinghamshire, a small town 30 miles (50 kilometres) up the Thames River. Here he and Mary read aloud to each other in the evenings, and here they entertained both Hogg and Peacock. Other visitors were Godwin and Leigh Hunt and his large family. Here Mary put together her useful *History of a Six Weeks' Tour* (1817), wrote her famous *Frankenstein* (published 1818), and gave birth to their daughter, Clara, on September 2. And, in the first six months at Albion House, Shelley wrote his longest poem, *Laon and Cythna* (renamed *The Revolt of Islam,* 1818). But the couple were not ideally happy, for they, especially Mary, lived in a state of uneasiness and embarrassment in the presence of Claire who was there with Byron's child Allegra. Her equivocal state of being a "Mrs." who was bringing up someone else's child became impossible; Shelley's reputation was in danger. In March 1818 they therefore left England to turn over to Byron at Venice the child he freely offered to accept and rear as his own.

To the reasons already given for the Shelleys' migration to Italy must be added two more: Shelley's deteriorating health and the fear that his children by Mary might be taken from him by law, as Harriet's had been. But not even to Godwin or his friends did he ever make all his motives clear. They stopped briefly at Milan, Como, and Pisa and spent a month at Leghorn (Livorno). In April, from Milan, they had sent Allegra to Byron in Venice in the care of one of their maids. In August, Claire's anxiety about Allegra induced Shelley to make with her the long and exhausting journey from the Baths of Lucca to Venice. She stopped at Padua, her presence to be kept a secret, while Shelley went on to Venice to meet Byron, who was delighted to see him and offered the use of his villa at Este, which Byron himself had never used. Shelley wrote Mary, asking her to bring their family there at once. She did so, but as a result their baby girl Clara died. Mary secretly blamed Shelley and Claire for this calamity, and the strained relations led Shelley to write (or alter) *Julian and Maddalo* and a group of his "saddest verses." Shelley also wrote, however, the first act of *Prometheus Unbound* and entered upon the period of his greatest achievement as a poet. In the following summer, amid the vast ruins of the Baths of Caracalla, in Rome, he wrote Acts II and III of *Prometheus Unbound*—and he began *The Cenci.* Then, on June 7, the Shelley's three-year-old son William died and left them childless.

Leaving Rome on June 10, the Shelleys spent the summer at Montenero, where Shelley finished *The Cenci.* From Oct. 2 to Jan. 25, 1820, they lived in Florence rather uncomfortably, Shelley because of bad health and the cold weather. Mary's deep melancholy was much relieved by the birth of a son, named Percy Florence after Shelley and the city of his birth, on November 12. He was to be Mary and Shelley's only surviving child. The removal to Pisa late in January 1820 was to be their last, except for occasional trips to Leghorn and Lucca and the final summer at Casa Magni, near Lerici.

Shelley went to Pisa chiefly to consult the famous Italian physician Andrea Vaccà Berlinghieri, but he soon became the nucleus of a considerable group of people—English, Irish, Italian, and Greek. And in the following year Byron joined their "Pisan Circle."

The death of Byron's daughter Allegra on April 20, 1822, caused the Shelleys to begin their projected summer on the coast precipitately and early; they wished to remove Claire from the vicinity of Byron before she knew of her terrible loss. They rented Casa Magni at San Terenzo, facing Lerici, on the Gulf of Spezia, and occupied it on April 8. On July 1, Shelley sailed his trim yacht, the "Don Juan," to Leghorn to welcome Leigh Hunt and his wife and six children to Italy, to help them settle in Byron's *palazzo* in Pisa, and to make some definite arrangements with Byron concerning *The Liberal,* a periodical Byron wished to establish and had, through Shelley, brought Leigh Hunt to Italy to edit. On the return trip on July 8, a sudden squall struck and sank the boat, and Shelley was drowned.

Immediately after her husband's death Mary resolved to devote her life to the ordering, preservation, and publication of Shelley's manuscripts and to write a biography. In 1824 she published *Posthumous Poems;* Shelley's father, Sir Timothy, however, frustrated further publication until 1839, and in the *Poetical Works* Mary's invaluable notes are primarily biographical. (F.L.J./Ed.)

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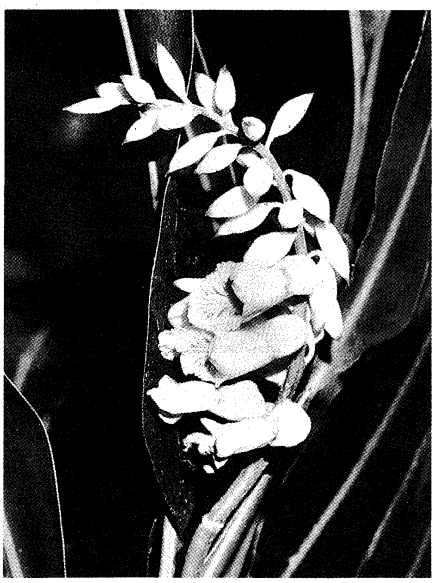
shellfish, any aquatic invertebrate animal having a shell and belonging to the phylum Mollusca, the class Crustacea (phylum Arthropoda), or the phylum Echinodermata. The term is often used to refer to the edible species of the groups, especially those that are fished or raised commercially. Bivalve mollusks, which include oysters, mussels, scallops, and clams (especially cockles and coquina clams), rank among the most commercially important shellfish throughout the world. Certain gastropod mollusks, such as abalone, whelk, and conch, are also marketed. The main crustacean forms caught and eaten are the shrimp and prawns of the genera *Crangon* and *Palaemon* off the coast of Europe and the genus *Peneus* in the coastal waters from North Carolina to Mexico. The American lobster, the Norway lobster (also called Dublin Bay prawn), and the South African rock lobster are highly valued, as are the king crab and the Dungeness crab and its related species. Among echinoderms, sea urchins and sea cucumber (trepang, or bêche-de-mer) are locally popular.

There is considerable confusion concerning the nomenclature of shellfish, compounded by the restaurateur's tendency to name his offerings based on size rather than species. In Britain, for example, large shrimps are called prawns; in Italy, large Dublin Bay prawns, *Nethrops norvegicus,* are called scampi. Any large shrimps broiled in butter and garlic may be called scampi on an American menu.

After being harvested, all shellfish are highly perishable. Many types are cooked live to protect the consumer against the effects of spoilage. Most shellfish benefit from brief and gentle cooking; with high heat they may disintegrate or turn rubbery, and the flavour becomes disagreeably strong. Conch and abalone, however, must be pounded to tenderize the tough meat. Shellfish are often served with rich or highly seasoned sauces.

shellfish poisoning, illness in humans resulting from the eating of certain mussels and clams. The source of the poison has been traced to the plankton upon which shellfish feed during parts of the year. Symptoms often begin within 10 minutes after eating the shellfish. Initially, there is tingling and numbness about the lips and prickly feelings in the fingertips. The throat is often dry. Staggering, giddiness, and muscular incoordination may appear, and speech is often incoherent. In severe cases, respiratory paralysis and death soon follow; mechanical respiratory aids and tracheotomy (surgical creation of an airway through an opening in the neck) may be lifesaving. If the individual survives the first 12 hours of illness, the chances for complete recovery are good. *See also* fish poisoning.

shellflower, also called SHELL GINGER, any of about 250 species of plants in the genus *Alpinia* of the ginger family (Zingiberaceae), native to warm climates of Asia and Polynesia. These plants have ginger-like rhizomes (underground stems) and grow to 6 m (20 feet). Their leaves are long-bladed and leathery. The flower petals form a shortened tube



Shellflower, or shell ginger (*Alpinia speciosa*)
E.R. Degginger—EB Inc.

with three teeth and a large labellum (two or three fused stamens), giving an orchidlike appearance. The fragrant flowers occur in delicate pinks, yellows, or whites and are borne in dense, long clusters.

Sheltie: *see* Shetland sheepdog.

Shelton, town (township) and city, Fairfield County, southwestern Connecticut, U.S. It lies along the Housatonic River opposite Derby, a few miles west of New Haven. The area was first settled as part of Stratford about 1697, and in 1724 the parish of Ripton was organized. Renamed Huntington (for Governor Samuel Huntington), it was separately incorporated as a town in 1789. Industries expanded after 1870, when power facilities were increased by the construction of the Derby Dam on the Housatonic at Shelton. The town's diversified industries now include the manufacture of sponge rubber, metal products, and electronic equipment. In 1915 Huntington was chartered as a city (coextensive with the town), and in 1919 it was renamed for Edward N. Shelton, promoter of the dam project. Indian Well State Park is nearby. Pop. (1986 est.) 33,622.

Shema (Hebrew: "Hear"), the Jewish confession of faith made up of three scriptural texts (Deuteronomy 6:4–9, 11:13–21; Numbers 15:37–41), which, together with appropriate prayers, forms an integral part of the evening and morning services. The name derives from the initial word of the scriptural verse "Hear, O Israel: The Lord our God is one Lord" (Deuteronomy 6:4). The time for recital was determined by the first two texts: "when you lie down, and when you rise." The Shema texts are also chanted at other times during the Jewish liturgy and are inscribed on ritual objects. The biblical verses inculcate the duty to learn, to study, and to observe the Torah. These texts and their appropriate prayers are consequently sacred to Jews because they contain a profession of faith, a declaration of allegiance to the kingship and Kingdom of God, and a symbolic representation of total devotion to the study of the Torah. Since, however, meditation on the Torah "night and day" was a practical impossibility, the Shema became a substitute for Torah study or, more exactly, the minimum requirement for observing the precept. By identifying the reading of the Shema selections with actual study of the Torah, the liturgy made study a form of worship on a par with prayers of praise and of supplication.

Following the example of the scholar-martyr rabbi Akiba (2nd century AD), the Shema has been uttered by Jewish martyrs throughout the ages as their final profession of faith in the one God of mankind and their love for him. Pious Jews hope to die with the words of the Shema on their lips.

Shemakha, also spelled ŠEMACHA, city and administrative centre of a *rayon* (sector), Azerbaijan Soviet Socialist Republic. It is located 76 miles (122 km) west of Baku and is one of the oldest cities in the republic, dating from the 6th century AD, but the modern city was not incorporated until 1824. From the 9th to the 16th century, it was the residence of the Shīrvān-Shāhs. There are numerous historic buildings, including mosques and mausoleums, which have been damaged by the frequent earthquakes. Shemakha is now a centre of food industries and is especially noted for wines. Pop. (1974 est.) 19,000.

Shemini Atzeret (Hebrew: "Eighth Day of the Solemn Assembly"), a Jewish religious festival on the eighth day of Sukkoth (Feast of Booths), considered by some to be an independent celebration immediately following Sukkoth. In Old Testament times a distinction was made regarding sacrifices: whereas 70 sacrifices were offered on the first seven days to signify the "70 nations" constituting all mankind, a single ram and a single bullock were sacrificed on the eighth day to symbolize Israel's special relationship to God. In Israel, Simḥat Torah is also celebrated on the eighth day of Sukkoth, although in other countries it is celebrated on the ninth day.

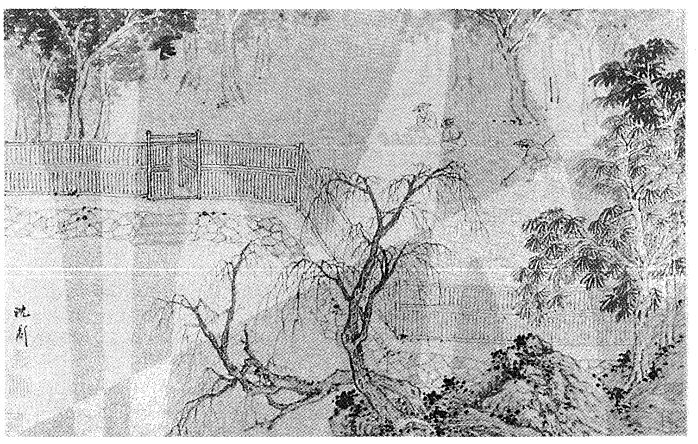
shen, Pinyin SHEN (Chinese: "spirit"), in indigenous Chinese religion, a beneficent spirit of the dead; the term is also applied to deified mortals and gods. *Shen* are associated with the yang (bright, active) aspect of the cosmos, and with the higher, spiritual component of the human soul. After death a person's soul becomes either of two spirits: the *shen,* which ascends to the spirit world, or the *kuei* (*q.v.*), a dark, passive yin spirit, which remains within the grave. The successful ascent of the *shen* depends on adequate ritual offerings from the surviving family, without which it becomes dissatisfied and eventually seeks revenge on the human world in the form of the malevolent *kuei,* or ghost.

Shen-chen, Pinyin SHENZHEN, city, south-central Kwangtung *sheng* (province), southeastern China. It lies along the coast of the South China Sea and immediately north of Hong Kong. Shen-chen was a small border city that served as a customs stop into China

from Hong Kong until in 1979 it was declared to be a special economic zone, *i.e.*, one of several cities along the coast of China that were opened to foreign investment, technology, and managerial expertise through the establishment of foreign-owned, joint-venture, and other business enterprises without the prior approval of the central government. The fledgling city also received sizable loans from Chinese banks that were used to build new roads, housing, schools, and water, power, and communications facilities for its burgeoning population. During the 1980s the city grew at a phenomenal rate, both as a tourist stopover for visitors to Hong Kong and as a manufacturer of electronics, pharmaceuticals, chemicals, textiles, building materials, and processed foods. Intensive investment likewise increased the surrounding agricultural area's production of poultry, livestock, and vegetables. The special economic zone had wages and standards of living significantly higher than average in China, and the success of the project prompted the Chinese government to convert several other coastal cities into special economic zones. Pop. (1988 est.) city, 245,000; economic zone, 1,600,000.

Shen Chou, Pinyin SHEN ZHOU, also called SHEN SHIH-T'IEN (b. 1427, Su-chou, Kiangsu province, China—d. 1509), Chinese artist, a leading member of a group of scholar-artists later known as the Wu school (after Wu district), which was considered superior to the "professional" artists of the Che school, in which Tai Chin held an equivalent place.

Shen Chou was born to an honoured and secure family and enjoyed a long life involved in the learned arts of poetry, painting, and calligraphy. His many paintings reveal an active concern with preserving the aesthetic discoveries of bygone ages as well as a similar concern with nature in its many manifestations (especially landscapes). However various in stylistic source and subject matter, Shen Chou's art consistently bears his unique touch of an abiding confidence, restrained calmness, and subtle warmth. The ideal of his life and the accomplishments of his art have earned him reverence by all artists devoted to the ideals of the literati (*wen-jen*) tradition. Among his pupils was Wen Cheng-ming.



"Gardening," painting in ink and colour by Shen Chou; in the William Rockhill Nelson Gallery and Mary Atkins Museum of Fine Arts, Kansas City, Mo.
By courtesy of the Nelson Gallery-Atkins Museum (Nelson Fund), Kansas City, Mo.

Shen Congwen (Chinese author): *see* Shen Ts'ung-wen.

Shen Kua (b. 1031, Ch'ien-t'ang, China—d. 1095, Ching-k'ou), Chinese astronomer, mathematician, and high official whose famous work *Meng ch'i pi t'an* ("Dream Pool Essays") contains the first reference to the magnetic compass, the first description of movable type, and a rather accurate explanation of the origin of fossils. The *Meng ch'i pi t'an* also contains Shen's observations on such varied subjects as mathematics, astronomy, cartography, optics, and medicine. Shen wrote his account after he had been banished from office following the defeat of troops under his command by the Khitan tribes (some 60,000 Chinese perished in the battle).

Shen Nung, Pinyin SHEN NONG (Chinese: "Divine Husbandman"), formally YEN TI, second of China's mythical emperors, said to have been born in the 28th century BC with the head of a bull and the body of a man. By inventing the cart and plow, by taming the ox and yoking the horse, and by teaching his people to clear the land with fire, Shen Nung reputedly established a stable agricultural society in China. His catalog of 365 species of medicinal plants became the basis of later herbological studies. Tales of his youth relate that he spoke after three days, walked within a week, and could plow a field at age three.



Shen Nung, engraving from *San-ts'ai t'u-hui* (1607–09); in the collection of the University of Hong Kong
By courtesy of the University of Hong Kong

Shen Shih-t'ien (Chinese artist): *see* Shen Chou.

Shen Te-hung (Chinese writer): *see* Mao Dun.

Shen Tsung, Pinyin SHEN ZONG (temple name, or *miao-hao*), personal name (*hsing-ming*) CHAO HSÜ (b. 1048, China—d. 1085, China), sixth emperor (reigned 1067/68–1085/86) of the Sung dynasty of China, during whose reign some of the greatest intellectual and cultural figures of the era flourished, among them Ou-yang Hsiu and Su Tung-p'o. Under Shen Tsung, the radical reformer Wang An-shih carried out his economic and social program. Low-interest government loans to peasants were instituted, new land surveys were made to correct tax inequities, and government revenues were increased by a program of purchasing manufactured specialties in one region and selling them in another. To augment the military forces, Shen Tsung and Wang ordered the training of local militia groups in all villages. The government also procured horses and assigned them to peasant families in North China, in return for which each family selected one of its members to serve in the cavalry in times of emergency.

Although Shen Tsung continued to implement the reforms, Wang himself created so much personal antagonism that he had to retire from office in 1076. The magnitude of the program and the ineptness of the bureaucracy prevented the program from achieving any great success. On Shen Tsung's death, the regents who ruled for his young son were dominated by conservative officials who revoked all the reforms.

When the new emperor came of age, the reforms were restored, but the struggle between the two factions continued for several generations, not only denying Shen Tsung's reforms the chance to take effect but nullifying any good that might have been accomplished by the programs of either side.

Shen Tsung (Chinese emperor): *see* Wan-li.

Shen Ts'ung-wen, Pinyin SHEN CONGWEN, original name SHEN YÜEH-HUAN, Pinyin SHEN YUEHUAN (b. Dec. 28, 1902, Feng-huang, Hunan province, China—d. May 10, 1988, Peking), Chinese author of more than 35 volumes of fiction dealing with the struggles and triumphs of ordinary people in rural China.

Trained for a military career, Shen Ts'ung-wen joined a regiment in Yüan-ling, where he spent the next few years adding to his scanty education and observing the border fighting and the lives of the local Miao tribesmen, which later became the subject matter of his earliest successful short stories. Shen Ts'ung-wen began writing fiction in 1922, when he arrived in Peking, and from then until 1949 he rarely stopped writing, producing a tremendous number of novels and short stories of varying quality. He revised extensively, an unusual practice for a modern Chinese author.

During the Sino-Japanese War (1937–45) Shen Ts'ung-wen, out of economic necessity, also taught Chinese literature at a number of universities. After the Communists triumphed in 1949, the basically apolitical writer came under attack and suffered a breakdown under the pressure of "thought reform." He managed a recovery by 1955 and was placed on the staff of the Palace Museum in Peking, about which he wrote a work of nonfiction (1957). After 1949, however, he produced no fiction.

Shen Ts'ung-wen was greatly influenced by the works of Western authors that he had read in translation; the influence was apparent in his loose, vernacular style. His techniques, however, were derived from classical Chinese literature. Of Shen Ts'ung-wen's longer works of fiction, *Ch'ang ho* ("The Long River"), written during the Sino-Japanese War, is generally considered his best. *Ch'un-teng chi* ("Lamp of Spring") and *Hei-feng chi* ("Black Phoenix") are his most important collections of short stories. Fourteen stories appeared in *The Chinese Earth* (1947).

Shen-yang, formerly MUKDEN, Pinyin SHENYANG, capital of Liaoning *sheng* (province), China, and the largest city in the Northeast (formerly Manchuria). It is one of China's greatest industrial centres.

The Lower Liao Basin, from the time of the Han dynasty (206 BC–AD 220), has been known as the Chinese Pale, an area settled chiefly by immigrants from what are now

the provinces of Hopeh and Shantung. The rest of Manchuria was under the control of various nomadic and tribal peoples of whom the Manchus became the most important. The Pale was largely set off from the rest of Manchuria by a discontinuous wall known as the Willow Palisade; and Shen-yang, then known as Shen, was a frontier post along the edge of the wall.

By the 10th century, Shen had become a major frontier settlement of the Khitan kingdom; its dominant peoples, also known as the Khitan, founded the Liao dynasty (947–1125). Southern Manchuria was conquered by the Chin, or Juchen, peoples by 1122–23 and a century later by the Mongols, who by about 1280 had completed their conquest of all China. It was under the Mongols that the name Shen-yang was first applied to Shen. By 1368 the Ming dynasty had displaced the Mongols.

In the early 17th century the Manchus controlled all of Manchuria, and Shen, renamed Mukden (a Manchu name), proved an admirable organizing base for the conquest of China. In 1644, when the Manchus supplanted the Mings on the Imperial throne, the capital was transferred to Peking. Mukden retained its prestige as the older capital of the reigning dynasty, however; the tombs of earlier emperors at Pei Ling (North Mausoleum) are among the most famous monuments of China. Thereafter, the city grew steadily, especially in the last half of the 19th century when Chinese immigration to Manchuria reached flood proportions.

In the period of struggle between Russia and Japan for dominance in Manchuria after 1895, Mukden was inevitably one of the key positions. From that time, when the Russians gained rights to build railroads in Manchuria, Mukden was a Russian stronghold; during the Russo-Japanese War (1904–05) it was the scene of the Battle of Mukden, which lasted from February 19 to March 10, 1905, when the city finally fell to the Japanese. In the early 1920s the Chinese warlord Chang Tso-lin, a protégé of the Japanese, participated with other warlords in the struggle for control of Peking. The last warlord to resist the advance of the Kuomintang (National Party) Army against Peking in 1928, he was killed in his retreat with his defeated troops. Three years later, on Sept. 18, 1931, an explosion touched off the Mukden Incident. An alleged Chinese bomb went off on the railway track near Mukden and gave the signal for a surprise Japanese attack on the Chinese Nationalist garrison and arsenal in Mukden. After protracted fighting, the Chinese forces were driven out of Manchuria.

The Soviet Union declared war on Japan in early August 1945 and soon took Mukden. Several months after the surrender of Japan on Aug. 14, 1945, Mukden was occupied by Chinese Nationalist troops (in March 1946). During the ensuing civil war (1946–49) Mukden fell to Communist forces on Oct. 30, 1948. The city then served as a base for the subsequent Communist conquest of the entire Chinese mainland.

Since 1950 Mukden, again under the name of Shen-yang, has continued as the hub of the heavy industrial complex of the southern region of China's Northeast, the greatest in China. The chief manufactures are machinery and fabricated metals. Rolling stock, machine tools, wire and cables, cement, electrical equipment, chemicals and chemical fertilizers, and pharmaceuticals are produced there. The complex also includes oil-seed-processing plants, flour mills, paper plants, soap and leather factories, textile mills, and glass factories. The smelting of metals such as copper, zinc, lead, and manganese also is an important part of the industrial mix of the city.

Shen-yang remains, after Peking, the leading railway centre of China. A network of roads converges on the city, and bus services link the various parts of the metropolis. An airport, constructed by the Japanese, is located on the northern outskirts.

Shen-yang has long functioned as the education and cultural centre of the Northeast. The city houses Liaoning University, Northeastern China Technical University, Northeastern Engineering College, Northeastern Institute of Finance and Economics, and a medical college. In addition to theatres and libraries, it is the home of the Northeastern Institute of Fine Arts and the Northeastern Music Institute. It is also the site of the Northeast Museum and of the North Mausoleum and other Chinese historical monuments. Pop. (1983 est.) 4,020,000.

Shen Yen Huang Ti (in Chinese mythology): *see* Huang Ti.

Shen Yen-ping (Chinese writer): *see* Mao Tun.

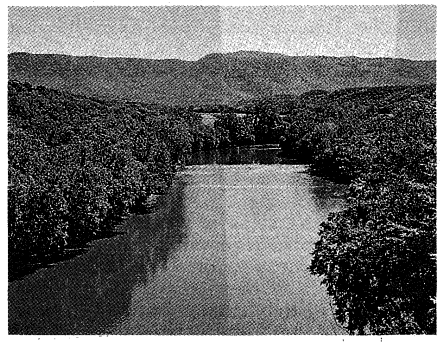
Shen Zhou: *see* Shen Chou.

Shen Zong (Chinese emperor): *see* Shen Tsung.

Shenandoah National Park, preserve of 193,537 ac (78,322 ha) in the Blue Ridge section of the Appalachians, in northern Virginia, U.S., formed in 1935. The park is noted for its scenery, which affords some of the widest views in the eastern states. Skyline Drive runs the length of the park, winding among the peaks and through valleys and gaps. This accessibility is due to the great age of the mountains, which have been rounded and worn down by millions of years of erosion.

Except for a few grassy meadows along the crest, Shenandoah National Park is heavily forested with both hardwoods and conifers. From spring to autumn a succession of brilliant wild flowers bloom. Wildlife includes deer, foxes, squirrels, and other mammals, along with numerous birds, some of which migrate south in winter.

Shenandoah Valley, part of the Great Appalachian Valley, chiefly in Virginia, U.S. It extends southwest from the vicinity of Harpers Ferry, W.Va., on the Potomac River and lies between the Blue Ridge Mountains (east)



Shenandoah River Valley, Virginia, with Massanutten Mountain in the background

By courtesy of the Virginia State Travel Service, Richmond

and the Alleghenies (west). Drained by the Shenandoah River, it embraces nine counties—Berkeley and Jefferson in West Virginia and Frederick, Clarke, Shenandoah, Warren, Rockingham, Page, and Augusta in Virginia. The valley is often considered to extend to the James River and to include Rockbridge County. It is approximately 150 mi (241 km) long and 25 mi (40 km) wide. Massanutten Mountain extends from a point east of Harrisonburg northeast for 50 mi, rising to 3,000 ft (914 m) and dividing the north and south forks of the Shenandoah River. Historic passes through the Blue Ridge include Swift Run Gap and Rockfish Gap.

The famous Valley Pike, now a U.S. interstate highway, was early used by Tuscarora and Shawnee Indians, later becoming a main artery for westward expansion. The lower valley was explored (1707) by Louis Michelle, and in 1716 Gov. Alexander Spotswood led an expedition over the Blue Ridge to the Shenandoah River. White settlement began about 1730. During the Civil War, Confederate general Thomas J. "Stonewall" Jackson won immortality during his "Valley Campaign."

Tourists are attracted by the George Washington National Forest, Shenandoah National Park, the Natural Bridge near Lexington, and many limestone caverns. Skyline Drive and Blue Ridge Parkway, running along the crest of the Blue Ridge Mountains, bound the valley on the east.

Articles are alphabetized word by word, not letter by letter

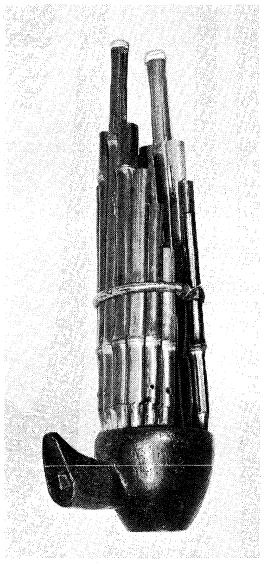
Shenandoah Valley Campaigns (July 1861–March 1865), in the American Civil War, important military campaigns in a four-year struggle for control of the strategic Shenandoah Valley, Virginia, running roughly north and south between the Blue Ridge and Allegheny mountains. The South used the transportation advantages of the valley so effectively that it often became for the North the "valley of humiliation" until late in the war, when Union forces finally took undisputed control. Whenever a Confederate army moved north, it drew nearer to Washington, but when a Union army moved up the valley, it was pulled away from Richmond. When a Southern army crossed the Potomac (where the Shenandoah River joined it), the army cut across the Baltimore and Ohio Railroad and was only 60 miles northwest of Washington. Hence the presence of a Confederate army in the northern part of the Shenandoah Valley was often considered a sufficient menace to justify calling back troops from campaigns elsewhere to ensure the security of the capital.

During the first several years of the war, the valley was the arena for a series of Confederate attacks and manoeuvres under such generals as P.G.T. Beauregard, T.J. "Stonewall" Jackson, Richard S. Ewell, and Wade Hampton. These campaigns tied up thousands of troops and posed a continual threat to the Northern capital. Finally in May 1864 Union Gen. Ulysses S. Grant dispatched Gen. Philip H. Sheridan to clear the valley once and for all. On March 2, 1865, Confederate forces under Gen. Jubal A. Early suffered a decisive defeat that ended Southern resistance in the valley. The Confederacy collapsed the following month.

sheng, Pinyin SHENG, a Chinese aerophone (musical wind instrument) consisting usually of 17 bamboo pipes set in a small wind-chest into which one blows through a mouthpiece. Each pipe has a free reed, made of metal, that vibrates to produce sound when a hole is closed on the pipe by a finger. The acoustical length of each pipe is set by a slot in the back of it, but the circular set of the pipes appears in five different lengths, arranged in two triangular shapes to symbolize the folded wings of a phoenix bird. Today some pipes have no reeds but are maintained for design purposes, although originally they may have produced other pitches in the Chinese tone system. The Japanese *shō* variation of the instrument has the same characteristics, although it is played differently. The Chinese instrument plays melodies with occasional fourth or fifth harmonies (*e.g.*, F or G above C), whereas the Japanese *shō* normally plays 11-note chords, a tradition that may have emerged from a misinterpretation of ancient court notations.

Similar instruments are found all over South-

east Asia in forms often called the *khen*, or *khaen*. A *sheng* taken to Russia in the 1770s was one factor stimulating the invention of European instruments using free reeds—



Sheng; in the Horniman Museum, London

By courtesy of the Horniman Museum, London; photograph, J.R. Freeman & Co. Ltd.

including the accordion, concertina, harmonium, and harmonica.

Sheng Hsüan-huai, Pinyin SHENG XUANHUAI (b. Nov. 4, 1844, Wuchin, Ch'angchou, now in Kiangsu Province, China—d. April 27, 1916, Shanghai), Chinese government official and entrepreneur in the last years of the Ch'ing dynasty, responsible for much of China's early industrialization. His efforts to nationalize the railroad lines in 1911 touched off the crisis that eventually overthrew the dynasty.

In 1870 Sheng joined the staff of the Chinese statesman and general Li Hung-chang (1823–1901) and soon became his chief economic deputy.

By 1893 Sheng had taken over control of the important China Merchants' Steam Navigation Company; established the Imperial Telegraph Administration, which laid over 14,000 miles (22,500 kilometres) of line and connected all the major cities and strategic centres of China; and reorganized under his own direction the Hua-sheng Spinning and Weaving Company, making it the first successful cotton mill in China. In 1896 Sheng added the famous Han-yang ironworks and its associated mines to his empire, and he also gained control of the newly formed Imperial railway administration.

In recognition of his services to the government, especially in acting as an intermediary between China and the Western powers, he was given high rank in the Imperial Cabinet. In 1911 Sheng was appointed head of the Board of Posts and Communications, and he then attempted to bring the railway system under national control by consolidating and expanding local railroad projects that had been initiated by gentry and merchant groups in the provinces.

The provincial interests, however, felt that this move represented a conspiracy on the part of high government officials to sell out China to foreign imperialist powers. Thus, shortly thereafter, rioting began in the western province of Szechwan and spread throughout the country. Finally, on Oct. 10, 1911, a revolt in the central China city of Wuhan set in motion the events that brought down Sheng's plan and the dynasty and ended 2,000 years of Imperial rule.

Sheng-li Feng (Kirgiz S.S.R.): *see* Victory Peak.

Sheng-li oil field, Pinyin SHENGLI, oil field in Shantung Province (*sheng*), China, one of the country's major sources of oil. Consisting of about 40 small fields, it is located southeast of Peking near the Gulf of Chihli south of the mouth of the Huang Ho (river). Drilling teams, brought in from the Ta-ch'ing oil field in Heilungkiang Province, began drilling in 1964 near the village of Sheng-li. The field began to produce oil in 1966 and by the 1970s had been considerably expanded; an oil refinery has been built and a pipeline about 700 mi (1,100 km) long (completed in 1979) connects Sheng-li and nearby Jen-ch'in oil fields with Nanking (southeast) on the Yangtze River. Crude oil production at Sheng-li in 1980 was estimated at roughly 420,000 bbl a day.

Sheng Tsu (Chinese emperor): *see* K'ang-hsi.

Sheng Xuanhuai (Chinese official): *see* Sheng Hsüan-huai.

Shenoud, also spelled SHENOUTE (Coptic abbot): *see* Shenute.

Shenshin, Afanasy Afanasyevich: *see* Fet, Afanasy Afanasyevich.

Shensi, Wade-Giles romanization SHEN-HSI, Pinyin SHAANXI, Chinese *sheng* (province) bordered by the Huang Ho (river) and Shansi (Pinyin Shanxi) province to the east, the Ningsia Hui Autonomous Region and Kansu province to the west, the Inner Mongolian Autonomous Region to the north, Szechwan province to the south, and Hupeh and Honan provinces to the southeast.

The article that follows is a summary of the significant detail about the Chinese province of Shensi; for additional detail about its geography, history, economy, and culture, *see* MACROPAEDIA: China.

The northern parts of Shensi were some of the earliest settled parts of China. Mesolithic remains have been found, as has evidence of ancient agricultural and construction projects, such as that part of the Great Wall between Shensi and the Ordos Desert. From 221 BC until the T'ang dynasty (618–907), the area was wealthy, the focus of a nationwide road system, extremely populous, and the centre of much political activity. The irrigation system upon which Shensi depended, however, began to deteriorate; soil erosion and deforestation became problems, and productivity decreased. The area declined rapidly and during the next millennium became one of the poorest and most backward areas of China. Under the Mongols, from 1279 onward, Shensi assumed its present form as a province. During the 19th century and the first part of the 20th, Shensi was severely damaged by war, famine, drought, and continuing deterioration. Finally there was some relief from the International Famine Relief Organization, which began to rehabilitate the irrigation system of the Wei Ho Valley. The Lunghai Railway was extended into the province, meaning that during future emergencies supplies could be brought in. Shensi came under the control of the Chinese Communists in 1937. The capital of Shensi is Sian.

The province has three distinct natural regions: the mountainous southern region, the Wei Ho Valley, and the northern upland plateau. The only major break in the southern mountain chain occurs in the far southwest, where the Chia-ling Chiang (river) cuts through on its way to join the Yangtze. The Wei Ho Valley, bounded on its south by faults and fractures, is especially vulnerable to earthquakes. The upland plateau is composed of largely undisturbed sedimentary rocks of immense thickness. The plateau has a characteristic landscape of almost vertical walls, cliff faces, and deep ravines.

Shensi has two distinct climate zones, divided by the Tsinling Shan (mountain range). The southern area has a subtropical climate. The Wei Ho Valley has a much drier and somewhat colder climate, and is subject to severe drought.

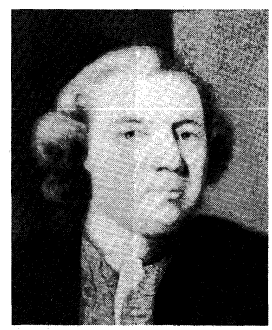
The Shensi people are nearly all Han Chinese and speak a local Mandarin dialect. There are no ethnic minorities. Most of the population lives in the Wei Ho and Han Shui valleys. Some Chinese Muslims live in the south and northwest of the province. The major cities are Sian, Paochi, Hsien-yang, T'ung-ch'uan, and Han-chung.

In the south, corn (maize) and winter wheat are cultivated in addition to rice. Such subtropical crops as tea, tung oil, and citrus fruits are also grown. The Wei Ho Valley is intensely cultivated, producing some rice, good winter wheat, tobacco, cotton, millet, barley, corn (maize), and *kaoliang* (sorghum). Hemp and sesame are important subsidiary crops. In the past, the whole of Shensi suffered badly from soil erosion. To counteract this a great effort has been made to spread terraced cultivation and to construct a large number of dams. Ancient irrigation systems have been restored after centuries of neglect and the entire system has been extended.

The basin in the north of the province has enormous coal reserves; however, there are few modern mines. There are some minor gold-producing areas and minor deposits of manganese and other minerals. The only major industry in Shensi is centred around Sian. Cotton textiles and electrical equipment are produced and the city is a centre for engineering and chemical manufacturing as well.

The Wei Ho Valley has formed part of the main east-west route since prehistoric times, and modern highways follow it from the North China Plain in the east to the Kansu corridor and the steppe lands in the west. At Sian these roads meet the routes that cross the Tsinling Shan to the south and southeast, to the Ordos region in the north, and to the Fen Ho Valley and Shansi to the northeast. The northern part of Shensi is still without adequate communications. Area 75,600 sq mi (195,800 sq km). Pop. (1983 est.) 29,040,000.

Shenstone, William (b. Nov. 18, 1714, Leasowes, Halesowen, Shropshire, Eng.—d. Feb.



Shenstone, detail of an oil painting by E. Alcock, 1750; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

11, 1763, Leasowes), a representative 18th-century English "man of taste." As a poet, amateur landscape gardener, and collector, he influenced the trend away from Neoclassical formality in the direction of greater naturalness and simplicity.

From 1745, in response to the current vogue for the *ferme ornée* ("ornamental farm"; *i.e.,* one that was as picturesque as it was profitable), he devoted his chief energies to beautifying his estate, the Leasowes, by "landscape gardening," a term he was the first to use. His

theories, outlined in "Unconnected Thoughts on Gardening" (1764), involved the creation of winding waterways and walks and a series of picturesque views.

In his poetry Shenstone celebrated rustic virtue and simplicity, foreshadowing the sentiments of the early Romantics. His best-known poem, "The School-Mistress," commemorates, in Spenserian stanzas, his first teacher at the village school—Sarah Lloyd. He was influential in reviving the ballad and advised and assisted Bishop Percy in the compilation and editing of Percy's *Reliques of Ancient English Poetry* (1765), the book that conferred literary status on the ballad.

Shenute, also spelled SHENOUTE, SHENOUD, SHENOUDI, or SCHENOUDI (b. *c.* 360—d. *c.* 450), monastic reformer, abbot of the White Monastery, near Atripe, in Upper Egypt, who is regarded as a saint in the Coptic (Egyptian Christian) Church.

Shenute entered monastic life as a youth and succeeded his uncle as abbot of the White Monastery in 383. He revived the rule of Pachomius, the 4th-century founder of cenobitic, or communal, monasticism (as opposed to the solitary, contemplative religious life), which emphasized manual labour, liturgical prayer, and strict obedience. Shenute was the first abbot to require of his monks a written profession of obedience.

In 431 Shenute attended the Council of Ephesus, where he joined in the condemnation of Nestorius and his teachings on the nature of Christ. Shenute wrote extensively, primarily letters and sermons, attacking paganism and heresy and expressing his views on monastic life. These works are among the earliest-known writings in the Coptic language and, from a literary viewpoint, are considered unsurpassed in their mastery of that language. Although many of Shenute's original works were preserved in the monastic library, none were translated into Greek or Latin. Thus, his writings were virtually unknown to Western church historians until modern times. According to legend, Shenute ruled the monastery for 83 years and lived to the age of 118.

Shenzhen (China): *see* Shen-chen.

Sheopur, also called SHEOPUR KALAN, town, northwestern Madhya Pradesh state, central India. The town and fort were founded in 1537 by Gaur Rājputs (a warrior caste) and served as capital of the former Sheopur princely state. A road junction and rail terminus, it is an important produce market known also for its lacquered woodwork; playing cards are also manufactured. Sheopur has a hospital and a college affiliated with Jiwaji University. Pop. (1981) 27,097.

Shepard, Alan B(artlett), Jr. (b. Nov. 18, 1923, East Derry, N.H., U.S.), first U.S. astronaut to travel in space. On May 5, 1961, he made a 15-minute suborbital flight in *Freedom 7,* which reached an altitude of 115 miles (185 km). The flight came 23 days after Major Yury Gagarin of the Soviet Union became the first man to orbit the Earth.



Alan B. Shepard

By courtesy of the National Aeronautics and Space Administration

Shepard graduated from the U.S. Naval Academy, Annapolis, Md., in 1944 and served in the Pacific during World War II. He became a naval test pilot, and in 1958 he graduated from the Naval War College, Newport, R.I. In 1959 he became one of the original seven U.S. Mercury program astronauts.

Shepard commanded the Apollo 14 flight (Jan. 31–Feb. 9, 1971; with Stuart A. Roosa and Edgar D. Mitchell), which involved the first landing in the lunar highlands. In 1971 he was appointed to an administrative post that he held until 1975, when he retired from the Navy and the space program to undertake a career in private business in Texas.

Shepard, Francis P(arker) (b. May 10, 1897, Brookline, Mass., U.S.—d. April 25, 1985, La Jolla, Calif.), American marine geologist whose pioneering surveys of submarine canyons off the coast of California near La Jolla marked the beginning of Pacific marine geology.

Shepard studied geology at Harvard under R.A. Daly and at the University of Chicago (Ph.D., 1922). Most of Shepard's professional life was spent at the Scripps Institution of Oceanography, where he was appointed professor of submarine geology in 1948. Central to his research was the search for an explanation of the origin of submarine canyons. His series of observations of depth changes (begun in the early 1950s) at the head of submarine canyons gave concrete evidence, although not positive proof, of their formation by turbidity currents (submarine flows of muddy suspensions) and sediment slumping. Among his principal works are *Submarine Geology* (1948) and, with R.F. Dill, *Submarine Canyons and Other Sea Valleys* (1966).

Shepard, Sam, byname of SAMUEL SHEPARD ROGERS (b. Nov. 5, 1943, Fort Sheridan, Ill., U.S.), American playwright and actor whose plays adroitly blend images of the American West, Pop motifs, science fiction, and other elements of popular and youth culture.

As the son of a career Army father, Shepard spent his childhood on military bases across the United States and in Guam before his family settled on a farm in Duarte, Calif. After a year of agricultural studies in college, he joined a touring company of actors and, in 1963, moved to New York City to pursue his theatrical interests. His earliest attempts at playwriting, a rapid succession of one-act plays, found a receptive audience in Off-Off-Broadway productions. In the 1965–66 season, Shepard won Obie awards (presented by the *Village Voice* newspaper) for his plays *Chicago, Icarus's Mother,* and *Red Cross.*

Shepard lived in England from 1971 to 1974, and two notable plays of this period—*The Tooth of Crime* (1972) and *Geography of a Horse Dreamer* (1974)—premiered in London. In late 1974, he became playwright-in-residence at the Magic Theatre in San Francisco, where most of his subsequent plays were first produced.

Shepard's works of the mid-1970s showed a heightening of earlier techniques and themes. In *Killer's Head* (1975), for example, the rambling monologue, a Shepard stock-in-trade, blends horror and banality in a murderer's last thoughts before electrocution; *Angel City* (1976) depicts the destructive machinery of the Hollywood entertainment industry; and *Suicide in B-Flat* (1976) exploits the potentials of music as an expression of character.

Beginning in the late 1970s, Shepard applied his unconventional dramatic vision to a more conventional dramatic form, the family tragedy. *Curse of the Starving Class* (1977), the Pulitzer Prize-winning *Buried Child* (1978), and *True West* (1980) are linked thematically in their examination of troubled and tempestuous blood relationships in a fragmented society.

Shepard returned to acting in the late 1970s, winning critical accolades for his performances in such films as *Days of Heaven* (1978), *Resurrection* (1980), *The Right Stuff* (1983), and *Fool for Love* (1985), which was written by Shepard and based on his 1983 play of the same name.

His other plays include *La Turista* (1966), *Operation Sidewinder* (1970), *The Unseen Hand* (1970), *Seduced* (1979), and *A Lie of the Mind* (1985).

Shepherd, William Robert (b. June 12, 1871, Charleston, S.C., U.S.—d. June 7, 1934, Berlin, Ger.), American historian known as an authority on Latin America and on European overseas expansion.

Shepherd was educated at Columbia University, where he earned his Ph.D. (1896). He studied in Berlin, returned to Columbia as a professor of history, and taught there until his death in 1934.

By 1908 Shepherd was considered an authority on Latin America and served that year as a delegate to the first Pan-American Scientific Congress at Santiago, Chile, and a year later as secretary of the U.S. delegation to the fourth International Conference of American States at Buenos Aires. He continued to participate in numerous pan-American conferences and lectured extensively abroad on Latin America. He became Seth Low professor of history at Columbia in 1924. Among Shepherd's major works on Latin America are *Central and South America* (1914), *Latin America* (1914), and *The Hispanic Nations of the New World* (1919). His *Historical Atlas* (1911) is perhaps the work by which he is best known, however. In addition, he served as advisory editor of *The Hispanic-American Review* and was a member of numerous scholarly societies. His continual criticism of U.S. imperialism in relations with Latin America was influential in the attempt to achieve greater pan-American unity.

Shepherd of Hermas, a 2nd-century Christian writing that is one of the works representing the Apostolic Fathers, Greek Christian writers of the late 1st and early 2nd centuries. The author, Hermas, is known only through the autobiographical details given in the *Shepherd.* A Christian slave who was given his freedom, he became a wealthy merchant, lost his property, and did penance for past sins. He stated that he was a contemporary of Clement of Rome (possibly Pope Clement I; d. *c.* 95). However, the Muratorian Canon, the oldest (*c.* 180) extant list of New Testament writings, asserts that he was a brother of Pope Pius I (d. 155), and internal evidence in the *Shepherd* seems to support the later date.

The *Shepherd* records five visions experienced by Hermas, and it is named for the angel of repentance who appeared in the fifth vision dressed as a shepherd. In addition, the work contains 12 mandates (moral commandments) and 10 similitudes (parables). The basic theme is that post-baptismal sin can be forgiven at least once and that a day of repentance is coming, after which sins cannot be forgiven. Concerned with morals rather than theology, the work is a valuable indication of a type of Jewish Christianity—still adhering to the Mosaic Law—evident in Rome during the 2nd century.

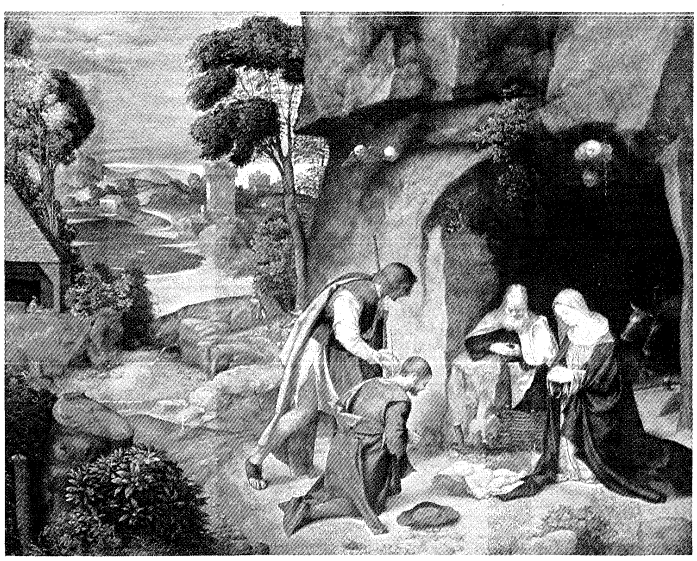
It was regarded as scripture by Irenaeus, Clement of Alexandria, Origen, and Tertullian; but the Muratorian Canon denied that it was inspired, and St. Jerome stated that it was known very little in the Western Church. Much more popular in the Eastern Church,

the work is contained in the 4th-century Codex Sinaiticus of the Greek Bible. Manuscripts in Greek, Latin, and Ethiopic and fragments in Coptic and Persian exist.

shepherds, adoration of the, as a theme in Christian art, depiction of shepherds paying homage to the newborn Christ, an event described in the Gospel According to Luke. It is related to the older but less frequently represented annunciation to the shepherds, which shows the same shepherds in the fields receiving from an angel news of the miraculous birth.

The adoration of the shepherds was never treated as a separate theme in the East, and in the West not until the 15th century. At first, in Early Christian art in the 4th century, one or more shepherds were included in scenes of the adoration of the Magi, the Wise Men who came from the East to worship the Child. They were depicted in such scenes because, as the first local people to worship Christ, they symbolize the spreading of Christianity among the Jews, just as the Magi, the first of the Gentiles to see and worship the Child, symbolize the spread of Christianity throughout the pagan world.

Because of the simple piety illustrated by the event, the adoration of the shepherds was a popular subject for altarpieces and other devotional paintings in both the Northern and the Italian schools in the Renaissance and Baroque periods. In many of these paintings the shepherds bring humble gifts, symbolic counterparts of the magnificent ones brought by the Magi; the most frequent gift is a lamb with tied feet, perhaps also symbolizing Christ's sacrifice. At the end of the 16th century the theme of the adoration of the shepherds provided inspiration for genre painting,



"Adoration of the Shepherds," panel painting by Giorgione, *c.* 1508; in the National Gallery of Art, Washington, D.C.

By courtesy of the National Gallery of Art, Washington, D.C., Samuel H. Kress Collection

and the taste for pastoral subjects contributed to its popularity throughout the 16th and 17th centuries.

shepherd's purse (*Capsella bursa-pastoris*), weed, of the mustard family (Brassicaceae), worldwide in distribution, but native to the Mediterranean region. This widespread lawn and roadside weed is distinguished for its flat, heart-shaped, green fruits that are borne along the flower stalks. The terminal clusters of tiny, four-petalled flowers are white. Below the seeds are small, arrow-shaped, clasping stem leaves. The branching flower stalks arise from



Shepherd's purse (*Capsella bursa-pastoris*)

G.E. Hyde—EB Inc.

a dandelion-like rosette of deeply cut or almost entire basal leaves. The plants sometimes reach 45 centimetres (18 inches) in height.

Shepherdstown, town, Jefferson County, northeastern West Virginia, U.S., near the Potomac River, just southeast of Martinsburg. One of the state's oldest continuously settled towns, it was first settled by Germans from Pennsylvania (*c.* 1730) and was later laid out by Thomas Shepherd and chartered as Mecklenburg in 1762. In 1787 James Rumsey successfully demonstrated his steamboat there on the Potomac. The state's first newspaper, *The Potomac Guardian,* was published by Nathaniel Willis in Mecklenburg in 1790, the same year the town was, according to papers in the Library of Congress, considered by George Washington as the site for the nation's capital. It was renamed to honour Shepherd in 1798. Shepherdstown is an agricultural-trading centre and is the seat of Shepherd College (1871). Inc. 1762. Pop. (1980) 1,791.

Sheppard, Jack, byname of JOHN SHEPPARD (b. December 1702, Stepney, Eng.—d. Nov. 16, 1724, London), 18th-century English thief who managed four spectacular escapes from London prisons and became a favourite figure in verse, popular plays, romances, and burlesques.

His father having died when he was a child, Sheppard was brought up in a workhouse; he learned to read and write but fell into the company of thieves and prostitutes in Drury Lane and turned to a life of petty crime. On April 24, 1724, he was seized and committed to St. Giles Roundhouse, from which he soon escaped. More thefts were followed by another incarceration, in New Prison, from which he again escaped on May 24, ridding himself of irons, cutting through bars, descending one wall, and scaling another. Thefts, highway robberies, and burglaries continued until he was betrayed by London's master informer and crime lord, Jonathan Wild (*q.v.*), and captured on July 23. Tried and condemned to death, he again escaped from the jails at Old Bailey, aided by a file smuggled to him by his girlfriend Poll Maggot. He was seized a fourth time on September 10 and housed in solitary in the strongest part of Newgate Prison. Manacled to the floor he nevertheless broke his chains, climbed a chimney, forced a bolted door, then returned to his cell to get a blanket for rope, returned to the upper levels, and descended a wall to freedom. The next days found him pilfering and burgling, followed by a drunken bout that led to his capture and return to prison. On November 16 his hanging at Tyburn was reportedly witnessed by 200,000 people.

Sheppard, Mel, byname of MELVIN W. SHEPPARD (b. Sept. 5, 1884, Almonesson, N.J., U.S.—d. Jan. 4, 1942, Queens, New York City), U.S. middle-distance runner, the first to win two gold medals in individual events in the Olympic Games.

Sheppard was a member of the Irish American Athletic Club of New York City. In 1906 and 1907 he set records for the 880-yard and 1,000-yard races. In the 1908 Olympic Games at London, he won gold medals in the 800-metre and 1,500-metre (metric-mile) races and was also a member of the relay team in the 4 × 400-metre race that won a gold medal. Sheppard is important in the history of middle-distance racing because he was one of the first runners to set a fast pace early in the race. In the 1912 Olympic Games at Stockholm, he won the silver medal for the 800-metre race and was a member of the gold-medal-winning 4 × 400-metre relay team that set a world record of 3 min 16.6 sec, unbroken until 1924. He was also a member of a team that set a 4 × 440-yard relay world record (1911–15) of 3 min 18.2 sec and of another team that set a 4 × 880-yard relay world record of 7 min 53 sec (1911–15). He was the Amateur Athletic Union 800-metre champion (1906–08, 1911–12).

Shepparton, city, north central Victoria, Australia, at the confluence of the Goulburn and Broken rivers, northeast of Melbourne. The site, called Canny-goopna (River of Big Fish) by the local Bangerang Aborigines, was settled as a sheep run in the early 1840s. The first European settlement was known as Macguire's Punt, after a ferryman of the 1850s; the present name, which dates from 1853, came from an early settler, Sherbourne Sheppard. Proclaimed a shire in 1879, it prospered with regional agricultural development. In 1927 it was separated as a borough and became a city in 1949. It is now the headquarters of the Goulburn Valley Irrigation Area (including the Yarrawonga Weir, on the Murray River, and Eildon Weir, on the Goulburn), which supports fruits, garden vegetables, fodder, cereals, dairy, and poultry. Local industries include lumbering, fruit canning, wool milling, wine making, and plasterworks, brickworks, tileworks, and light engineering works. Both the Tatura Horticultural Research Station and the Dookie State Agricultural College are in Shepparton. Pop. (1981) including Mooroopna, 28,373.

Sheppey, Isle of, island at the mouth of the River Thames in Swale district, county of Kent, England. It covers 35 sq mi (91 sq km), and its extremely fertile low-lying land supports grain and vegetable crops and sheep. Although it is physically separated from the

mainland only by small streams, its single connection for ground transport is the Kingsferry road and rail bridge. There are harbour facilities at both Sheerness and Queenborough-in-Sheppey, the former having a 17th-century naval dockyard. The smaller communities of Leysdown and Minster grew in importance in the late 20th century as holiday resorts. Pop. (1971) 31,854.

Shepstone, Sir Theophilus (b. Jan. 8, 1817, Westbury-on-Trym, Gloucestershire, Eng.—d. June 23, 1893, Pietermaritzburg, Natal), British South African statesman, an outstanding administrator of native affairs, who was responsible for the annexation of the Transvaal in 1877.



Shepstone
BBC Hulton Picture Library

His family emigrated in 1820 to Cape Colony, and he was educated in his father's mission school. At an early age Shepstone acquired great proficiency in the native dialects and culture. He served on the governor's staff in the Kaffir War of 1834–35 and was appointed British resident in Kaffraria (now in Transkei) in 1839. Success in dealing with various tribes led to his promotion to secretary for native affairs and membership in the executive and legislative council (1856–77) of the newly created colony of Natal. Despite strong opposition, Shepstone uncompromisingly held to the policy that tribal tenure customs be preserved.

Exercising his own authority as supreme chief, Shepstone arranged for the succession of Cetshwayo as king of the Zulus and at his coronation had him swear fealty to Britain and promise to keep the peace. Because of Shepstone's skill in maintaining the peace, the new colonial secretary, Lord Carnarvon (who was anxious to federate the South African territories), called him as a consultant to a London conference on South African affairs in 1876. While in England, he was knighted and empowered to annex the Transvaal, which mission he carried out unopposed in April 1877.

The annexation and his subsequent role as administrator in the Transvaal (1877–79) have given rise to considerable controversy. Critics insist that Shepstone was a crafty, secretive "South African Talleyrand" whose "soaring ambition" led him to employ deceit and intimidation with the Transvaalers when he took over their land and that his high-handed, autocratic rule contributed much to the successful rebellion of the Boers (1880–81). Shepstone retired from public life in 1880, but later he agreed to serve briefly as administrator (1884) in Zululand, where the natives called him "Somtseu" (white father).

Shepway, district, county of Kent, England, extending along the English Channel coast from north of Folkestone (the district headquarters) to south of Dungeness Point. Inland, the diverse landscapes of the district include a part of the chalk hills known as the North Downs; the low-lying Romney Marsh, which has emerged from the sea since Roman times, partly by natural accretion and partly by dyking and reclamation; and a section of the old shoreline, which can still be traced, running along the landward margin of the marsh.

The district looks toward Folkestone as the shopping and service centre. Seaside resorts line the coast, and a nuclear power station stands isolated on Dungeness Point. At Lydd there is an airport specializing in ferrying cars across the Channel. Romney Marsh is an area of superb natural grassland, noted for its sheep. The area of Shepway is 138 sq mi (357 sq km). Pop. (1983 est.) 86,800.

Shēr Shāh of Sūr, original name FARĪD KHĀN (b. 1486?, Sasarām, India—d. May 22, 1545, Kālinjar), emperor of North India (1540–45) in the Islāmic Sūr (Afghan) dynasty of 1540–57 who organized a long-lived bureaucracy responsible to the ruler and a carefully calculated revenue system. For the first time during the Islāmic conquest the relationship between the people and the ruler was systematized, with little oppression or corruption.

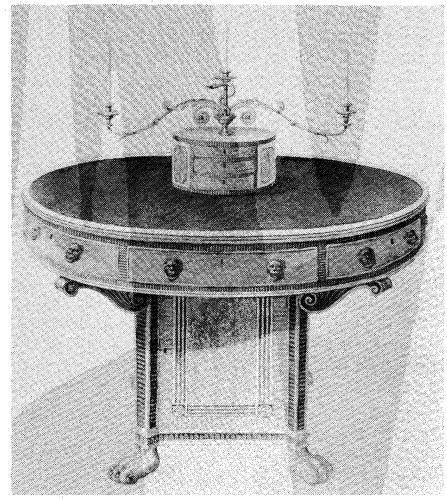
One of eight sons of Ḥasan Khān, a horse breeder, Farīd rebelled against his father and left home to enlist as a soldier in the service of Jamāl Khān, the governor of Jaunpur. He later worked for the Mughal king of Bihār, who rewarded him for bravery with the title of Shēr Khān. After he defeated a Bengal army, he took over the rule of Bihār. In early 1539 he conquered Bengal and, through clever deception, the Rohtās stronghold southwest of Bengal. At the Battle of Chausa on June 26, 1539, he defeated the Mughal emperor Humāyūn and assumed the royal title of Farīd-ud-Dīn Shēr Shāh. In May 1540 at Kannauj he again defeated Humāyūn and had driven his foes from Bengal, Bihār, Hindustān, and the Punjab and also suppressed the Baluch chiefs on the northwestern frontier. Intent on expanding the sultanate of Delhi, he captured Gwalior and Mālwa but was killed during the siege of Kālinjar.

One of the great Muslim rulers of India, Shēr Shāh rose from the rank of private to be emperor, efficiently administered the army and tax collections, and built roads, rest houses, and wells for his people. He was generally tolerant of non-Muslims, except in his massacre of Hindus after the surrender of Raisen. His tomb at Sasarām is one of the most magnificent in India.

sherardizing, means of forming a uniform, corrosion-resistant coating of zinc on the surface of iron or steel objects. The process, practiced since about 1900, is named for its English inventor Sherard O. Cowper-Coles. The object is heated in a sealed container with finely divided zinc to a temperature below the point at which zinc melts. The two metals amalgamate, forming alloys of zinc and iron and an external layer of pure zinc in an adherent coating that resists corrosion and also makes an excellent base for paint. *Compare* galvanizing.

Sheraton, Thomas (b. 1751, Stockton-on-Tees, Durham, Eng.—d. Oct. 22, 1806, Soho, London), English cabinetmaker and one of the leading exponents of Neoclassicism who gave his name to a style of furniture characterized by a firm feminine refinement of late Georgian and who became probably the most powerful source of inspiration behind the furniture of the late 18th century. His four-part *Cabinet-Maker and Upholsterers' Drawing Book* greatly influenced English and American design.

Sheraton apparently was apprenticed to a cabinetmaker, being also an inventor, artist, mystic, and religious controversialist. He was first known as a writer on theological subjects, describing himself as a "mechanic, one who never had the advantage of collegiate or academical education." He settled in London *c.* 1790, and his trade card gave his address as Wardour Street, Soho, where he "teaches perspective, architecture and ornaments, makes designs for cabinet-makers, sells all kinds of drawing-books."



Design for a library table by Thomas Sheraton, engraving from his book, *The Cabinet-Maker, Upholsterer and General Artist's Encyclopaedia* (1805)
By courtesy of the Victoria and Albert Museum, London, Crown copyright reserved

Supporting himself mainly as an author, Sheraton wrote *Drawing Book* (1791), the first part of which is devoted to somewhat naive, verbose dissertations on perspective, architecture, and geometry; the notes on the plates, however, are much more detailed than in any other comparable publication and reveal sound technical knowledge. The second part, on which his reputation is certainly based, is filled with plates that are admirable in draftsmanship and rarely at fault in form or proportion.

In 1803 Sheraton, who had been ordained a Baptist minister in 1800, published his *Cabinet Dictionary* (with plates), containing *An Explanation of All Terms Used in the Cabinet, Chair and Upholstery Branches with Dictionary for Varnishing, Polishing and Gilding.* Unfortunately, the selection of terms is arbitrary and eclectic, suggesting that he was increasingly more interested in the eccentric. Of his final project, the *Cabinet-Maker, Upholsterer and General Artist's Encyclopaedia,* only one volume, covering A to C, appeared in 1805. Some of the designs in this work, venturing well into the Regency style, are markedly unconventional. That he was a fashionable cabinetmaker is legendary, for he was poor, his home of necessity half shop. It cannot be presumed that he was the maker of those examples even closely resembling his plates. The *Drawing Book* was a trade catalog, the plates of which were reproduced throughout Britain with varying degrees of accuracy. Of his own manufacture, only one piece is known with certainty—a glass-front bookcase, stamped "T.S." inside one drawer.

Although Sheraton undoubtedly borrowed from other cabinetmakers, most of the plates in his early publications are supposedly his own designs. The eccentricity in his later works is as yet scarcely perceptible, but he was gifted with an innate sense of proportion and style. The term Sheraton has been recklessly bestowed upon vast quantities of late 18th-century painted and inlaid satinwood furniture, but, properly understood and used in a generic sense, Sheraton is an appropriate label recognizing a mastermind behind the period. The opinion that his lack of success was caused by his tart, angular, and self-assertive character is hypothetical.

At his best, Sheraton had a natural approach to contemporary design: he used wood for its own sake, rather than covering it with such disguises as gilt or modulating it excessively with ormolu mounts; he gave strength to his feminine Neoclassical interpretations; he painstakingly delineated form. At his worst, he proposed preposterous designs to be made by cabinetmakers; what earlier had been a firm yet precious handling of wood could later be as successfully executed in stone; and his discreet use of drapery bursts forth in later designs with overly lavish and affected, almost humorous, theatricality. His writing moved from something of a passive tone begging pardon for his lack of education (*A Scriptural Illustration of the Doctrine of Regeneration*) to an aggressive tone, revealing displeasure toward rivals, such as George Hepplewhite, or predecessors. His mind breaking, he managed to publish another tract, *Discourse on the Character of God as Love,* shortly before dying. Facsimile editions of Sheraton's *Cabinet-Maker and Upholsterers' Drawing Book* and *Cabinet Dictionary* were issued (1970) by Praeger Publications.

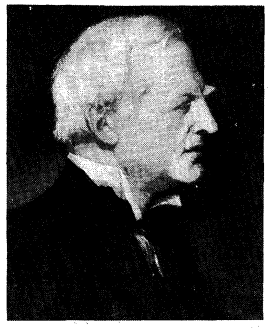
sherbet, frozen dessert usually flavoured with fruit, made from water, sugar, flavourings, and milk or cream. Egg white or gelatin may be added to ensure a fine texture. Sherbets may also be flavoured with wine or liqueurs. By U.S. federal regulation, sherbets must contain a minimum of 1 percent and a maximum of 2 percent butterfat. Water ice, called in French *sorbet* and in Italian *granita,* is similar to sherbet but contains no dairy ingredients.

The word sherbet derives from the Persian *sharbat,* an iced fruit drink; iced desserts were introduced to the West via the Middle East. Recently there has been a revival of the practice of serving a tart sherbet or *sorbet* between the courses of an elaborate meal to refresh the palate.

Sherbro Island, island in the Atlantic Ocean off the southwestern coast of Sierra Leone, West Africa, separated from the mainland by the Sherbro River (north) and the Sherbro Strait (east). It is 32 mi (51 km) long and up to 15 mi wide. The western extremity is Cape St. Ann; Bonthe, on the eastern end, is the chief port and commercial centre. Swamp-rice cultivation and fishing are the main economic activities. The site of an early-19th-century British post against the slave trade, it was acquired from the Sherbro people by the colony at Freetown in 1861 and is now administered as part of Sierra Leone's Southern Province. Pop. (1974) 18,991.

Sherbrooke, city, seat of Sherbrooke regional county (municipalité régionale de comté) and of Cantons-de-l'Est (Eastern Townships) region, southern Quebec province, Canada, at the confluence of the Magog and Saint-François rivers. It originated as a fur-trading post, about 75 mi (120 km) east of Montreal city and 30 mi north of the Vermont, U.S., boundary, and later served as a grist-milling centre for Loyalist farmers. In 1818 it was named after Sir John Sherbrooke, governor general of Canada. Sherbrooke has developed into an industrial, commercial, cultural, and administrative centre, as well as a regional transportation hub on several main highways and railway lines. The city has a hydroelectric plant; asbestos, copper, and limestone are found in the vicinity, and neighbouring woodlands provide birch, cedar, elm, and maple. Diversified manufactures include textiles, heavy machinery, pulp and paper, dairy products, rubber and leather goods, and clothing. The city is the seat of a Roman Catholic bishopric and the Université de Sherbrooke, a French-language Roman Catholic university chartered in 1954. Surrounded by numerous lakes and hilly terrain, Sherbrooke has also become a tourist centre. Inc. town, 1852; city, 1875. Pop. (1981) 74,075.

Sherbrooke (of Sherbrooke), Robert Lowe, Viscount (b. Dec. 4, 1811, Bingham, Nottinghamshire, Eng.—d. July 27, 1892, Warlingham, Surrey), British Liberal Party politician whose effective opposition to the



Sherbrooke, painting by G.F. Watts; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Liberals' electoral Reform Bill of 1866 made it possible for the Conservatives to sponsor and take credit for the Reform Act of 1867. Despite his leadership of the renegade Liberals known as the Adullamites, he served as chancellor of the Exchequer (1868–73) and home secretary (1873–74) in the first ministry of the Liberal prime minister William Ewart Gladstone.

After teaching at Oxford, Lowe was called to the bar (1842) and emigrated to Sydney, where he became prominent as a lawyer and as a member of the state legislative council (1843–50). He then returned to London, where he began writing editorials for *The Times* and sat in the House of Commons (1852–80). In the offices of joint secretary of the Board of Control for India (1852–55), vice president of the Board of Trade (1855–58), and vice president of the Committee of Council for Education (1859–64), he helped to establish competitive entry to the Indian civil service; secured statutory recognition of the principle of limited liability for investors in joint-stock companies (1856–57); and introduced the payment by results system of grants to schools contingent on the success of pupils in national examinations (1862; abolished 1904).

Disbelieving in democracy, Lowe thought that suffrage should depend on informed intelligence—in practice, on educational attainments. His defeat of the Reform Bill of 1866 caused the fall of Lord Russell's Liberal government. The Reform Act of 1867, which Lowe also opposed, was drafted by Benjamin Disraeli (afterward 1st earl of Beaconsfield and twice prime minister), at that time chancellor of the exchequer in Lord Derby's Conservative government. While serving under Gladstone, Lowe capably administered the Treasury and supported the Prime Minister's reforms, but his abilities were offset by his lack of tact. He was created viscount in 1880. (He had no children by either of his two marriages, and the viscountcy became extinct upon his death.)

Sherente, also spelled XERENTE, Brazilian Indian group speaking Sherente, a Macro-Ge language. The Sherente live in central Goias state, on a hilly upland plateau broken up by strips of forest that trace the courses of the rivers flowing through the region. They numbered about 500 in the mid-1970s.

The Sherente and the closely related Shavante (*q.v.*) at one time lived as neighbours along the Tocantins River in Goias state; the earliest travellers through the area failed to distinguish the two groups, ethnically or linguistically. By the 1840s, however, newcomers settling along the Tocantins River had pushed the Sherente and Shavante away from the river; the Sherente moved northeast, to their present home between the Tocantins River and the Rio do Sono.

The Sherente, unlike the Shavante, interacted with the missionaries and other early settlers; some learned Portuguese, some became Christians, and most became knowlegeable about mainstream Brazilian culture. In the second half of the 20th century, the Sherente were an "integrated" group, participating so fully in the Brazilian society and economy that they are no longer considered to have a distinct tribal identity.

Sheridan, city, seat (1888) of Sheridan County, northern Wyoming, U.S., at the confluence of Big Goose and Little Goose creeks, on the east slope of the Bighorn Mountains near the Montana border. It was founded in 1882 and named for Gen. Philip H. Sheridan, Union cavalry leader during the Civil War. Not until a series of wars subdued the Cheyenne, Sioux, and Crow, was the area well settled. The arrival of the railroad (1892) and the discovery of coal stimulated its growth. A railroad division point, the city has acquired some diversified manufacturing. Ranching, truck farming, flourmilling, sawmilling, and oil and coal mining are local occupations. Sheridan College was established in 1948. The city is headquarters of the Bighorn National Forest, and tourism (dude ranches, big game hunting, and fishing) is an economic asset. A rodeo is held in July and the All American Indian Days celebration in August. Inc. 1884. Pop. (1980) 15,146.

Sheridan, Philip H(enry) (b. March 6, 1831, Albany, N.Y., U.S.?—d. Aug. 5, 1888, Nonquitt, Mass.), highly successful U.S. cavalry officer whose driving military leadership in the last year of the American Civil War was instrumental in defeating the Confederate Army.

A graduate of the U.S. Military Academy at West Point, N.Y. (1853), Sheridan served



Philip H. Sheridan

By courtesy of the Library of Congress, Washington, D.C.

mostly at frontier posts until the spring of 1862, when he was appointed colonel of the 2nd Michigan Cavalry. In July he skillfully split his outnumbered command to rout a large Confederate force at Booneville, Miss. Made a brigadier general, he led the 11th Division, Army of the Ohio, at Perryville, Ky., in October, as it held its position against repeated attacks. At the Battle of Stones River, or Murfreesboro, Tenn. (December 1862–January 1863), he was made a major general of volunteers for his unyielding defense of the Federal right centre.

Sheridan was unable to prevent defeat at the Battle of Chickamauga, Ga. (September 1863), but his assault on Missionary Ridge below Chattanooga, Tenn., two months later, brought his fighting in the West to a brilliant close. This victory so impressed Gen. Ulysses

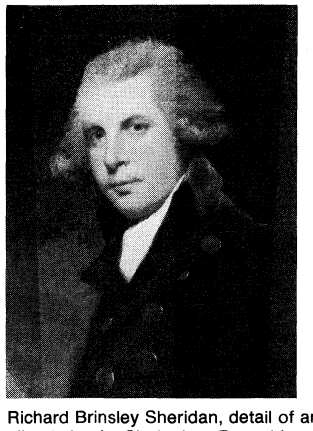
S. Grant that Sheridan was called East in the spring of 1864 to head the cavalry of the Army of the Potomac. Following action in the Battle of the Wilderness (May 1864), he led a raid toward Richmond, Va., that destroyed considerable Confederate supplies and rolling stock and resulted in the death of the South's great cavalry leader, Gen. J.E.B. ("Jeb") Stuart.

On August 4 Sheridan was given command of the Army of the Shenandoah and charged with forcing the Confederates from that rich valley and destroying the means of subsistence that had sustained their defense of the Southern capital for more than three years. In the Third Battle of Winchester, Va. (September), he drove Gen. Jubal A. Early out of Winchester, and, after two further victories during the next few weeks, he was made a major general and received the thanks of Congress.

Having completed his mission in the Shenandoah Valley, Sheridan rejoined his cavalry before Petersburg in March 1865. With the 5th Corps Infantry added to his command, he circled south and west of the city to cut the Confederate general Robert E. Lee's rail communications. At the end of the month, he twice broke into the Confederate right and rear, forcing Lee to retire westward from his Richmond–Petersburg lines. Sheridan continued his pressure against Lee's southern flank and at the end helped close off his escape near Appomattox.

After the war, Sheridan reported to the Gulf of Mexico, where his presence along the Texas border hastened the fall of Maximilian, the French puppet emperor in Mexico, in 1867. He was later named military commander of Louisiana and Texas (1867), but his harsh administration of Reconstruction measures led to his removal soon thereafter by Pres. Andrew Johnson. He spent the remaining years until 1883 in Western command. He planned and conducted a successful Indian campaign (1868–69), after which he was promoted to lieutenant general. He became general in chief of the army in 1883 and five years later was commissioned as general of the army of the United States. He spent his last months writing his memoirs. A standard biography is Richard O'Connor's *Sheridan, the Inevitable* (1953).

Sheridan, Richard Brinsley (Butler) (baptized Nov. 4, 1751, Dublin—d. July 7, 1816, London), Irish-born playwright, impresario, orator, and Whig politician, noted as a link in the history of the comedy of manners between



Richard Brinsley Sheridan, detail of an oil painting by Sir Joshua Reynolds, 1788–89; in the Lord Plunket Collection

By courtesy of the Lord Plunket

the end of the 17th century and Oscar Wilde in the 19th century, notably in *The School for Scandal* (1777).

Formative years. Sheridan was the third son of Thomas and Frances Sheridan. His grandfather Thomas Sheridan had been a companion and confidant of Jonathan Swift; his father was the author of a pronouncing dictionary and the advocate of a scheme of public education that gave a prominent place to elocution; and his mother gained some fame as a playwright.

The family later moved to London, and Sheridan never returned to Ireland. He was educated (1762–68) at Harrow, and in 1770 he moved with his family to Bath. While there he corresponded with a school friend then at Oxford, and together they wrote a farce that was at one time called *Ixion,* and at another *Jupiter.* They also collaborated (1771) in a metrical version of the epistles of the fifth-century writer Aristaenetus who compiled two books of love stories taken from Plato, Lucian, and Plutarch. Sheridan's poems *The Ridotto of Bath* and "Clio's Protest" also date from this period.

In Bath Sheridan fell in love with Elizabeth Ann Linley (1754–92), whose fine soprano voice had, from an early age, delighted audiences at the concerts and festivals conducted by her father, Thomas. In order to avoid the unpleasant attentions of a Welsh squire, Thomas Mathews of Llandaff, she decided to take refuge in a French nunnery. Sheridan accompanied her to Lille in March 1772, but returned to fight two duels that same year with Mathews, in London in May, where he disarmed Mathews, and at Bath in July, where he was bodily wounded. Meanwhile, Elizabeth had returned home with her father, and Sheridan was ordered by his father to Waltham Abbey, Essex, to pursue his studies. He was entered at the Middle Temple in April 1773 but after a week broke with his father, gave up a legal career, and married Elizabeth at Marylebone Church, London.

Theatrical career. After his marriage Sheridan turned to the theatre for a livelihood. His comedy *The Rivals* opened at Covent Garden Theatre, London, in January 1775. It ran an hour longer than was usual, and, because of the offensive nature and poor acting of the character of Sir Lucius O'Trigger, it was hardly a success. Drastically revised and with a new actor as Sir Lucius, its second performance 11 days later won immediate applause. The situations and characters were not entirely new, but Sheridan gave them freshness by his rich wit, and the whole play reveals Sheridan's remarkable sense of theatrical effect. Characteristic is the genial mockery of affectation displayed by some of the characters. Even the malapropisms that slow down the play give a proper sense of caricature to the character of Mrs. Malaprop.

Some of the play's success was due to the acting of Lawrence Clinch as Sir Lucius. Sheridan showed his gratitude by writing the amusing little farce *St. Patrick's Day; Or, The Scheming Lieutenant* for the benefit performance given for Clinch in May 1775. Another example of his ability to weave an interesting plot from well-worn materials is seen in *The Duenna,* produced the following November. The characters are generally undeveloped, but the intrigue of the plot and charming lyrics and the music by his father-in-law, Thomas Linley, and his son gave this ballad opera great popularity. Its 75 performances exceeded the 62, a record for that time, credited to John Gay's *The Beggar's Opera* (1728), and it is still revived.

Thus, in less than a year Sheridan had brought himself to the forefront of contemporary dramatists. David Garrick, looking for someone to succeed him as manager and proprietor of Drury Lane Theatre, saw in Sheridan a young man with energy, shrewdness, and a real sense of theatre. A successful physician, James Ford, agreed with Garrick's estimate and increased his investment in the playhouse. In 1776, Sheridan and Linley became partners with Ford in a half-share of Drury Lane Theatre. Two years later they bought the other half from Willoughby Lacy, Garrick's partner. Sheridan had put only £1,300 into the enterprise; the transaction had been possible only because Garrick and Ford had backed him with mortgages in the belief that Drury Lane would flourish under his direction.

In fact, Sheridan's interest in his theatre soon began to seem rather fitful. Nevertheless, he was responsible for the renewed appreciation of Restoration comedy that followed the revival of the plays of William Congreve at Drury Lane. In February 1777 he brought out his version of Vanbrugh's *The Relapse* (1696) as *A Trip to Scarborough,* again showing his talent for revision. He gave the rambling plot a neater shape and removed much indelicacy from the dialogue, but the result was disappointing, probably because of the loss of much of the play's former gusto.

What Sheridan learned from the Restoration dramatists can be seen in *The School for Scandal,* produced at Drury Lane in May 1777. That play earned him the title of "the modern Congreve." Although resembling Congreve in that its satirical wit is so brilliant and so general that it does not always distinguish one character from another, *The School for Scandal* does contain two subtle portraits in Joseph Surface and Lady Teazle. There were several Restoration models (*e.g.,* Mrs. Pinchwife in Wycherley's *The Country-Wife* and Miss Hoyden in Vanbrugh's *The Relapse*) for the portrayal of a country girl amazed and delighted by the sexual freedom of high society. Sheridan softened his Lady Teazle, however, to suit the more refined taste of his day. The part combined innocence and sophistication and was incomparably acted. The other parts were written with equal care to suit the members of the company, and the whole work was a triumph of intelligence and imaginative calculation. With its spirited ridicule of affectation and pretentiousness, it is often considered the greatest comedy of manners in English.

Sheridan's flair for stage effect, exquisitely demonstrated in scenes in *The School for Scandal,* was again demonstrated in his delightful satire on stage conventions, *The Critic,* which since its first performance in October 1779 has been thought much funnier than its model, *The Rehearsal* (1671), by George Villiers, the 2nd duke of Buckingham. Sheridan himself considered the first act to be his finest piece of writing. Although Puff is little more than a type, Sir Fretful Plagiary is not only a caricature of the dramatist Richard Cumberland but an epitome of the vanity of authors in every age.

Political career. Sheridan continued to adapt plays and to improvise spectacular shows at Drury Lane, but as a succession of acting managers took over the burden of direction his time was increasingly given to politics. His only full-length later play was the artistically worthless but popular patriotic melodrama *Pizarro* (1799), based on a German play on the conquest of Peru. Sheridan had become member of Parliament for Stafford in September 1780 and was undersecretary for foreign affairs (1782) and secretary to the treasury (1783). Later he was treasurer of the navy (1806–07) and a privy councillor. The rest of his 32 years in Parliament were spent as a member of the minority Whig party in opposition to the governing Tories. His critical acumen and command over language had full scope in his oratory and were seen at their best in his speeches as manager of the unsuccessful impeachment of Warren Hastings, governor general of India.

He was recognized as one of the most persuasive orators of his time but never achieved greater political influence in Parliament because he was thought to be an unreliable

intriguer. Some support for this view is to be found in his behaviour during the regency crisis (1788–89) following the temporary insanity of George III, when Sheridan acted as adviser to the unpopular, self-indulgent prince of Wales (later George IV). He encouraged the prince to think that there would be a great majority for his being regent with all the royal powers simply because he was heir apparent. In the country at large this was seen as a move by Charles James Fox and his friends to take over the government and drive out Prime Minister William Pitt. Sheridan was also distrusted because of his part in the Whigs' internecine squabbles (1791–93) with Edmund Burke over the latter's implacable hostility to the French Revolution. He was one of the few members courageous enough openly to defend those who suffered for their support of the French Revolution. Indeed, Sheridan liked taking an individual stand, and, although he supported Fox in urging that the French had a right to choose their own way of government, he broke with Fox once the French became warlike and threatened the security of England. He also came out on the side of the Tory administration when he condemned mutineers who had rebelled against living conditions in the British Navy (1797). Much to Fox's disgust, Sheridan, although a Whig, gave some support to the Tory administration of Prime Minister Henry Addington, later 1st Viscount Sidmouth (1801–04).

In November 1806, Sheridan succeeded Fox as member for Westminster—although not, as he had hoped, as leader of the Whigs—but he lost the seat in May 1807. The prince of Wales then returned him as member for the "pocket borough" of Ilchester, but his dependence on the prince's favour rankled with Sheridan, for they differed in their attitude on Catholic emancipation. Sheridan, who was determined to support emancipation, stood for election as member from Stafford again in 1812, but he could not pay those who had previously supported him as much as they expected and, as a result, was defeated.

Last years. Sheridan's financial difficulties were largely brought about by his own extravagance and procrastination, as well as by the destruction of Drury Lane Theatre by fire in February 1809. With the loss of his parliamentary seat and his income from the theatre, he became a prey to his many creditors. His last years were beset by these and other worries—his circulatory complaints and the cancer that afflicted his second wife, Esther Jane Ogle. She was the daughter of the dean of Winchester, whom he had married in April 1795, three years after Elizabeth's death. Pestered by bailiffs to the end, he made a strong impression on the poet Lord Byron, who wrote a *Monody on the Death of the Right Honourable R.B. Sheridan* (1816), to be spoken at the rebuilt Drury Lane Theatre. (C.J.L.P.)

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Biography and criticism. Thomas Moore, *Memoirs of the Life of the Right Honourable Richard Brinsley Sheridan,* 5th ed., 2 vol. (1827, reprinted 1971), is indispensable. William Smyth, *A Memoir of Mr. Sheridan* (1840), is a brief but vivid account from personal acquaintance. W. Fraser Rae, *Sheridan,* 2 vol. (1896); and W. Sichel, *Sheridan,* 2 vol. (1909), are full accounts, printing much new material, but are not altogether reliable. R.C. Rhodes, *Harlequin Sheridan* (1933, reprinted 1969), provides a scholarly review of evidence about disputed passages in Sheridan's life; Lewis Gibbs, *Sheridan* (1947, reprinted 1970), gives a useful summary of accepted material. *The Letters of Richard Brinsley Sheridan,* ed. by C.J.L. Price, 3 vol. (1966), are mainly concerned with his life in politics and the theatre, but they also include some delightful ones to his second wife. Mark S. Auburn, *Sheridan's Comedies: Their Contexts and Achievements* (1978), analyzes the plays closely and discusses their writing and production.

Sheridan, Thomas (b. 1719, Dublin—d. Aug. 14, 1788, Margate, Kent, Eng.), Irish-born actor and theatrical manager and father of the dramatist Richard Brinsley Sheridan.

While an undergraduate at Trinity College, Dublin, Sheridan wrote a farce, *The Brave Irishman, or Captain O'Blunder,* and after a successful appearance as Richard III at the Smock Alley Theatre, Dublin, in 1743, determined on an acting career. His first London appearance came in 1744 at Covent Garden, where he played a number of leading roles, including Hamlet. In 1747 he became manager of the Smock Alley Theatre in Dublin and married Frances Chamberlaine, a novelist. As an actor, he was described as having conceptions superior to his powers of execution but occasionally rising to greatness. Through Sheridan's efforts, Samuel Johnson was given a pension. John Stuart, Lord Bute, was impressed with Sheridan's scheme for a pronouncing dictionary and granted him a pension of £200 a year. In 1764 Sheridan took his family to France, returning after his wife's death in 1766. He published *A Plan of Education for the Young Nobility and Gentry* (1769) and *A general dictionary of the English language* (1780). He also assisted in the management of Drury Lane Theatre.

sheriff, a senior executive officer in an English county or smaller area who performs a variety of administrative and judicial functions. Officers of this name also exist in Wales, Scotland, Northern Ireland, and the United States.

In England the office of sheriff existed before the Norman Conquest (1066). The separation of the ecclesiastical from the secular courts under William I the Conqueror left the sheriff supreme in the county and as president of its court. He convened and led military forces of the shire, executed all writs, and, for the first century after the Conquest, judged both criminal and civil cases. From the time of Henry II (reigned 1154–89), however, his jurisdiction was severely restricted as a result of the growing jurisdiction of the curia regis ("king's court"). His duty thereafter was to investigate allegations of crime from within his shire, to conduct a preliminary examination of the accused, to try lesser offenses, and to detain those accused of major crimes for the itinerant justices.

The new offices of coroner (first mentioned in 1194), of local constable (first mentioned in 1242), and of justices of the peace (first known in the 12th century as *custodes pacis,* "keepers of the peace") all took work and duties from the sheriffs. After the Tudor reorganization of local government in the 15th and 16th centuries, the office was largely ceremonial. English law was consolidated in the Sheriffs Act of 1877, however, under which sheriffs in all parts of England were assigned a unified set of duties. Sheriffs now attend on the judges at assizes and at election petitions and are responsible for the execution of writs; they prepare the panel of jurors for assizes, are liable for the safe custody of prisoners, and act as returning officer at parliamentary elections. Until the Murder (Abolition of Death Penalty) Act of 1965, the sheriffs were also responsible for the execution of sentences of death.

In Scotland the sheriff, as a ministerial and judicial officer, appears in records from the 12th century, and, despite the later introduction of the office of justice of the peace, the sheriff has retained considerable powers. Sheriffs principal and sheriffs for the six sheriffdoms are appointed and removed by the crown on recommendation of the secretary of state for Scotland. The original jurisdiction of the Sheriff Court is exercised largely by sheriffs. In certain civil matters, appeal lies to the sheriff principal and through him to the Court of Session. The civil jurisdiction of the Sheriff Court extends to nearly all actions. Only grave crimes are excepted from the criminal jurisdiction of the Sheriff Court, these being tried by the High Court of Justiciary.

In Northern Ireland the sheriff and salaried undersheriff for a county are appointed by the governor. Their duties, similar to those in England, are set in the Sheriffs (Ireland) Act of 1920.

In the United States, the sheriff is ordinarily an elected public officer in his county, the chief executive officer, and an officer of the court, with a term usually of from two to four years. The deputy is appointed by the sheriff and is delegated duties. The sheriff and deputy are peace officers and thus have the power of police officers in the enforcement of criminal law. They may also assume some of the functions of the local police department and are empowered to call out the *posse comitatus* ("the force of the county," a summoning of private citizens to assist in maintaining peace). The sheriff's main judicial duties are the service and return of process and the execution of writs, particularly judgments by sale or distress. Although the sheriff is usually a salaried official, he is sometimes paid from fees, which, in populous counties, can be lucrative.

Sherlock Holmes (fictional character): *see* Holmes, Sherlock.

Sherman, city, seat (1846) of Grayson County, northern Texas, U.S., on a watershed split between the Red and Trinity rivers, near Lake Texoma and Denison. Founded in the 1840s, it was named for General Sidney Sherman, a cavalry officer during the Texas Revolution. On the Butterfield Trail, it became a rendezvous for cattle drovers, buffalo hunters, and farmers. The railroads arrived in the 1870s. In 1876 Austin College (Presbyterian, founded 1849) was moved there from Huntsville. Agricultural industries (cotton ginning, cottonseed-oil milling, gin-machinery manufacture, and flour milling) developed. Local oil and gas deposits were tapped in the 1930s. Since World War II there has been considerable industrial development, including the manufacture of electronic and office equipment, truck bodies, surgical supplies, and aluminum, steel, and wire products. Grayson County College (1965) is nearby. Inc. town, 1858; city, 1895. Pop. (1984 est.) city, 31,217; (1985 est.) Sherman–Denison metropolitan area (MSA), 96,700.

Sherman, James (Schoolcraft) (b. Oct. 24, 1855, Utica, N.Y., U.S.—d. Oct. 30, 1912, Utica), U.S. congressman from New York (1887–91; 1893–1909) and vice president of the United States (1909–12), under the administration of President William Howard Taft.

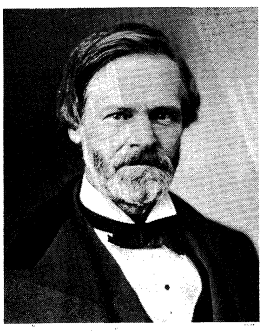
Admitted to the New York bar in 1880, Sherman practiced law in Utica and was active in Republican Party affairs. In 1884 he

was elected mayor of Utica, N.Y. Sherman served 10 terms in the U.S. House of Representatives between 1887 and 1909, rising to the post of chairman of the House Committee on Indian Affairs. He gained a reputation as a deft parliamentarian and loyal Republican; his affability earned him the nickname "Smiling Jim."

In 1908 Sherman was elected vice president on the Republican ticket with Taft. Nominated for reelection with Taft in 1912, Sherman, suffering from Bright's Disease, was unable to campaign. He died less than a week before election day and thus did not live to see the party's loss to Woodrow Wilson.

Sherman, John (b. May 10, 1823, Lancaster, Ohio, U.S.—d. Oct. 22, 1900, Washington, D.C.), U.S. statesman, financial administrator, and author of major legislation concerning currency and regulation of commerce.

A younger brother of Gen. William Tecumseh Sherman, he practiced law in Ohio before



John Sherman

By courtesy of the Library of Congress, Washington, D.C.

entering politics. He served in the U.S. House of Representatives (1855–61), and in the U.S. Senate (1861–77, 1881–97), and was secretary of the treasury under Pres. Rutherford B. Hayes (1877–81).

Early in his congressional career Sherman gained a reputation as a fiscal expert. He was chairman of the House Ways and Means Committee (1859–61) and of the Senate Finance Committee (1867–77). He consistently preferred conservative financial policies but was often forced to balance his own convictions with the preferences of his constituents, many of whom favoured inflationary measures. He had a leading role in the establishment of the national banking system (1863), in the enactment of the bill (1873) that discontinued the coinage of silver dollars (denounced by critics as the "the crime of '73") and of the Specie Payment Resumption Act (1875), which provided for the redemption of Civil War greenbacks in gold. It was thus largely through his efforts that the United States returned to the gold standard. During the administration of Pres. Benjamin Harrison, the Antitrust Act of 1890 and the Silver Purchase Act of the same year bore his name, but both represented compromises that had only his qualified approval.

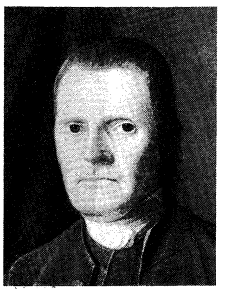
Sherman's name was presented as a presidential consideration to three Republican national conventions (1880, 1884, and 1888). His lack of popular appeal, however, and his middle-of-the-road course on monetary policies, which suited neither the inflationist West nor the conservative East, prevented his winning the nomination.

In 1897 Pres. William McKinley appointed Sherman secretary of state, but partly for reasons of health and partly for reasons of principle, he resigned on April 25, 1898, the day Congress declared war against Spain.

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Sherman, Roger (b. April 19, 1721, Newton, Mass.—d. July 23, 1793, New Haven, Conn., U.S.), U.S. politician whose plan for representation of large and small states prevented a deadlock at the U.S. Constitutional Convention of 1787.

Active in both trade and law, Sherman held numerous public offices, including several terms in the Connecticut legislature between



Roger Sherman, detail of an oil painting by Ralph Earl; in the Yale University Art Gallery

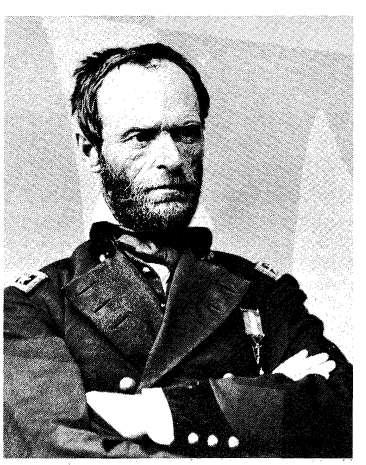
By courtesy of the Yale University Art Gallery, gift of Roger Sherman White, B.A., 1899

1755 and 1766, judge of the superior court (1766–85), and mayor of New Haven (1784–93). Although a staunch conservative, he was an early supporter of U.S. independence from Britain. As a delegate to the Second Continental Congress at Philadelphia, he signed the Declaration of Independence (1776) and helped draft the Articles of Confederation.

Sherman's greatest service was rendered at the Constitutional Convention called to remedy the deficiencies of the Articles. A critical difference appeared between the states advocating congressional representation on the basis of population and those desiring equal representation regardless of size. Sherman promoted what came to be known as the Connecticut (or Great) Compromise, providing for a bicameral legislature using a dual system of representation. His plan helped save the convention from disintegrating and established the basis of the present system of federal government.

Sherman served in Congress under the new Constitution, first as a representative (1789–91) and then as a senator (1791–93), supporting Alexander Hamilton's program for assumption of state debts, establishment of a national bank, and enactment of a tariff.

Sherman, William Tecumseh (b. Feb. 8, 1820, Lancaster, Ohio, U.S.—d. Feb. 14, 1891, New York City), American Civil War general and a major architect of modern warfare, who led the Union forces in the crushing campaigns through the South, marching through Georgia and the Carolinas (1864–65). He is often quoted as author of the saying, "War is hell."



William Tecumseh Sherman

By courtesy of the Library of Congress, Washington, D.C.

Early life and career. Named Tecumseh in honour of the renowned Shawnee chieftain, Sherman was one of eight children of Judge Charles R. Sherman, who died when the boy "Cump" was only nine. Thomas Ewing, a warm family friend and a Whig political force in Ohio, adopted Cump as "the brightest of the lot." His foster mother, a devout Catholic who feared that no priest would baptize a child with a heathen name, added William to the boy's name. When Sherman was 16, Ewing obtained an appointment to West Point for his adopted son, whom Eastern relatives saw as "an untamed animal just caught in the Far West." Cadet Sherman excelled in engineering, geology, rhetoric, and philosophy. He also did well in collecting demerits.

After graduation Sherman was sent to fight Seminole Indians in Florida; he encountered no Indians but was delighted with the young ladies of St. Augustine. Transferred to Ft. Moultrie, South Carolina, within easy reach of Charleston, he enjoyed four years of "horseracing, picnicking, boating, fishing, swimming, and God knows what not." He also thought of becoming an artist.

The Mexican War, in which so many generals of the Civil War received their experience, passed Sherman by. He was stranded in California as an administrative officer. In 1850 Sherman married Ellen Ewing, daughter of his adoptive father, who was then serving as secretary of the interior in Washington. They settled in St. Louis, Mo.

He was bored by his commissary duties of purchasing cattle in Kansas and Missouri. The lure of gold in California led him to resign from the army on Sept. 6, 1853, and join the St. Louis banking firm of Lucas, Turner and Co. as its representative in San Francisco. In the collapse of the gold rush, he had accumulated a debt of $13,000; he thereupon declared himself "the Jonah of banking." Other disappointments followed. As a self-taught lawyer his legal career came to an end in Leavenworth, Kan., with his first case—proving anew, as he declared, that he had become "a dead cock in a pit." The army would not reinstate him.

Old friends, Southerners Braxton Bragg and P.G.T. Beauregard, found Sherman employment as superintendent of the Louisiana State Seminary of Learning and Military Academy (now part of Louisiana State University). He loved being a schoolmaster, but with Louisiana's secession from the Union he returned north and became president of the Fifth Street Railroad in St. Louis. The war, he told one of his daughters, demonstrated that "men are blind and crazy." He distrusted Pres. Abraham Lincoln yet used the influence of his younger brother, Sen. John Sherman, to obtain appointment in the U.S. Army as a colonel in May 1861.

Civil War years. Raised to a generalship after the first Battle of Bull Run (July 21, 1861), Sherman begged Lincoln not to trust him in an independent command. Nevertheless, he was placed in charge of troops in Kentucky until his hallucinations concerning the Confederate force opposing him caused him to ask for so many reinforcements that he was publicly called insane. He then served as a commander under generals Henry Halleck and U.S. Grant.

Grant had a calming influence upon Sherman. Together they fought brilliantly to capture Vicksburg, Miss. (1862–63), shattering the Confederate defenses and opening the Mississippi River to Northern commerce once more. When, in 1864, Grant went east to fight Confederate general Robert E. Lee, Sherman led three armies in the invasion of Georgia that

brought the fall of Atlanta. Both Grant and Lincoln doubted the wisdom of Sherman's celebrated "March to the Sea" from Atlanta to Savannah with 60,000 men. But a cocky Sherman reached the Atlantic coast in time to offer President Lincoln the city of Savannah for a Christmas present. Grant plunged into the Wilderness to trap Lee in Virginia; Sherman marched north through the Carolinas; and the war entered its climactic phases.

Sherman declined all opportunities to run for political office, saying he would not run if nominated and would not serve if elected. When Grant became president in 1869, he made Sherman commanding general of the army, a post he held until 1884. Sherman remained a soldier until the end, though he expressed his view of warfare in the phrase, "War is hell." His friends accused him of keeping a carpetbag packed so that he could leave at an instant's notice upon invitation to address an audience. He died in New York City in 1891. (E.S.Mi.)

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Articles are alphabetized word by word, not letter by letter

Sherman Antitrust Act, first legislation enacted by the United States Congress (1890) to curb concentrations of power that interfere with trade and reduce competition. One of its main provisions outlaws all combinations that restrain trade between states or with foreign nations. This prohibition applies not only to formal cartels but also to any agreement to fix prices, limit industrial output, share markets, or exclude competition. A second key provision makes illegal all attempts to monopolize any part of trade or commerce in the United States. These two provisions, which comprise the heart of the Sherman Act, are enforceable by the Department of Justice through litigation in the federal courts. Firms found in violation of the act can be ordered dissolved by the courts, and injunctions to prohibit illegal practices can be issued. Violations are punishable by fines and imprisonment. Moreover, private parties injured by violations are permitted to sue for triple the amount of damages done them.

For more than a decade after its passage, the Sherman Act was invoked only rarely against industrial monopolies, and then not successfully, chiefly because of narrow judicial interpretations of what constitutes trade or commerce among states. Its only effective use was against trade unions, which were held by the courts to be illegal combinations. The first vigorous enforcement of the Sherman Act occurred during the administration of Pres. Theodore Roosevelt (1901–09). In 1914 Congress passed two legislative measures that provided support for the Sherman Act. One of these was the Clayton Antitrust Act (*q.v.*), which elaborated on the general provisions of the Sherman Act and specified many illegal practices that either contributed to or resulted from monopolization. The other measure created the Federal Trade Commission, providing the government with an agency that had the power to investigate possible violations of antitrust legislation and issue orders forbidding unfair competition practices.

In 1920, however, the Supreme Court applied the so-called "rule of reason" interpretation of the Sherman Act, which explains that not every contract or combination restraining trade is unlawful. Only "unreasonable" restraint of trade through acquisitions, mergers, and predatory pricing constitute a violation of the Sherman Act. This interpretation was, in effect, an application of the criterion of conduct as opposed to that of structure, and it allowed large firms considerably more latitude. But in a case involving Aluminum Company of America (1945), the court reversed its stance, declaring that the size and structure of a corporation were sufficient grounds for antitrust action. Since that ruling, the prohibition against monopoly has been periodically enforced, involving in some cases the dismemberment of the offending firm. Enforcement of the Sherman Act also has discouraged substantially the use of exclusionary tactics to eliminate competition.

Sherpa, mountain-dwelling people of Nepal and Sikkim state, India, related to the Bhutia. They are of Tibetan culture and descent, and speak a Tibetan dialect. They number about 80,000 and have won fame as porters in the high Himalayas; a Sherpa mountaineer, Tenzing Norgay, and Sir Edmund Hillary were the first men to reach the summit of Mt. Everest (1953). Sherpa traders cross the mountain passes to Tibet carrying rice, which they exchange for salt. Along with farming and cattle breeding, they make a livelihood from the spinning and weaving of wool.

Sherriff, R(obert) C(edric) (b. June 6, 1896, Hampton Wick, Surrey, Eng.—d. Nov. 13, 1975, London), English playwright and screenwriter, remembered for his *Journey's End,* a World War I play that won wide critical acclaim.

After attending grammar school at Kingston on Thames, Sherriff worked in his father's insurance business until he entered the army in World War I, serving as a captain in the East Surrey Regiment. After the war he worked for several years as a claims adjuster and began to write. He drew on his war experiences in the writing of *Journey's End* (1929). A moving account of life in a dugout on the Western Front in 1918, the play met with instant success in London and ran for 595 performances, later duplicating this success all over the world. A London revival in 1972 testified to its dramatic soundness. The rest of his plays suffered by comparison with his masterpiece, though *Home at Seven* (1950) is still sometimes performed.

Sherriff also wrote a number of successful film scripts, including *The Invisible Man* (1933), *Goodbye Mr. Chips* (1936), *Odd Man Out* (1945), and *The Dam Busters* (1955). His autobiography, *No Leading Lady,* was published in 1968.

Sherrington, Sir Charles Scott (b. Nov. 27, 1857, London—d. March 4, 1952, Eastbourne, Sussex, Eng.), English physiologist whose 50 years of experimentation laid the foundations for an understanding of integrated nervous function in higher animals and brought him (with Edgar Adrian) the Nobel Prize for Physiology or Medicine in 1932.

A student of Sir Michael Foster at Cambridge (1881–85) and of Rudolf Virchow and Robert Koch in Berlin (1886), Sherrington worked at the universities of London (1891–95), Liverpool (1895–1913), and Oxford (1913–35). He was knighted in 1922.

Working with cats, dogs, monkeys, and apes that had been deprived of their cerebral hemispheres, he found that reflexes must be regarded as integrated activities of the total organism, not as the result of the activities of isolated "reflex arcs," a notion that was currently accepted. The first major piece of evidence supporting "total integration" was his demonstration (1895–98) of the "reciprocal innervation" of muscles, also known as Sherrington's law: when one set of muscles is stimulated, muscles opposing the action of the first are simultaneously inhibited.

In his classic work, *The Integrative Action of the Nervous System* (1906), he distinguished three main groups of sense organs: exteroceptive, such as those that detect light, sound, odour, and tactile stimuli; interoceptive, exemplified by taste receptors; and proprioceptive, or those receptors that detect events occurring in the interior of the organism. He found—especially in his study of the maintenance of posture as a reflex activity—that the muscles' proprioceptors and their nerve trunks play an important role in reflex action, maintaining the animal's upright stance against the force of gravity, despite the removal of the cerebrum and the severing of the tactile sensory nerves of the skin.

His investigations of nearly every aspect of mammalian nervous function have influenced directly the development of brain surgery and the treatment of such nervous disorders as paralysis and atrophy. Sherrington also coined the terms neuron and synapse to mean the nerve cell and the point at which the nervous impulse is transmitted from one nerve cell to another, respectively. His books include *The Reflex Activity of the Spinal Cord* (1932).

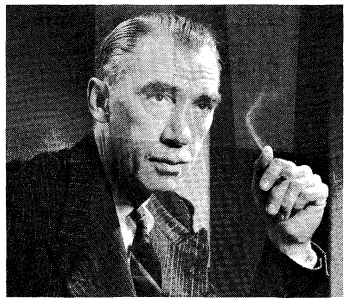
sherry, specifically, a fortified wine from the province of Jerez de la Frontera in Spain, "sherry" being an Anglicization of "Jerez"; also, any of several similar fortified wines made elsewhere.

A distinguished and venerable wine, sherry results from the soil and grapes of Jerez and a unique vinification. Essential is the action of *flor,* a mildewlike growth encouraged by a slight exposure to air after fermentation, which imparts the distinctive nutty flavour to sherry. Also unique is the *solera* system of blending wines of many vintage years, maturing the newer wines, and maintaining the historical continuity of a type. A *solera* consists of from three to eight tiers of barrels in which sherries of various ages are held, the oldest on the bottom. As wine is drawn off the lowest level for blending, the next oldest wine, directly above, is drawn down in its place; the second tier in turn is refilled with younger wines from above, and so on. A date on a sherry bottle or label refers to the year the *solera* for that sherry was begun. All sherry is fortified after fermentation with high-proof brandy, to about 16–18 percent alcohol, depending upon type.

As apéritifs, four main types are: Manzanilla, Fino, Amontillado, and Vino de Pasto. All are dry and pale, descending in order named to Vino de Pasto, sometimes characterized "not dry," and of a golden colour. Sweeter, heavier sherries are used as dessert wines; the usual types are Oloroso, Amoroso, and Golden, all somewhat dry; and Cream, Brown, and East Indian, all sweet and darker. Sherry-type wines are made in Cyprus, South Africa, Australia, and the United States. No satisfactory duplication of the Spanish process has been achieved, though recent use of *flor* and Palomino grapes in California has resulted in a few wines comparable to some good Spanish sherries.

Sherwood, Robert E(mmet) (b. April 4, 1896, New Rochelle, N.Y., U.S.—d. Nov. 14, 1955, New York City), U.S. playwright whose works reflect involvement in human problems, both social and political.

Sherwood was an indifferent student at Milton Academy and Harvard, failing the freshman rhetoric course while performing well and



Sherwood, photograph by Yousuf Karsh

© Karsh from Rapho/Photo Researchers—EB Inc.

happily on the *Lampoon*, the humour magazine, and with the Hasty Pudding club, producer of the annual college musical comedy. He left before graduation to enlist in 1917 in the Canadian Black Watch Battalion, served in France, was gassed, and was discharged in 1919. He was drama editor of *Vanity Fair* (1919–20) and with his colleagues Dorothy Parker and Robert Benchley found his way to the Algonquin Round Table, the centre of a New York literary coterie. Sherwood was associate editor (1920–24) and editor (1924–28) of the humour magazine *Life*. His first play, *The Road to Rome* (1927), criticizes the pointlessness of war, a recurring theme in many of his dramas. The heroes of *The Petrified Forest* (1935) and *Idiot's Delight* (1936) begin as detached cynics but recognize their own bankruptcy and sacrifice themselves for their fellowmen. In *Abe Lincoln in Illinois* (1939) and *There Shall Be No Night* (1941), in which his pacifist heroes decide to fight, Sherwood's thesis is that only by losing his life for others can a man make his own life significant. In 1938 Sherwood formed, with Maxwell Anderson, Sidney Howard, Elmer Rice, and S.N. Behrman, the Playwrights' Company, which became a major producing company.

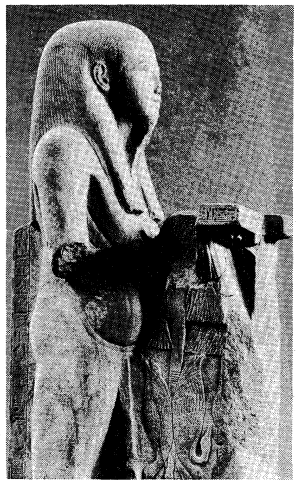
The Lincoln play led to Sherwood's introduction to Eleanor Roosevelt and ultimately to his working for President Franklin D. Roosevelt as speechwriter and adviser. Sherwood's speechwriting did much to make ghostwriting for public figures a respectable practice. Between service as special assistant to the secretary of war (1940) and to the secretary of the navy (1945), Sherwood served as director of the overseas branch of the Office of War Information (1941–44). From his wartime association with Roosevelt came much of the material for *Roosevelt and Hopkins: An Intimate History*. Except for his Academy Award-winning film *The Best Years of Our Lives* (1946), Sherwood's theatrical work after World War II was negligible.

Sherwood Forest, woodland and former royal hunting ground, county of Nottinghamshire, England, well known for its association with Robin Hood, the outlaw hero of medieval legend. Sherwood Forest formerly occupied almost all of western Nottinghamshire and extended into Derbyshire. Today a reduced area of woodland, mostly pine plantations, remains between Nottingham and Worksop. In the north the great ducal estates, or "dukeries," of Welbeck, Clumber, and Thoresby have preserved parts of the forest. Many veteran oaks remain, and there is much heath. Agricultural encroachment has been limited by the poor, sandy soil. An underlying coalfield has been extensively developed since the mid-19th century.

Sheshonk I, also spelled SHOSHENQ I, biblical SHISHAK I, (fl. 10th century BC), first king (reigned 945–924 BC) of the 22nd dynasty of Egypt.

Sheshonk came from a line of princes or sheikhs of Libyan tribal descent, whose title was "great chief of the Meshwesh" and who appear to have settled in Heracleopolis in Middle Egypt, although another tradition placed the line in Bubastis in the eastern Nile delta. Sheshonk probably ascended the throne without a struggle, making Bubastis his residence and marrying his son Osorkon to a daughter of Psusennes II, the last king of the previous dynasty.

According to the Old Testament, "Shishak king of Egypt came up against Jerusalem" (I



Sheshonk I, detail of a statue found at Karnak; in the British Museum

Reproduced by courtesy of the trustees of the British Museum

Kings 14:25–26) in about 930 BC in support of Jeroboam, the pretender who challenged the right of Solomon's son Rehoboam to succeed to the Israelite throne. Sheshonk's victories in Palestine were celebrated by reliefs and inscriptions at Karnak. Although the biblical account reported the looting of the palace and Temple, the name Jerusalem did not survive in the Egyptian record. A fragment bearing Sheshonk's name was found at Megiddo.

Shetland Islands, also called ZETLAND ISLANDS, or SHETLAND ISLES, group of about 100 islands (fewer than 20 of them inhabited) lying 130 miles (210 km) north of the Scottish mainland, administered as the Shetland Islands Area. Mainland, the largest island, contains Scalloway, a fishing port, and Lerwick, the seat of the islands area council, which carries out the responsibilities of both region and district authority.

North of Mainland lie the islands of Yell and Unst, the most northerly island. One mile off its coast is Muckle Flugga lighthouse, the most northerly point of Britain. Fair Isle, 24 miles (39 km) west of Mainland, belongs to the National Trust for Scotland and has an important ornithological observatory. The scenery of the Shetland Islands is wild and beautiful, having deeply indented, fjordlike coasts (the sea lochs are locally called voes) enclosed by steep hills. The winds are continuous and strong, and trees are therefore sparse, but the climate is very mild for such high latitudes (only 400 miles [640 km] south of the Arctic Circle) because of the warming influence of the North Atlantic Current, an extension of the Gulf Stream system.

The main form of agriculture is crofting, each croft having a few acres of arable land and the right to graze sheep on the "scattald," or common grazings. The Shetland breed of sheep produces fine wool that is spun and knitted by the island women in the distinctive patterns known as Shetland and Fair Isle. Many of the crofts cannot adequately support a family, so men seek work in the North Sea oil industry, abroad, or in the Royal Navy. Fishing has always been important, and crofters fish to supplement their diet or their income. The herring-fishing industry centred on Lerwick has declined since the mid-20th century; seine fishing for whitefish is now more important. Only after the discovery of oil in the Brent and Ninian fields of the North Sea, northeast of Shetland, was the long-persisting depopulation arrested. The most advanced technology entered into Shetland's traditional way of life when a major oil terminal was built in the 1970s at Sullom Voe in the north of Mainland. Pipelines extend from the North Sea fields to this depot, which is approached by tankers using the sheltered, deep water provided by Yell Sound. The oil developments increased the importance of Sumburgh airport in the southern tip of Mainland.

During the 7th and 8th centuries, the conversion of the population to Christianity was begun. In the 8th and 9th centuries, Shetland was invaded by the Norsemen, who ruled the islands until the 15th century; many Norse customs survive. In 1472 the islands, with Orkney, were annexed to the Scottish crown. The islands have, nevertheless, stood outside the mainstream of Scottish history and traditions. Pop. (1986 est.) 23,580.

Shetland pony, breed of horse popular as a child's pet and mount. Originating in the Shetland Islands, Scotland, the breed is adapted to the islands' harsh climate and scant food supply. Shetlands were used as pack horses and in about 1850 were taken to England to work in the coal mines. About the same time, they were introduced to the United States, where a more refined pony suitable for children's riding was bred.



Shetland mare and foal

Walter Chandoha

With the exception of certain dwarf ponies resulting from genetic mutation, the Shetland is the smallest breed of horse. The average height is about 40 inches (102 cm; unlike other horses Shetlands are not measured in hands). Maximum height is 46 inches (117 cm). Most colours, including spotting, are found. Shetlands are long-lived and need little care; they are gentle and even-tempered if properly trained. The American Shetland Pony Club was organized in 1888.

Shetland sheepdog, also called SHELTIE, small working dog developed as a herd dog for the small sheep of the Shetland Islands, Scotland. The dog resembles the rough-coated collie but in miniature, and like the collie it is descended from an old breed of Scottish working dog. Characteristically sturdy and agile, the Shetland sheepdog is noted for its herding ability and affectionate nature. For show purposes the American Kennel Club recognizes

only those dogs that are 33 to 41 cm (13 to 16 inches) high at the shoulder. The long, straight



Shetland sheepdog
Sally Anne Thompson—EB Inc.

coat is black, brown, or blue-gray with black mottling and may be marked with tan and white.

Shevardnadze, Eduard Amvrosiyevich (b. Jan. 25, 1928, Mamati, Georgian S.S.R.), Soviet politician and foreign minister of the Soviet Union (from 1985).

The son of a Georgian teacher, Shevardnadze was educated at a Communist Party school in Georgia and graduated in 1960 from the Kutaisi Pedagogical Institute. As a Komsomol member, he rose steadily in the hierarchy, becoming first secretary of Georgia's Komsomol Central Committee (1957–61). Thereafter he rose in the regular party apparatus in Tbilisi, the capital of Georgia, becoming first secretary of the Central Committee of the Communist Party of Georgia in 1972. Meanwhile, he had been in charge of the Georgian police from 1965 to 1972.

He became a member of the Central Committee of the Communist Party of the Soviet Union in 1976 and a candidate member of the Politburo in 1978. In 1985 the new Soviet leader Mikhail S. Gorbachev promoted Shevardnadze to full membership in the ruling Politburo and named him minister of foreign affairs in succession to Andrey Gromyko, even though Shevardnadze had had no experience in foreign affairs up to that time. As foreign minister, Shevardnadze skillfully helped implement Gorbachev's foreign-policy initiatives, including the withdrawal of Soviet troops from Afghanistan in 1988, the negotiation of new arms treaties with the United States, and his country's tacit acquiescence in the fall of communist governments across eastern Europe in 1989.

Shevaroy Hills, outlying range of the Eastern Ghāts, north-central Tamil Nādu state, southern India. The Shevaroy Hills occupy an area of about 150 square miles (390 square km). The highest peaks are in the southwest, reaching 5,231 feet (1,594 m) at Sanyāsimalai (Duff's Hill) on the Yercaud plateau. Widespread bauxite deposits are the basis for aluminum-processing plants at Mettūr and Yercaud. Coffee is extensively grown on the plateau. In 1845 the British established a hill station at Yercaud, which is now a resort and educational centre.

Shevchenko, Taras Hryhorovych (b. March 9 [Feb. 25, Old Style], 1814, Morintsy, Ukraine, Russian Empire—d. March 10 [Feb. 26], 1861, St. Petersburg [now Leningrad]), foremost Ukrainian poet of the 19th century and a major figure of the Ukrainian national revival.

Born a serf, Shevchenko was freed in 1838 while a student at the St. Petersburg Academy of Art. His first collection of poems, entitled *Kobzar* (1840; "The Bard"), expressed the historicism and the folkloristic interests of the Ukrainian Romantics, but his poetry soon moved away from nostalgia for Cossack life to a more sombre portrayal of Ukrainian history, particularly in the long poem "The Haidamaks" (1841). When the secret Brotherhood of Saints Cyril and Methodius was suppressed in 1847, Shevchenko was punished by exile and compulsory military service for writing the poems "The Dream," "The Caucasus," and "The Epistle," which satirized the oppression of the Ukraine by Russia and prophesied a revolution.

Though forbidden to write or paint, Shevchenko clandestinely wrote a few lyrical poems during the first years of his exile. He had a revival of creativity after his release in 1857; his later poetry treats historical and moral issues, both Ukrainian and universal.



Shevchenko, detail of a portrait by an unknown artist
Sovfoto

Shevchenko exercised a decisive influence on the Ukrainian literature and culture of his century, formulating the terms of 19th-century Ukrainian self-identification.

Shewa, also spelled SHOWA, or SHOA, historic kingdom of central Ethiopia. It lies mostly on high plateau country, rising to 13,123 feet (4,000 m) in Mount Abuye Meda. Its modern capital and main commercial centre is Addis Ababa. Shewa is bounded on the northwest by the Blue Nile and on the southwest by the Omo River; its eastern and southeastern boundaries are in the Great Rift Valley along the Awash River.

Shewa was the residence of Ethiopian kings from the mid-10th century to the end of the 14th century. The actual sites of the royal residences have not yet been accurately located. In 1528 Shewa was overrun by Muslim invaders from the state of Adal to the east, and the ancient cities were destroyed. For over a century afterward, Shewa was penetrated by the Oromo (Galla) people from the south who moved into the political vacuum left in the region and established themselves in farming communities as far north as the Blue Nile valley. In 1856 Shewa was incorporated into the Ethiopian empire by the emperor Tewodros (Theodore) II, but Menelik II regained his kingdom of Shewa and in 1886 chose the site for Addis Ababa, his future capital. Building began at once, and, when Menelik became emperor of the whole country in 1889, Addis Ababa became the capital of Ethiopia.

shewbread, also spelled SHOWBREAD, also called BREAD OF THE PRESENCE, any of the 12 loaves of bread that stood for the 12 tribes of Israel, presented and shown in the Temple of Jerusalem in the Presence of God. The loaves were a symbolic acknowledgment that God was the resource for Israel's life and nourishment and also served as Israel's act of thanksgiving to God. The arrangement of the bread on a table in two rows of six (Leviticus 24) was an important aspect of the presentation because some verses in the Bible literally speak of "the bread of the arrangement" (I Chronicles 9:32, 23:29; Nehemiah 10:33). The table, which stood at the west end of the "holy place" of the Temple, next to the Holy of Holies, was also important. The bread was changed every sabbath, and the priests ate that which had been displayed. Once, in an emergency, it was given to David to feed his hungry men. Many aspects of the Christian Eucharist show that it was influenced by Israel's shewbread.

Shexian (China): *see* She-hsien.

Shi Dakai (Chinese rebel leader): *see* Shih Ta-k'ai.

Shi Huangdi (first emperor of China): *see* Shih Huang-ti.

Shīʿah, also spelled SHĪʿA, singular SHĪʿĪ, the Muslims who constitute the smaller of the two major branches of Islām, distinguished from the majority Sunnites. The Arabic term Shīʿah also denotes the system or doctrine of such Muslims. *See* Shīʿite.

Shiba Kōkan, also called KŌKAN, or SHIBA SHUN, original name ANDŌ KICHIJIRŌ, or KATSUSABURŌ, pseudonym KUNGAKU (b. 1738/47, Edo [now Tokyo], Japan—d. 1818, Edo), Japanese artist and scholar of the Tokugawa period who introduced many aspects of Western culture and learning to Japan. He was a pioneer in Western-style oil painting and was the first Japanese to produce a copperplate etching.

Kōkan studied painting first with a teacher of the Kanō school, in which Chinese themes and techniques were stressed, and then took up woodblock printing with Suzuki Harunobu. Kōkan became adept at imitating Harunobu's style and even forged Harunobu's signature on many of his own prints; he later adopted the signature Harushige. However, he soon moved away from what he considered the spiritless ukiyo-e style and came under the influence of Western realistic painting, with its techniques of shading and perspective. His interest in Western culture developed especially through close association with Hiraga Gennai, a scholar of Western learning, and through study under Maeno Ryōtaku, a scholar of the Dutch language and of Western medicine. He learned copperplate engraving and oil painting by studying Dutch books, the only foreign books available at the time. After much trial and error, he succeeded in making his first copperplate prints; the model product of this effort was an etching entitled "Mimeguri Keizu" (1783; "The View from Mimeguri").



"Shinobazu no ike," print by Shiba Kōkan; in the Tokyo National Museum
By courtesy of the Tokyo National Museum

In 1788 he left Edo and traveled westward to Nagasaki, which during the Tokugawa period was the only Japanese port open to external trade. While there he visited the Dutch trading enclave on the island of Dejima, trying to absorb as much Western knowledge as he could. His account of the journey appeared in *Saiyū ryodan* (1794; "Account of a Western Visit"). He later published a set of volumes on Dutch astronomy and also endeavoured, through etchings, to illustrate Nicolaus Copernicus' heliocentric theory of the solar system.

Kōkan is also known for his oil paintings, such as "Shichiri Beach at Kamakura" and "Ikoku fukei jinbutsu zu" ("Landscape with Foreign People"), both good examples of his acquired Western techniques. In 1799 he wrote *Seiyō-gadan* ("Dissertation on Western Painting") in which he explained fundamental principles of the realism of Western painting.

In his later years, he turned to studying the Chinese sages, notably Lao-tzu and Confucius. He also became a disciple of Zen Buddhism, secluding himself at the Engaku Temple in Kamakura and spending much time in meditation.

shibah (Judaism): *see* shivah.

Shibarghān (Afghanistan): *see* Jowzjān.

Shibeli River (East Africa): *see* Shebeli River.

Shibīn al-Kawm, also spelled SHEBIN EL-KOM, capital of al-Minūfīyah *muḥāfaẓah* (governorate), Lower Egypt. It lies 37 miles (60 km) northwest of Cairo in the southern Nile Delta. Its centre, 10 miles (16 km) east of the Rosetta Branch of the Nile, is situated on the west side of the Shibīn Canal, which flows north from al-Khayrīyah Dam to irrigate a rich alluvial region growing cotton, flax, and cereals. Shibīn al-Kawm's manufactures include textiles and cigarettes. It is the site of the Higher Institute of Agriculture and of the Shibīn al-Kawm Institute, an affiliate of Cairo's al-Azhar University. The town is linked to Ṭanṭā, Minūf, and Talā by the Cairo–Ṭanṭā Railway. Pop. (1985 est.) 129,600.

Shiburoku Kaizuka: *see* Sakai Toshihiko.

Shibusawa Eiichi, SHISHAKU (Viscount) (b. March 16, 1840, Musashi province, Japan—d. Nov. 11, 1931, Tokyo), Japanese government official who helped establish the reforms that put Meiji Japan (1868–1912) on a firm financial footing; his Shibusawa Company became one of the largest of the *zaibatsu* (financial cartels) in the country, helping establish the close relations between government and business.

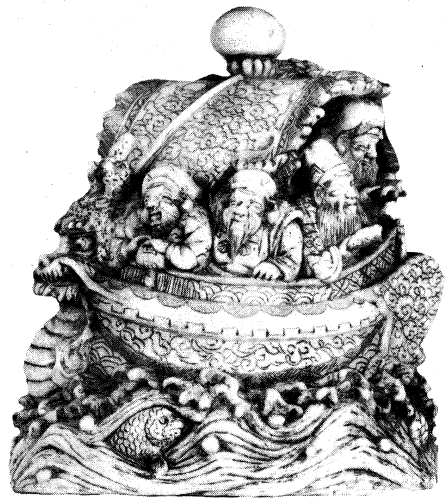
Although Shibusawa's parents were peasants, they could afford to give him a good education. He early joined the loyalist movement that demanded the expulsion of all foreigners from Japan. Because of his ability he became a member of the staff of the great Hitotsubashi heir Tokugawa Yoshinobu, who granted him samurai status; when Yoshinobu assumed the office of shogun, or hereditary military dictator of Japan, Shibusawa was made a member of the central government. He soon changed his expulsionist ideas, and in January 1867 he accompanied Yoshinobu's brother on a visit to Europe. On his return home, he discovered that the shogunate had been overthrown and replaced by an imperial government under the emperor Meiji.

The banking and trading concern that Shibusawa formed that year was the first Japanese company to be incorporated. In October 1869 he joined the government as an official in the tax ministry and helped carry out currency and tax reforms, revision of the system of weights and measures, and development of a new method of provincial administration.

In 1873 Shibusawa resigned from the government as a result of a policy disagreement and became president of the First National Bank (present-day Daiichi Kangyō Bank) of Japan, which he had helped found. That same year he founded the Ōji Paper Manufacturing Company, and 10 years later he began the famous Ōsaka Spinning Company. Larger and more efficient than any other of its kind, this plant established Shibusawa's dominance over Japanese industrial life. Shibusawa, in fact, was involved in almost every enterprise associated with the country's industrial development in this period, founding railways, steamship companies, fisheries, printing companies, steel plants, gas and electric industries, and oil and mining concerns. He retired in 1916 to devote himself to social welfare causes, in which he actively continued until his death at 91.

Shichi-fuku-jin (Japanese: "Seven Gods of Luck"), group of seven popular Japanese deities, all of whom are associated with good fortune and happiness. The seven are drawn from various sources but have been grouped together from at least the 16th century. They are Bishamon, Daikoku, Ebisu, Fukurokuju, Jurōjin, Hotei, and the only female in the group, Benten (*qq.v.*).

The Shichi-fuku-jin are a favourite theme of folk song and are frequently given comic representation in painting and theatre, both singly and as a group. The seven are often shown on their treasure ship (*takara-bune*) together with various magical implements, such as a hat of invisibility, rolls of brocade, an inexhaustible purse, keys to the divine treasure-house, cloves, scrolls or books, a lucky rain hat, or a robe of feathers.



Shichi-fuku-jin on a treasure ship, ivory carving; in the Victoria and Albert Museum, London

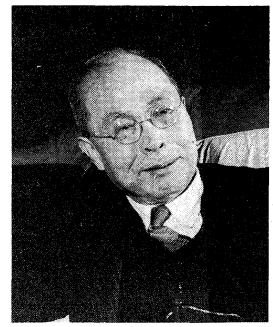
By courtesy of the Victoria and Albert Museum, London; photograph, A.C. Cooper Ltd.

Shichi-go-san (Japanese: "Seven-Five-Three"), one of the most important festivals for Japanese children, observed annually on November 15. On this date girls of three and seven years of age and boys of five years of age are taken by their parents to the Shintō shrine of their tutelary deity to offer thanks for having reached their respective ages and to invoke blessings for the future. In former times the day was also marked by five-year-old boys of the samurai class being dressed in a *hakama* (pleated, divided skirt) and presented to their respective feudal lords, seven-year-old girls wearing the formal obi (stiff sash), and the three-year-old girls having their hair arranged on top of their heads, all for the first time.

To make the best use of the Britannica, consult the INDEX *first*

Shidehara Kijūrō, DANSHAKU (Baron) (b. Sept. 13, 1872, Ōsaka—d. March 10, 1951, Tokyo), Japanese diplomat, statesman, and prime minister for a brief period after World War II (1945–46). He was so closely identified with the peaceful foreign policy followed by Japan in the 1920s that this policy is usually referred to as Shidehara diplomacy.

He entered the diplomatic service in 1899 and served in Korea, London, Washington, and The Netherlands. As ambassador to the United States in 1919 he argued in vain against U.S. immigration laws discriminating against the Japanese. He was the chief Japanese delegate to the Washington Conference (1921–22), in which the major Pacific powers agreed to a naval disarmament, a series of international agreements that would provide for security in the Pacific, and a conciliation of their rival policies toward China. As foreign minister of Japan from 1924 to 1927 and again from 1929 to 1931, Shidehara became known as an advocate of a conciliatory policy toward China and a policy of economic rather than military expansion.



Shidehara Kijūrō

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Although he was forced from office by the militarists in 1931, Shidehara continued to be held in high regard abroad. He again played a significant role in Japanese politics in October 1945, when, at the age of 73, he was accepted by the American military occupation authorities as prime minister. He held office until the end of the demilitarization period in May 1946. He was then elected as a conservative to the lower house of the Diet (parliament), where he served as speaker until his death. Although a liberal in foreign policy, he was conservative in domestic affairs, a fact that may be partly explained by his long association with the Mitsubishi financial interests (his wife was the daughter of the head of the Mitsubishi industrial combine). His book *Gaikō Gojūnen* (1951) describes his public career.

Shiel, Loch, narrow lake, northwest highlands of Scotland. About 17 miles (28 km) long, it extends ribbonlike from Glenfinnan southwestward and drains into the River Shiel (31 miles [50 km] long), which empties into Loch Moidart, a sea loch. The upper reaches of Loch Shiel, toward Glenfinnan, are bounded by wild and rough scenery, with mountains rising precipitously to about 3,000 feet (900 m). Glenfinnan Monument, at the head of Loch Shiel, marks the spot where, on Aug. 19, 1745, Charles Edward the Young Pretender raised his standard, the signal for the Rebellion of '45. The lake and region are historically associated with the Macdonald clan; on St. Finnan's isle are an ancient chapel and the traditional burial place of the Macdonalds.

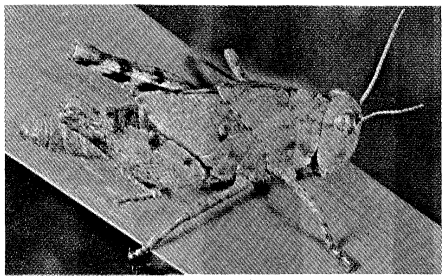
shield (geology): *see* continental shield.

shield, tunneling: *see* tunneling shield.

shield-backed grasshopper, also called SHIELD BEARER, orthopteran of the insect subfamily Decticinae, within the long-horned grasshopper family Tettigoniidae. It is cricketlike in appearance, is more than 2.5 cm (1 inch) long, and is brown or black in colour. It has a pronotum (dorsal surface of prothorax) that extends back to the abdomen. Most species have short wings; some species are wingless.

The Mormon cricket (*Anabrus simplex*) is a serious pest in the Great Plains of North America. In 1848 at Salt Lake City, Deseret (later Utah), the arrival of a flock of sea gulls saved the Mormons' crops from complete destruction by this insect. When present in

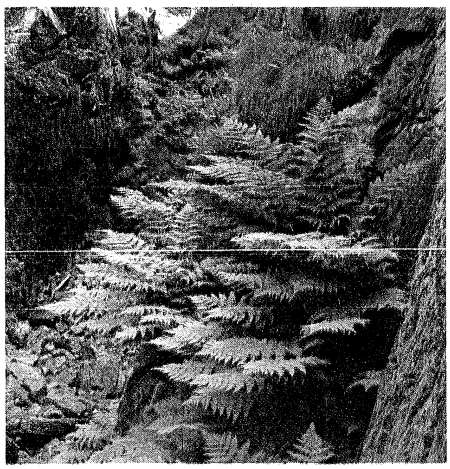
sufficient numbers the coulee cricket (*Peranabrus scabricollis*) is a destructive pest in the Pacific Northwest. Both species are wingless,



Shield-backed grasshopper (*Decticinae*)
E.R. Degginger

and metal or wood barriers serve as effective control devices, as does poison bait.

shield fern, also called WOOD FERN, any member of the fern genus *Dryopteris* (family Aspleniaceae), about 150 species with worldwide distribution. The genus is placed in the family Aspidiaceae in some classification systems. Shield ferns are medium-sized woodland plants with bright-green, leathery leaves that are several times divided. They have numer-



Wood fern (*Dryopteris dilatata*)
Ingmar Holmasen

ous round spore clusters (sori) attached along the veins on the underside of the leaves and protected by a tissue covering.

shield money (feudal law): *see* scutage.

shieldtail snake, any of more than 40 species of burrowing, southern Asian snakes of the family Uropeltidae. Shieldtail snakes are harmless, short (usually less than 30 cm, or 12 inches, long), and small-eyed. They often have pointed snouts, and a number have tails ending in a flat, disklike shield. Many species are brightly coloured; some are black but highly iridescent. Most feed on earthworms.

The genera *Cylindrophis* (pipe snakes) and *Anomochilus,* both possessing remnants of the pelvic girdle, are sometimes placed in the family Aniliidae with the South American *Anilius.* Pipe snakes are often found in rice fields; when molested, it hides its head under its coiled body and raises its tail, which simulates a more dangerous head.

Shiels, Robert (b. before 1700, Roxburghshire, Scot.—d. Dec. 27, 1753, London), Scottish poet and editor.

Moving to London, where he was a printer, Shiels was employed by Samuel Johnson as an amanuensis on the *Dictionary of the English Language.* When this work was completed, Shiels, with others, began the compilation of a five-volume *The Lives of the Poets of Great Britain and Ireland, to the Time of Dean Swift* (1753), published shortly before his death. Although this work bore the name of Theophilus Cibber (1703–58), playwright and actor, it was actually Shiels who did most of the research for whatever original writing appeared in the work. Shiels also wrote a poem, "Marriage," in blank verse; "Musidorus," an elegy on the Scottish poet James Thomson; and several other pieces.

shifting agriculture, system of cultivation preserving soil fertility by plot (field) rotation, as distinct from crop rotation. In shifting agriculture a plot of land is cleared and cultivated for a short period of time; then it is abandoned and allowed to revert to its natural vegetation while the cultivator moves on to another plot. The period of cultivation is usually terminated when the soil shows signs of exhaustion or, more commonly, when the field is overrun by weeds. The length of time that a field is cultivated is usually shorter than the period over which the land is allowed to regenerate by lying fallow.

One land-clearing system of shifting agriculture is the slash-and-burn method that leaves only stumps and large trees in the field after the standing vegetation has been cut down and burned, its ashes enriching the soil. Cultivation of the earth after clearing is usually accomplished by hoe or digging stick and not by plow.

Shifting agriculture is often attacked in principle because it degrades the fertility of forest lands of tropical regions, where the extensive land required is available and where most such agriculture occurs. Nevertheless, shifting agriculture is an adaptation to tropical soil conditions in regions where long-term, continued cultivation of the same field, without advanced techniques of soil conservation and the use of fertilizers, would be extremely detrimental to the fertility of the land. In such environments it may be preferable to cultivate a field for a short period and then abandon it before the soil is completely exhausted of nutrients.

shifting cultivation: *see* slash-and-burn agriculture.

Shiga, landlocked *ken* (prefecture), southern Honshu, Japan, containing Lake Biwa, the largest lake in Japan. The lake and surrounding mountainous district form Lake Biwa Quasi-national Park. The total area of Shiga is 1,551 square miles (4,016 square km). The prefecture's percentage of rice paddies is among the highest in Japan, and its Ōmi beef is well known throughout Japan. The textile industries at Ōtsu, the prefectural capital, Hikone, and Nagahama are dependent on Lake Biwa's water. Pop. (1985) 1,155,843.

Shiga Kiyoshi (b. Feb. 7, 1871, Sendai, Japan—d. Jan. 25, 1957, Tokyo), Japanese bacteriologist, chiefly noted for his discovery (1897) of the dysentery bacillus *Shigella,* which is named after him.

Shiga graduated from the University of Tokyo in 1896. Two years earlier he had begun work with Kitasato Shibasaburo, who had discovered the tetanus bacillus. In 1899 Shiga was appointed laboratory director at the Institute for Infectious Diseases in Tokyo. Shortly thereafter he went to Europe and worked with Paul Ehrlich, a German bacteriologist, on developing chemotherapy for trypanosomiasis, a blood disease caused by a protozoan microorganism. In 1900 Shiga developed a dysentery antiserum. Returning to Tokyo in 1903, he resumed work with Kitasato at his institute. In 1920 Shiga was appointed professor of bacteriology at the University of Seoul and in 1929 was named president. Two years later he returned to Tokyo and in 1936 was appointed an official of the Imperial household. His research also included work on leprosy, beriberi, and tuberculosis.

Shiga Naoya (b. Feb. 20, 1883, Ishinomaki, Japan—d. Oct. 21, 1971, Tokyo), Japanese fiction writer, a master stylist whose intuitive delicacy and conciseness have been epitomized as the "Shiga style."

Born into an aristocratic samurai (warrior aristocracy) family, Shiga was taken by his parents to live with his paternal grandparents in Tokyo in 1885. In his youth he was influenced by the Christian educator Uchimura Kanzō, but Christianity itself made little lasting impression on him. After graduating from the Peers School in 1906, he entered the department of English literature at Tokyo Imperial University but left after two years without graduating. In 1910 he joined Mushanokōji Saneatsu, Arishima Takeo, Satomi Ton, and



Shiga Naoya
By courtesy of the International Society for Educational Information, Tokyo

other friends of his Peers School days in founding the journal *Shirakaba* ("White Birch"), which gave rise to an important literary movement emphasizing individualism and Tolstoyan humanitarianism. The movement lasted until the early 1920s, but Shiga found its idealism incompatible with his more realistic approach to literature and moved away from the group. Through the years he refined his objective style, perceptively delineating the most sensitive reactions of his characters with subtle simplicity. He engaged in little abstract speculation, concentrating instead on a concrete, unsentimental depiction. Spurts of literary activity, which brought him a reputation as a fine short-story writer, were separated by long periods of inactivity, and he never earned a living from his writing.

Much of Shiga's fiction is concerned with difficult family relationships, and his concern with the psychological involvements of his first-person heroes places some of his stories in the category of *shishōsetsu* ("I," or autobiographical, fiction). Both the story *Wakai* (1917; "Reconciliation") and his masterpiece, the long novel *An'ya kōro* (written in two parts between 1921 and 1937; *A Dark Night's Passing*), describe the hero's search for peace of mind in the face of family and personal conflict. The short story "Kinosaki nite" (1917; "At Kinosaki") is a fine example of his sensitive, unsentimental treatment of his own state of mind. His writing career virtually ended with the completion of *An'ya kōro.*

Shigaraki, town, one of the six major pottery centres of ancient Japan, located in southern Shiga *ken* (prefecture), east of Kyōto and southeast of Nara. The wares for which the town is known were first produced in 1278; they have a crude shape and an oatmeal-like surface covered with various glazes. Water urns, seed jars, and bottles were produced for daily use by the farming community. Shigaraki bowls and jars have been used as utensils in the *cha-no-yu* (tea ceremony) since 1520. Modern factories produce imitations of the blue splash Kwangtung stoneware of China. Agricultural products of the area include rice, mandarin oranges, tea, and timber. A physical science research institute is located there. Shi-

garaki has railway and highway connections to Nara. Pop. (1980) 13,511.

Shigatse (China): *see* Jih-k'a-tse.

Shigella, genus of rod-shaped bacteria in the family Enterobacteriaceae, species of which are normal inhabitants of the human intestinal tract and can cause dysentery, or shigellosis.

Shigella are microbiologically characterized as gram-negative, non-spore-forming, nonmotile bacteria. Their cells are 0.4 to 0.6 micrometre across by 1 to 3 micrometres long.

S. dysenteriae, spread by contaminated water and food, causes the most severe disease because of its potent exotoxin, but *S. sonnei* and *S. flexneri* are also implicated as dysentery agents.

shigellosis, infectious disease that is caused by various species of *Shigella* bacteria and is known as bacillary dysentery. *See* dysentery.

Shigemitsu Mamoru (b. July 29, 1887, Ōita, Japan—d. Jan. 26, 1957, Yugawara), Japanese diplomat who served as minister of foreign affairs in various cabinets and was one of the signers of Japan's surrender to the Allies at the end of World War II.

Shigemitsu, a graduate of Tokyo University, joined the Ministry of Foreign Affairs in 1911. By 1918 he held a position in the embassy in Poland and, while in Europe, attended the Paris Peace Conference. After serving in the embassy in Germany, he became consul general of Shanghai and in 1931 Japanese minister to China. In 1933 Shigemitsu became Japan's vice-minister of foreign affairs. He later served as ambassador to the Soviet Union and to Great Britain.

In 1943 Shigemitsu was called to serve as minister of foreign affairs under Tōjō Hideki and later served in the Koiso Kuniaki Cabinet. During the war he favoured a number of conciliatory measures in hopes of gaining an early peace. On Sept. 2, 1945, as foreign minister in the Higashikuni Naruhiko Cabinet, Shigemitsu signed Japan's unconditional surrender to the Allies. He was convicted of war crimes and was sentenced to seven years in prison; he was paroled in 1950.

In 1952 Shigemitsu became chairman of the Progressive Party and, later, assistant chairman of the Democratic Party. In 1954 Shigemitsu again served as minister of foreign affairs—this time in the Hatoyama Ichirō Cabinet.

shih, the basic unit of weight in ancient China. The *shih* was created by Shih Huang Ti, who became the first emperor of China in 221 BC and who is celebrated for his unification of regulations fixing the basic units. He fixed the *shih,* or *tan,* at about 60 kg (132 pounds). The *shih* as currently used in China is equivalent to 71.68 kg (157.89 pounds).

Shih-che (Chinese poet): *see* Hsü Chih-mo.

Shih-ch'i (China): *see* Chung-shan.

Shih-chia-chuang, Pinyin SHIJIAZHUANG, city in west-central Hopeh *sheng* (province), China. It is the administrative capital of Hopeh province. It stands on the edge of the North China Plain at the foot of the T'ai-hang Mountains, which lie to the west, to the south of the Hu-t'o River.

In pre-Han times (*i.e.,* before 206 BC) it was the site of the city of Shih-i in the state of Chao, and, from Han (206 BC–AD 220) to Sui (581–618) times, it was the site of a county town with the same name. With the reorganization of local government in the early period of the T'ang dynasty (618–907), the county was abolished. Shih-chia-chuang then became little more than a local market town, subordinated to the flourishing city of Chen-ting (modern Cheng-ting) a few miles to the north.

The growth of Shih-chia-chuang into one of China's major cities began in 1905, when the Peking–Wu-han (Han-k'ou) railway reached the area, stimulating much new trade and encouraging local farmers to grow cash crops. Two years later the town became the junction for the new Shih-t'ai line, running from Shih-chia-chuang to T'ai-yüan in central Shansi. This connection immediately transformed the town from a local collecting centre and market into a communications centre of national importance on the main route from Peking and Tientsin to Shansi and—later, when the railway from T'ai-yüan was extended to the southwest—to Shensi province as well. The city also became the centre of an extensive road network.

During the pre-World War II period, Shih-chia-chuang was a large railway town as well as a commercial and collecting centre for Shansi and the regions farther west and for the agricultural produce of the North China Plain, particularly for grain, tobacco, and cotton. By 1935 it had far outstripped Cheng-ting as an economic centre. At the end of World War II the character of the city changed once again. Not only did it assume an administrative role as the preeminent city in western Hopeh, but it also developed into an industrial city. Some industry, such as match manufacturing, tobacco processing, and glassmaking, had already been established before the war.

Only after 1949, however, did the planned industrialization of the city gather momentum. Its population more than trebled in the decade 1948–58. In the 1950s the city experienced a major expansion in the textile industry, with large-scale cotton spinning, weaving, printing, and dyeing works. In addition, there are various plants processing local farm produce. In the 1960s it was also the site of a new chemical industry, with plants producing fertilizer and caustic soda. Shih-chia-chuang also became an engineering base, with a tractor-accessory plant. There are important coal deposits at Ching-hsing and Huo-lu, a few miles to the west in the foothills of the T'ai-hang Mountains, which provide fuel for a thermal-generating plant supplying power to local industries. The city's role as a transport centre has been supplemented by the construction of an airport handling regular domestic flights. Pop. (1988 est.) 987,000.

Shih ching (Chinese: "Classic of Poetry"), the first anthology of Chinese poetry. It was compiled by the ancient sage Confucius (551–479 BC) and cited by him as a model of literary expression; for, despite its numerous themes, the subject matter was always "expressive of pleasure without being licentious, and of grief without being hurtfully excessive" (*Lun-yü*).

The book, one of the Five Classics (*Wu ching*), contains 305 poems (and six poem titles) that are classified either as popular songs or ballads (*feng,* "wind"), courtly songs (*ya,* "elegant"), or eulogies (*sung*).

Four versions of the *Shih ching* came into existence after the Ch'in-dynasty ruler Shih Huang-ti ordered the famous burning of the books in 213 BC. The only surviving version contains introductory remarks by Mao Ch'ang, who flourished in the 2nd century BC.

Shih-ho-tzu, Pinyin SHIHEZI, new city in Uighur Autonomous Region of Sinkiang, China. The city is situated north of the T'ien Mountains in the south-central Dzungarian Basin near the Ma-na-ssu River. Prior to 1949 the area was sparsely inhabited by Uighur, Kazakh, and other Turkic pastoralists. The new Chinese government sent a colony of soldiers (later provided with wives), organized as a military construction corps, to the area in 1950 to dig irrigation ditches, clear fields, and build housing for settlement. Today state farms around Shih-ho-tzu produce corn (maize), wheat, cotton, grapes, and sugar beets. The city's industries include a sugar refinery, a cannery, a woolen mill, an oil-pressing mill, a flour mill, and an agricultural machinery plant. Most of the population of the city is ethnic Chinese. It is connected by road with Wu-lu-mu-ch'i to the southeast and with K'o-la-ma-i to the northwest. Pop. (1988 est.) 301,000.

Shih huang-ti, Pinyin SHI HUANGDI, personal name (*hsing-ming*) CHAO CHENG (b. *c.* 259 BC, Ch'in, northwestern China—d. 210/209), emperor of the Ch'in dynasty (221–210/209 BC) and creator of the first unified Chinese empire (which collapsed, however, about four years after his death).

Early years. He was born the son of Chuang Hsiang (who later became king of the state of Ch'in in northwestern China), while his father was held hostage in the state of Chao. His mother was a former concubine of a rich merchant, Lü Pu-wei, who, guided by financial interests, managed to install Chuang Hsiang on the throne, even though he had not originally been designated as successor.

When Cheng, at the age of 13, ascended the throne in 246 BC, Ch'in already was the most powerful state and was likely to unite the rest of China under its rule. Although Ch'in was looked upon by the central states as a barbarous country, its strong position on the mountainous western periphery (with its centre in the modern province of Shensi) enabled Ch'in to develop a strong bureaucratic government and military organization as the basis of the totalitarian state philosophy known as legalism.

Until Cheng was officially declared of age in 238, his government was headed by Lü Pu-wei. Cheng's first act as king was to execute his mother's lover, who had joined the opposition, and to exile Lü, who had been involved in the affair. A decree ordering the expulsion of all aliens, which would have deprived the king of his most competent advisers, was annulled at the urging of Li Ssu, later grand councillor. By 221, with the help of espionage, extensive bribery, and the ruthlessly effective leadership of gifted generals, Cheng had eliminated one by one the remaining six rival states that constituted China at that time, and the annexation of the last enemy state, Ch'i, in 221, marked his final triumph: for the first time China was united, under the supreme rule of the Ch'in.

Emperor of China. To herald his achievement, Cheng assumed the sacred titles of legendary rulers and proclaimed himself Ch'in Shih huang-ti ("First Sovereign Emperor of Ch'in"). With unbounded confidence, he claimed that his dynasty would last "10,000 generations."

As emperor he initiated a series of reforms aimed at establishing a fully centralized administration, thus avoiding the rise of independent satrapies. Following the example of Ch'in and at the suggestion of Li Ssu, he abolished territorial feudal power in the empire, forced the wealthy aristocratic families to live in the capital, Hsien-yang, and divided the country into 36 military districts, each with its own military and civil administrator. He also issued orders for almost universal standardization—from weights, measures, and the axle lengths of carts to the written language and the laws. Construction of a network of roads and canals was begun, and fortresses erected for defense against barbarian invasions from the north were linked to form the Great Wall.

In 220 Shih huang-ti undertook the first of a series of imperial inspection tours that marked the remaining 10 years of his reign. While supervising the consolidation and organization of the empire, he did not neglect to perform sacrifices in various sacred places, announcing to the gods that he had finally united the empire, and he erected stone tablets with ritual inscriptions to extol his achievements.

Another motive for Shih huang-ti's travels

was his interest in magic and alchemy and his search for masters in these arts who could provide him with the elixir of immortality. After the failure of such an expedition to the islands in the Eastern Sea—possibly Japan—in 219, the emperor repeatedly summoned magicians to his court. Confucian scholars strongly condemned the step as charlatanry, and it is said that 460 of them were executed for their opposition. The continuous controversy between the emperor and Confucian scholars who advocated a return to the old feudal order culminated in the famous burning of the books of 213, when, at Li Ssu's suggestion, all books not dealing with agriculture, medicine, or prognostication were burned, except historical records of Ch'in and books in the imperial library.

The last years of Shih huang-ti's life were dominated by an ever-growing distrust of his entourage—at least three assassination attempts nearly succeeded—and his increasing isolation from the common people. Almost inaccessible in his huge palaces, the emperor led the life of a semidivine being. In 210 or 209 Shih huang-ti died during an inspection tour. He was buried in a gigantic grave hewn out of a mountain and shaped in conformity with the symbolic patterns of the cosmos. (Excavation of the 20-square-mile [52-square-kilometre] tomb complex began in 1974. Among the early findings were more than 6,000 life-sized terra-cotta soldier and horse figures forming an "army" for the dead king. For further details of the excavation, *see* Ch'in tomb.) The disappearance of Shih huang-ti's forceful personality immediately led to the outbreak of fighting among supporters of the old feudal factions that ended in the collapse of the Ch'in dynasty and the extermination of the entire imperial clan (206).

Most of the information about Shih huang-ti's life derives from the successor Han dynasty, which prized Confucian scholarship and thus had an interest in disparaging the Ch'in period. The report that Shih huang-ti was an illegitimate son of Lü Pu-wei is possibly an invention of that epoch. Further, stories describing his excessive cruelty and the general defamation of his character must be viewed in the light of the distaste felt by the ultimately victorious Confucians for legalist philosophy in general.

Shih huang-ti certainly had an imposing personality and showed an unbending will in pursuing his aim of uniting and strengthening the empire. His despotic rule and the draconian punishments he meted out were dictated largely by his belief in legalist ideas. With few exceptions, the traditional historiography of imperial China has regarded him as the villain par excellence, inhuman, uncultivated, and superstitious. Modern historians, however, generally stress the endurance of the bureaucratic and administrative structure institutionalized by Shih huang-ti, which, despite its official denial, remained the basis of all subsequent dynasties in China. (C.C.M./Ed.)

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Shih-shih (sculpture): *see* Lion of Fo.

Shih Ta-k'ai, Pinyin SHI DAKAI (b. 1831, Kuei-hsien, Kwangsi province, China—d. June 1863, Ch'eng-tu, Szechwan province), one of the leaders of the Taiping Rebellion, the widespread uprising that gripped South China between 1850 and 1864. The most literate of the Taipings, Shih was an avowed enemy of the alien Ch'ing (Manchu) rulers of China. In the early part of the 20th century, he came to be revered as a hero of the Chinese nationalist rebellion against foreign domination.

As one of the original five Taiping rebel leaders, Shih assumed the title of *i-wang* ("assistant king"). In 1856, when the eastern king Yang Hsiu-ch'ing attempted to usurp the throne of the supreme Taiping leader, Hung Hsiu-ch'üan (1814–64), Shih plotted with the northern king Wei Ch'ang-hui to kill Yang. The northern king killed not only Yang but thousands of his adherents and relatives as well. When Shih objected to the slaughter, the northern king plotted to kill him, but Shih discovered the plot and escaped. Hung finally had the northern king executed and recalled Shih to the capital, but Shih's immense popularity with the Taiping troops aroused Hung's suspicion.

Disgruntled, Shih split from the Taiping movement at the end of 1856, taking with him a large personal following and some of the most able Taiping commanders. Although the Ch'ing government offered him huge rewards and high rank, he refused to surrender, chiding the Ch'ing officials for their cooperation with foreign barbarians. Shih, who had hoped to establish an independent kingdom in the western province of Szechwan, was unable to win a popular base and was eventually caught and executed by government forces.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Shih-t'ao, Pinyin SHITAO, also called TAO-CHI (b. 1641, Kuei-lin, Kwangsi province, China—d. *c.* 1720), Chinese painter and theoretician who was, with Chu Ta, one of the most famous of the Individualist painters in the early Ch'ing period.

Like Chu Ta, Shih-t'ao was of the formerly imperial Ming line and became a Buddhist monk; but unlike Chu Ta he seems to have led a life typical of his class and birth. Although he spent most of his life in Kiangsu and Anhwei, he traveled extensively throughout China, and he knew a wide variety of learned individuals both inside and outside the Manchu court. He thus was very much the traditional Chinese gentleman, with little of the eccentricity that marked his older contemporary Chu Ta. His work, however, is as diverse in both style and interest as his life was; and it merits the term Individualist for the extraordinarily expressive range of the paintings. In distinct contrast to his contemporaries known as the orthodox masters (*e.g.,* Wang Hui), he was far less tied to the imitation or inspiration of old masters; and, while he respected them, he saw ancient styles more as knowledge to be expanded than to be exploited. Shih-t'ao's quite independent spirit is also found within his theoretical writings—such as the "Hua-yü lu" ("Comments on Painting"); he speaks of "a style of no style" and the indicative importance of "the single stroke."

Shih-tsu (4 BC–AD 57): *see* Kuang-wu Ti.

Shih Tsu: *see* Wu-ti (AD 236–290).

Shih-tsu (1638–61): *see* Shun-chih.

Shih-tsung (1507–66): *see* Chia-ching.

Shih-tsung (1678–1735): *see* Yung-cheng.

Shih tzu, Tibetan dog breed developed from the Pekingese and the Lhasa apso. Listed in the toy group by the American Kennel Club, the Shih tzu, called in Chinese Shih-tzu kou ("lion dog"), is a long-haired, characteristically active and alert little dog standing about 10 inches (26 cm) and weighing 18 pounds (8 kg) or less. It is longer than it is tall, sturdily built and short-legged, with a short muzzle, hanging ears, and a heavily haired tail carried over its back. Its dense coat, which may be a variety of colours, falls over its eyes and forms a beard and whiskers on the face.

Shih Wang, in Chinese mythology, the 10 kings of hell, who preside over fixed regions where the dead are punished by physical tortures appropriate to their crimes. The Chinese hell is principally a Buddhist concept that has been accepted and modified by Taoism, and the many existing descriptions vary in details.

The first king receives the dead and determines whether or not they require punishment and, if so, to which region they should be sent. Formerly the position of first judge was held by Yen-lo Wang (a Chinese form of the Indian lord of death, Yama), but he was demoted to the fifth court because of his leniency. The second king has jurisdiction over the region that punishes dishonest go-betweens, fraudulent trustees, and ignorant doctors. The third king punishes unjust mandarins, forgers, slanderers, and shrews. The fourth king punishes the miserly rich, dishonest tradesmen, and those who know cures but do not divulge them. The fifth king punishes religious sinners, murderers, hunters, fishers, and the lustful. The sixth king punishes those guilty of sacrilege. The seventh king punishes violators of graves and sellers and consumers of human flesh. The eighth king punishes those lacking in filial piety. The ninth punishes arsonists, abortionists, and obscene painters and writers and their clients and oversees the city of those dead by accident (including suicides), from which no one is reborn unless he can find another accident victim to take his place. The 10th king turns the wheel of transmigration that carries the dead to their new existences as either gods, human beings on earth or in hell, good or bad demons, or animals.

The 10 kings and the regions over which they preside are frequently represented in temples of Ch'eng Huang, a folk god of walls and moats.

Shihāb ad-Dīn Aḥmad IBN FAḌL ALLĀH AL-ʿUMARĪ: *see* ʿUmarī, al-.

Shihāb-ud-Dīn Muḥammad Ghūrī: *see* Muʿizz-ud-Dīn Muḥammad ibn Sām.

Shīʿī: *see* Shīʿite.

Shīʿī, Abū ʿAbd Allāh ash- (b. Ṣanʿā', Yemen—d. AD 911), Ismāʿīlī propagandist and commander, architect of the Fāṭimid Muslim ascendancy in North Africa.

Ash-Shīʿī appeared among the Kutāma, a Berber tribe of North Africa, at the end of the 9th century, proclaiming himself a precursor of the mahdi (messianic deliverer) and urging the people to revolt. He had met the Berbers at an earlier time during a pilgrimage to Mecca. After several years of preparation, the Berbers, under ash-Shīʿī's leadership, captured portions of present-day Tunisia and eastern Algeria from the Aghlabids (nominal vassals of the Baghdad caliphs) and entered al-Qayrawān, the Aghlabids' capital, in March 909.

When news of ash-Shīʿī's success reached ʿUbayd ʿAllāh al-Mahdī, the leader of the Ismāʿīlīs, at his headquarters at Salamiyya, ʿUbayd disguised himself as a merchant and traveled toward northwest Africa. He was captured and jailed by the Khārijī emir of Sijilmāssa but was then rescued by ash-Shīʿī in August 909. In January of the following year, ʿUbayd made a triumphal entry into Qayrawān, proclaiming himself caliph. This marked the beginning of Fāṭimid power in North Africa. Ash-Shīʿī was executed soon after on the orders of the caliph for plotting against him.

Shīʿite, Arabic SHĪʿĪ, plural SHĪʿAH, or SHĪʿA, member of the smaller of the two major branches of Islām, distinguished from the majority Sunnites. In early Islāmic history the Shīʿites were a political faction (*shīʿat ʿAlī,* "party of ʿAlī") that supported the power of

ʿAlī, who was a son-in-law of Muḥammad and the fourth caliph (temporal and spiritual ruler) of the Muslim community. ʿAlī was killed while trying to maintain his authority as caliph, and the Shīʿites gradually developed a religious movement that asserted the legitimate authority of ʿAlī's lineal descendants, the ʿAlīds. This stand contrasted with that of the more pragmatic Sunnite majority of Muslims, who were generally willing to accept the leadership of any caliph or caliphal dynasty whose rule afforded the proper exercise of religion and the maintenance of order in the Muslim world.

Over the centuries the Shi'ite movement has deeply influenced all Sunnite Islām, and its adherents numbered about 60 to 80 million in the late 20th century, or one-tenth of all Islām. Shīʿism (Arabic: Shīʿah, or Shīʿī Islām) is the majority faith in Iran, Iraq, and perhaps Yemen (Ṣanʿā') and has adherents in Syria, Lebanon, East Africa, India, and Pakistan.

In 656 ʿAlī had been raised to the caliphate with the support, among many others, of the murderers of the third caliph, ʿUthmān. ʿAlī never quite received the allegiance of all the Muslims, however, and thus had to wage increasingly unsuccessful wars to maintain himself in power. ʿAlī was murdered in 661, and Muʿāwiyah, his chief opponent, became caliph. ʿAlī's son, Ḥusayn, later refused to recognize the legitimacy of Muʿāwiyah's son and successor as caliph, Yāzid. The Muslims of the Shīʿite-dominated town of Kūfah in Iraq, ʿAlī's former capital, invited Ḥusayn to become caliph. The Muslims in Iraq generally failed to support Ḥusayn, however, and he and his small band of followers were cut down (680) by the governor of Iraq's troops near Kūfah at the Battle of Karbalā' (*see* Karbalā', Battle of), which is now a pilgrimage spot for Shīʿites.

Swearing vengeance against the triumphant Umayyad government, the Kūfans soon gained support from other groups that opposed the status quo—from aristocratic Muslim families of Medina, from pious men protesting a too worldly interpretation of Islām, and from non-Arab Muslims (*mawālī*), especially in Iraq, who demanded an equality denied them by the ruling Arabs. Over time the Shīʿites became a distinct collection of sects who were alike in their recognition of ʿAlī and his descendants as the legitimate leaders of the Muslim community. The Shīʿites' conviction that the ʿAlīds should be the leaders of the Islāmic world was never fulfilled over the centuries. But though the ʿAlids never won power, ʿAlī himself was rehabilitated as a major hero of Sunnite Islām, and his descendants by Fāṭimah, Muḥammad's daughter, received the courtesy titles of "sayyids" and "sharifs."

The largest Shīʿite sect is that of the Ithnā ʿAsharīyah (*q.v.*), or Twelvers, who recognize the legitimacy of a succession of twelve ʿAlid claimants (beginning with ʿAlī himself) who are known as imams. Other, smaller Shīʿite sects include the Ismāʿīlīyah and Zaydīyah (*qq.v.*).

Despite occasional Shīʿite rulers, the Shīʿites remained almost everywhere an Islāmic minority until the start of the 16th century, when the Iranian Ṣafavid dynasty made it the sole legal faith of their empire, which then embraced the Persians of Iran, the Turks of Azerbaijan, and many of the Arabs of Iraq proper. These peoples have since been overwhelmingly Ithnā ʿAsharīyah and have given that sect a vigorous life. In the late 20th century, notably in Iran, the Shīʿites became the chief voice of militant Islāmic fundamentalism.

Shijiazhuang (China): *see* Shih-chia-chuang.

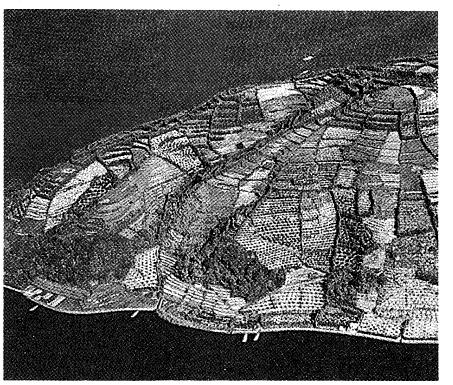
Shijō school, also called MARUYAMA SCHOOL, Japanese school of naturalistic painting that was founded in the late 18th century by Maruyama Masataka (Ōkyo) and was made popular by his pupils, among them Matsumura Gekkei, called Goshun, from whose residence on Fourth Street (Shijō), in Kyōto, the movement took its name. Among the most important artists associated with the school were Matsumura Keibun and Okamoto Toyohiko.

The Shijō style was an important influence on painting in Kyōto during the Edo period. It was revived in the Meiji period by Kōno Bairei.

Shikārpur, city, northern Sind province, southern Pakistan. The city lies 18 miles (29 km) west of the Indus River and is connected by road and rail with Sukkur (20 miles [32 km] southeast), Jacobābād, and Lārkāna. It is a historical trade centre, founded in 1617 on a caravan route through the Bolān Pass into Afghanistan. Shikārpur's manufactures include brass and metal goods, carpets, cotton cloth, and embroidery. It was constituted a municipality in 1855. Its great bazaar (covered because of the summer heat) is famous throughout Turkistan and southern Asia. The city also has a government college affiliated with the University of Sind.

The area about Shikārpur consists of flat alluvial deposits northwest of the Indus River. It is a major area for rice cultivation and for sheep and goat raising; other crops include wheat, gram, rapeseed, sugarcane, and cotton. Pashtun are the major ethnic group. Pop. (1981) city, 88,138.

Shikoku, island, smallest of the four main islands of Japan. It is separated from Honshu by the Inland Sea and from Kyushu by the Bungo Strait. Much of the island's 7,261 square miles (18,806 square km) is mountainous, and the population is concentrated in urban areas along the coast. The island is divided into the prefectures of Ehime, Kagawa, Kōchi, and Tokushima.



Terraced farmland on Shikoku, Japan
FPG—EB Inc.

Agriculture is intensive in the north; rice, barley, wheat, and mandarin oranges are among the major crops. Fishing is well developed, and salt is produced from evaporated seawater. Industries produce petroleum, nonferrous metals, textiles, wood pulp, and paper. Important cities and industrial centres are Matsuyama, Takamatsu, Kōchi, and Tokushima. Pop. (1987 est.) 4,228,000.

Shilka River, also spelled ŠILKA, river, Chita *oblast* (province), Russian Soviet Federated Socialist Republic, formed by the union of the Onon and Ingoda rivers. It flows 348 miles (560 km) northeast to unite with the Argun to form the Amur River on the Soviet Union–China border. The area of its drainage basin is 80,000 square miles (206,000 square km). The river is navigable for its entire length.

shilling, former English (and British) coin, nominally valued at one-twentieth of a pound sterling, or 12 pence. A silver coin of 12 pence, called a teston, or testoon, was first struck in 1504, bearing a profile likeness of Henry VII and engraved by Alexander Bruchsal. This coin was continued by Henry VIII and was renamed the shilling during the succeeding reign of Edward VI. (The direct origin of the word is obscure: there was an Anglo-Saxon coin termed *scilling,* or *scylling,* and some German states minted *schillings* from the 13th century onward.) By 1921 the value of the British shilling had become merely token, for the coin's silver content became fractional; in 1947 it became wholly cupronickel (copper–nickel alloy). The shilling was phased out of the British system of coinage beginning on Feb. 15, 1971, when a decimal system based on 100 new pence to £1 was introduced.

The shilling was also formerly used in such countries as Australia, New Zealand, and Ireland. It is the basic monetary unit (equaling 100 cents) in Kenya, Somalia, Tanzania, and Uganda.

Shillong, town, capital of Meghālaya state, northeastern India. The town is located on the Shillong Plateau at an elevation of 4,990 feet (1,520 m). Shillong first became prominent in 1864, when it succeeded Cherrapunji as the district headquarters; in 1874 it was made the capital of the new province of Assam. An earthquake destroyed the city in 1897, necessitating its complete rebuilding. The North East Frontier Agency's headquarters were in Shillong until that region became the union territory of Arunāchal Pradesh in 1972. In that year Shillong became the capital of Meghalaya, which had been newly created out of territory that was formerly within the state of Assam.

Shillong is one of the largest towns in northeastern India and is an important trade centre for agricultural products. Its research stations include dairy farm, fruit, and silkworm-growing institutions; it also has the Pasteur Institute and Medical Research Institute and two hospitals. The Barpāni hydroelectric station lies a few miles to the north. Pop. (1981) town, 109,244; metropolitan area, 174,703.

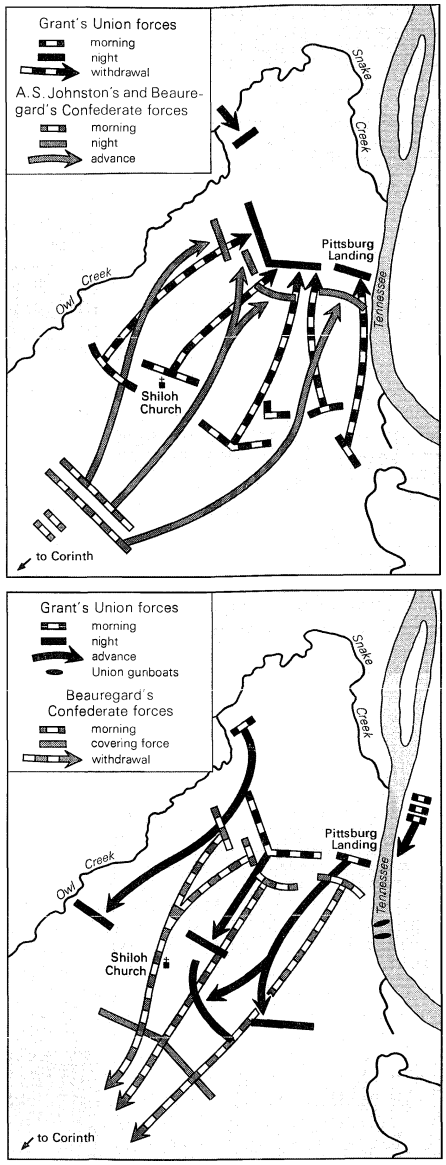
Shilluk, Nilotic people living along the west bank of the Nile between Lake No and latitude 12° N in the south of The Sudan. They speak an Eastern Sudanic language of the Chari-Nile branch of the Nilo-Saharan family.

The Shilluk are sedentary agriculturists with strong pastoral interests (cattle, sheep, and goats). Men hunt, herd, and milk the livestock; both sexes do agricultural work. The community is a cluster of hamlets with a headman elected by a council of hamlet heads from among the members of a dominant lineage. The Shilluk were historically united in a single tribal state headed by a divine king (*reth*) chosen from the sons of previous kings. The king's physical and ritual well-being was held to ensure the prosperity of the whole land. The large royal clan traced descent from the first king and culture hero, Nyikang (Nyikango). In addition to several classes of royalty, the Shilluk traditionally were divided into commoners, royal retainers, and slaves. *See also* Nilotes.

Shiloh, Canaanite town that became the central sanctuary site of the Israelite confederacy during the period of the judges (12th–11th century BC). After the Israelite conquest of Canaan, the Tabernacle and the Ark of the Covenant were installed in Shiloh until the Ark was captured by the Philistines (*c.* 1050 BC) in a battle with the Israelites at Ebenezer (site unknown), and Shiloh was soon thereafter destroyed. Excavations at Khirbat Sayūn, Jordan, during 1920–32 suggest that Shiloh remained a ruin for several centuries.

Shiloh, Battle of, also called BATTLE OF PITTSBURG LANDING (April 6–7, 1862), second great engagement of the American Civil War, fought in southwestern Tennessee, re-

sulting in a victory for the North and in large casualties for both sides. In February, Union Gen. Ulysses S. Grant had taken Ft. Henry on the Tennessee River and Ft. Donelson on the Cumberland. The Confederates had acknowledged the importance of these forts by abandoning their strong position at Columbus, Ky., and by evacuating Nashville. Grant's next aim was to attack the Memphis and Charleston Railroad, and to this end he encamped his troops on the Tennessee at Pittsburg Landing. At this point Gen. A.S. Johnston, commanding Confederate forces in the West, and Gen. P.G.T. Beauregard were collecting a force aimed at recovering some of their recent losses. Since Union troops were planning an offensive, they had not fortified their camps. To their surprise, General Johnston seized the initiative and attacked Grant before reinforcements could arrive. The battle was fought in the woods by inexperienced troops on both sides. Johnston was mortally wounded on the first afternoon. Despite a rallying of Northern troops and reinforcements for the South, the battle ended the next day with the Union Army doing little more than reoccupying the camp it had lost the day before while the Confederates returned to Corinth, Miss. Although both sides claimed victory, it was a Confederate failure; both sides were immobilized for the next three weeks because of the heavy casualties—about 10,000 men on each side.



The Battle of Shiloh on (top) April 6, 1862, and (bottom) April 7, 1862

Shimabara Rebellion (1637–38), uprising of Japanese Roman Catholics, the failure of which virtually ended the Christian movement in 17th-century Japan and furthered government determination to isolate Japan from foreign influences.

The revolt began as a result of dissatisfaction with the heavy taxation and abuses of local officials on the Shimabara-hantō (peninsula) and the Amakusa-rettō (islands). Most of the peasants in the Shimabara vicinity had been converted to Catholicism by Portuguese and Spanish missionaries, and the rebellion soon took on Christian overtones. With the support of large numbers of *rōnin,* samurai whose lords had been dispossessed, the rebels fought so zealously that an army of 100,000 troops was unable to quell them, and the Japanese government had to call in a Dutch gunboat to blast the rebel stronghold. Following this incident the government vigorously enforced its proscription of all Christian beliefs and activities.

Shimada, city, Shizuoka Prefecture (*ken*), Honshu, Japan, on the lower Ōi-gawa (Ōi River). During the Tokugawa era (1603–1867) it was an important post town on the Tōkaidō (Eastern Sea Highway) because fording the river was both difficult and dangerous. Since the early 20th century the city has become a trade centre for timber from the forest-covered Akaishi-sammyaku (Akaishi Range) upstream. Shimada contains several large paper mills and lumber and woodworking industries. Tea and oranges are cultivated on the hills north of the city. Pop. (1980) 70,705.

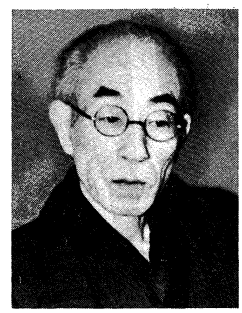
Shimane, prefecture (*ken*), southwestern Honshu, Japan, facing the Sea of Japan. Its area of 2,559 sq mi (6,627 sq km) includes the Oki-guntō (Oki Archipelago). The interior is composed chiefly of a volcanic mountain chain, and the coast is dotted with numerous associated hot springs. In the north, the Shimane-hantō (Shimane Peninsula) encloses Shinji-ko (Lake Shinji), a popular resort area.

Because of its distance from central Honshu and its unfavourable natural conditions, Shimane Prefecture's culture, notable in ancient times, and industry have progressed slowly. Forestry and stockbreeding, however, are well developed, and rice paddies are scattered throughout the prefecture. Matsue (*q.v.*), the prefectural capital, is known outside of Japan through the writings of the 19th-century U.S. writer and teacher Lafcadio Hearn. Shimane University (1949) is located there.

The Izumo Taisha, the oldest Shintō shrine in Japan, is located near Izumo town; it contains a valuable collection of ancient art. The Shimane Prefecture area figures strongly in Japanese mythology, and it is said that in October all the Shintō gods gather at Izumo. Pop. (1983 est.) 787,000.

Shimazaki Tōson, pseudonym of SHIMAZAKI HARUKI (b. March 25, 1872, Magome, Nagano Prefecture, Japan—d. Aug. 22, 1943, Ōiso, Kanagawa Prefecture), Japanese poet and novelist, whose fiction illuminated the clash of old and new values in a Japan feverishly modernizing itself during the period of the Meiji Restoration (1868–1912).

Tōson was educated in Tokyo at Meiji Gakuin, where he was also baptized, although Christianity did not lastingly affect either his life or his thought. In the early 1890s he began to write poetry and joined the short-lived Romantic movement of young poets and writers, which he later described in his novel *Haru* (1908; "Spring"). The first of his major novels, *Hakai* (1906; *The Broken Commandment,* 1974), the story of a young outcast schoolteacher's struggle for self-realization, has been called representative of the Naturalist school, then the vogue in Japan, although it more clearly reflects the influence of Jean-Jacques Rousseau than of Émile Zola. *Ie* (1910–11; *The Family,* 1976) depicts the stresses Japan's modernization brought to his own family. *Shinsei* (1918–19; "New Life") narrates the unsavoury affair of a writer with his niece in a manner that carries the confessional principle to embarrassing excesses.



Shimazaki Tōson

By courtesy of the International Society for Educational Information, Tokyo

Tōson began research in 1928 for *Yoake mae* (1935; "Before the Dawn"), his greatest work and one of the masterpieces of modern Japanese literature. This is a story of the struggle for the Imperial Restoration in the 1860s as mirrored in a rural community. The tragic hero of the novel, modelled after the writer's own father, eventually dies an embittered death, convinced that the cause of pure patriotism had been betrayed by the glib modernizers of post-Restoration Japan. A final novel, *Tōhō no Mon* ("Gate to the East"), incomplete at his death, seems to invoke the Buddhist wisdom of medieval Japan as a way out of the impasse of the present.

Shimazu FAMILY, powerful warrior clan that controlled the southern tip of the Japanese island of Kyushu from the 12th to the 19th century. Ensconced in their isolated stronghold on the frontier of Japan, the Shimazu were the only feudal family to play a leading role in Japanese history in both medieval and modern times. During the Tokugawa shogunate (1603–1867), the family's Satsuma fief was the third largest in the country. Then, in the Meiji Restoration, Shimazu warriors, together with warriors loyal to the Mōri family in Chōshū, overthrew the Tokugawa in 1867 and established the new Imperial government. Men from the Satsuma fief continued to dominate the Japanese government until the close of World War I and the Japanese Navy long afterward.

The Shimazu family was founded in the late 12th century by Shimazu Tadahisa (1179–1227), who adopted the surname of Shimazu after he was appointed governor of the southern portion of Kyushu. The clan prospered by taking advantage of trade with Korea and the Ryukyu Islands. By the 16th century the Shimazu had become the major power in southwestern Japan, and they also controlled most of the island of Kyushu.

The Shimazu family was finally defeated by Toyotomi Hideyoshi (1537–98) in 1587 in his efforts to reunify Japan. Hideyoshi allowed them to keep the southern part of their domain, and thereafter they became one of his staunchest allies. In 1600, however, the Shimazu clan joined the other great lords of western Japan in a futile effort to avoid the hegemony of Hideyoshi's successor, Tokugawa Ieyasu (1543–1616). After the fighting ended, the Shimazu made peace with Ieyasu and were permitted to keep their relatively inaccessible domain.

In 1609 the Shimazu conquered the Ryukyu Islands and forced that territory to pay tribute to Satsuma. Since the Ryukyu islanders con-

tinued their traditional tributary trade with China, Satsuma had indirect access to Chinese luxury products. Although over the next 20 years the Tokugawa gradually imposed restrictions that closed Japan to almost all trade and intercourse with foreign countries, the Shimazu were able to continue their trade with the Ryukyu Islands.

The Shimazu also continued aloof from the Tokugawa and nourished a hatred for the Tokugawa house among their warriors. After Satsuma led the movement that overthrew the Tokugawa in 1867, the fief of Satsuma was dissolved and made into the Kagoshima Prefecture of the new central government, which gave the head of the Shimazu clan the hereditary rank of prince.

Shimazu Hisamitsu, KOSHAKU (Duke, or Prince) (b. Nov. 28, 1817, Kagoshima, Satsuma Province, Japan—d. Dec. 6, 1887, Kagoshima), noted Japanese lord who led his clan in the 1868 overthrow of the Tokugawa shogunate, the military dictatorship that had dominated Japan for 264 years. He then helped organize the newly restored Imperial government.

In 1858 Hisamitsu succeeded to the head of Satsuma *han,* one of the largest feudal fiefs into which Japan was then divided. At that time the country was in the midst of a grave crisis over Western demands that Japan end its two centuries of seclusion and open its ports to international trade. That crisis revived sentiment for the restoration of Japan's Imperial power. Hisamitsu accordingly demanded that shogunal officials grant more power to the emperor and to the important feudal lords like himself, who had previously been denied participation in the central government. The appointment of the Hitotsubashi clan leader Tokugawa Yoshinobu as shogunal guardian signalled the acceptance of Hisamitsu's proposals. To give Yoshinobu the opportunity to work out a new program, Hisamitsu helped suppress the extremist leaders who had gathered around the Emperor and who were harassing the Shogun.

On Sept. 14, 1862, as Hisamitsu was travelling to the court with his retinue, his followers attacked four Britons who rode past the procession without paying proper respect to Hisamitsu. One was killed and two others were wounded. Britain's demand for a huge indemnity precipitated a major crisis. The Shogun agreed to pay £100,000, but the Satsuma *han* refused to pay anything. The British then attacked and partly levelled the *han* capital, Kagoshima. Realizing that British strength was far superior, Hisamitsu offered to pay £25,000 and to punish the culprits if they could be found.

Early in 1864, Hisamitsu and several other great lords were appointed as members of a new governing council composed of representatives of the court and of the shogun. But a dispute between Yoshinobu and Hisamitsu soon broke up the conference and ended hope of a political compromise.

After his return to Satsuma in March 1864, Hisamitsu increasingly came under the influence of his vassals Saigō and Ōkubo, who, in 1868, instituted the coup d'état that toppled the shogun. The coup was led in Hisamitsu's name, and he participated in organizing the new government. His position was largely symbolic, however, and he soon retired.

Shimazu Nariakira (b. Nov. 5, 1809, Edo, Japan—d. Aug. 24, 1858, Kagoshima, Satsuma Province), mid-19th century Japanese daimyo (lord) of the Satsuma *han,* or feudal fief, whose adoption of Western military techniques and armaments helped make Satsuma one of the strongest fiefs in the country and put the *han* in a position to play a leading role in the overthrow of the Tokugawa state and the establishment of a new Imperial central government in 1868.

The Shimazu house had long maintained special relations with the Ryukyu Islands, and the family therefore was more familiar with foreign affairs than were most of the other Japanese clans. After Nariakira became the lord of Satsuma in 1851, he put this knowledge to good use by experimenting with Western drill in his army and constructing blast furnaces to produce modern firearms. In a short time, docks were built, a steamer was launched, a cavalry force modelled after that of France was trained, a Western-style navy was started, and a number of nonmilitary industries were begun. His policy of promoting young men of lesser rank into higher positions in his government put many of the men who in 1868 led the Meiji Restoration into positions of authority.

Nariakira himself played an important role in national politics, becoming one of the major advisers to the Tokugawa government during the crisis brought on by the 1853 arrival in Japan of U.S. Commo. Matthew C. Perry, whose mission was to open Japan to contact with the outside world. Nariakira was one of the few great lords to advise a policy of moderation during this period, urging that Japan temporarily accede to Perry's demands in order to gain time to strengthen its armaments.

But the Shogun went even farther in acceding to Perry's demands for opening up Japan and brought on the criticism of Nariakira, who joined other great lords in urging the selection of Tokugawa Yoshinobu as shogunal successor. For this he was ordered into retirement, thus increasing the growing friction between the houses of Shimazu and Tokugawa that led to the 1868 Meiji Restoration, 10 years after Nariakira's death.

Shimazu Shigehide (b. November 1745, Kagoshima, Satsuma Province, Japan—d. March 22, 1833, Edo), Japanese lord of the great *han,* or feudal fief, of Satsuma. Shimazu's strong leadership and his interest in Western studies put Satsuma in a position to play a leading role in Japanese affairs from the mid-19th to the mid-20th century.

Succeeding his father as head of Satsuma in 1755, Shigehide soon acquired an intense curiosity about Western affairs. He studied Dutch, the Dutch being the only Westerners then allowed into Japan, and patronized specialists in Western studies. In 1774 he founded a medical school, and he later also established institutes for the study of astronomy and mathematics, making Satsuma one of the most technically advanced areas of Japan.

Shigehide married his daughter to the Shogun, the hereditary military dictator of Japan. The alliance enabled Shigehide to exercise great influence over the central government, but the cost of pursuing that kind of power brought Satsuma to the verge of financial ruin. He therefore ordered reforms that included cancellation of all debts to merchants and reassertion of strong central authority. These measures so strengthened Satsuma's economy that it was able to take a leading role in the Meiji Restoration (1868), which overthrew the shogun and established a new Imperial government.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Shimizu, city, Shizuoka Prefecture (*ken*), Honshu, Japan, situated on the northwest coast of Suruga-wan (Suruga Bay). During the Tokugawa era (1603–1867) Shimizu was a post town on the Tōkaidō (Eastern Sea Highway). Its commercial port, protected by the sandspit of Miho-saki (Cape Miho), is also a major industrial area and one of the largest deep-sea fishing centres in Japan. Main products are canned goods, motorcycles, ships, musical instruments, and synthetic textiles. Petroleum and aluminum refineries operate there. Future industrial development will be difficult because level land is scarce. In the surrounding rural area, oranges, tea, cucumbers, and strawberries are raised. Places of scenic and historic interest include Miho-no-Matsubara (Pine Groves of Miho), the Ryuge-ji (Ryuge Temple), containing a fern palm believed to be more than 1,000 years old, and the nearby Nippon-Daira plateau. Pop. (1983 est.) 240,952.

Shimjon (Korean painter): *see* An Chung-sik.

shimmy, jazz dance, originally popular among U.S. blacks at least as early as 1900. Its movements consist of trembling the shoulders or the entire body. After its appearance in Broadway musicals in 1919 and 1922 it became, in somewhat diluted form, a craze in U.S. ballrooms. It has counterparts in the Caribbean (*e.g.,* the *banda* of Trinidad) and in West Africa.

Shimodate, city, Ibaraki Prefecture (*ken*), Honshu, Japan, situated on a tributary of the Kokai-gawa (Kokai River). Shimodate was a cotton textile centre during the Tokugawa era (1603–1867). The construction of railways during the Meiji era (1868–1912) connected the city with Mito (east) and Utsunomiya (northwest). It is now a major commercial and transport centre producing electrical appliances. Pop. (1980) 61,324.

Shimoga, town, administrative headquarters of Shimoga district, western Karnātaka (formerly Mysore) state, southern India. Situated on the Tunga River (a headstream of the Tungabhadra), it is a road and rail junction, reexporting areca nuts, rice, coffee, and pepper. Industries include rice and oilseed milling and cotton processing. Cloth is handloomed as a cottage industry. The town's schools of education, commerce, arts and science, law, Kamala Nehru Memorial National College for Women, and other colleges are affiliated with the University of Mysore.

The district (4,073 sq mi [10,548 sq km]) is drained by the Tungabhadra and Sharavati rivers. Coffee, sugarcane, and rice are grown in the mountainous western portion, while the eastern plain is devoted to dry crops (cotton, millet, and oilseed). Natural resources include timber, iron ore, limestone, and manganese. There is a hydroelectric project near Jog Falls (*q.v.*). Apart from the district headquarters, the main towns are Bhadrāvati (*q.v.*), Sāgar, and Shikārpur. Pop. (1981) town, 151,783; district, 1,656,731.

Shimomura Kanzan, original name SHIMOMURA HARUSABURŌ (b. April 10, 1873, Wakayama, Japan—d. May 10, 1930, Tokyo), Japanese artist who contributed to the modernization of traditional Japanese painting.

Shimomura went to Tokyo in 1881 to study painting and became a pupil of Kanō Hogai and Hashimoto Gahō. One of the first students to enter the Tokyo Fine Arts School, founded in 1889, he joined its staff upon graduation, only to leave the school when the principal and famous art critic, Okakura Kakuzō, was ousted. Shimomura then joined the Japan Fine Arts Academy established by Okakura and Hashimoto. He was known for his mastery of traditional Japanese and Chinese painting and for his keen sense of colouring. Among his representative works are "Ōhara Gokō" (the retired emperor Go-Shirakawa visiting the ex-empress and nun Kenreimonin at Ōhara, 1908) and "Yowahōshi" ("The Weak Monk," 1915).

Shimonoseki, largest city, Yamaguchi Prefecture (*ken*), Honshu, Japan, occupying a strategic position on the Shimonoseki-kai-

kyō (Shimonoseki Strait) between Honshu and Kyushu. The city was formerly called Akamaga-seki and Bakan. Its modern development began in 1905 with the opening of railroad ferry service to Moji (now Kita-Kyūshū), Kyushu; later links include a railroad tunnel (1942) and a vehicular-pedestrian tunnel (1958) under the strait. An international ferry service opened between Shimonoseki and the port of Pusan, South Korea, in 1970. Shimonoseki became a heavy-industrial centre after 1942, and in 1940 its port was amalgamated with those of Moji and Kokura into the single port of Kammon. During the 1970s the Shinkansen (New Trunk Line) railway service linking Tokyo with Ōsaka was extended to Shimonoseki, en route to northern Kyushu through an underground tunnel beneath the Shimonoseki Strait.



Akamo Shrine, Shimonoseki, Japan
Photos Pack—EB Inc.

The city's attractions include the Shimonoseki Aquarium, the largest in Japan. The Akama Shrine hosts an annual festival in April commemorating the defeat at the city site of the Taira (Heike) clan in the 12th century. Pop. (1989 est.) 264,803.

Shimonoseki, Treaty of (April 17, 1895), agreement that concluded the first Sino-Japanese War (1894–95), which ended in China's defeat. China was obliged to recognize the independence of Korea, over which it had traditionally held suzerainty; to cede Taiwan, the Pescadores Islands, and the Liaotung (south Manchurian) Peninsula to Japan; to pay an indemnity of 200,000,000 taels to Japan; and to open the ports of Sha-shih, Ch'ung-ch'ing, Soochow, and K'ang-chow to Japanese trade. The Triple Intervention (1895), secured by Russia, France, and Germany, subsequently required Japan to retrocede the Liaotung Peninsula to China in return for an additional indemnity of 30,000,000 taels.

Shimshelevich, Isaac: *see* Ben-Zvi, Itzhak.

Shin, in full JŌDO SHINSHŪ (Japanese: True Pure Land sect), the largest of the popular Japanese Buddhist Pure Land sects. *See* Pure Land Buddhism.

shin (anatomy): *see* tibia.

Shin Rengo, English in full JAPANESE TRADE UNION CONFEDERATION, the largest trade union confederation in Japan from its founding in 1989. Shin Rengo's predecessor organization was Rengo, a large and politically moderate confederation of private-sector trade unions that was formed in 1987. When Sōhyō, a confederation of public-sector unions, was dissolved in 1989, most of its members became part of Rengo, which was then renamed Shin Rengo. The new confederation had more than 8 million members and was centre-left in ideology, with political affiliations to both the Japan Socialist Party and the Clean Government Party (Kōmeitō).

Shinano River, river, the longest in Japan, draining most of Nagano and Niigata prefectures. It rises at the foot of Mount Kobushi, in the Japanese Alps of Honshu, and flows north-northeast for 228 miles (367 km) to enter the Sea of Japan at Niigata. Its upper course is joined by numerous tributaries, including the Sai and Uono rivers, both of which drain small but productive and populous intermontane basins. The lower reaches of the Shinano River become deltaic and swampy as the river crosses the Niigata Plain.

Because the river's lower course flooded during the spring thaw, a discharge canal was constructed at Okozu in 1923. The decreased amount of transported sand and silt, however, has made the river's delta vulnerable to the sea, a danger further enhanced by land subsidence resulting from the withdrawal of groundwater to extract natural gas. The Shinano River has long served as an inland waterway. Its numerous river ports include Niigata, at its mouth.

Shinbutsu shūgō, in Japan, amalgamation of Buddhism with the indigenous religion Shintō. The precedents for this amalgamation were laid down almost as soon as Buddhism entered Japan in the mid-6th century, and the process of blending Buddhism with Shintō has dominated the religious life of the people up to the present. Even today Japanese frequently retain in their homes both Shintō god shelves (*kamidana*) and Buddhist altars (*butsudan*) and observe Shintō rites for marriage and Buddhist rites for funerals.

The pattern of coexistence first began to emerge in the Nara period (AD 710–784). Before construction of the Daibutsu (Great Buddha) at Nara in AD 741, the proposal to build the statue was first reported to Amaterasu Ōmikami, the Shintō sun goddess, at the Ise Shrine, the chief shrine of Japan. Aid was also requested of the kami (god) Hachiman, and a branch of the (Shintō) Usa Hachiman Shrine on the island of Kyushu was built in the compound of the (Buddhist) Tōdai Temple to protect it. From that time a practice developed of building Shintō shrines in Buddhist temple compounds and temples or pagodas near Shintō shrines, and also of reciting Buddhist scriptures at Shintō shrines.

In the Heian period (9th–12th century), Shintō kami (gods) came to be identified as incarnations of the Buddha, and for a time Shintō priests were dominated by Buddhist ecclesiastics and were relegated to a secondary role even in Shintō rites. During the general spiritual awakening of the Kamakura period (AD 1192–1333), however, Shintō attempted to emancipate itself from Buddhist domination, and the Ise Shintō (*q.v.*) movement claimed that Shintō divinities were not incarnations of the Buddha but that buddhas and bodhisattvas (buddhas-to-be) were rather manifestations of Shintō kami.

The separation of the two religions was one of the early reforms of the Meiji regime, which in 1868 issued an edict ordering Buddhist priests connected with Shintō shrines either to be reordained as Shintō priests or to return to lay life. Buddhist temple lands were confiscated and Buddhist ceremonies abolished in the imperial household. Shintō was proclaimed as the national religion; later it was reinterpreted as a suprareligious national cult (*see* State Shintō).

shinden-zukuri, Japanese architectural style for mansion-estates constructed in the Heian period (794–1185) and consisting of a *shinden,* or chief central building, to which subsidiary structures were connected by corridors.

The *shinden* style developed when the Heian court nobility, given rectangular plots of land around the imperial enclosure, based the construction of their houses on the same Chinese models as had been used in designing the Imperial Palace. The complex centred on the *shinden,* which faced south on an open court. The eastern and western *tainoya,* or subsidiary living quarters, were attached by *watadono,* wide covered corridors, from which narrow corridors extended south, ending in *tsuridono,* small pavilions, creating a U-shaped arrangement around the court. Wealthier nobles built additional buildings behind the *shinden* and *tainoya.*

The *moya,* or main room of the *shinden,* was surrounded by a secondary roofed veranda, or *hisashi.* The *moya* was not partitioned, privacy being secured by low portable screens. Mats on the floor served for seating. Across the court from the *moya* was the pond garden, forming the enclosure's southern limit. Mountain shapes, trees, and rocks combined in a landscape representation of the Western Paradise of the Amida Buddha. The eastern gate was the formal entrance around which officers and guards were quartered.

In smaller complexes, as time progressed, corridors gradually were shortened until they disappeared, and the outbuildings came to be attached to the central building. Sliding partitions, rather than physical distance, were used more and more to differentiate living quarters.

shiner, any of several small North American fishes of the minnow (*q.v.*) group.

Shingei, also called GEIAMI (d. 1485, Japan), Japanese artist who represents the second generation of an extraordinary family of painters and art connoisseurs and who served the Ashikaga shoguns (a family of military dictators that ruled Japan, 1338–1573).

Shingei succeeded his father, Shinnō (Nōami), as curator of the Ashikaga art collection, but as an artist he followed Tenshō Shūbun (early to mid-15th century), the foremost *suiboku* (monochromatic ink painting) painter who, in turn, had been inspired by the Chinese landscape masters Hsia Kuei and Ma Yüan (active 12th century AD). Shingei's most famous painting, "The Waterfall" (1480; in the Nezu Art Museum in Tokyo), is executed in the Tenshō Shūbun manner; but its pronounced stylization represents a significantly greater departure from the original Chinese landscape paintings. Shingei's style was continued by his disciple Kei Shoki, for whom "The Waterfall" was painted as a parting gift.

shingle, thin piece of building material, usually with a butt end thicker than the other. Shingles are widely used as roof covering on residential buildings and sometimes for siding. They are of stock sizes and various materials—including wood, asphalt, and slate. They are attached in overlapping courses, or rows.

As roofing, the degree to which the shingle's surface is exposed is controlled by the pitch of the roof. As siding, the degree of overlap is mainly an aesthetic concern. Wooden shingles are cut in various ways, such as hand splitting, which is the ancient method, quarter-sawing, and plain-sawing. They are usually cut from green wood and kiln-dried. If quartersawn and with a thick butt, they resist warping. Wood shingles in the United States are usually of cypress, redwood, or Western red cedar. They may be entirely of heartwood, in which case they are relatively decay resistant, or of mixed heartwood and sapwood. The surface may be striated, left smooth by sawing, or feature the slight roughness of hand splitting. Wood shingles must be treated with some kind of weatherproofing stain or paint to keep them from bleaching to a grayish colour.

"Shingle style" is a mode of wood shingle-covered American domestic architecture of the 1870s and '80s. The finest examples are Henry Hobson Richardson's Sherman House (1874–75) in Newport, R.I., and the Stoughton House (1882–83) in Cambridge, Mass.

Shingle style, uniquely American architectural style that flourished between 1879 and 1890 in which the entire building was covered with shingles. In a period when revivals of



Detail of the Stoughton House, Cambridge, Mass., U.S., designed in the Shingle style, by H.H. Richardson, 1881–83
Wayne Andrews

historical styles had overpowered architectural designs, the Shingle style turned away from learned eclecticism and thereby helped provide the spirit of functionalism that developed fully at the beginning of the 20th century.

The Shingle style, to a large extent, grew out of the earlier Stick and Queen Anne styles and was stimulated by a revived interest in colonial American architecture of the 17th century. The buildings in this style are all private homes or hotels, as no large industrial or commercial buildings could practically be built entirely of wood.

The Shingle style, like the Stick style that preceded it, was characterized by a free-flowing, open plan and frequent interpenetrations between interior and exterior space. Open porches and the irregular roof line contribute to the general picturesque or rustic effect. The irregular elevation of the building conveys a feeling of openness.

The major theoretician of the style was John C. Stevens (1855–1940), author of *Examples of American Domestic Architecture* (1889). Notable architects working in the Shingle style included William Ralph Emerson, H.H. Richardson, and Bruce Price. The Price version of the Shingle style, best seen in his homes at Tuxedo Park, N.Y. (1885), influenced the early work of Frank Lloyd Wright.

shingles (disease): *see* herpes zoster.

Shingon (Japanese: "True Word"), Chinese CH'EN-YEN, esoteric Buddhist sect that has had a considerable following in Japan since its introduction from China in the 9th century. Shingon may be considered an attempt to reach the eternal wisdom of the Buddha that was not expressed in words and, thus, not in his public teaching. The sect believes that this wisdom may be developed and realized through special ritual means employing body, speech, and mind, such as the use of symbolical gestures (*mudrās*), mystical syllables (*dhāraṇī*), and mental concentration (yoga). The whole is intended to arouse an immediate sense of the pervading spiritual presence of the Buddha that lies inherent in all living things.

The principal scripture of the school is the *Dainichi-kyō* (Sanskrit: *Mahāvairocana-sūtra,* "The Great Sun Sūtra"), a late text known only in its Chinese version. The whole universe is conceived to be the body of the Buddha Mahāvairocana (the "Great Illuminator"). He has two aspects, known as the *kongō-kai* ("diamond world"; Sanskrit: *vajradhātu*) and the *taizō-kai* ("womb world"; Sanskrit: *garbha-dhātu*), each of which has its characteristic depiction in the *maṇḍala,* the ritual diagram often painted on the Shingon altar and appearing in painting and sculpture. Entry into the *maṇḍala* is called *kanjō* (Sanskrit: *abhiṣekha*), an initiation ceremony involving sprinkling with water.

Shingon esotericism is a part of Vajrayāna, or Tantric Buddhism, which spread in the 8th century from northeastern and northwestern India to Tibet and Java as well as to China and from there to Japan. In Japan, however, the doctrine was much modified and systematized by the great religious leader Kūkai, known posthumously as Kōbō Daishi.

The Shingon doctrine reached China through the missionary work of three Indian monks, Śubhakarasiṃha, Vajrabodhi, and Amoghavajra. The Ch'en-yen school flourished for a time in the court at Ch'ang-an but disappeared in China after the fall of the T'ang dynasty (907). Some of its rituals have been adopted by other Chinese Buddhist sects, and it has had lasting influence on Chinese funeral rites.

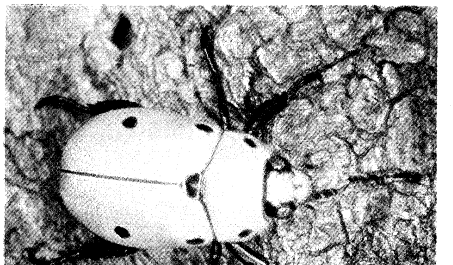
Kōbō Daishi studied the doctrine in China under a Tantric master and returned to found the Kongōbu Temple monastic centre at Mount Koya, south of Kyōto, in 819; he later established the Tō Temple in Kyōto as the sect's headquarters. By the end of the Heian period, it was, like the other Heian-founded sect, the Tendai, both rich and powerful. The esoteric doctrine of the Shingon school is sometimes called Tōmitsu (for the tradition transmitted in the Tō Temple), to distinguish it from the similar Tendai esoteric tradition, sometimes called Taimitsu.

The genius of Kōbō Daishi lay in his appropriation of the philosophical insights of Ch'en-yen for the formulation of his own worldview, set forth in his theory of the 10 stages of spiritual development. This scheme not only ranked all the major Buddhist schools according to what he considered their degree of insight but also included Hinduism, Confucianism, and Taoism. The Shingon school took a conciliatory attitude toward Shintō and provided the theoretical basis for a rapport with Ryōbu ("Two Aspects") Shintō, a Shintō-Buddhist amalgamation.

Shingon Shintō: *see* Ryōbu Shintō.

shining leaf chafer, any member of the insect subfamily Rutelinae of the scarab family Scarabaeidae (order Coleoptera), including some of the most beautifully coloured and most destructive beetles. The iridescent and metallic colours of most species are produced by pigments in the integument ("skin"). The majority of the species are tropical or subtropical.

The North American goldsmith beetle (*Cotalpa lanigera*) is broad and oval and is about 20 to 26 mm (0.8–1 inch) long. It is coloured a shining gold on the head and thorax (region behind the head) and is copper-coloured on the underside of the body. A related species,



Common vine pelidnota (*Pelidnota punctata*)
Stephen Collins

the common vine pelidnota (*Pelidnota punctata*), occurs throughout North America. It is bright orange-brown with three black spots on each wing cover (elytra). The larvae feed on grapevine roots, the adults on the leaves; both can be quite destructive. The Japanese beetle (*q.v.; Popillia japonica*), which has become a major pest in North America, is also a member of this group.

Shining Path, byname of COMMUNIST PARTY OF PERU FOR THE SHINING PATH OF JOSÉ CARLOS MARIÁTEGUI, Spanish SENDERO LUMINOSO, or PARTIDO COMUNISTA DE PERU PARA EL SENDERO LUMINOSO DE JOSÉ CARLOS MARIÁTEGUI, Peruvian revolutionary movement that employs guerrilla tactics and violent terrorism in the name of Maoism. It was founded in 1970 in a multiple split in Peru's Communist Party (dating from the 1920s) and took its name in reference to the maxim of the founder of Peru's first Communist Party, José Carlos Mariátegui: "El Marxismo-Leninismo abrirá el sendero luminoso hacia la revolución" ("Marxism-Leninism will open the shining path to revolution").

The leader and principal founder was Abimael Guzmán Reynoso, alias Comrade Gonzalo (b. 1934, Mollendo, near Arequipa, Peru), a long-time Communist and former philosophy teacher (1962–78) at the University of Huamanga in the city of Ayacucho in the high Andes. He and his followers, known as Senderistas, sought to restore the "pure" ideology of Mao Tse-tung, which, they felt, had been betrayed by the "revisionism" of the leaders in Moscow, Cuba, and post-Mao China. The party's models being Stalinist Russia, China's Cultural Revolution, and the Khmers Rouges regime in Cambodia, the Senderistas envisioned revolution as a long military offensive, relying primarily on the peasantry and ruthlessly destroying municipal sites and other evidences of parliamentary and "bourgeois" influences. Although the Senderistas originally operated in remote areas of the Andes (their first act of violence occurred on May 17, 1980, near Ayacucho), they soon were bombing targets, committing assassinations, and engaging in other terrorist acts in various urban centres, including Lima and Callao.

Shinkansen (Japanese: "New Trunk Line"), high-speed rail line between Tokyo and Fukuoka on the Japanese islands of Honshu and Kyushu. The line was built and originally operated by the Japanese National Railways (JNR); in 1987 it became one of the private companies formed from the breakup of the JNR.

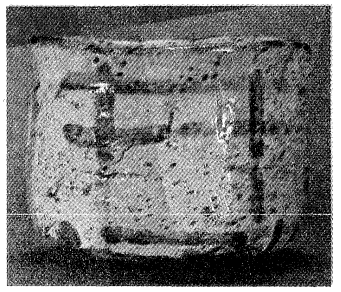
The first section of the line, a 320-mile (515-kilometre) stretch between Tokyo and Ōsaka known as the "New Tōkaidō Line," was opened in 1964. Many innovations, such as the use of prestressed concrete ties and mile-long welded sections of track, were introduced in constructing this line. A 100-mile (160-kilometre) extension from Ōsaka to Okayama was completed in 1972, and the final segment of the line, a 244-mile (393-kilometre) stretch between Okayama and the Hakata station in Fukuoka, northern Kyushu, opened in 1975. Other lines radiating north of Tokyo to the cities of Niigata (168 miles [270 km]) and Morioka (289 miles [465 km]) were completed in 1982. More than 50 percent of the track in the Okayama–Hakata extension runs through tunnels, including one under the Strait of Shimonoseki to Kyushu; the Tokyo–Niigata line includes a tunnel 14 miles (22.5 km) long.

About 250 trains operate daily on the Shinkansen, running at 7.5-minute intervals during the morning and evening rush hours. The fastest trains, called Hikari ("Light"), are able to make the 664-mile (1,068-kilometre) trip from Tokyo to Hakata in less than 7 hours. The Hikari is an electric, multiple-unit train consisting of 16 cars designed to seat more than 1,000 passengers. It derives its electric power from an overhead wire system. The Hikari's maximum speed on the original section between Tokyo and Ōsaka is 130 miles (210 km) per hour, but on the newer section it reaches speeds of 160 miles (260 km) per hour. Such high speeds have

necessitated elaborate safety features. Each car, for example, is equipped with brakes consisting of cast-iron disks and metallic pad linings specially designed not to distort under emergency braking. Moreover, all movements of the train are monitored and controlled by a central computerized facility in Tokyo.

shinny (game): *see* shinty.

Shino ware, glazed Japanese ceramic ware produced in Mino Province (in modern Gifu Prefecture), and perhaps the most typical variety of pottery produced during the Azuchi-Momoyama period (1574–1600). The name *shino* may possibly be derived from the name



Shino tea bowl, second half of the 16th century, Momoyama period; in the Mitsui Collection

By courtesy of the Mitsui Collection

of Shino Soshun, a tea and incense master who flourished in the Daiei era (1521–27) of the late Muromachi period. It is also possible that Shino is simply a corruption of *shiro,* which means "white" in Japanese.

Shino ware is generally covered with a rich, white feldspar glaze, sometimes with a faint hint of rose beneath. Under the white glaze some wares have plant and other naturalistic motifs drawn in iron glazes. Shino pottery was made at Okaya, Onada, Gotomachi, and Kujiri in the northwestern part of Toki, as well as at a number of other kilns throughout southern Japan. Each of these kilns had its own distinguishing stylistic characteristics, but their wares are all made from a fine, white potting clay, covered with thick feldspar glazes. Besides white Shino, there are red Shino, rose Shino, *neriagede* (which combines different colours), and gray Shino. The warm gray hue of the latter type was produced by covering the ware with an iron slip before scratching in its designs and by then covering the piece with a feldspar glaze and firing it in reducing flames.

Shinran, original name MATSUWAKA-MARU, also called HAN'EN, SHAKKŪ, ZENSHIN, or GUTOKU SHINRAN, posthumous name KENSHIN DAISHI (b. 1173, near Kyōto—d. Jan. 9, 1263, Kyōto), Buddhist philosopher and religious reformer whose concern for the salvation of the masses apart from those endowed with self-enlightenment led him to establish (1224) the Jōdo Shinshū (True Pure Land sect), the largest school of Buddhism in modern Japan. His monumental anthology *Kyōgyōshinshō* (1224; "Teaching-Action-Faith-Attainment") made an original contribution to Buddhist philosophy with its interpolation of faith between action and attainment.

Orphaned at an early age, Shinran entered the Tendai priesthood when he was nine and was given the name Han'en in 1182 by the priest Jichin (Jien), the head of Shōren-in. For 20 years Shinran studied Buddhism on Mt. Hiei, where an eminent Buddhist monk, Saichō (Dengyō Daishi), had established the centre of the Tendai school, which taught that the Buddha uses skillful means to enlighten men.

Despite the most rigorous asceticism, Shinran failed to find the assurance of salvation. A long spiritual struggle in quest of salvation had occupied his early years as a monk of the Tendai school, which had been weakened by its political affiliation with the aristocracy. Moreover, at the beginning of the Kamakura period (1192–1333), the decline of the aristocratic class and its fierce struggles with the military class for political supremacy brought so much confusion and distress that the people began to accept a pessimistic view of history, according to which, with the passage of time after the Buddha's death, the world would gradually become degenerate and the Buddha's teaching would become decadent.

Shinran then came down from Mt. Hiei for 100 days to continue his quest for salvation in the Rokkaku-dō (Hexagonal Temple), in Kyōto. It was at this time that he met the Buddhist saint Hōnen, founder of the Jōdo (Pure Land) sect, who had been preaching to the masses the message: "Anyone who only calls Amida's Name shall be saved without fail, for the Name-Call is not a human contrivance, but the select way given in Amida's Original Vow." This practice of calling the name of the Amida Buddha (or Amitābha) is known as *nembutsu.*

In his 29th year, Shinran abandoned ascetic practices and took refuge in the Original Vow. In his 33rd year, Shinran was allowed to copy Hōnen's main work, the *Senchaku hongan nembutsu-shū* ("Collection on the Choice of the *Nembutsu* of the Original Vow"), or *Senchaku-shū,* and drew a portrait of Honen. The *Senchaku-shū* was a great source of inspiration to Shinran, for copies of the document were entrusted only to a few close disciples.

Shinran's study under Hōnen came to an end in 1207, when the government issued an edict against Hōnen's *nembutsu* movement (focussed on the invocation of the Buddha's name). The oppression had its centre in Kōfuku-ji at Nara and at Enryaku-ji on Mt. Hiei. As a result, Hōnen was exiled to Tosa Province and Shinran to Echigo Province, and



Shinran, detail, ink on paper by Sen-ami, mid-13th century; in the Nishi-Hongan-ji, Kyōto

By courtesy of the International Society for Educational Information, Tokyo

two other *nembutsu* teachers were beheaded. Soon after his arrival in Echigo, Shinran married Eshinni, in violation of the Buddhist precept of celibacy for the priesthood.

Shinran's biography *Denne,* written by Kakunyo in 1295, ascribes a strong evangelistic impulse to his move to the Kantō region in east central Japan, where, between 1212 and 1235 or 1236, he lived an academic and missionary life. During this period he compiled the six volumes of the *Kyōgyōshinshō.* His ministry also had great success. Leaving behind a body of devoted believers, he had sown seeds that were later to bear fruit when ecclesiastical institutions were set up.

After 20 years he left Kantō for Kyōto, where his fellow believers were in a miserable plight from constant oppression after Hōnen's death. Moreover, in 1256 Shinran had to disown Zenran, his oldest son, who tried to control the community with a heretical interpretation of the faith. This was the most tragic experience in Shinran's long life. Despite spiritual depressions and economic difficulties, he was able to compile a number of derivative works designed to make his teachings accessible to the masses. Works that are regarded as important include *Jōdo wasan, Kōsō wasan,* and *Shōzōmatsu wasan,* three volumes of Buddhist poems and hymns (*wasan*) that were later compiled by the patriarch Rennyo in the *Sanjō wasan; Jinen hōni shō ("Treatise on the Ultimate Truth of Things"*); and *Yuishinshō mon'i* ("Notes on 'The Essentials of Faith Alone' ").

Shinran died quietly in January 1263 in Kyōto, where he had been born 90 years before. Shinran's teaching of justification by faith alone, and especially his teaching concerning the spiritual priesthood of all devotees, contained democratic implications that the mass of the people were later to apply in the service of a social and religious reformation.

(G.H.S.)

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shinsen, in the Shintō religion of Japan, food offerings presented to the *kami* (god or sacred power). The dishes may vary according to the shrine, the deity honoured, and the occasion of worship, but they generally consist of rice, sake (rice wine), rice cake, fish, fowl, meat, seaweed, vegetables, fruits or sweets, salt, and water. The *shinsen* is prepared with meticulous care, often of food especially cultivated for the purpose. During agricultural and other festivals (*see* matsuri), the *shinsen* may consist of the first fruits or first rice sheaves of the harvest. *Shinsen* is also distinguished by the manner in which the food is prepared, either cooked (*jukusen*) or raw (*seisen*), or entirely vegetarian (*sosen*). The consecrated food is consumed after the ceremony at a feast usually attended by the priests and worshippers.

Shinshō (Japanese potter): *see* Ogata Kenzan.

shinshoku, priest in the Shintō religion of Japan. The main function of the *shinshoku* is to officiate at all shrine ceremonies on behalf of and at the request of worshippers. He is not expected to lecture, preach, or act as spiritual leader to his parishioners; rather, his main role is to ensure the continuance of a satisfactory relationship between the *kami* (god or sacred power) and the worshipper through offerings, evocation of the *kami,* and mediation of the deity's blessing to the parishioners.

The highest rank of *shinshoku* is the *gūji* (chief priest). In large shrines he generally has serving under him the *gon-gūji* (associate chief priest), *negi* (priest, or senior priest), and *gon-negi* (junior priest).

In the Grand Shrine of Ise, the supreme priestess, the *saishu* ("chief of the religious ceremonies"), ranks even above the supreme

priest, the *dai-gūji.* Formerly the post of supreme priestess was always filled by an unmarried princess of the Imperial family. She devoted herself entirely to the religious ceremonies (*matsuri, q.v.*) of the Ise Shrine.

To qualify as a *shinshoku,* a novice must attend a school approved by the Jinja Honchō (Association of Shintō Shrines), usually the Kokugakuin University in Tokyo, or pass a qualifying examination. At one time the office of high priest was inherited. The priesthood of some temples is said to have remained within the same families for as many as 100 generations. Although the hereditary status of the office has been abolished, the practice continues in many shrines by local preference.

Priests may marry and have families. Women may also be admitted to the priesthood, and widows often succeed their husbands. The priests are supported by offerings of the parishioners and worshippers.

In modern Japan an alternative name for the Shintō priest is *kannushi,* which traditionally referred only to a head priest who, through the observance of purificatory practices, had become qualified to serve as a medium for a deity.

Shinsō (Japanese artist): *see* Sōami.

shintai (Japanese: "god-body"), in the Shintō religion of Japan, manifestation of the deity (*kami*), its symbol, or an object of worship in which it resides; also referred to as *mitama-shiro* ("the material object in which the divine soul resides"). The *shintai* may be a natural object in which the divinity's presence was discovered, such as a stone, mountain, or well, or an object made for him, such as a sword, comb, or mirror.

The symbol of the sun goddess Amaterasu, worshipped at the main Shintō shrine at Ise, is a mirror (along with a jewel and a sword), one of the Three Sacred Treasures (Sanshu no Jingi) of Japan. The *shintai* is usually enclosed in cloth or in a box and kept in the main sanctuary of the shrine within a small room or cupboard whose doors are seldom opened. Representations in painting or sculpture of Shintō divinities are less commonly worshipped, though some appeared under Buddhist influence (*see* shinzō).

shinten, collectively, sacred texts of the Shintō religion of Japan. Although there is no single text that is accepted as authoritative by all schools of Shintō thought, some books are considered invaluable as records of ancient beliefs and ritual; they are generally grouped together as *shinten.* The books include the *Kojiki* ("Records of Ancient Matters"), the *Nihon shoki,* or *Nihon-gi* ("Chronicles of Japan"), the *Kogoshūi* ("Gleanings of Ancient Works"), and the *Engi shiki* ("Institutes of the Engi Period").

Some commentators enlarge the category of sacred texts to include also such works as the *Man'yōshū* ("Collection of Ten Thousand Leaves," the oldest Japanese anthology of verse, compiled in the 8th century AD); the *Fudoki* ("Records of Air and Soil," 8th-century notes on local legends and geography); and the *Taihō-ryō* (oldest extant code of law in Japan, promulgated in 702). The *shinten* give mythological and historical accounts of the origin of the world; the appearance of the gods, the land, and all the creatures of the universe; the establishment of the Japanese nation; the proper relationship between the gods and government; and ceremonies of worship, manners, and customs.

Shintō (Japanese: way of *kami*), indigenous religious beliefs and practices of Japan, which are more readily observed in the social life of the Japanese people and in their personal motivations than in a pattern of formal belief or philosophy.

A brief treatment of Shintō follows. For full treatment, *see* MACROPAEDIA: Shintō.

The term Shintō, in its proper historical usage, does not encompass the earliest manifestations of Japanese religion. It does not appear in the literature until the latter part of the 6th century of the Western era. In its more remote states of development Shintō as a system appears to have been nameless. The designation came into existence after the introduction of Buddhism into Japan and was evidently created in order to distinguish the Way of *Kami* from the Way of the Buddhist Law.

At the core of Shintō are beliefs concerning the nature and attributes of *kami* (sacred power), which is usually understood to be found in a variety of polytheistic forms (hence the frequent translation of the term as "god" or "divinity"), and in the truthfulness of *kami,* which can be recognized every moment in each individual thing.

Little is known about the religious practices that gave expression to this immanent, monistic world view during the period before the introduction of Sino-Korean culture and the establishment of a unified nation-state (4th–7th century). Presumably, agricultural rites were celebrated seasonally, and most communal religious functions centred around objects or places considered to be especially steeped in *kami*-nature. Gradually the *kami* of some of these places were associated with local ruling clans (*uji*) and acquired the name *ujigami.* The leaders of one clan in the Yamato region (near the present city of Nara) came to be regarded as descendants of the universally recognized chief *kami,* the sun goddess Amaterasu. By virtue of this distinction the family was recognized as the Japanese Imperial Household and became the cornerstone of Japanese nationhood.

With the emergence of the unified nation-state, centred in Yamato, Shintō festivals and ceremonies (*matsuri*) became inseparable from the ordinary affairs of government. These activities were called *matsuri-goto* (literally, "affairs of religious festivals"), and the term has retained its meaning of "government" in the modern Japanese language.

This ancient union was revived and reemphasized after the Meiji Restoration of 1868, when the shrines of Shintō were magnified into the primary agencies for dramatizing, celebrating, and supporting the major interests of the national life. At the end of World War II, the ideology of this so-called State Shintō (Kokka Shintō) was discredited but was reorganized without its political associations as Shrine Shinto (Jinja Shintō), which remained closely associated with the Imperial family.

Throughout its history, Shintō, as a foundation of belief and practice, has been subject to a variety of external influences. The successive inroads made by Confucianism, Taoism, and Buddhism into Japan left distinctive marks on the indigenous religion. Despite the revived orthodoxy of State Shintō, the tendency toward assimilation and hybridization reached a peak during the Meiji period (1868–1912), when some 13 new movements, known collectively with other such movements as Sect Shintō (Kyōha Shintō), arose around various points of emphasis from asceticism to faith healing to Confucian ethics. Sect Shintō underwent further fragmentation after World War II.

While especially the sectarian groups, but also State and later Shrine Shintō, took on aspects of imported religions and philosophies, the beliefs and practices of the rural population remained remarkably true to the ancient tradition. Folk Shintō (Minzoku Shintō), as it is called, has no formal organizational structure or doctrinal formulation but is centred in the veneration of small roadside images and in the agricultural rites of rural families.

Although distinctive in flavour, the three types of Shintō are integrally related: Folk Shintō exists as the substructure of Shintō faith, and a Sect Shintō follower is usually a parishioner (*ujiko*) of a certain Shrine Shintō shrine at the same time.

The traditions of Shintō may be thought of as the traditions of Japan itself. Seasonal and other festivals (*matsuri*) elicit virtually universal participation. These usually entail ritual purification, the offering of food to the *kami,* recitation of prayers, sacred music and dance, solemn worship, and joyous celebration. Numerous Shintō shrines and art objects have been designated by the government as national treasures and invaluable cultural properties. All shrines have a *torii*—the gateway usually consisting of two vertical posts topped by two crosswise beams—which divides the sacred precincts from the secular area.

Shintōhō Motion Picture Company, leading Japanese motion-picture studio, known for its production of war films and action pictures appealing to mass audiences. Formed in 1947, it was originally financed by the Tōhō Motion Picture Company. Within two years, after the motion picture *Sambyaku-rokujugo-ya* (1948; "Three Hundred and Sixty-five Nights") was a financial success, Shintōhō began to open its own distribution outlets and to move toward independence from Tōhō.

In 1951, financial difficulties, resulting from lack of adequate distribution facilities and from rivalry with Tōhō, forced a month-long close. Mitsugi Ōkura, the owner of a small theatre chain, became the head of the studio in 1955. He risked its future on the epic film *Meiji Tennō to Nichi-Ro dai sensō* (1957; "Emperor Meiji and the Great Russo-Japanese War"). Its tremendous success saved the company. Shintōhō has since produced war films that appeal to ultraconservative viewers, as well as films of sex and violence directed toward urban mass audiences.

shinty, also called SHINNY, or SHINNEY, Gaelic CAMANACHD, game played outdoors with sticks and a small, hard ball in which



Shinty
Aberdeen Journals Ltd.

two opposing teams attempt to hit the ball through their opponents' goal (hail); it is similar to the Irish game of hurling and to field hockey. Shinty probably originated in chaotic mass games between Scottish Highland clans at least as early as the 17th century, and it is still played in Scotland under supervision of the Camanachd Association (founded 1893), which considers it the "national game."

The modern game is played on a field 160 yd (146 m) long and 80 yd (73 m) wide, with goals 10 ft (3 m) high and 12 ft (3.7 m) wide, with a crossbar, at both ends. The sticks (*camáns*) are curved at the striking end, small enough to pass through a ring of 2.5 in. (6.3 cm) diameter, and somewhat shorter than a field-hockey stick. The ball is 7–8 in. (17.7–20.32 cm) in circumference and weighs 2.5–3 oz (70–85 g). There is no offside rule, but an attacking player may not precede the ball into a marked 10-yd (9.1-m) semicircular area in front of the goal. Teams are 12 on a side.

Similar games are played less formally in other areas of the world, sometimes on ice with the players wearing skates.

shinzō, in the Shintō religion of Japan, a representation either in painting or sculpture of a kami (god or sacred power). The Shintō religion did not have a tradition of iconic representation, but under the influence of Buddhism a few anthropomorphic images began to be created in the Heian period (794–1185).

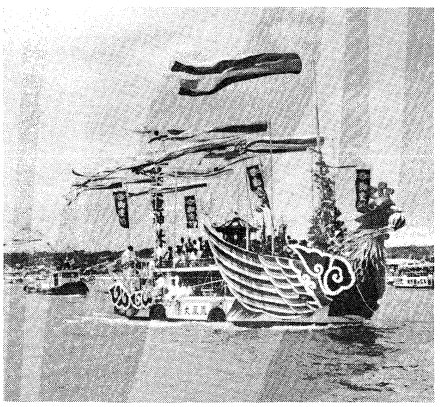


Shinzō, painted wood, 9th century; in the Matsunoo Shrine, Kyōto

By courtesy of the International Society for Educational Information, Tokyo

Notable examples are the late 9th-century wooden statues in the Matsunoo Jinja at Kyōto. Paintings of Shintō kami became more common in the Kamakura period (1192–1333) with the development of the syncretic Shintō-Buddhist school of Ryōbu Shintō (*q.v.*).

Shiogama, city, Miyagi *ken* (prefecture), Honshu, Japan, facing Matsushima Bay. Long known for its production of salt, Shiogama



Sea festival, Shiogama, Japan

Orion Press—FPG/EB Inc.

became a prosperous temple town during the Tokugawa period (1603–1867). The Shiogama Line (railway) was opened in 1887, and the city's port subsequently developed as a major fishing centre (saury, tuna, bonito). The city's major industries are now shipbuilding and the processing of marine products. Tourism is based on Matsushima Bay, which is renowned for its pine-clad islands. The annual sea festival in July centres on the Shiogama Shrine, which stands on a wooded hill in the centre of the city. Pop. (1985) 61,825.

ship, any large floating vessel capable of crossing open waters, as opposed to a boat, which is generally a smaller craft. The term formerly was applied to sailing vessels having three or more masts; in modern times it usually denotes a vessel of more than 500 tons of displacement. Submersible ships are generally called boats regardless of their size.

The following is a brief treatment of ships. Articles providing fuller treatment appear in the MACROPAEDIA. For coverage of historical aspects, *see* Transportation; for shipbuilding, *see* Industries, Manufacturing; for military aspects, *see* War, The Technology of.

The earliest knowledge of ships comes from Egyptian rock drawings dating from 6000 BC. These depict crescent-shaped reed craft that had no keels, the shape being held by a cable running from bow to stern. At first they were rowed, but later square sails were added that would move them when the wind was from the stern.

By about 2000 BC the Minoans on Crete had developed ships that had log keels with ribs and planking on the sides joined at the stem and stern. The keel was bent upward and forward of the joint between the two sides of the ship to form a double, or bifid, bow. The Minoans and their successors, the Phoenicians, began to differentiate between fighting and merchant vessels. The long, narrow rowing galley became their warship. By Greek and Roman times the rowing galley was powered by as many as three tiers of rowers. In order to reduce the space taken up by rowers, designers of merchantmen increasingly relied on sails for propulsion. Roman models had sails that could take the wind from about 45° off dead astern, giving them greater maneuverability.

During the Middle Ages the introduction of carvel planking (smooth siding) on Mediterranean ships greatly reduced skin friction. This allowed for the construction of much larger merchantmen, called nefs, which were fitted with lateen sails. Triangular in shape and set in a fore-and-aft configuration, the lateen made it possible to sail into the wind.

While the nef was being developed, the Vikings were refining their double-ended fighting galleys. These ships, designed to handle the rough northern seas, had a high bow and stern, a stoutly built hull of clinker construction (overlapping planks) that was also flexible, and a single, large, reinforced square sail. By the 13th century, sailors of an improved merchant version of this ship, the cog, were venturing into the Mediterranean and making contact with lateen-rigged nefs.

Over the next few years the features of the two types merged in the carrack, the forerunner of the galleon. The development of sets of smaller, more efficient sails was the beginning of the age of the full-rigged, classic ship, in which a combination of square and lateen sails was used. Both merchant and fighting ships began using the same basic hull design. By the end of the 15th century, ships were capable of sailing anywhere in the world. In the mid-19th century, sailing ships reached their peak with the sleek, swift clipper ship, but by the end of the century steam power had almost completely replaced sails.

The history of the modern ship began in 1801, when the British engineer William Symington developed a practical steamboat for towing barges on the Forth and Clyde Canal in Scotland. Six years later the American inventor Robert Fulton successfully demonstrated his steamboat by making a run between New York City and Albany on the Hudson River in about one-fourth the time required by sailing craft. Soon thereafter he inaugurated the world's first regularly scheduled steamboat service.

Several years of technological advances were needed before steam-powered vessels could seriously rival sailing ships; but by 1850 steamships were competitive with sail in terms of speed, and ocean crossings had become routine. Early steamships were driven by low-pressure engines, and power could be increased only by building larger engines. By 1870 the limit in size had been reached. Attempts were made to increase steam pressure by building more efficient boilers and designing engines that used the same steam two or even three times. Called double- or triple-expansion engines, they passed steam on to successively larger cylinders and by the early 1900s could develop more than 20,000 horsepower. Meanwhile, the screw propeller was perfected and replaced the paddle wheel, which was vulnerable and tended to come out of the water when the ship rolled.

A major revolution in ship propulsion occurred in 1884 when the English engineer Charles Parsons demonstrated the first successful steam turbine. Turbines were far more efficient and easier to build than reciprocating steam engines, but they spun too fast to allow propellers to turn at efficient speeds. This problem was solved by about 1910 with the introduction of reduction gearing. Using these highly efficient and lighter turbines, ships of great size and speed were constructed in the early decades of the 20th century. Other important advances in propulsive systems include the marine diesel, which is more efficient than the steam turbine, and the nuclear-powered steam turbine, which when used in a submarine enables it to remain submerged for extended periods of time.

Throughout the era of the sailing ship, wood was the chief construction material used. Planks were nailed to wooden ribs that were mounted on a wooden keel. By the 18th century, sheathing, and later iron cladding, was used to protect the wooden hull. The first all-iron ship was built in 1818, the hull being formed of iron plates riveted to each other and braced by iron ribs. In 1880 steel began to replace iron, and by about 1950 it became practical to build all-welded ships.

The construction of larger, faster, and safer ships from the mid-19th century gave rise to a large and highly competitive passenger industry, especially across the North Atlantic Ocean. The era of the great ocean liners lasted from roughly 1900 to the outbreak of World War II. Although passenger travel resumed after the war and was highly popular during the 1950s, the advent of reliable long-distance jet aircraft in the early 1960s precipitated a rapid decline in ship travel.

The expansion of postwar international trade, however, created a boom in freight traffic. Specialized carriers for such bulk commodities as grain and oil had first appeared in the late 19th century. After World War II bulk carriers, especially oil tankers, became enormous in size; by the mid-1970s tankers of 500,000 tons deadweight had been constructed. Specialized ships were also developed to carry general freight in standardized containers that could be easily loaded, unloaded, and transported to and from the dock. Other types of modern specialized vessels include the roll-on–roll-off (ro-ro) ship, which can be loaded and unloaded by trucks that use ramps between the ship and the dock; and the LASH (lighter-aboard-ship) vessel, which can carry a number of lighters (barges) in its specially designed hold.

ship money, in British history, a nonparliamentary tax first levied in medieval times by the English crown on coastal cities and counties for naval defense in time of war. It required those being taxed to furnish a certain number of warships or to pay the ships' equivalent in money. Its revival and its enforcement as a general tax by Charles I aroused widespread opposition and added to the discontent leading to the English Civil Wars.

After bitter constitutional disputes, Charles dismissed Parliament in 1629 and began 11 years of personal rule; during this time, deprived of parliamentary sources of revenue, he was forced to employ ship money as a financial expedient. The first of six annual writs appeared in October 1634 and differed from traditional levies in that it was based on the possibility of war rather than immediate

national emergency. The writ of the following year increased the imposition and extended it to inland towns. The issue of a third writ in 1636 made it evident that Charles intended ship money as a permanent and general form of taxation. Each succeeding writ aroused greater popular discontent and opposition, and upon the issue of the third writ John Hampden, a prominent parliamentarian, refused payment.

His case, brought before the Court of Exchequer in 1637, lasted six months. The judges, headed by Sir John Finch (later Baron Finch), decided 7 to 5 in favour of the crown; but the highhanded opinions of Finch provoked widespread distrust of Charles's courts, whereas the narrowness of the decision encouraged further resistance. Charles's writs of 1638 and 1639 fell far short of their goal. In 1641, by an act of the Long Parliament, ship money was declared illegal.

ship of the line, type of sailing warship that formed the backbone of the Western world's great navies from the mid-17th century through the mid-19th century, when it gave way to the steam-powered battleship.

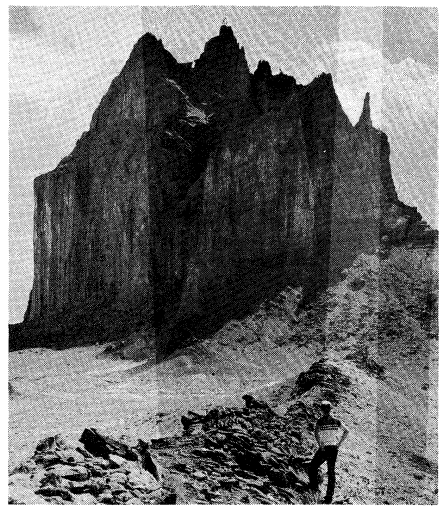
The ship of the line evolved from the galleon, a three- or four-masted vessel that had a high superstructure on its stern and usually carried heavy guns along two decks. As fleets composed of these ships engaged in combat, they adopted a fighting formation called the line of battle, in which two opposing columns of ships maneuvered to fire their guns in broadside (a simultaneous discharge of all the guns arrayed on one side of a ship) against each other. Combat using these formations was known as line-of-battle warfare. Such battles were usually won by the heaviest ships carrying the biggest and most powerful guns. Therefore, a natural progression was toward fleets of big "line-of-battle ships," or ships of the line.

Through the 17th century, the ship of the line acquired its definitive shape by settling on three masts and losing the ungainly superstructure aft. Lengths of 200 feet (60 m) became common for such ships, which displaced 1,200 to 2,000 tons and had crews of 600 to 800 men. A ship of the line's armament was arranged along three decks: the bottom-deck battery might consist of 30 cannons firing balls of 32 to 48 pounds; the middle-deck battery had as many guns firing balls of about 24 pounds; and the upper battery carried 30 or more 12-pounders.

Great Britain's Royal Navy, which rated its sailing ships by the number of guns they carried, considered ships of the first through third rates—that is, ships carrying 60 or 70 to 100 or 110 guns—to be ships of the line. One of the most famous of these was HMS *Victory,* a 100-gun first-rater that served as the flagship of Horatio Nelson at the Battle of Trafalgar in 1805. (*See* Victory.)

The columnar formations that typified line-of-battle tactics were developed by the British in the late 17th century and came into standard use by most navies thereafter. In these tactics, each ship in the fleet followed in the wake of the ship ahead of it. The ships arrayed themselves one after the other at regular intervals of about 100 or more yards, for a distance that could stretch as long as 12 miles (19 km). This formation maximized the new firing power of the broadside and marked a final break with the tactics of galley warfare, in which individual ships sought each other out to engage in single combat by means of ramming, boarding, and so on. By maintaining the line throughout the battle, the fleet, despite obscuring clouds of smoke, could function as a unit under the control of the admiral. In the event of reverses, they could be extricated with a minimum of risk.

Ship Rock, volcanic neck with radiating dikes located in the northwest corner of New Mexico, U.S. The landmark stands 1,400 feet



Ship Rock, New Mexico
Josef Muench

(420 m) above the surrounding area and was the basis for local Navajo legends. Solidified in the vent of an ancient volcano, the more resistant rock of the neck is all that remains after erosion.

Shipibo, also spelled XIPIBO, Panoan-speaking Indian group living on the upper Ucayali River near the headwaters of the Amazon, on the eastern slopes of the Peruvian high Andes Mountains.

In the pre-Spanish period, the Shipibo were only minimally influenced by the Inca empire, despite the proximity of the Shipibo to the great Inca cities. When Spanish missionaries, soldiers, and explorers first contacted the Shipibo in the mid-16th century, they met with hostile and often deadly resistance. Between the mid-17th and early 18th century, Spanish missionaries exerted powerful influences on the Shipibo. In the 20th century the Shipibo, numbering about 10,000, lived in remote villages in the mountains of Peru.

Shipka Pass, Bulgarian SHIPCHENSKI PROKHOD, pass in the Balkan Mountains, Bulgaria. Situated on the main road from Ruse on the Danube River through Stara Zagora to Edirne (Adrianople) in Turkey, it was a strategically important pass and was the scene of fierce fighting during the Russo-Turkish War (1877–78). The pass was originally held by a Turkish force of 4,000 men, but the Russian general I.V. Gurko seized it by surprise in July 1877. In response, the Turkish general Süleyman Paşa attacked Shipka in August. The Russian force there, which included 7,500 Bulgarian volunteers, held the position against Süleyman's 30,000 Turks, and the fighting continued until late September, when both sides entrenched themselves in the pass. After the capitulation of the Turkish forces at Pleven, Bulg., in December, the Russians began a general advance, and, in January 1878, General F.F. Radetsky attacked the Turks at Shipka Pass. The fall of Pleven made Turkish resistance strategically useless, and so, on January 9, General Vessil Paşa (who had succeeded Süleyman) surrendered.

The Russians had lost 5,500 men in the battle for Shipka Pass, while the Turks had lost approximately 13,000. The way Süleyman had sacrificed his men earned him the name of the "Shipka butcher."

Shippard, Sir Sidney Godolphin Alexander (b. May 29, 1837, Brussels, Belg.—d. March 29, 1902, London, Eng.), British colonial official in South Africa who served as administrator in the Bechuanaland Protectorate (now Botswana) from 1885 to 1895 and was closely associated with the empire builder Cecil Rhodes.

The scion of a naval family, Shippard was educated in the law, which he practiced later as an advocate in Cape Colony. In 1873 he was appointed attorney general of Griqualand West and four years later became recorder of the high court. From 1880 to 1885 he served as a Cape Supreme Court judge. When the British established a protectorate in Bechuanaland, he served as chief magistrate and administrator. He was knighted in 1887.

Shippard enthusiastically approved Rhodes's plans to extend British influence northward into central Africa in order to forestall a possible advance there by the Germans or the Boers. He supported Rhodes on several crucial occasions. In 1888 he visited Lobengula, ruler of Matabeleland-Mashonaland (now in Zimbabwe), and persuaded Lobengula to grant to Rhodes's agents the C.O. Rudd mineral concession, which led to the chartering of Rhodes's British South Africa Company the following year. Shippard retired to England in 1895 and served as a director of the British South Africa Company until his death.

Shippen, William, Jr. (b. Oct. 21, 1736, Philadelphia, Pa. [U.S.]—d. July 11, 1808, Philadelphia), first systematic teacher of anatomy, surgery, and obstetrics in the United States. He was also one of the first to use dissected human bodies in the teaching of anatomy in America.

Shippen graduated from the College of New Jersey (Princeton) in 1754, studied in London, and went on to Edinburgh for his M.D. (1761). As one of the few physicians in Philadelphia educated abroad, Shippen was uniquely qualified to open his own school of anatomy. Using pictures and casts of the human body as well as dissected cadavers, he lectured on both anatomy and midwifery. His use of human bodies proved unpopular with the community, however, and his office was attacked several times by angry mobs. In 1762 he established the first American maternity hospital in Philadelphia.

In 1765 Shippen, along with John Morgan, another prominent local physician, organized the medical school of the College of Philadelphia. Shippen served as professor of anatomy and surgery at the college. After being appointed in 1777 to a position from which Morgan had just been dismissed—chief physician and director-general of the Medical Corps of the Continental Army—Shippen was accused by Morgan of obtaining the position by undermining Morgan's authority. Shippen was later court-martialed on charges of financial malfeasance but was acquitted; he resigned shortly thereafter (1781). He subsequently became a professor at the medical school of the newly established University of Pennsylvania. A founder of the College of Physicians of Philadelphia, he served as the organization's president from 1805 to 1808.

shipping fever: *see* pasteurellosis.

shipping route, any of the lines of travel followed by merchant sea vessels. Early routes usually kept within sight of coastal landmarks, but, as navigators learned to determine latitude from the heavenly bodies, they ventured onto the high seas more freely. When exact positions could be fixed, the effects of prevailing winds and currents began to be taken into consideration in determining routes.

The first systematic study of ship routes was undertaken in the 19th century with the aid of shipmasters' logbooks by Lieutenant Matthew Fontaine Maury of the U.S. Navy. Maury's *Pilot Charts,* containing recommended routes, earned him the title of "Pathfinder of the Seas." Within a few years, as steam propulsion was introduced and wind ceased to be a navigational consideration, modern shipping

lanes were gradually adopted. They are based simply on the fact that a great circle on the Earth's surface is the shortest distance between two ports. Deviations are made only to avoid land or ice masses and unfavourable meteorological conditions. The hydrographic offices of the world have published volumes of sailing directions with advice on routes. Definite lanes have been recognized in the North Atlantic between the United States and Europe.

As early as 1855 Maury recognized the danger of collision in the North Atlantic because of the fog, high travel density, and annual incursions of icebergs. In his *Sailing Directions* (1855), he included "Steamer Lanes Across the Atlantic," with recommended separate lanes for eastbound and westbound steamers. In 1898, at the instigation of the U.S. Navy Hydrographic Office, the five principal transatlantic steamship companies of the day concluded the voluntary North Atlantic Track agreement to adopt regular steamer lanes. These lanes remained unchanged until 1924, when the seasonal tracks still in use in the late 20th century were adopted.

The first International Convention for Safety of Life at Sea was convened at London in 1913 as a result of the sinking of the British steamer *Titanic*. At the convention, companies were obliged to give public notice of the routes their vessels would follow, and owners were urged to follow routes adopted by the principal companies. The convention also established an international ice patrol to warn ships of dangerous ice and recommend safe tracks. Since the patrol's inception, no lives have been lost or vessels sunk on the U.S.–European lanes because of icebergs.

ship's bell, bell used as early as the 15th century to sound the time on board ship by striking each half hour of a watch. The

Ship's bells

number of bells	hour (either AM or PM)		
1	12:30	4:30	8:30
2	1:00	5:00	9:00
3	1:30	5:30	9:30
4	2:00	6:00	10:00
5	2:30	6:30	10:30
6	3:00	7:00	11:00
7	3:30	7:30	11:30
8	4:00	8:00	12:00

mariner's day is divided into six watches, each four hours long, except that the 4:00 to 8:00 PM watch may be "dogged"; that is, divided into the first and second dogwatches, each two hours long, to allow men on duty to have their evening meal. Through the 18th century, time was ordinarily measured on board ship by using a 30-minute sandglass. The quartermaster or ship's boy turned the glass when the sand ran through, and it became customary for him to strike the bell as he did so. Eight times in each watch the glass was turned and the number of strokes on the bell indicated the number of half hours elapsed after the men came on deck. These strokes are sounded in pairs, with an interval following each pair.

The place of origin of this seagoing custom is unknown, but it was nearly universal among Europeans and sailors of the Mediterranean area by the 18th century.

British ships, after the mutiny at the Nore (1797), followed a special numbering in the dogwatch. From 4:00 to 8:00 PM, the usual bells are struck except that at 6:30 PM only one bell is struck instead of five; two at 7:00 PM; three at 7:30 PM; and eight bells at 8:00 PM. Thus the signal for the mutiny, five bells in the second dogwatch, has never since been given.

A series of rapid, successive strokes on the bell is used as a warning during fog, and, at other times, this is a fire signal.

shipworm, also called PILEWORM, any of the approximately 65 species of marine bivalve mollusks of the family Teredidae (Teredinidae). Shipworms are common in most oceans and seas and are important because of the destruction they cause in wooden ship hulls, wharves, and other submerged wooden structures.

Only a small part of the anterior end of the shipworm is covered by a shell; the remainder is a long tubelike structure that, in some species, may be 180 cm (6 feet) long. The white shell, often marked with closely set lines, is used for burrowing into wood. File-like ridges on the shell cut into the wood at a rate of about 8 to 12 rasping motions a minute. Shipworms secrete lime to line the inside of the burrow. The tubelike portion of the animal, which extends back to the burrow opening, ingests food particles and oxygen from the water and discharges wastes and reproductive cells. A certain amount of wood is also ingested as food by most species.

The most economically important shipworms, *i.e.*, those causing the most damage, are members of the genus *Teredo*, which includes about 15 species. Other genera are *Bankia, Xylotrya,* and *Xylophaga. Teredo norvegica,* of the coasts of Europe, has a tube about 30 cm (1 foot) long. The common shipworm, *T. navalis* (20 to 45 cm [8 to 18 inches] long), has a worldwide distribution but is especially destructive on the Baltic Sea coast.

shipyard, shore establishment for building and repairing ships. The shipbuilding facilities of the ancient and medieval worlds reached a culmination in the arsenal of Venice, a shipyard in which a high degree of organization produced an assembly-line technique, with a ship's fittings added to the completed hull as it was floated past successive docks. In 18th-century British shipyards, the hull was towed to a floating stage called a sheer hulk, where it received its masts and rigging. Modern ships also are launched incomplete.

Typically, a shipyard has a limited number of building berths, sloping down toward the waterway, with large adjacent working areas. Plates and sections are delivered to a point distant from the berth and converge toward the berth as they are assembled into components and subassemblies, which are ultimately welded together. Very large ships are often built in deep drydocks because of the greater convenience in lowering large components. When the hull is complete, water is admitted and the ship floated to the fitting-out basin.

Shīr ʿAlī Khān (b. 1825, Kābul?, Afg.—d. Feb. 21, 1879, Mazār-e Sharif), emir of Afghanistan from 1863 to 1879 who tried with only limited success to maintain his nation's equilibrium in the great power struggles between Russia in the north and British India in the south.

The third son of Dōst Moḥammad Khān, Shīr ʿAlī succeeded to the throne upon his father's death. Only after a bewildering series of intra-family struggles, revolts, and civil war, however, was his hold on the throne secure.

Shīr ʿAlī attempted to maintain Afghanistan as a noninvolved buffer state in the continuing conflicts between Russia and Great Britain. The British finally concluded, however, that he was coming under Russian influence and created situations, both intentionally and unintentionally, that developed into the Second Afghan War (1878–81). The British executed a well-planned three-pronged drive into Afghanistan. Shīr ʿAlī tried to rally the tribes to his support with little success. He then placed his son Yaʿqūb Khān on the throne and fled toward Turkistan; he died during the journey.

Shirakawa, in full SHIRAKAWA TENNŌ, personal name SADAHITO (b. July 8, 1053, Kyōto, Japan—d. July 24, 1129, Kyōto), 72nd emperor of Japan who abdicated the throne and then established a cloister government (*insei*) through which he could maintain his power unburdened by the exacting ceremonial and family duty required of the legitimate Japanese sovereign. He thus established a precedent that allowed the Japanese emperor to abdicate and, once away from the court, to assume the real power of government.

He succeeded to the throne in 1072, taking the reign name Shirakawa, after his father, the emperor Go-Sanjō, had abdicated in his favour. His ascendancy came at a time when the encroachment of private landed estates (*shōen*) on the public domain seriously threatened the economic foundations of the imperial government. The warrior monks of the nearby temples threatened the capital city of Kyōto, and the weakening of the Fujiwara family, which had dominated the emperors for two centuries, made for bitter factionalism within the court, a situation that gave the emperor the chance to reassert his authority.

Shirakawa abdicated in 1086 and as retired emperor (*jōkō*) succeeded in retaining power in opposition to the Fujiwara regent. He established an administrative centre replete with judicial functions and military guard. This was the cloister government through which all the subsequent emperors until 1185 exercised power after abdicating. Shirakawa, however, had scant interest in reform. Although at first he sought to reduce private estates, he soon gave up the effort and became instrumental in converting large tracts of public domain into imperial *shōen*. With these sources of wealth he lavishly patronized Buddhism. He failed, however, to strengthen the imperial government, and he was unable to prevent the rise of the provincial warrior gentry.

Shirakawa, Go-, in full GO-SHIRAKAWA TENNŌ, personal name MASAHITO (b. Oct. 18, 1127, Kyōto, Japan—d. April 26, 1192, Kyōto), 77th emperor of Japan, during whose reign political power was transferred from the imperial court to the provincial warrior class.

He ascended the throne in 1155, taking the reign name Go-Shirakawa, after the death of his brother, the emperor Konoe. When his father, the former emperor Toba, died a year later, another brother, the former emperor Sutoku, attempted a coup d'état. Sutoku had succeeded Toba on the throne but had abdicated in 1141 on condition that his own son succeed Konoe. After Toba chose Go-Shirakawa instead as Konoe's successor, Sutoku began to plot his revenge. In the ensuing Hōgen Disturbance (1156), the forces supporting Go-Shirakawa proved victorious.

In 1158 Go-Shirakawa abdicated, hoping to be able to control the government, as retired emperors often did. Real power, however, was exercised by the warrior Taira Kiyomori, leader of the successful forces in the Hōgen Disturbance. Kiyomori made his power absolute in the Heiji Disturbance (1159–60) when the powerful Minamoto clan attempted to challenge his rule.

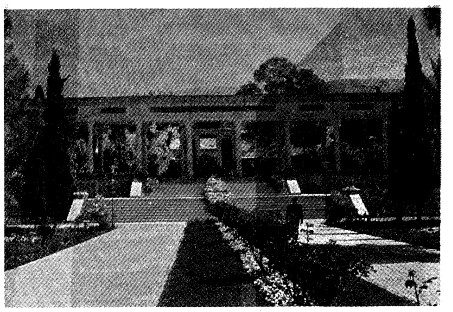
Constantly involved in plots and schemes to further his own power, Shirakawa was regarded with distrust by the Taira clan; in 1179 Kiyomori confined him to his quarters as a result of Shirakawa's attempts to confiscate the estates of Kiyomori's deceased children. He did not regain full imperial power, despite the warrior Minamoto Yoritomo's revolt against Kiyomori (1180) and the annihilation of the Taira clan that followed (1185).

Shiras, George, Jr. (b. Jan. 26, 1832, Pittsburgh, Pa., U.S.—d. Aug. 2, 1924, Pittsburgh), associate justice of the United States Supreme Court (1892–1903).

Shiras was admitted to the bar in 1855, and in 25 years of practice he built up a wide

reputation in corporation law. In 1892 he was appointed to the U.S. Supreme Court by Pres. Benjamin Harrison. An able justice, he gave the opinion of the court on a number of cases involving corporation and commercial law, including *Brass* v. *North Dakota* (1894), which upheld the regulatory power of states over grain elevators. He is chiefly remembered for an incident involving the 1895 income tax case *Pollock* v. *Farmers' Loan and Trust Co.* On the first hearing the court, with one member ill, was evenly divided on aspects of the tax; on rehearing, one of the initial supporters of the tax changed his vote, and the tax was ruled unconstitutional. Widespread belief identified Shiras as the changed vote, and he became temporarily the object of an outpouring of sentiment from both supporters and opponents of the measure. Neither he nor his colleagues ever revealed who had changed his vote, although in 1928 Chief Justice Charles Evans Hughes suggested that it had been another justice.

Shīrāz, capital, Fārs *ostān* (province), south central Iran, within the Zagros Mountains on an agricultural lowland at an elevation of 4,875 ft (1,486 m). Famous for its wine, it is both a historic site and an attractive modern city, with gardens, shrines, and mosques. Shīrāz is the birthplace of the Persian poets Sa'dī and Ḥāfeẓ, whose garden tombs, both resplendently renovated, lie on the northern



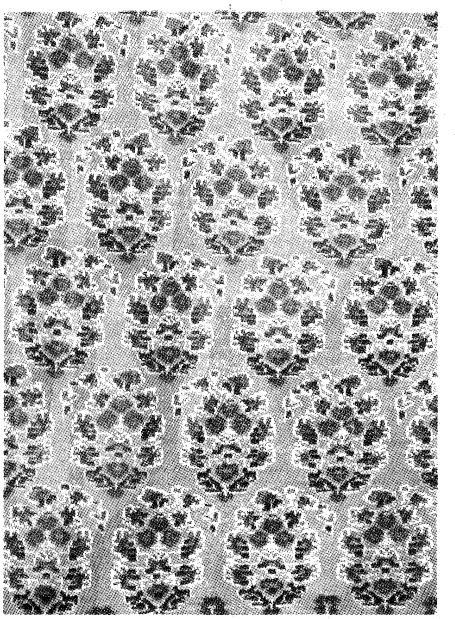
Gardens at the tomb of the poet Ḥāfeẓ, Shīrāz, Iran
Paolo Koch—Photo Researchers

outskirts. Despite calamitous floods (1630, 1668), pestilences, famines, and earthquakes (chiefly 1824, 1853), remarkably much of the city survived.

Shīrāz was important during the Seleucid (312–175 BC), Parthian (247 BC–AD 224), and Sāsānid (*c.* AD 224–651) periods. In the early 13th century the Mongols built the New Mosque and the fortress Bāgh-e Takht. In 1387 and again in 1393, Timur (Tamerlane), the Turkic conqueror, occupied Shīrāz, which, with its Congregational Mosque (894), Shāh Cherāgh shrine (1344–49), and Great Library (later the Madrasseh, or theological school; 1615), had become a Muslim centre rivalling Baghdad. In 1724 the city was sacked by Afghan invaders. Shīrāz became capital of the Zand dynasty (1750–94), whose founder, the *vakīl* (regent) Karīm Khān Zand, adorned the old city with many fine buildings, including his mausoleum (an octagonal tiled kiosk, now a museum); the Ark, or citadel (now a prison); and the Vakīl Bazaar and Mosque. Buildings in the new city include the Persian Church of St. Simon the Zealot and the university (1945).

The city, a trading and road centre for the central Zagros Mountains, is linked to Bushire, its port on the Persian Gulf. It has cement, sugar, and fertilizer factories and textile mills, and traditional inlay work flourishes. Pop. (1976) 416,408.

Shīrāz rug, handwoven floor covering made in the district around the city of Shīrāz in southern Iran. The best known are the Qashqā'ī rugs, products of nomadic tribesmen. A group of tribes—some Arab, some Turkish,

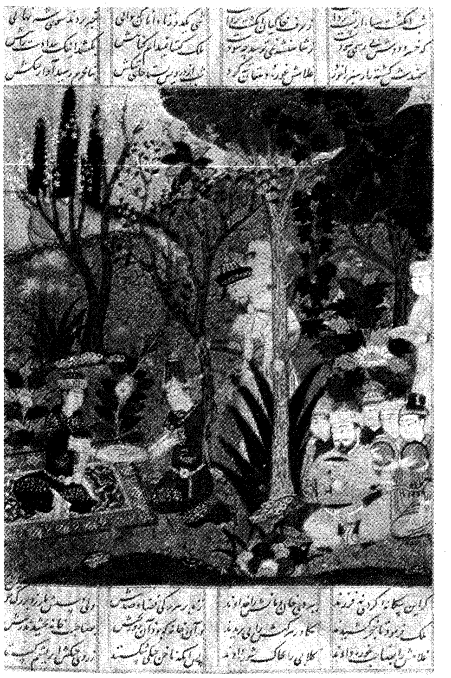


Detail of an allover repeat pattern of leaves on the field of a Shīrāz rug, 19th century; in the Textile Museum, Washington, D.C.
Textile Museum Collection, Washington, D.C.; photograph, Otto E. Nelson—EB Inc.

forming the Khamseh Confederation—weaves rugs somewhat similar to the Qashqā'ī pieces in a variety of patterns, as do the inhabitants of certain Iranian weaving villages in the locality of Shīrāz. They usually use Senna (Sehna) knotting, whereas the Qashqā'ī use Ghiordes.

Shīrāz rugs frequently display rectilinear medallions in polygonal or diamond form, often with three diamonds connected by a "pole." Arrangements of manifold narrow stripes and small geometric figures are also common. The strong colouring of the rugs has been described as sombre. The foundation is of wool, and the pile may consist of wool softer to the touch than is common in other parts of Persia.

Shīrāz school, in Persian miniature painting, styles of a group of artists centered at Shīrāz,



"Khosrow Feasting" from the *Khamseh* of Neẓāmī, Shīrāz school miniature, 1445 (John Rylands University Library of Manchester, Persian MS. 36, fol. 36v)
By courtesy of the John Rylands University Library of Manchester

in southwestern Iran near the ancient city of Persepolis. The school, founded by the Mongol Il-Khans (1256–1353) in mid-14th century, was active through the beginning of the 16th century. It developed three distinct styles (examples of which are in the Metropolitan Museum of Art, New York City).

An early painting, dated 1341, is a leaf from the Persian poet Ferdowsī's epic *Shāh-nāmeh* ("Book of Kings"), depicting Prince Seyāvūsh in a polo match. The work displays as much emphasis on drawing as on painting, with colours washed in. The numerous figures, set on one level, are large and fill the picture plane. The painting represents little development past the early Mongol styles. The main asset of the early artists was their keen decorative sense in colour and design.

The school reached maturity in about 1410–20, under the Timurids (the dynasty of the Islāmic conqueror Timur, founded 1370). The paintings have a dreamlike and very personal quality. Fewer figures are represented, and they are elongated and stylized in pose and gesture. Faces are expressionless and remote. A system of perspective is introduced. Landscapes, which replace solid-colour backgrounds, are represented in fantastic shapes and colours, thus adding to the dream effect. Pale blues, pinks, grays, and white dominate. When the Shīrāz school was coming of age, however, it was overshadowed by the Herāt school (*q.v.*) at the seat of the Timurid court.

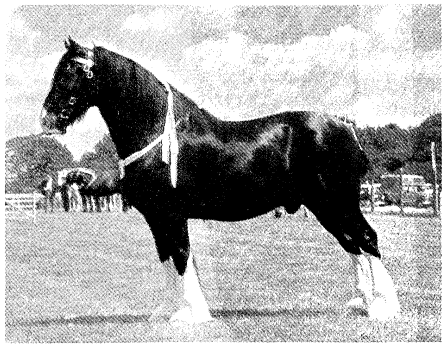
The third phase of the school began in mid-15th century when the Turkmen tribes took Shīrāz. The Turkmen rulers admired Persian culture and continued the patronage of the arts. Major changes in the Shīrāz style were a return to intense colouring, a heavy use of black, and an enrichment of landscapes. Figures became expressive but no more realistic. A leaf from Ibn Husām's *Khavaran-nāmeh*, dated about 1480, reflects the new style. Although no longer as important as it had been under the Timurids, the Shīrāz school continued to be among the most interesting styles of Islāmic miniature painting through the first part of the 16th century.

shire, in Great Britain, a county (*q.v.*) as an administrative division. The Anglo-Saxon shire (Old English *scir*) was an administrative division next above the hundred (*q.v.*) and seems to have existed in the south in the time of Alfred the Great (871–899) and to have been fully established by the reign of Edgar (959–975). It was administered by an ealdorman (alderman) and by a sheriff (*i.e.*, shire-reeve), who presided over the shire court. After the Norman Conquest the French term county was introduced and generally supplanted shire in preferred official use, though shire continued in popular use and frequently even in official records and lasted in many county names such as Cheshire, Hampshire, and Warwickshire. The root shire is still also adjoined to the names of smaller communities such as the parish of Hexhamshire.

Shire, draft horse breed native to the middle section of England. The breed descended from the English "great horse," which carried men in full battle armour that often weighed as much as 400 pounds. Shires were improved as draft and farm animals in the latter part of the 18th century by breeding mares from Holland to English stallions. In 1853 the first Shire was imported to the United States, but the breed never became popular there and was primarily bred to upgrade smaller farm horses.

Shire stallions average slightly more than 17 hands (68 inches, or 173 centimetres) in height and weigh as much as 2,000 pounds (about 900 kilograms). Generally massive and somewhat coarse in build, they are characterized

by considerable hair, called feather, on their legs and are usually bay, brown, black, gray, or chestnut. In 1878 the Shire Horse Society



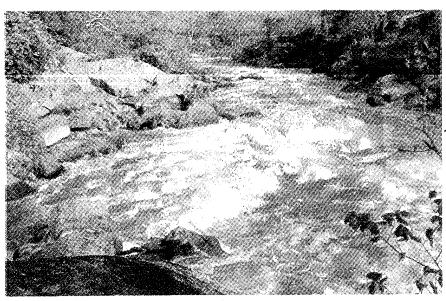
Shire
Sally Anne Thompson—EB Inc.

was established in England, and in 1885 the American Shire Horse Association was organized.

Shire Highlands, plateau in southern Malawi, with an area of about 2,800 sq mi (7,300 sq km). Roughly diamond-shaped, it is bounded by the Shire Valley (northwest and southwest), the Ruo Valley (southeast), and the Lake Chilwa-Phalombe Plain (northeast); its average elevation of 2,000–4,000 ft (610–1,220 m) rises to more than 9,000 ft in the Mulanje Mountains and more than 6,000 ft in the Zomba Massif (*qq.v.*). The plateau forms the divide between the Shire River and Lake Chilwa drainage systems.

The Scottish explorer-missionary Dr. David Livingstone established a missionary station there in 1861, and the highlands developed as an early region of European settlement. It is now Malawi's most densely populated area, with up to 1,030 persons per sq mi in rural areas. The plateau is under intense cultivation (tea, tung, tobacco, peanuts [groundnuts], and corn [maize]) and is well served by road and rail. Chief towns are Blantyre, Zomba, and Thyolo.

Shire River, most important river in Malawi, 250 mi (402 km) long, issuing from the southern shore of Lake Nyasa, of which it is the only outlet. It enters Lake Malombe (*q.v.*) 5



Shire River at Mpatamanga Gorge, Malawi
R. Eith—Keystone

mi (8 km) south of Mangochi and exits to flow through swampy banks flanked by the Mangoche Hills and the Zomba Mountain scarp to the east and the Chiripa Plateau to the west. The Shire then enters its narrow middle valley. Between Matope and Chikwawa, it drops 1,260 ft (384 m) through 50 mi of gorges and cataracts, falling successively over Kholombidzo (formerly Murchison) Falls, Nkula Falls, and Tedzani Falls, through the Mpatamanga Gorge, and over Hamilton Falls and Kapichira (formerly Livingstone) Falls. Dams at Nkula Falls and Tedzani Falls, northwest of Blantyre, harness the waters for hydroelectric power. Below Chikwawa the river enters a wide marshy extension of the Mozambique coastal plain, the only area of Malawi below an elevation of 500 ft. The valley borders are distinct only to the northeast (the Cholo Escarpment) and the southwest (the Nsanje Hills). The chief tributary, the Ruo River, joins the main stream in the Lower Shire Valley, forming a narrow levee on which the village of Chiromo is located. The replenished waters then pass through Elephant Marsh (160 sq mi [414 sq km]) and Ndindi Marsh (10 sq mi) on a tortuous lower course to the Zambezi confluence 30 mi below Cena, Mozambique.

The Shire River flow was formerly totally dependent upon the level of Lake Nyasa and the varying volume of the Ruo River; but a barrage to regulate the flow from Lake Nyasa through the hydroelectric stations and to provide flood control in the lower reaches has been built at Liwonde. Of the Shire's minor tributaries only the Lisungwe, Wankurumadzi, Masenjere, and Tangadzi East are perennial. Water is lost through evaporation and transpiration in Lake Malombe and the miles of swamp and marshy banks, cultivable only during the dry season.

Shirer, William L(awrence) (b. Feb. 23, 1904, Chicago), U.S. journalist, historian, and novelist, best known for his massive study *The Rise and Fall of the Third Reich: A History of Nazi Germany* (1960).

In the 1920s, '30s, and '40s, Shirer was stationed in Europe and in India as a foreign correspondent for the *Chicago Tribune* and the Universal News Service. In addition, he served as radio broadcaster for the Columbia Broadcasting System, relaying to America news of the European crises leading to World War II. His impassioned statements alerting America to the Nazi danger earned him several journalistic awards, including the Wendell Wilkie One World Award in 1948.

Shirer collected his impressions of political events in *Berlin Diary: The Journal of a Foreign Correspondent, 1934–1941* (1941), which gained an international audience for its simple documentation of survival amidst horror. In the 1950s Shirer began his research for *The Rise and Fall of the Third Reich*, which won a National Book Award in 1961. The book is a comprehensive and readable study of the Nazis' rise to power under Hitler, the details and excesses of their rule, and their eventual demise. Though Shirer intended to give a historical account of the Nazi era, many critics and scholars faulted the book for sensationalism and concentration on lurid details. Shirer's other major historical work is *The Collapse of the Third Republic: An Inquiry into the Fall of France in 1940* (1960). The book is considered by some to be the best one-volume study of France during the period between the world wars. In 1980 Shirer published *Gandhi: A Memoir,* in which he recalled a series of interviews that he conducted with Mahatma Gandhi while stationed as a foreign correspondent in India during the early 1930s.

shirk (Arabic: "making a partner" [of someone]), in Islām, idolatry, polytheism, and the association of God with other deities.

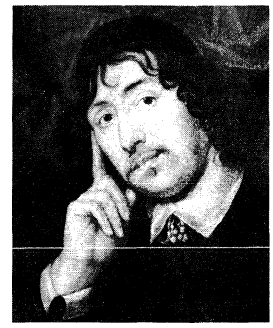
The Qur'ān (Islāmic scripture) stresses in many verses that God does not share his powers with any partner (*sharīk*); it warns those who believe their idols will intercede for them that they, together with the idols, will become fuel for hellfire on the Day of Judgment (21:98). The great majority of *mushrikūn* (polytheists) in the Prophet's time were those who had never become Muslims; thus the words of the Qur'ān were not addressed to Muslims with the intention of keeping them firm in their faith, but rather to the pagan, polytheistic Arabs.

In *fiqh* (Islāmic jurisprudence), *shirk* became legally equivalent to *kufr* (unbelief). Those Muslims who profess it are considered outlaws who should be ousted from the Muslim community; all their legal rights are suspended until they denounce their polytheistic beliefs.

Shirk, however, received considerable extension of meaning throughout the dogmatic development of Islām. It did not remain simply a term for the idolatry prevailing outside Islām but came to be used as the opposite of *tawḥīd* (the oneness of God) and became synonymous with any belief or practice rejected by a particular sect.

Different grades of *shirk* have been distinguished, apart from pure and blatant polytheism. There is *shirk al-ʿādah* (*shirk* of custom), which includes all superstitions, such as the belief in omens and the seeking of help from soothsayers. There is also *shirk al-ʿibādah* (*shirk* of worship), which is manifested in the belief in the powers of created things—*e.g.,* the reverencing of saints, kissing holy stones, and praying at the grave of a holy man. There is *shirk al-ʿilm* (*shirk* of knowledge)—*e.g.,* to credit any one, such as astrologers or interpreters of dreams, with knowledge of the future. All of these types of *shirk* are *shirk ṣaghīr* (minor *shirk*) in comparison with polytheism.

Shirley, James (b. September 1596, London—buried Oct. 29, 1666, London), English poet and dramatist, one of the leading playwrights in the decade before the closing of the theatres by Parliament in 1642.



James Shirley, detail of an oil painting by an unknown artist; in the Bodleian Library, Oxford
The Bodleian Library, Oxford

Shirley was educated at Cambridge and after his ordination became master of the St. Albans Grammar School. In about 1624 he moved to London and became a playwright. His first play, *The Schoole of Complement*, was performed in 1625 at the Phoenix, Drury Lane. When the theatres closed in 1636 as a plague precaution, he became dramatist for St. Werburgh's Theatre in Dublin. He returned to London in 1640, succeeding Massinger as dramatist for the King's Men at the Blackfriars Theatre. After the Civil War he returned to teaching and published two Latin grammars and some nondramatic verse and masques.

Thirty-one plays, five masques, and a moral allegory are extant. His elaborate masque, *The Triumph of Peace* (1634), was performed at the Inns of Court, with scenery by Inigo Jones and music by William Lawes.

Shirley wrote plays in most of the current modes. Among the best are the mildly satirical comedies of fashionable London life: *The Wittie Faire One* and *The Lady Of Pleasure*, his most polished comedy of manners, were performed between 1626 and 1635. His best tragedies, both on dark, Italianate themes, are *The Traytor* (1631) and *The Cardinal* (1641).

Shirley, William (b. Dec. 2, 1694, Preston, Sussex, Eng.—d. March 24, 1771, Roxbury, Mass.), colonial governor of Massachusetts who played an important role in Britain's struggle against France for control of North America.

In 1731, after 11 years of law practice in

England, Shirley migrated to Boston. He was appointed admiralty judge in 1733 and the king's advocate general in 1734. In 1741 Shirley was appointed governor. He built up the Massachusetts fortifications, and during King George's War (1740–48) he organized and planned Britain's one great victory, the capture in 1745 of the French fortress of Louisbourg on Cape Breton Island.

After the defeat and death of Gen. Edward Braddock in western Pennsylvania (1755), Shirley became commander in chief of the English forces in America but failed to gain the respect and cooperation necessary to carry out his plans. Following the failure of his expedition against Ft. Niagara, he was replaced as commander and governor. Accusations of



William Shirley, detail of a mezzotint engraving by Peter Pelham

By courtesy of the Metropolitan Museum of Art, New York, bequest of Charles Allen Munn, 1924

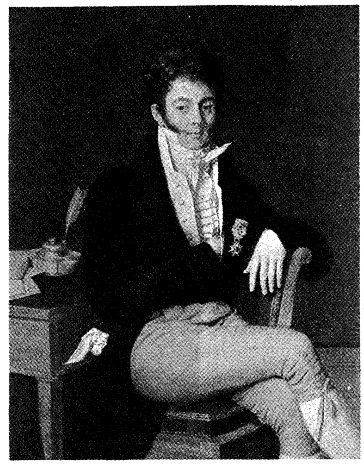
mismanagement aroused suspicions, and he was recalled to England, where he was charged with treason. After being vindicated he was appointed governor of the Bahamas in 1761 but later returned to Massachusetts (1770).

shirt, any of a variety of cloth garments having sleeves and worn on the upper part of the body, often under a coat, jacket, or other garment. Shirts were worn as early as the 18th dynasty of ancient Egypt; they were made of a rectangular piece of linen, folded and sewn up the sides, with openings left for the arms and a hole cut at the fold for the head. There are also shirts preserved from ancient Egypt that have long, tight sleeves sewn into the armholes.

Toward the end of the Middle Ages, when clothing became rather closely fitted, the shirt gradually increased in importance. During the 14th century, shirts worn by the Normans developed a neckband and cuffs. By the end of the 15th century, shirts were made in a variety of fabrics, such as wool, linen, and sometimes silk, for royalty.

Shirts began to be embroidered, laced, and frilled in the 16th century, and men's outer garments—the doublet, or jacket—had a low neckline so that the shirt showed across the chest. By the end of that century, the shirt frill had developed into the ruff, which was a mark of the aristocracy. A law, in fact, was passed in England that forbade persons without social rank to wear elaborately decorated shirts. At the beginning of the 17th century, the doublet had become so short that the ruffled shirt was visible between it and the breeches. The new style of men's dress initiated in 1666, when Charles II of England adopted the long waistcoat, however, covered up most of the shirt.

In the late 18th and early 19th centuries, the neckcloth was so elaborate and voluminous that "Beau" Brummell's valet sometimes spent a whole morning getting it to sit properly. Brummell set the mode in 1806 for the ruffled shirt for both day and evening wear. Men's clothing became more sombre in the Victorian age. High neckcloths were abandoned for collars and ties more or less the same as those worn in the 20th century. Men's shirts in



Gentleman in ruffled shirt with neckcloth, oil portrait by an unknown French artist, *c.* 1810; in the Philadelphia Museum of Art

Courtesy, John G. Johnson Collection, Philadelphia

the 1960s were made in a variety of stripes, patterns, and colours previously not worn. In the 20th century, women's shirts have been made on lines similar to men's; those made for sportswear are especially varied in design, colour, pattern, and fabric.

Shirvan rug, floor covering handmade in the Shirvan region of the southeastern Caucasus (Azerbaijan S.S.R.). Shirvan rugs are difficult to distinguish from Dagestan rugs, produced directly north beyond the mountains, but are generally coarser, with somewhat longer pile. To the south, Shirvan rugs blend with Karabagh rugs. A vertical row of medallions, a row of stylized palmettes, or a series of elements copied from Kurdish *harshang* rugs may fill the field. Geometrically formed peacocks or pheasants may face each other across the surface, or there may be numbers of tiny, geometrically formed sheep, deer, or dogs. In one favourite border, the "wine cup," a tiny figure, resembling a tuning fork between two jagged leaves, is repeated. Another mimics a Persian stripe of interlaced arabesques.



Shirvan rug from the Caucasus, 19th century; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York City, gift of J.F. Ballard; photograph, Otto E. Nelson—EB Inc.

Shirvan rugs are usually woven entirely of wool, but some show cotton weft. The Seichurs are a well-known subclass.

Shirwa, Lake (Malawi): *see* Chilwa, Lake.

shish kebab, dish of small pieces of lamb threaded on a skewer and cooked over an open fire. The name of the dish is derived from the Turkish *şiş,* a spit or skewer, and *kebab,* mutton or lamb. Variants of this dish are found throughout the Balkans, the Middle East, and the southern U.S.S.R. In Greece it is called arni souvlakia, in the U.S.S.R. *shashlyk,* in Yugoslavia *šiš-cévap.*

In many of the versions the lamb is marinated in lemon juice, olive oil, and spices and skewered with onions, bay leaves, and green peppers. It is often served with rice and with grilled vegetables. Lamb livers, tongues, and other entrails, veal, game, pork, and chicken are similarly cooked in the region. Highly seasoned ground meat, such as the Yugoslavian *ćevapčići* and Bulgarian *kebàp,* are also cooked on skewers. *Chelo kebab,* the national dish of Iran, consists of broiled marinated lamb or chicken served with rice that is enriched with butter and raw egg yolk.

Shisha Pangma (mountain, Tibet): *see* Gosainthan.

Shishak I (king of Egypt): *see* Sheshonk I.

Shishakli, Adib ash- (b. 1909, Ḥamāh, Syria—d. Sept. 27, 1964, Brazil), Syrian army officer who overthrew the Syrian government in December 1949 and dominated Syrian politics until his own overthrow in 1954.

Shishakli was a Syrian nationalist who after World War II opposed movements toward the political union of Syria and Iraq. When unification seemed likely in December 1949, Shishakli executed his coup.

At first assuming no open authority, Shishakli forced the acceptance of an army officer as minister of defense but allowed the Syrian parliamentary structure to remain intact. The Syrian political parties did not provide effective leadership, however, and power passed to elements outside Parliament. Some politicians tried unsuccessfully to reduce Shishakli's influence over the government by removing the police force from the jurisdiction of the minister of defense. Shishakli initiated a second coup in November 1951, when he ordered the arrest of the prime minister, Fawzi Salu, his associate in 1949, who had proposed a government that Shishakli could not accept.

The basis of Shishakli's power was the undivided allegiance of the army, whose fighting ability he increased with French aid. Soon after the coup of 1951, he suppressed most political parties. With time, however, he came to feel a need for civilian political support and a constitutional basis for his rule. He pressed land reform policies and refused aid from the United States. In August 1952 he launched the Arab Liberation Movement, which was to be a mass-based political party under his leadership. No politicians of importance joined this organization, and most united against it. Thus weakened, Shishakli was overthrown by a military revolt that drove him into exile in February 1954.

Shishkov, Aleksandr Semyonovich (b. March 20 [March 9, old style], 1754—d. April 21 [April 9, O.S.], 1841, St. Petersburg, Russia), Russian writer and statesman whose intense nationalistic and religious sentiments made him a precursor of the Slavophile movement in Russia of the 1830s and 1840s.

A naval officer by training, Shishkov rose to the rank of vice admiral before retiring in disagreement with the early liberal reforms of Alexander I. Devoting himself to the promotion of Russian patriotism, he became a self-styled philologist, insisting that the Russian language be purged of foreign, especially French, influence. To this end, he founded a literary society, Beseda Lyubitelyey Russkogo Slova (Gathering of Lovers of the Russian

Word), and wrote *Discourse on Love for One's Country* (1811).

Alexander I, impressed by the discourse and faced with invasion by Napoleon, made Shishkov secretary of state. He was nominated president of the Russian Academy in 1813, made a member of the State Council in 1814, and became minister of education and director of non-Orthodox religious affairs in 1824. In these positions he opposed mass education, instituted strict censorship, and persecuted the biblical societies for distributing revolutionary books.

Shitao: *see* Shih-t'ao.

Shiv Narayan Agnihotri (Hindu religious leader): *see* Agnihotri, Shiv Narayan.

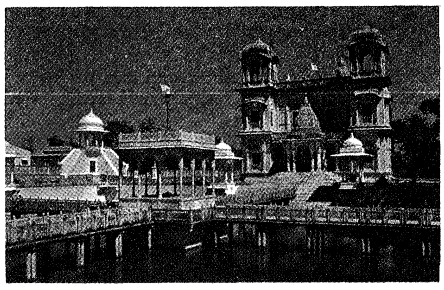
Shiva (Hindu god): *see* Śiva.

shivah, also spelled SHIBAH, or SHIV'A (Hebrew: "seven"), in Judaism, period of seven days of prescribed mourning that begins immediately after the burial of a parent, a spouse, a child, a brother, or a sister and concludes with sundown on the seventh day. Shivah is not observed on the intervening Sabbath and terminates if a major religious festival occurs during the period.

Traditional observance of shivah requires that mourners stay at the home of the deceased, sit on low stools or on the floor, cover all mirrors, and put on no new garments or leather footwear; they may not cut their hair or shave, may take no part in ordinary business, and may not engage in marital relations. Friends and relatives visit to express their sympathy; men may form a minyan (quorum) for prayers recited at the home of the deceased. Some mourners burn a seven-day candle in memory of the departed. Actual observance, especially among Reform Jews, varies considerably.

Shivājī (Indian king): *see* Śivājī.

Shivpuri, also called SIPRI, town, northern Madhya Pradesh state, central India. It is situated on an elevated watershed from which streams radiate in all directions. It formerly served as a summer capital of Gwalior princely state. In 1804 the town was captured from the Narwar Rājput chief by the Sindhia family, whose palace still stands. Nearby are marble cenotaphs of the Sindhia rulers. Shivpuri,



Cenotaph of Sakhya Raja, one of the Sindhia rulers, in Shivpuri, Madhya Pradesh, India

Baldev—Shostal Assoc./EB Inc.

which was constituted a municipality in 1904, has a hospital, a forestry training school, and a college affiliated with Jiwaji University. A natural wildlife sanctuary surrounds the town, which is connected by road and rail with Gwalior and is an agricultural market and a major distribution centre for the products of the surrounding forested area.

The region in which Shivpuri is situated consists chiefly of forested hill ridges. The area west of the Vindhya Range is fairly level and fertile, however, and allows the cultivation of jowar (sorghum), wheat, legumes, corn (maize), oilseeds, and barley. Iron and aluminum deposits are also worked in the region. Pop. (1981) 75,738.

Shivpuri National Park, national park in northern Madhya Pradesh state, central India. It has an area of 61 square miles (158 square km). Originally the private game preserve of the rulers of the former princely state of Gwalior, the park was established as Madhya Bharat National Park in 1955. It received its present name in 1959. Located about 70 miles (110 km) south of Gwalior town on the main Bombay–Āgra road, it consists of hills and valleys in the Vindhya Range. The park's vegetation includes mixed forests of sal (*Shorea*), teak, and khair (*Acacia*) interspersed with grassland. Tiger, leopard, langur, jackal, mouse deer, wild pig, four-horned antelope, jungle fowl, quail, and bustard inhabit the park. Lake Sakhya, or Cāndpātha, a man-made lake with a circumference of 7 miles (11 km), is provided with canoes and picnic sites. Tigers in the park can be photographed from protected "shooting boxes."

Shizuoka, city and *ken* (prefecture), central Honshu, Japan, facing the Pacific Ocean. It occupies an area of 3,001 square miles (7,773 square km). Cape Omae and the Izu Peninsula in the prefecture are separated by the deeply indented Suruga Bay. The eastern and western sections of the prefecture differ considerably from each other. Volcanoes and hot springs are major physical features in the east, while large river valleys such as those of the Fuji, Ōi, and Tenryū rivers predominate in the west. The prefecture's favourable climate supports a varied agriculture, of which mandarin oranges and tea are the chief products. Fishing is highly developed at the principal port, Shimizu, on Suruga Bay. Motor vehicles, ships, textiles, canned goods, and musical instruments are the principal goods manufactured at Hamamatsu and Shimizu.

Much of the coastline of the prefecture is followed by the Shinkansen (New Trunk Line) railway service, which links Shizuoka to Nagoya and Fukuoka. The major cities in the prefecture lie along the railway. Shizuoka, the prefectural capital, is situated on the delta of the Abe River. Sumpu, as Shizuoka city was called until 1869, was a castle town as well as one of the 53 stage towns lying along the Tōkaidō road. Much of Japan's green tea is raised in the environs of Shizuoka, and the city is famous as a trade and processing centre for green tea. It is, in addition, the seat of Shizuoka University and houses a women's pharmaceutical college and agricultural experimental stations.

The Izu Peninsula is a tourist centre, and Atami, Itō, and Shuzenji are popular spas with hot springs. The port of Shimoda, on the east coast of the peninsula, received the ships of Commodore Matthew C. Perry of the United States in 1854 and was one of the first Japanese ports that were opened to trade with the United States. Other historic sites in the prefecture include Tōro, an excavated prehistoric village that is about 2,000 years old, outside Shizuoka city. The shrine at Kunō Hill, near Tōro, was the first burial place of Tokugawa Ieyasu (1543–1616), the first Tokugawa shogun, whose remains were subsequently moved to Nikkō, Tochigi Prefecture, in 1617. Pop. (1986 est.) city, 470,025; prefecture, 3,596,000.

Shklovsky, Viktor Borisovich (b. Jan. 24 [Jan. 12, Old Style], 1893, St. Petersburg [now Leningrad]—d. Dec. 8, 1984, Moscow), Russian literary critic and novelist. He was a major voice of Formalism (*q.v.*), a critical school that had great influence in Russia in the 1920s.

Educated at the University of St. Petersburg, Shklovsky helped found OPOYAZ, the Society for the Study of Poetic Language, in 1914. He was also connected with the Serapion Brothers, a collection of writers that began meeting in Petrograd (Leningrad) in 1921. Both groups felt that literature's importance lay primarily not in its social content but rather in its independent creation of language. In *O teori prozy* (1925; "On the Theory of Prose") and *Metod pisatelskogo masterstva* (1928; "The Technique of the Writer's Craft"), Shklovsky argued that literature is a collection of stylistic and formal devices that force the reader to view the world afresh by presenting old ideas or mundane experiences in new, unusual ways. His concept of *ostranenie,* or "making it strange," was his chief contribution to Russian Formalist theory.

Shklovsky also wrote autobiographical novels, chiefly *Sentimentalnoye puteshestvie: vospominaniya* (*A Sentimental Journey: Memoirs, 1917–1922*), a widely acclaimed memoir of life during the early years of Bolshevik rule; and *Zoo. Pisma ne o lyubvi, ili tryetya Eloiza* (*Zoo, or Letters Not About Love, or the Third Héloise*). Both of these books were published in 1923, during a period (1922–23) when he lived in Berlin. He returned permanently to the Soviet Union in the latter year, at which time the Soviet authorities dissolved OPOYAZ, obliging Shklovsky to join other state-sanctioned literary organs. With his essay "Monument to a Scholarly Error" (1930), he finally bowed to the Stalinist authorities' displeasure with Formalism. Thereafter, he tried to adapt the theory of the accepted doctrine of Socialist Realism. He continued to write voluminously, publishing historical novels, film criticism, and highly praised studies of Tolstoy, Dostoyevsky, and Vladimir Mayakovsky.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Shkodër, also called SHKODRA, Latin SCODRA, Italian SCUTARI, town, northwestern Albania. It lies at the southeast end of Lake Scutari, at a point where the Buenë (Serbo-Croatian: Bojana) River, one of Albania's two navigable streams, flows out of the lake toward the Adriatic Sea. Situated at the edge of a wide plain surrounded by high mountains, the city is overlooked on the west by the peak of Tarabosh. Shkodër is dominated on the south by the now-isolated citadel of Rozafat, past which the Kiri River flows into the Buenë. Since 1900 the town has spread northeastward, away from its bazaar, which was once important because of its location at the convergence of trade routes from the Danube River and the Aegean Sea.

Shkodër is the most historic town in Albania. The oldest wall of the Shkodër castle dates from the first millennium BC. The Roman historian Livy cited the town as the capital of the Illyrian king Gentius, who surrendered to the Romans in 168 BC. The town was subsequently held by the Byzantines, Bulgars, Serbs, and Turks, again by Illyrians, and by the Serbian Balša family, who sold it to Venice in 1396. It was a stronghold of the Albanian national hero, Skanderbeg, in the 15th century. The Turks mounted determined sieges of Shkodër in 1473 and 1479, and in the latter year Venice ceded the town and its fortress to Turkey. Shkodër was virtually independent after 1760, when the Bushati family took control; but in 1831 the Turks reasserted their authority and made it the capital of a province. It became the centre of the Albanian cultural movement after the Albanian League was suppressed in 1881. After being occupied by the Austrians in 1916–18 during World War I, it was taken over by the Allied Powers until it was reunited with free Albania in 1921. Before World War II, Shkodër was the chief Roman Catholic centre of Albania, with a cathedral, a pontifical college, and Franciscan and Jesuit convents, libraries, and publishing

houses. It was the home of the poet Migjeni (Milosh Gjergj Nikolla, 1911–38). After 1944 it resisted the Communist government that had taken control of the country. About half the population is Catholic, with a strong Muslim minority and a few Eastern Orthodox.

The city remains the traditional market centre for the northern Albania mountain area, where grains, tobacco, potatoes, fruits, and grapes are grown. A dam on the Drin River southeast of the city controls flooding and contains one of the country's major hydroelectric power stations. Shkodër's manufactures include cotton and silk textiles, copper-wire products, and processed foods. It is served by the Adriatic port of Shëngjin (25 miles [40 km] south) and has an airport. Pop. (1983 est.) 71,200.

Shlisselburg (Russian S.F.S.R.): *see* Petrokrepost.

Shlomo (king of Israel): *see* Solomon.

Shlomo Yitzḥaqi (Jewish scholar): *see* Rashi.

Shlonsky, Abraham, also spelled AVRAHAM SHLONSKI (b. March 6, 1900, Poltava province, Russia—d. May 18, 1973, Tel Aviv–Yafo, Israeli), Israeli poet who founded Israel's Symbolist school and was an innovator in using colloquial speech in Hebrew verse.

In the early 1920s Shlonsky emigrated to Palestine, becoming literary editor of various periodicals. He translated into Hebrew works by authors such as Bertolt Brecht, Nikolay Gogol, Aleksandr Pushkin, William Shakespeare, and G.B. Shaw. Much of Shlonsky's poetry concerns the Israeli pioneer's rejection of Western values and the emergence of Israel as a modern country. Verse collections include *Shire ha-mapolet ve-ha-piyyus* (1938; "Songs of Defeat and Conciliation") and *'Al Mille't* (1947; "On Filling In").

Shmidt, Otto Yulyevich (b. Sept. 30 [Sept. 18, Old Style], 1891, Mogilyov, Russia—d. Sept. 7, 1956, Moscow), Soviet scientist and explorer responsible for the Soviet program of exploration and exploitation of Arctic resources; through his many activities he exercised a wide and diverse influence on Soviet life and thought.

Professor of mathematics at the University of Moscow from 1926 until his death, Shmidt became director of the Arctic Institute (1930) and head of the chief administration of the Northern Sea Route (Glavesmoput), the government department responsible for Arctic development. During his six years in this position he spent the whole of each summer aboard an icebreaker off the north Siberian coast, completing the first crossing of the Northeast Passage from the Barents Sea to the Pacific (1932) in a single season. He established on drifting ice near the North Pole a scientific station notable for its oceanographic researches (1937). At his urging, the Academy of Sciences created the Institute of Theoretical Geophysics (1938), which he directed until 1948. In the late 1940s he advanced a theory of the formation of the Earth from a rotating cloud of dust and gas. He was also chief editor (1924–41) of the *Great Soviet Encyclopedia* and of the popular science journal *Priroda.*

Shmu'el (Jewish prophet): *see* Samuel.

Shoa (Ethiopia): *see* Shewa.

Sho'ah (Jewish persecution): *see* Holocaust.

shoal, accumulation of sediment in a river channel or on a continental shelf that is potentially dangerous to ships. On the continental shelf it is conventionally taken to be less than 10 m (33 feet) below water level at low tide. Shoals are formed by essentially the same factors that produce offshore bars. *See* sandbar.

Shoalhaven River, river in southeastern New South Wales, Australia, rising in the Gourock Range of the Eastern Highlands (25 miles [40 km] west of Goruya) and flowing northward mainly through a precipitous gorge. At Braidwood, it emerges into a broad basin that supports pastoral activities. Continuing northward to a point 20 miles (32 km) east of Goulburn, the river turns east, enters a second gorge, and flows through a northern section of the Morton National Park and then past Nowra and Bomaderry to empty into the Shoalhaven Bight of the Pacific Ocean, 75 miles (121 km) southwest of Sydney, after a course of 206 miles (332 km). The Shoalhaven, the chief tributary of which is the Mongarlowe, was visited in 1797 and named by the explorer George Bass.

Shōchiku Co., Ltd., leading Japanese motion-picture studio, the films of which are usually home-centred dramas aimed toward an audience of women. The company was formed in 1902 as a production company for kabuki performances. The business was expanded in 1920 to include motion-picture production, and, shortly afterward, the corporation established the Shōchiku Kinema Company to train actors and technicians. It adopted its present name in 1937.

At first the studio's motion-picture productions were copies of American films, but gradually the directors began to develop a distinctively Japanese style. The company became the most financially sound of the pre-World War II Japanese studios and steadily expanded its production and exhibition facilities. In 1931 Shōchiku presented the first successful Japanese talking film, *Madamu to nyōbō* (1931; "The Neighbour's Wife and Mine"), directed by Gosho Heinosuke.

Labour problems after World War II damaged Shōchiku's financial stability. The company did produce, however, *Kimi no na wa* (1953–54; "What Is Your Name?"), the most lucrative film in postwar Japan. The profits were used to modernize the studio and to set up the Shōchiku Motion Picture Science Institute, which studies the technical problems of filmmaking. In 1955 Shōchiku presented the first Japanese picture using a wide-screen process, *Rebyu tanjo* (1955; "Birth of a Revue"). In addition to film production and distribution, the company has continued to produce live programs and has expanded into television production.

shock, in physiology, failure of the circulatory system to supply sufficient blood to peripheral tissues to meet basic metabolic requirements for oxygen and nutrients and the incomplete removal of metabolic wastes from the affected tissues. Shock is usually caused by hemorrhage or overwhelming infection and is characterized in most cases by a weak, rapid pulse; low blood pressure; and cold, sweaty skin. Depending on the cause, however, some or all of these symptoms may be missing in individual cases.

A brief treatment of shock follows. For full treatment, *see* MACROPAEDIA: Circulation and Circulatory Systems.

Shock may result from a variety of physiological mechanisms, including sudden reductions in the total blood volume through acute blood losses, as in severe hemorrhage; sudden reductions in cardiac output, as in myocardial infarction (heart attack); and widespread dilation of the blood vessels, as in some forms of infection. Whatever the central physiological mechanism, the effect of shock is to reduce blood flow through the small vessels, or capillaries, where oxygen and nutrients pass into the tissues and wastes are collected for removal.

Shock is usually classified on the basis of its presumed cause, although in many cases the true cause of the peripheral circulatory insufficiency may not be apparent. The most common cause of shock is massive loss of blood, either through trauma or through surgery. In the latter case, the blood loss can be anticipated and shock prevented by providing blood transfusions during and after the operation. An acute loss of blood reduces the amount of venous blood returning to the heart, in turn reducing the cardiac output and causing a drop in arterial blood pressure. Pressure receptors, or baroreceptors, in the walls of the aorta and carotid arteries trigger physiological reflexes to protect the central circulation, increasing heart rate to boost cardiac output and constricting small blood vessels to direct blood flow to essential organs. If the blood losses continue, even these mechanisms fail, producing a sharp drop in blood pressure and overt manifestations of shock. Loss of blood plasma in burns or dehydration can also lower blood volume sufficiently to induce shock.

The heart's output can also be reduced sufficiently to produce shock without a blood loss. In coronary thrombosis, the supply of blood to the heart muscle through the coronary artery is interrupted by a blood clot or vascular constriction; the damaged muscle may then lack strength to force a normal volume out of the heart with each stroke. Again, the diminished output triggers the baroreceptors in the arteries to restrict peripheral circulation. Blood clots that block the circulation of blood to the lungs (pulmonary emboli) or increase the fluid that surrounds and cushions the heart (cardiac tamponade) can also impair the pumping of the heart sufficiently to cause shock.

The most common cause of shock by dilation of the blood vessels is massive bacterial infection, which may be further exacerbated by reductions in total blood volume caused by fluid losses secondary to the infection. Generally, toxins produced by the bacteria are the cause of the dilation. Foreign substances in the bloodstream can also produce a form of shock, called anaphylactic shock, through allergic reactions causing blood vessels to dilate. Another possible cause of shock through vascular dilation is drugs; many anesthetic drugs create a controlled shock that must be carefully monitored by adjusting dosage, and overdoses of several such drugs, including barbiturates and narcotics, produce shock symptoms.

The chief problem in treating shock is to recognize the cause of the physiological problem, as several possible causes may coexist in a single patient, especially following an accident. Failure to distinguish between shock caused by inadequate cardiac output and that caused by fluid losses reducing blood volume can result in a therapeutic dilemma, since treatments that are effective for one kind of shock will aggravate the other. Intravenous fluids are the usual treatment for shock caused by loss of blood, but adding extra fluid to the circulation can overload a damaged heart that already has a reduced output, so that the shock deepens. When the cause of shock is unclear, physicians may make a trial using intravenous fluids; if the central venous pressure rises, indicating diminished cardiac capacity, the fluids are stopped before the heart can be further compromised. Shock secondary to bacterial infection may be treated by combined fluid replacement and appropriate antibiotics, while anaphylactic shock is combated with epinephrine and antihistamines, which counter the acute allergic response.

shock, electrical: *see* electrical shock.

shock absorber, also called SNUBBER, device for controlling unwanted motion of a spring-mounted vehicle. On an automobile, for example, the springs act as a cushion between the axles and the body and reduce the shocks on the body produced by a rough road surface. Some combinations of road surface and car speed may result in excessive up-and-down motion of the car body. Shock absorbers slow down and reduce the mag-

nitude of these vibratory motions. Modern shock absorbers are hydraulic devices that oppose both the compression and the stretch of the springs. The direct-acting, or strut, type is attached to the vehicle frame and the axle by two eyes. One eye is attached to a piston that slides in an oil-filled cylinder attached to the other eye. Any relative motion between the frame and the axle causes the piston to act against the oil in the cylinder. This oil has to leak through small openings or pass through a spring-loaded valve. In this way, a force is created that opposes the contraction and stretching of the springs, and the vibration of the body is dampened.

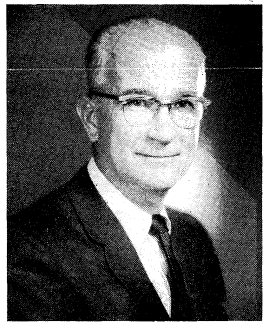
shock therapy, also called ELECTROSHOCK THERAPY, ELECTROCONVULSIVE THERAPY, or ECT, method of treating certain psychiatric disorders through the use of drugs or electric current to induce shock; the therapy derived from the notion (later disproved) that epileptic convulsions and schizophrenic symptoms never occurred together. In 1933 the psychiatrist Manfred Sakel of Vienna presented the first report of his work with insulin shock. Until the discovery of the tranquilizing drugs, variations of insulin-shock therapy (also called insulin-coma therapy) were commonly used in the treatment of schizophrenia and other psychotic conditions. With insulin-shock treatment, the patient is given increasingly large doses of insulin, which reduce the sugar content of the blood and bring on a state of coma. Usually the comatose condition is allowed to persist for about an hour, at which time it is terminated by administering warm salt solution via stomach tube or by intravenous injection of glucose. Insulin shock had its greatest effectiveness with schizophrenic patients whose illness had lasted less than two years (the rate of spontaneous recovery from schizophrenia also is highest in the first two years of the illness). Insulin-shock therapy also had more value in the treatment of paranoid and catatonic schizophrenia than in the hebephrenic types.

Electroconvulsive, or electroshock, therapy, introduced in Rome in 1938 by U. Cerletti and L. Bini, has been widely used in treating disturbances in which severe depression is the predominant symptom. It has been particularly recommended for manic-depressive psychoses and other types of depression. The technique is essentially that of passing alternating current through the head between two electrodes placed over the temples. The passage of the current causes an immediate cessation of consciousness and the induction of a convulsive seizure. In general, electroconvulsive treatments are given three times a week for a period ranging from two to six weeks; some acutely disturbed patients, however, have been given as many as two or three treatments in a single day.

Following a course of treatment there is usually an impairment of memory, varying from a slight tendency to forget names to a severe confusional state. The memory defect diminishes gradually over several months. Electroconvulsive therapy, like insulin shock, declined in use after the tranquilizing drugs were introduced.

shock wave, strong pressure wave in any elastic medium such as air, water, or a solid substance, produced by supersonic aircraft, explosions, lightning, or other phenomena that create violent changes in pressure. Shock waves differ from sound waves in that the wave front, in which compression takes place, is a region of sudden and violent change in stress, density, and temperature. Because of this, shock waves propagate in a manner different from that of ordinary acoustic waves. In particular, shock waves travel faster than sound, and their speed increases as the amplitude is raised; but the intensity of a shock wave also decreases faster than does that of a sound wave, because some of the energy of the shock wave is expended to heat the medium in which it travels. The amplitude of a strong shock wave, as created in air by an explosion, decreases almost as the inverse square of the distance until the wave has become so weak that it obeys the laws of acoustic waves. Shock waves alter the mechanical, electrical, and thermal properties of solids and, thus, can be used to study the equation of state (a relation between pressure, temperature, and volume) of any material.

Shockley, William B(radford) (b. Feb. 13, 1910, London—d. Aug. 12, 1989, Palo Alto, Calif., U.S.), American engineer and teacher, cowinner (with John Bardeen and Walter H. Brattain) of the Nobel Prize for Physics (1956) for their development of the transistor, a device that largely replaced the bulkier and less-efficient vacuum tube and ushered in the age of microminiature electronics.



Shockley
Fabian Bachrach

Shockley studied physics at the California Institute of Technology (B.S., 1932) and at Harvard (Ph.D., 1936). He joined the technical staff of the Bell Telephone Laboratories in 1936 and there began experiments that led to the invention and development of the junction transistor. During World War II, he served as director of research for the Antisubmarine Warfare Operations Research Group of the U.S. Navy. After the war, he returned to Bell Telephone as director of transistor physics research. He was visiting professor of physics at the California Institute of Technology, Pasadena, in 1954 and deputy director of the Weapons Systems Evaluation Group of the Department of Defense in 1954–55; he joined Beckman Instruments, Inc., to establish the Shockley Semiconductor Laboratory in 1955. In 1958 he became lecturer at Stanford University, California, and in 1963 he became the first Poniatoff professor of engineering science there (emeritus, 1974). He wrote *Electrons and Holes in Semiconductors* (1950).

During the late 1960s Shockley became a figure of some controversy because of his widely debated views on the intellectual differences between races. He held that standardized intelligence tests reflect a genetic factor in intellectual capacity and that tests for IQ (intelligence quotient) reveal that blacks are inferior to whites. He further concluded that the higher rate of reproduction among blacks had a retrogressive effect on evolution.

shoe, outer covering for the foot, usually of leather with a stiff or thick sole and heel, and generally (distinguishing it from a boot) reaching no higher than the ankle.

History. Although sandals were the most common footwear in most early civilizations, shoes were also worn. During the Kassite period (*c.* 1600–1200 BC) in Mesopotamia, for example, soft shoes were introduced by mountain people on the border of Iran who ruled



Brocade high-heeled shoes with jeweled buckles worn by French women in the 18th century; Fulgence Collection
From *20,000 Years of Fashion* by Francois Boucher; photograph, Flammarion

Babylonia during that time. This first type of shoe was a simple wraparound of leather, with the basic construction of a moccasin, held together on the foot with rawhide lacings. Greek women often went barefoot or wore sandals, but indoors they sometimes wore soft, closed shoes, which became luxurious in the Hellenistic period, with white or red the preferred colours. Until the 5th century BC, when Greek influence became dominant, the Etruscans wore a high, laced shoe with a turned-up toe. The Romans, who established shoe guilds, developed shaped shoes fitted for the left or right foot. Their footwear was differentiated according to sex and rank.

Throughout the Middle Ages, shoes were generally simple; at the beginning, moccasin types made of untanned leather were worn, later becoming buckled or tied around the ankle. It was probably in 1305, when Edward I decreed that 1 inch (2.5 cm) should be the measure of three dried barleycorns, that English shoe sizing began; thus, a child's shoe that measured 13 barleycorns became size 13. In the 14th and 15th centuries, shoes became extremely long and pointed. King Edward III enacted a law that the spikes, or points, of shoes should not exceed the length of 2 inches (5 cm), but during the succeeding reign of Richard II (1377–99) shoes (called crakows) attained points of 18 inches (45 cm) or more. At the end of the 15th century, pointed toes gave way to rounded. During the 16th century, men's shoes had extremely broad toes, shaped like a duck's bill. Variety in design increased, with shoes having either leather or cork soles and uppers made of velvet, silk, or leather; it was also the fashion, as in clothes, to slash the shoes in order to reveal a lining of a different colour. Women's shoes were similar to men's but were less conspicuous because they were covered by voluminous gowns.

In 17th-century Europe, boots were generally worn. Shoes had moderately high heels and were often decorated with large rosettes made of lace and ribbons. In America, men and women wore stout leather shoes with a moderate heel. In the 18th century, shoes were decorated with gold and silver buckles and real or imitation gemstones. In America, women's dress shoes copied those in France and England and were made of brocade and had a French heel and usually a buckle; to protect the shoe, an overshoe, called a patten, often of the same material, was worn.

By 1760 the first shoe factory had appeared, in Massachusetts, and shoes began to be produced in quantity. It was not until the 19th century, however, and the development of modern machinery such as the sewing machine, that shoes could be made quickly and inexpensively. In the 20th century, shoes are made in innumerable styles, with various designs and colours.

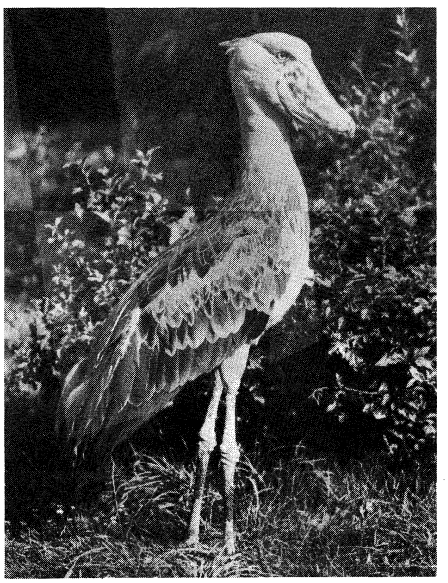
Materials. Since time immemorial, shoes have been made of leather. The luxury leather used in the finest men's and women's shoes is calf. The most versatile leather, used for many kinds of shoes, is side leather, made from cattle hide and called side because the

large hide is cut down the middle lengthwise into two sides for handling.

Kid leather, made from goatskin, is used for women's dress shoes and men's slippers. Sheepskin is used in linings and slippers. Reptile leathers (alligator, lizard, and snake) are used in women's and some men's shoes. Cordovan (a small muscle layer obtained from horsehide) is a heavy leather used in men's shoes. Patent leather, usually made from cattle hide, is given a hard, glossy surface finish. Suede is made from any of several leathers, calf, kid, or cattle hide, by buffing the inner surface to produce a napped finish.

Though still dominant, leather is being replaced in shoes by rubber and man-made fibres and compositions, particularly for heels and other shoe components. Linings and uppers may be natural or coated fabrics. Welting, heels, and counters (heel stiffeners) may be plastic. Most inner and outer soles are now nonleather. A fabric base coated with a chemical surface finish can be made in a variety of textures and designs, many simulating the grain of leather. Synthetic patent and synthetic suede are also used in shoes. Such modern materials cost less and meet performance standards. Certain fabrics, including linen, satin, and silk, are also used in footwear.

shoebill, also called SHOE-BILLED STORK, or WHALE-HEADED STORK (*Balaeniceps rex*), large African wading bird, a single species that constitutes the family Balaenicipitidae (order



Shoebill (*Balaeniceps rex*)
Tierbilder Okapia, Frankfurt am Main

Ciconiiformes). Shoebills stand about 115 cm (3.5 feet) tall. They are entirely gray, with broad wings and long legs. The head is large in proportion to the body, and the bill is wide and thick, shaped as the bird's name implies.

Shoebills fly with the head held back against the body, as do herons and pelicans. They eat small fishes and other aquatic animals. They nest on the ground and lay either one or two eggs. Shoebills inhabit swampy regions in and around the White Nile area of northeastern Africa.

Shoemaker, Bill, also called WILLIE SHOEMAKER, byname of WILLIAM LEE SHOEMAKER (b. Aug. 19, 1931, near Fabens, Texas, U.S.), greatest American jockey of the second half of the 20th century.

Weighing only 1 pound 13 ounces at birth, Shoemaker grew to an adult weight of 98 pounds and a height of 4 feet 11.5 inches. He moved with his family at the age of 10 to California, which became and remained his racing base. He started to ride at the age of six and began his track career in 1949.

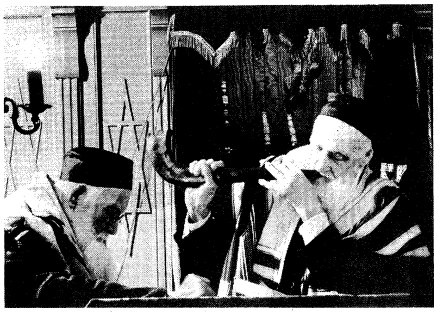
Shoemaker rode in 24 Kentucky Derbies and won four: 1955, 1959, 1965, and 1986, achieving the latter victory at the age of 54. He won the Belmont Stakes five times—1957, 1959, 1962, 1967, and 1975—and the Preakness twice—1963 and 1967. He was the leading rider among North American jockeys in 1950, 1953, 1954, 1958, and 1959 and led in purses won in a single year 10 times. From 1957 on he earned more than $2,000,000 annually, and by the time he finally retired in 1989, horses he rode had won more than $120,000,000. Shoemaker rode more than 8,800 winners in his 41-year career. In 1981 he rode John Henry, winner of the Arlington Million, the first million-dollar stake race for Thoroughbreds. *The Shoe: Willie Shoemaker's Illustrated Book of Racing,* written with Dan Smith, was published in 1976.

shōen, in Japan, from about the 8th to the late 15th century, any of the private, tax-free, often autonomous estates or manors whose rise undermined the political and economic power of the emperor and contributed to the growth of powerful local clans. The estates developed from land tracts assigned to officially sanctioned Shintō shrines or Buddhist temples or granted by the emperor as gifts to the imperial family, friends, or officials. As these estates grew, they became independent of the civil administrative system and contributed to the rise of a local military class. With the establishment of the Kamakura shogunate, or military dictatorship, in 1192, centrally appointed stewards weakened the power of these local landlords. The *shōen* system passed out of existence around the middle of the 15th century, when villages became self-governing units, owing loyalty to a feudal lord, or daimyo, who subdivided the area into fiefs and collected a fixed tax.

Shoenberg, Sir Isaac (b. March 1, 1880, Pinsk, Russia [now in Belorussian S.S.R.]—d. Jan. 25, 1963, London, Eng.), principal inventor of the first high-definition television system, which was used by the British Broadcasting Corporation (BBC) for the world's first public high-definition telecast (from London, 1936).

Before emigrating to England in 1914, Shoenberg had installed the first radio stations in Russia. For the British firm of Electric and Musical Industries (EMI), he headed a research group that developed (1931–35) an advanced kind of camera tube (the Emitron) and a relatively efficient hard-vacuum cathode-ray tube for the television receiver. Until 1964 the BBC adhered to the technical standards he had proposed: 405 scanning lines and 25 flickerless pictures a second. Shoenberg was knighted in 1962. His youngest son, David Shoenberg, became a noted physicist and a fellow of the Royal Society.

shofar, also spelled SHOPHAR, plural SHOFROTH, SHOPHROTH, or SHOFROT, a ritual musical instrument, made from the horn of a ram or other animal, used on important Jewish public and religious occasions. In biblical times the shofar sounded the Sabbath, announced the New Moon, and proclaimed the anointing of a new king. This latter custom has been preserved in modern Israel at the swearing in of the president of the state.



Blowing the shofar during a Rosh Hashana celebration
Jewish Museum, New York City—Art Resource/EB Inc.

The most important modern use of the shofar in religious ceremonies takes place on Rosh Hashana, when it is sounded in the synagogue to call the Jewish people to a spiritual reawakening as the religious New Year begins on Tishri 1. The shofar can be made to produce sobbing, wailing, and sustained sounds in sequences that are varied strictly according to ritual. The shofar is also sounded on Yom Kippur, the Day of Atonement, as a call for repentance and sacrifice and for love of the Torah. Ten biblical verses referring to the shofar are recited during the Additional Service on Rosh Hashana.

Shoghi Effendi Rabbānī (b. March 1, 1897, Acre, Palestine [now ʿAkko, Israel]—d. Nov. 4, 1957, London, Eng.), leader of the international Bahāʾī faith, who held the title of Guardian of the Cause of God from 1921 until his death.

Shoghi Effendi spent his early childhood in Acre. In 1918 he earned a B.A. from the American University in Beirut, Lebanon. His education was directed to serving as secretary and translator to his grandfather, Abd ol-Bahā', then leader of the Bahāʾī faith and son of the faith's founder, Bahā' Ullāh.

After further education at Balliol College of Oxford University, he returned to Haifa (1921) to assume the office of the Guardian bestowed on him through the unexpected death of his grandfather, who had designated him as successor. His next year was spent in maintaining the organization and unifying its followers.

Within the context of his office as Guardian, Shoghi Effendi wrote extensively as chief interpreter of the Bahāʾī teachings from his home and headquarters of the religion in Haifa, Israel. As a result of his travels in Africa, the membership in the Bahāʾī faith increased considerably on that continent.

Though the office of Guardian had been envisioned as hereditary, it terminated with his death. The assistants appointed by Shoghi Effendi, known as the Hands of the Cause of God, currently serve under the Universal House of Justice, which is the supreme administrative body that assumed world leadership of the religion in 1963.

shogi, Japanese SHŌGI, Japanese form of chess, the history of which is obscure. Traditionally it is thought to have originated in India and to have been transmitted to Japan via China and Korea.

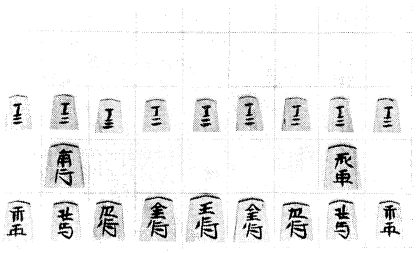
Shogi, like chess, is played on a squared board with pieces of varying powers, and the object is checkmate of the opposing king. The board has 81 squares, 9 by 9. Two distinctive features, however, differentiate shogi from European chess: (1) captured men are not dead but may be pointed in the opposite direction and replayed as part of the captor's forces, and (2) pawns capture in their normal move, one square straight ahead.

Each player has 20 men, which oppose each other on a board composed of nine horizontal and nine vertical rows. There are nine pawns (*fu*), a rook (*hisha*), a bishop (*kaku*), one king (*ōshō*), two gold generals (*kinshō*), two silver generals (*ginshō*), two knights (*keima*), and two spearmen (*kyōsha*). The pieces vary in power of movement, roughly corresponding to those of Western chess. Bishop and rook oppose each other diagonally, the rest on the same file. The pieces are flat, blunt, and taper slightly toward the front. Each bears identifying characters.

All men except the king and gold generals may be promoted on entering the last three rows of enemy territory. The promoted rank

of each piece is marked on its reverse; most become gold generals.

Captive men are held at reserve bases until they are needed on the field again; they retain



Japanese wooden shogi pieces, 20th century; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York, gift of Gustavus A. Pfeiffer, 1948

their original rank and may be reentered on any unoccupied square. If entered within the opponent's territory, they qualify for promotion on making their first move. Two books on shogi are Eiroku Ohara's *Japanese Chess: The Game of Shogi* (1958) and Trevor Leggett's *Shogi, Japan's Game of Strategy* (1966).

shogunate, Japanese BAKUFU, or SHŌGUN-SHOKU, government of the shogun, or hereditary military dictator, of Japan from AD 1192 to 1867. The title shogun (an abbreviation of *sei-i tai shōgun:* "barbarian-quelling generalissimo") had first been used for military commanders commissioned for the imperial government's 8th-century campaigns against the Ainu tribes of northern Japan. Legally the shogunate was under the control of the emperor, and the shogun's authority was limited to control of the military forces of the country. But the increasingly feudal character of Japanese society created a situation in which control of the military became tantamount to control of the country, and the emperor remained in his palace in Kyōto chiefly as a symbol of sovereignty behind the shogun.

Shoguns of Japan

	term
Kamakura shogunate	
Minamoto Yoritomo	1192–99
Minamoto Yoriie	1202–03
Minamoto Sanetomo	1203–19
Fujiwara Yoritsune	1226–44
Fujiwara Yoritsugu	1244–52
Munetaka Shinnō	1252–66
Koreyasu Shinnō	1266–89
Hisaaki Shinnō	1289–1308
Morikuni Shinnō	1308–33
Ashikaga (or Muromachi) shogunate	
Ashikaga Takauji	1338–58
Ashikaga Yoshiakira	1358–67
Ashikaga Yoshimitsu	1368–94
Ashikaga Yoshimochi	1394–1423
Ashikaga Yoshikazu	1423–25
Ashikaga Yoshinori	1429–41
Ashikaga Yoshikatsu	1442–43
Ashikaga Yoshimasa	1449–73
Ashikaga Yoshihisa	1473–89
Ashikaga Yoshitane	1490–93
Ashikaga Yoshizumi	1494–1508
Ashikaga Yoshitane (*2nd time*)	1508–21
Ashikaga Yoshiharu	1521–46
Ashikaga Yoshiteru	1546–65
Ashikaga Yoshihide	1568
Ashikaga Yoshiaki	1568–73
Tokugawa shogunate	
Tokugawa Ieyasu	1603–05
Tokugawa Hidetada	1605–23
Tokugawa Iemitsu	1623–51
Tokugawa Ietsuna	1651–80
Tokugawa Tsunayoshi	1680–1709
Tokugawa Ienobu	1709–12
Tokugawa Ietsugu	1713–16
Tokugawa Yoshimune	1716–45
Tokugawa Ieshige	1745–60
Tokugawa Ieharu	1760–86
Tokugawa Ienari	1787–1837
Tokugawa Ieyoshi	1837–53
Tokugawa Iesada	1853–58
Tokugawa Iemochi	1858–66
Tokugawa Yoshinobu	1866–67

The samurai leader Minamoto Yoritomo gained military hegemony over Japan in 1185; seven years later he assumed the title of shogun and established the first shogunate, or *bakufu* (literally, "tent government"), at his Kamakura headquarters. Eventually the Kamakura shogunate came to possess military, administrative, and judicial functions, although the imperial government remained the recognized legal authority. The shogunate appointed its own military governors, or *shugo,* as heads of each province and named stewards to supervise the individual estates into which the provinces had been divided, thus establishing an effective national network.

After the collapse of the Kamakura shogunate in 1333, Ashikaga Takauji established a second line of shogunal succession that ruled much of Japan from 1338 until 1573. The Ashikaga shogunate's capital was the imperial city of Kyōto. But the increasingly independent *shugo,* virtual warlords, who by the 16th century were known as daimyo, eventually undermined the power of the Ashikaga shogunate.

In 1600 Tokugawa Ieyasu gained hegemony over the daimyo and thus was able to establish in 1603 the third shogunate, headquartered in Edo (now Tokyo). The Edo shogunate was the most powerful central government Japan had yet seen; it controlled the emperor, the daimyo, and the religious establishments, administered Tokugawa lands, and handled Japanese foreign affairs.

After 1862 the Tokugawa shogunate underwent drastic changes in its efforts to maintain control, but in 1867 the last shogun, Yoshinobu, was forced to yield the administration of civil and military affairs to the emperor. Still, the central administration that the Tokugawa shogunate had developed in Edo provided a foundation for the new Japanese imperial government of the late 19th century.

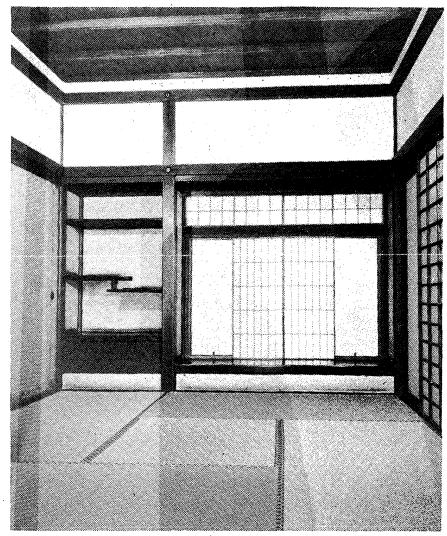
Shōhaku, also called MUAN (b. 1443, Japan—d. May 4, 1527, Japan), Japanese scholar and author of *waka* and *renga* ("linked-verse") poetry during the late Muromachi period (1338–1573). Along with two other *renga* masters, he composed *Minase sangin hyakuin* (1488; *Minase Sangin Hyakuin: A Poem of One Hundred Links Composed by Three Poets at Minase*).

Little is known of his early life, but at some time he became a student of the Buddhist monk and poet Iio Sōgi. In early 1488 Shōhaku, Sōgi, and another student, Sōchō, met at Minase, a village between Kyōto and Ōsaka, and wrote *Minase sangin.* The poem, which was written at the height of the *renga's* popularity, is considered to be one of the best examples of the genre.

Shōhaku assisted Sōgi in editing *Shinsen tsukubashu* (1495; "Newly Selected Tsukuba Collection"), an anthology of *renga* that included revised rules for their composition. His own works include *Ise monogatari shōbunshō,* a commentary on the *Tale of Ise;* and *Shōhaku kōden,* a scholarly treatise on *renga.*

shoin, in Japanese domestic architecture, desk alcove that projects onto the veranda and has above it a shoji window made of latticework wood covered with a tough, translucent white paper. The *shoin* is one of the formative elements of, and lends its name to, the *shoin* style of Japanese domestic architecture. It seems to have been a Chinese feature adapted to Japanese Buddhist (particularly Zen Buddhist) dwellings. The *shoin* bay was a popular feature of priests' houses by the late Kamakura period (1192–1333). It became part of the mainstream of secular architecture as a status symbol, giving a scholarly air to the main guest room.

shoin-zukuri, style of Japanese domestic architecture. The name is taken from a secondary feature called the *shoin,* a study alcove. The *shoin, toko-no-ma* (*q.v.*; alcove for the display of art objects), and *chigai-dana* (*q.v.*; shelves built into the wall) are all formative elements of this style, which appeared in the Kamakura period (1192–1333) and derived from Zen Buddhist monastic dwellings. The style gradually developed during the Muromachi period (1338–1573) with the gradual



Shoin-zukuri interior in the Ginkaku Temple, Kyōto, showing a *chigai-dana* (left background) and a *shoin* with *shōji* (right background), late 15th century

Oguro Planning Co.—FPG/EB Inc.

extinction of the *shinden* style (*see* shinden-zukuri). The *shoin-zukuri* style is characterized by a new modesty of scale (forced on the aristocracy by loss of income); asymmetry and an irregular flowing together of masses that created a more compact dwelling; and the use of solid wall construction and sliding screens (*see* shoji). Frequently, the central room, where the *toko-no-ma, shoin,* and *chigai-dana* are located, is given prominence by raising part of its floor one step above the main floor; this platform is called a *jōdan,* and a room so raised is called an *odanoma.*

Shojāʿ Mirza, also called SHOJĀʿ-UL-MULK: *see* Shah Shojāʿ.

shoji, Japanese SHŌJI, in Japanese architecture, sliding outer partition doors and windows made of a latticework wooden frame and covered with a tough, translucent white paper. When closed, they softly diffuse light throughout the house.

In summer they are often removed completely, opening the house to the outside—a desirable arrangement in Japan because of the extreme humidity. The shoji is a feature of the *shoin* style, which first appeared in the Kamakura period (1192–1333).

Shōjirō (Japanese painter): *see* Torii Kiyomasu.

shōka (Japanese: "living flowers"), in classical Japanese floral art, a three-branched asymmetrical style that is a simplification of the ancient stylized temple floral art of *rikka.* The serenely balanced *shōka* arrangements are triangular, based on three main lines: *shin,* the central "truth" branch; *soe,* supporting branches; and *tai,* branches placed near the base to balance the structure. They symbolize heaven, man, and earth; thus the arrangement represents the whole universe.

Basic to *shōka* designs is the maintenance of natural order; *e.g.,* varieties of plants native to mountain regions are placed above lowland varieties; the elements are harmonized according to season; and plants are hung or placed in an upright position, as they naturally grow. Other rules cover the proportion of plant material to the vase (1.5 times the height of the vase) and the numbers of branches used (always an uneven number).



Shōka arrangement of the Ikenobō school using pine and camellias

By courtesy of the International Society for Educational Information, Tokyo

Shōka incorporates many of the structural rules and classical feeling of the ancient Ikenobō school. The celebrated painter Sōami and the great art patron and shogun Yoshimasa were supporters of the *shōka* style as early as the 15th century, yet it did not reach its peak of popularity and artistic development until the 18th century. The *shōka* style is sometimes referred to as *seika, ikebana,* or Ikenobō, although these terms also have other, more specific meanings.

Shōkadō Shōjō, original name NAKANUMA SHIKIBU (b. 1584, Yamato Province, Japan—d. Nov. 3, 1639, Japan), Japanese calligrapher and painter, one of the "three brushes" of the Kan-ei era.



"Hotei," painting by Shōkadō Shōjō, ink on paper (inscription not reproduced here)

By courtesy of the International Society for Educational Information, Tokyo

He was a priest and respected theologian of the Shingon sect of Buddhism, who declined high office and retired to the Takinomoto-bō, a small temple on the slope of Otoko-yama (Mt. Otoko) south of Kyōto, to devote himself to calligraphy, painting, poetry, and the tea ceremony. In 1637 he moved to another small mountain retreat, the Shōkadō (Pine Flower Temple), whence his name and the name of his school of followers, the Shōkadō school. His major achievement was to revivify calligraphy by reviving the traditional *sō* ("grass") writing style—a rapid, cursive script that originated in China and was practiced by a 9th-century Japanese Shingon saint Kōbō Daishi. Using the *sō* script, Shōkadō inscribed 16 love poems on a six-panelled folding screen covered with gold leaf (Kimiko and John Powers Collection, U.S.). As a painter, he worked in both the *Yamato-e* (Japanese painting) style and in monochromatic ink after the manner of the 13th-century Chinese monk-artists Much'i Fa-ch'ang and Yin-t'o-lo.

Sholāpur, town, administrative headquarters of Sholāpur district, Mahārāshtra state, western India, on the Sīna River. In early centuries the town belonged to the Hindu Cālukyas and Devagiri Yādavas but later became part of the Bahmanī and Bijāpur kingdoms. Located on major road and rail routes between Pune (Poona) and Hyderābād with branch lines to the south, the town developed as a commercial centre for cotton and agricultural produce. It is also an industrial centre, second only to Bombay as a cotton textile centre. There are ruins of the old Muslim fort.

Sholāpur district (5,800 sq mi [15,021 sq km]) comprises a low, undulating plateau with no major hills. The Bhīma River (tributary of the Krishna) and two major tributaries—the Nīra and Sīna—drain the district. Most of the population is engaged in agriculture, but uncertain rainfall causes occasional famine. Wheat, millet, and cotton are the principal crops; sugarcane is grown under irrigation. Cigarette and oil-cake manufacture and handloom weaving are the major industries. Pandharpur is an important religious centre. Pop. (1981) town, 511,103; metropolitan area, 514,860; district, 2,610,144.

Sholem Aleichem, pseudonym of SHOLEM YAKOV RABINOWITZ, Sholem also spelled SHA-LOM, or SHOLOM (b. Feb. 18, 1859, Pereyaslav, Russia—d. May 13, 1916, New York City), popular Yiddish classical author.

Drawn to writing as a youth, he became a private tutor of Russian at the age of 17 and later served as a government rabbi in Lubin. His first writing had been in Russian and Hebrew, but between 1883, when his first story in Yiddish appeared, and his death, he published over 40 volumes of novels, stories, and plays in Yiddish. A wealthy man through marriage, he used part of his fortune to encourage Yiddish writers and edit the annual *Die Yiddishe Folksbibliotek* (1888–89) and lost the rest of it in business. His works were widely translated, and he became known in the United States as the "Jewish Mark Twain." He began a period of wandering in 1906, established his family in Switzerland, and lectured in Europe and the United States. English translations from his *Verk* (14 vol., 1908–14) include *Jewish Children,* translated by Hannah Berman, 3rd ed. (1937); *The Old Country,* translated by Julius and Frances Butwin, 3rd ed. (1954); and *Adventures of Mottel, the Cantor's Son,* translated by Tamara Kahana (1953). He was the first to write in Yiddish for children. Adaptations of his work were important in the founding of the Yiddish Art Theatre in New York, and the libretto of the musical comedy *Fiddler on the Roof* (1964) was adapted from a group of his short stories. *The Best of Sholem Aleichem,* a collection of tales edited by Irving Howe and Ruth Wisse, was published in 1979.

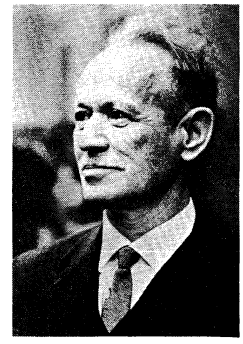
Sholes, Christopher Latham (b. Feb. 14, 1819, near Mooresburg, Pa., U.S.—d. Feb. 17, 1890, Milwaukee), U.S. inventor who developed the typewriter.

After completing his schooling, Sholes was apprenticed as a printer and four years later accompanied his parents to the new territory of Wisconsin, where he soon became editor of the *Wisconsin Enquirer,* in Madison. After a year, he moved to Southport (later Kenosha) to take charge of the newspaper there and soon entered politics, serving in the state legislature. In 1860 he became editor of the *Milwaukee News* and later of the *Milwaukee Sentinel,* a position he gave up to accept appointment from Pres. Abraham Lincoln as collector of the port of Milwaukee.

Sholes had already exhibited considerable inventive genius, and his new, less demanding daily job gave him time to exercise it. In 1864 he and a friend, Samuel W. Soulé, were granted a patent for a page-numbering machine. A fellow inventor-mechanic, Carlos Glidden, suggested to Sholes that he might rework his device into a letter-printing machine and referred him to a published account of a writing machine devised by John Pratt of London. Sholes was so attracted by the idea that he devoted the rest of his life to the project.

With Glidden and Soulé, Sholes was granted a patent for a typewriter on June 23, 1868; later improvements brought him two more patents, but he encountered difficulty raising working capital for development. In 1873 he sold his patent rights for $12,000 to the Remington Arms Company, a firm well equipped with machinery and skill to carry out the development work that resulted in the machine being marketed as the Remington Typewriter. Sholes himself continued to make contributions to improving the typewriter, despite poor health during the last several years of his life.

Sholokhov, Mikhail Aleksandrovich (b. May 24 [May 11, old style], 1905, Veshenskaya, Russia—d. Feb. 21, 1984, Veshenskaya, U.S.S.R.), Russian novelist, winner of the 1965 Nobel Prize in Literature for his "artistic strength and honesty when depicting a historical epoch in the life of the Russian people."



Sholokhov

Novosti Press Agency

After joining the Red Army in 1920 and spending two years in Moscow, he returned in 1924 to his native Cossack village in the Don region of southern Russia. He made several trips to western Europe and in 1959 accompanied Khrushchev to the United States. He joined the Communist Party in 1932 and became a member of the Central Committee in 1961.

Sholokhov began writing at 17, his first published book being *Donskie rasskazy* (1926; *Tales of the Don,* 1961), a collection of short stories. In 1925 he began his famous novel *Tikhy Don* ("The Silent Don"). The slow evolution of Sholokhov's work is remarkable: it took 12 years to publish *Tikhy Don* (4 vol., 1928–40; translated in two parts as *And Quiet Flows the Don,* 1934, and *The Don Flows Home to the Sea,* 1940) and 28 years to complete another major novel, *Podnyataya tselina* (1932–60; translated in two parts as *Virgin*

Soil Upturned [U.S. title, *Seeds of Tomorrow*], 1935, and *Harvest on the Don,* 1960). *Oni Srazhalis za rodinu* (1942; *They Fought for their Country,* 1959) is an epic tale of the Soviet people's bravery during the German invasion of World War II.

Sholokhov's most controversial work, *Tikhy Don,* is remarkable for the objectivity of its portrayal of the heroic and tragic struggle of the Don Cossacks against the Bolsheviks for independence. It became the most widely read novel in the Soviet Union and was heralded as a powerful example of Socialist Realism, winning the Stalin Prize in 1941.

It has been alleged, by Soviet émigrés Aleksandr Solzhenitsyn and Zhores Medvedev, among others, that much of *Tikhy Don* was plagiarized from the Cossack writer Fyodor Kryukov, who died in 1920. Proponents of this theory cite Sholokhov's youth and inexperience at the time of the publication of the first volume and his failure to produce another work of comparable literary quality. In 1979 his *Collected Works* was published.

Sholom Aleichem: *see* Sholem Aleichem.

Shomolu, also called SOMOLU, town, Lagos State, southwestern Nigeria, just north of Lagos. A residential suburb of Lagos, the national capital, the town is plagued by problems of overcrowding, poor housing, and inadequate sanitation. Most of its inhabitants are Yoruba. The town's local activities include work in leather handicrafts and printing. Pop. (1983 est.) 106,800.

Shomron (region, ancient Palestine): *see* Samaria.

Shōmu, in full SHŌMU TENNŌ, personal name OBITO (b. 701, Yamato, Japan—d. June 21, 756, Nara), 45th emperor of Japan, who devoted huge sums of money to the creation of magnificent Buddhist temples and artifacts throughout the realm; during his reign Buddhism virtually became the official state religion.

He ascended the throne in 715, taking the reign name Shōmu. In 729 his consort, a member of the powerful Fujiwara family, was declared empress, shattering the precedent that all empress consorts had to be princesses of the blood. Shōmu and his wife were both devout Buddhists, and he attempted to create a Buddhist structure throughout the country that would parallel the existing nationwide state bureaucracy. To this end he lavished huge sums of money on existing temples and monasteries and in 741 ordered the founding of a branch monastery and nunnery in each province. In addition, every temple was given a scripture (*sūtra*), which the Emperor himself copied out.

The Tōdai-ji (Tōdai Temple) in the capital city of Nara was erected as the central temple. Rebuilt on a smaller scale nine centuries later, it is still the largest wooden building in the world. In its great hall, 284 feet (87 metres) long, 166 feet (51 metres) wide, and 152 feet (46 metres) high, was housed a huge bronze image of Vairocana, the universal Buddha, which Shōmu had built as a protector of the central government. Begun in 743, the 53-foot-high seated figure utilized 1,000,000 pounds of copper, tin, lead, and gold gilding. Marred by later repairs, the statue is not considered a great work of art, but it is one of the two largest bronze figures in the world. Shōmu dedicated it in his famous speech of 752 in which he declared himself the slave of the Three Precious Things—the Buddha, Buddhist law, and the church. The ritual objects used in this dedication ceremony, together with the Emperor's personal effects, were placed in the large log Imperial repository called the Shōsō-in. These well-preserved artifacts provide a unique account of 8th-century Japan. Although Shōmu's building program depleted the Imperial treasury, the Nara period is considered one of the richest cultural periods in Japanese history.

shomyo, classical chant of Buddhism in Japan. Both the Tendai and Shingon sects maintain the tradition and use its theoretical books and notation systems as the basis for other forms of Buddhist singing. Although derived from earlier Chinese sources, the major influences of *shomyo* nomenclature and performance practices are found in later Japanese music much in the way ancient Western art music is based on early Catholic music theory.

Shona, group of culturally similar Bantu-speaking peoples living chiefly in the eastern half of Zimbabwe, north of the Lundi River. The main tribal groupings are the Zezuru, Karanga, Manyika, Tonga-Korekore, and Ndau.

The Shona are farmers of millet, sorghum, and corn (maize), the last being the primary staple, and a variety of other crops such as rice, beans, peanuts (groundnuts), and sweet potatoes. Cattle are kept by most groups, but, although useful for their milk, they are mainly for prestige, as a store of value, and for bride-price payments. Villages consist of clustered mud and wattle huts, granaries, and common cattle kraals and typically accommodate one or more interrelated families. Personal and political relations are largely governed by a kinship system characterized by exogamous clans and localized patrilineages. Descent, succession, and inheritance, with the exception of a few groups in the north that are matrilineal, follow the male line. Chiefdoms, wards, and villages are administered by hereditary leaders.

Shona traditional culture, now fast declining, was noted for its excellent ironwork, good pottery, and expert musicianship. There is belief in a creator-god, Mwari, and a concern to propitiate ancestral, tribal, and other spirits to ensure good health, rain, and success in enterprise. Elementary education, Christian missions, and partial urbanization, while weakening traditional institutions and leadership, have barely affected belief in magic, witchcraft, and sorcery.

shonkinite, rare, dark-coloured, intrusive igneous rock that contains augite and orthoclase feldspar as its primary constituents. Other minerals include olivine, biotite, and nepheline, with little plagioclase feldspar and no quartz. At Shonkin-Sag, in the Highwood Mountains, Montana, shonkinite forms the greater part of a stratified laccolith (inserted between sedimentary beds). It also occurs in Ontario, British Columbia, and Indonesia (Celebes, Timor).

shooting, the sport of firing at targets of various kinds with rifles, handguns (pistols and revolvers), and shotguns as an exercise in marksmanship.

Early history. Shooting at a mark as a test of skill began with archery, long before the advent of firearms (*c.* AD 1300). Firearms were first used in warfare and later in sport shooting (hunting), and because of the shadowy early history of firearms, it is not known when target shooting began. The early history of the sport is largely that of shooting with rifles. The earliest recorded shooting match is one held in Eichstäat, Bavaria, in 1477; the shooters, probably using matchlocks, competed at 220 yd (200 m).

A Swiss painting from 1504 shows a rifle shooting setup that is quite modern. Contestants fire from enclosed and covered shooting booths at targets in the background. Each target is flanked by a small hut in which a target marker would be concealed during shooting and would later signal by a staff or pole to the shooter and the judges the value of the hit. The judges and scorekeepers are in the right foreground at a table under a roof. Several wind flags are flying, and spectators are shown.

Many German museums have wooden targets dating to 1540 that were made for weddings and were shot at by the guests and then given to the host as a memento. By the 16th century target shooting with rifled arms was a popular pastime in much of Europe, especially in the Germanic countries. Elaborately decorated German wheel locks, presumably intended for target shooting, with rifled bores and quite sophisticated peep or aperture rear sights, appeared late in the 16th century.

Russia. Shooting at a mark was recorded in 1737 when the empress Anna established a target-shooting range at her court. The marks shot at were live birds, and the most proficient marksmen were given gold- and diamond-studded cups. The royal shooting matches became a tradition. In 1806 the Society of Shooting Amateurs, formed in St. Petersburg (later Leningrad) largely by military officers, had as its chief interest handgun shooting with flintlock pistols. The first shooting range or club was founded, also in St. Petersburg, in 1834 for rifles or handguns, where the public could shoot for a nominal fee. Many more such public shooting grounds had appeared by the 1850s. In the 1890s several shooting societies were formed: the Russian Athletic Society, with a shooting range on club property; the St. Petersburg Club of Sports Amateurs; the St. Petersburg Society of Salon Shooting; and the Riga Shooting Society. In 1897 the Imperial Society of Reglemented Hunting published rules for rifle-shooting competitions, and in the next year held two tournaments with more than 200 shooters in the second. In 1899 the recently formed Southern Russian Shooting Society offered gold and silver award badges in two categories to successful sharpshooters. The first All-Russian Championship shooting competition was held at Kiev in 1913 and a second at Riga in 1914. The continuing success of Soviet marksmen in the Olympic Games and world championships reflects Russian long-held interest in the sport.

The American frontier. Rifle shooting in the North American English colonies was a way of life both on the frontier, as it progressed west-ward, and in the farming settlements of the Atlantic seaboard, where the rifle was used for protection and hunting as well as for target shooting.

The flintlock Kentucky rifle, produced from about 1750 by American gunsmiths from Germany and Switzerland, provided great accuracy to 200 yd, then a long range. Virtually every village and settlement had a shooting match on weekends and holidays, often attracting a hundred or more marksmen. A common target was a piece of board, blackened in the smoke of a fire or charred, on which an X was slashed with a knife, the intersection marking the centre. Shooting at a wooden figure of a bird atop a pole, as crossbowmen had in the Middle Ages, was also popular. Live turkey shooting—the bird tethered behind a box or rock so that only the neck and head showed—was a standard event.

By 1830 shooting clubs were formed both in the heavily populated East and in towns and cities of the Midwest. Target shooting from a bench or rest was established before 1840. In the 1850s a Vermont benchrest shooting club was formed, the National Rifle Club, but regional rather than nationwide, and its members won a high reputation for accuracy with muzzle-loading rifles. In 1871 the National Rifle Association was founded by National Guard officers to improve marksmanship.

Great Britain. Target rifle shooting was a popular sport before 1800. The first book in

English on target rifle shooting, *Scloppetaria: Or considerations on the Nature and Use of Rifled Barrell Guns . . . by a Corporal of Riflemen* (pseudonym of Capt. Henry Beaufoy), was published in 1808.

The English military conducted research on various rifles from 1800, especially emphasizing long-range shooting at targets of more than 550 m. When early in the 1850s volunteer rifle brigades for this kind of shooting were formed, they attracted some of the finest shots in the United Kingdom, and long-range shooting became so popular that at the first prize meeting in 1860 of the National Rifle Association, Queen Victoria fired the first shot.

In 1873 an Irish rifle team bested England and Scotland in a match, and then challenged American shooters to a match at ranges of 700, 800, and 900 m. The match was held on Long Island, N.Y. in 1874, and though the American team had not shot beyond the 550-m range, it won.

Interest in long-range shooting grew rapidly in the last third of the 19th century and continued well into the 20th century in all English-speaking countries. International competitions were held frequently with teams from as far afield as Australia and New Zealand traveling to England to compete, as late as the 1930s.

Schuetzen shooting. Of Germanic–Swiss origin, the shooting called Schuetzen was practiced for centuries practically unchanged throughout much of central Europe, and by the 1880s it had become predominantly popular. It was done in the standing, or offhand, position at targets from 90 or 180 m outdoors, and at 23 m indoors. The sport began to decline in Europe and the United States in the 1920s.

After World War I, interest in target rifle shooting grew rapidly with shooting clubs and associations numbering in the thousands. A great part of this growth was in small-bore—.22-calibre rimfire—shooting.

Handguns. Target shooting with handguns roughly parallels that of rifles, but perhaps because they are so much more difficult to aim and shoot accurately, they have never been as widely used. (The handgun is a primary weapon of police forces.) Pistol shooting was included in the modern Olympic Games from their beginning in 1896 and was added to the National Rifle Association championships in Great Britain in 1893 and in the United States in 1900.

Shotguns. Target shooting with shotguns originated as practice for shooting game, usually upland game birds and waterfowl. For many years live pigeons were used, their release at unexpected angles offering good hunting practice. Live-pigeon shooting remained popular in France, Spain, and Italy in the second half of the 20th century. The live birds were replaced first by glass balls and ultimately by "clay pigeons." The term trapshooting (*q.v.*) evolved from the box traps from which live pigeons are released. Trapshooting, also known for some time as inanimate bird shooting (especially in England where the Inanimate Bird Shooting Association was founded in 1893), was introduced into the United States about 1830. The sport became popular in Europe in the 19th century, and international competitions were held annually at Monaco and elsewhere. The American sport of skeet shooting was offically named in 1925.

International competition and organization. Shooting has been an Olympic sport since the modern games began in 1896. In the early games there were events for army rifles and service pistols, as well as events for shooting running deer, boar, and live pigeons. Ultimately Olympic Games events became free pistol (from 1936), rapid-fire pistol (from 1948); small-bore rifle, prone and three positions: standing, prone, and kneeling (from 1900 and from 1952, respectively), air rifle (from 1984); clay pigeon (trapshooting) (1900–24, from 1952), skeet shooting (from 1968); and running target: running boar (1900 only, until revived from 1976). Early Olympic shooters were men, but women were not banned, and in the 1976 Games an American woman won the silver medal for rifle (three positions) having won the world's championship. In 1984, however, three separate events were created for women—sport pistol, air rifle, and small-bore standard rifle (three positions)—and only two shooting events, trapshooting and skeet shooting, remained open to both men and women. (For Olympic champions, *see* Olympic Games.)

Although there was a world championship in 1897, later world championships fell under the supervision of the international governing body, the International Shooting Union (ISU), formed in 1907 and reorganized in 1919 and 1946.

World championship competitions are with the small-bore rifle, free rifle, centre-fire pistol, free-pistol, rapid-fire pistol (.22 calibre), air rifle, air pistol, and shotgun. Running-deer and running-boar matches are fired with .22 rimfire or .222 centre-fire rifles with telescopic sights. All other guns have metal sights. The three positions for small-bore rifle are standing, prone, and kneeling at a range of 50 m. Three-position matches are held at 300 m in free-rifle and army rifle competitions. Free-pistol matches are at 50 m; centre-fire and rapid-fire competition is at 25 m. Targets are paper—either the concentric bullseye type or, for rapid-fire pistol and running boar and deer, silhouettes.

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shooting star (astronomy): *see* meteor.

shooting star, in botany, any flowering plant of the genus *Dodecatheon* (family Primulaceae), with about 14 species, mostly native to western North America. Several species are



Shooting star (*Dodecatheon meadia*)
John H. Gerard—EB Inc.

cultivated—often in rock gardens—for their attractive flowers. The low-growing shooting stars are perennial herbs with wavy-margined leaves growing from the base. The flowers, which are commonly reddish, purple, lilac, pink, or white, grow in a small cluster at the end of a leafless stalk (scope). The five lobes of the corolla (the structure formed by the petals) are turned backward.

shophar (musical instrument): *see* shofar.

shopping centre, also called SHOPPING MALL, or SHOPPING PLAZA, 20th-century adaptation of the historical marketplace, with accommodation made for automobiles. A shopping centre is a collection of independent retail stores, services, and a parking area conceived, constructed, and maintained by a management firm as a unit. Shopping centres may also contain restaurants, banks, theatres, professional offices, service stations, and other establishments.

Aspects considered by planners when a shopping centre is to be built include feasibility of the site in terms of the community's ability to support a centre; adequate vehicular access; and size, access, and topography of the site, as well as availability of utilities, zoning laws, and land use in the immediate area. Economic conditions of the area, the sociology of the region, and local commercial competition and attitudes determine the size of centre that can be supported and the kind of stores acceptable to a given locale.

Shopping centres are generally of neighbourhood, community, or regional scope. The smallest type, the neighbourhood centre, usually has a supermarket as a focus, with daily convenience shops such as a drugstore, shoe repair, laundry, and dry cleaner accompanying it. Such a centre can usually serve 2,500 to 40,000 people within a six-minute drive.

The community shopping centre contains all of the above-mentioned services in addition to a medium-sized department store or variety store, which acts, with the supermarket, as a focus. Wearing apparel, appliance sales, and repair stores are also found here. This centre will normally serve 40,000 to 150,000 people.

The regional shopping centre provides a full range of shopping services comparable to those found in a small central business district. It is built around at least one full-size department store and often several; specialty shops and boutiques are numerous, and there are usually several restaurants and perhaps a motion-picture theatre. Services for the immediate day-to-day needs are minimized. It will serve as many as 150,000 or even 400,000 or more people. On larger sites motels, medical centres, or office buildings may also be provided.

Car-parking facilities are a major consideration in shopping-centre design. The size and scope of the centre, the type of tenant, and the economics of the area partially determine parking needs, but it has been found that a ratio of 5.5 parking spaces per 1,000 square feet of leasable space is usually adequate. Access to the lots must be broad and easy enough to avoid traffic jams. On hilly sites the use of parking and service decks apart from the main consumer level is often advantageous.

Pedestrian and vehicular circulation within the centre are prime design considerations and should be kept physically separate as much as possible. Exceptions to this rule are the satellite placement of auto-accessory stores, movie theatres, and drive-in banks.

The first unified shopping mall, Country Club Plaza, founded by the J.C. Nichols Company, opened near Kansas City, Mo., in 1922. The first enclosed mall opened near Minneapolis, Minn., in 1956. In the 1980s there developed "megamalls," such as the West Edmonton Mall in Alberta, Can. (opened in 1981), which contained not only more than 800 stores vending everything from footwear to automobiles but also restaurants, a hotel, an amusement park, a miniature-golf course, a church, a "water park" for sunbathing and surfing, a zoo, a 438-foot-long lake, and, scattered about, more than 500 kinds of trees.

shoran, abbreviation of SHORT-RANGE NAVIGATION, system for determining the position of a ship or airplane by a radar-beacon pulse

signal from the craft that triggers responses from two separate stations on land; from the time intervals between sending the pulse and receiving answers from each of the two stations, the distances of the craft from the two ground stations can be determined. From these distances, exact position can be calculated. Shoran can be accurate to within a few yards in 100 miles (a few metres in 160 kilometres) and, though obsolete for navigation, is much used in aeromagnetic, oceanographic, and hydrographic surveying. Hiran (*q.v.*), an improved version, has greater accuracy.

Shore, Jane (d. 1527), mistress of the English king Edward IV (ruled 1461–70 and 1471–83). Beautiful, charming, and witty, she is thought to have exercised a beneficial influence over Edward.

The daughter of a prosperous London merchant, she married at an early age William Shore, a goldsmith. Edward, who enjoyed the company of the London populace, discovered her about a year after his return from France in 1469 and took her for his mistress. After Edward's death in 1483 she became the mistress of Thomas Grey, 1st marquess of Dorset, son of Edward's widow, Elizabeth Woodville. She also became a concubine to the powerful William, Lord Hastings, and probably helped unite the Hastings and Woodville factions against the protector, Richard of Gloucester. Shortly before he seized the throne as Richard III in June 1483, Richard had Jane arrested; later he forced her to do public penance as a harlot. Her fortunes never recovered and she died a beggar in 1527.

shore bug, a small, dark-coloured insect with white or yellow markings, any of the more than 200 species of the family Saldidae (order Heteroptera). Shore bugs prey upon other insects near fresh water or saltwater.

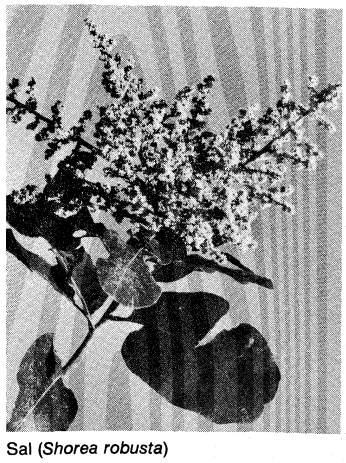
When disturbed, shore bugs fly short distances and then hide in crevices or under vegetation. They occur throughout the world and are recognized by the shape of certain cells in their wings.

shore fly, any tiny dark-coloured insect of the family Ephydridae (order Diptera), commonly found in great numbers around ponds, streams, and the seashore. The carnivorous petroleum fly (*Psilopa petrolei*) lives and breeds in pools of crude petroleum, feeding on trapped insects.

At one time Indians in the western United States gathered the aquatic larvae of shoreflies for food. A few of the larvae are leaf miners.

shore lichen: *see* yellow scales.

Shorea, genus of plants, in the family Dipterocarpaceae, comprising 180 species of tall South Asian evergreen trees, valuable for their timber. Sal (*S. robusta*) and *S. talura* also are grown for the culture of lac scale insects that produce the resin used in shellac. *S. macrophylla* produces illipe nuts, which contain a fat used as a substitute for cocoa butter. Dumala (*S. oblongifolia*), a very large tree, yields dammar resin.



Sal (*Shorea robusta*)
E.S. Ross

shorebird, any member of the suborder Charadrii (order Charadriiformes) commonly found on sea beaches or inland mud flats; in Britain called wader or wading bird. Shorebirds include the avocet, courser, lapwing, oystercatcher, phalarope, plover, pratincole, sandpiper, and snipe (*qq.v.*).

Shoreham-by-Sea, port in Adur district, county of West Sussex, England, on the English Channel at the mouth of the River Adur. The town lies between the seaside resorts of Hove to the east and Worthing to the west. The river is used as a port for coastal traffic, including timber, cement, and materials for Shoreham's gas works and electric power station. Pop. (1981 prelim.) 20,827.

Shorey, Paul (b. Aug. 3, 1857, Davenport, Iowa, U.S.—d. April 24, 1934, Chicago), U.S. scholar and Humanist noted for his writings on classical Greek art and thought.

Shorey graduated from Harvard in 1878, was admitted to the bar in 1880, and later studied in Germany and Greece. He taught at Bryn Mawr College and the universities of Chicago and Berlin. A man of vast erudition, Shorey was reputed a brilliant teacher and lecturer, especially in the fields of Greek poetry and philosophy. His writings include *The Idea of Good in Plato's Republic* (1895); *Horace: Odes and Epodes* (1898); *The Unity of Plato's Thought* (1903), his summary work on Plato; *The Assault on Humanism* (1917); *What Plato Said* (1933); and his edition (with English translation) of Plato's *Republic* (Loeb Classical Library, 1930–35). He was a frequent contributor to *Classical Philology*, of which he was managing editor from 1908 until his death.

shoring, form of prop or support, usually temporary, used during repair or original construction of buildings and in excavations. Temporary support may be required to relieve the load on a masonry wall while it is repaired or reinforced. The shoring timbers slope upward at about 65° to 75°, with the lower end framed onto a base to transfer the load to the ground with minimum deformation. Wedges may be used to give a snugger contact. If the wall is several stories high, more than one shore is required.

Shores are also used to support the forms for cast-in-place concrete slabs, beams, and girders in reinforced concrete frames.

Short, James (b. June 10, 1710, Edinburgh—d. June 14, 1768, London), British optician and astronomer who produced the first truly parabolic and elliptic—hence nearly distortionless—mirrors for reflecting telescopes.

Short entered the University of Edinburgh as a candidate for the ministry, but he was inspired to study optics instead by the lectures of the mathematician Colin Maclaurin. Maclaurin, realizing Short's mathematical talents, encouraged his interest in mathematics and optics, even providing him with an optical workshop. Short settled in London in 1738 and soon gained renown and wealth for his fine work. He manufactured metallic mirrors for more than 1,000 reflecting telescopes that were among the best then available. Secretive about his craft, he ordered his tools destroyed shortly before he died.

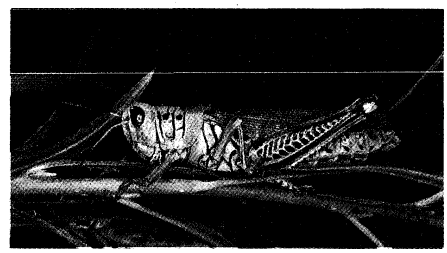
short-eared owl (*Asio flammeus*), stocky bird of prey of the family Strigidae (order Strigiformes), about 40 centimetres (about 1.3 feet) long with a prominent facial disk. Among the most widely distributed of owls, it is circumpolar from the Arctic to the North Temperate Zone, occurs in Hawaii and much of South America, and migrates far south. Short erectile tufts (ear tufts) on the front of the head are rudimentary and inconspicuous. The bird is brown above with white spots, pale below with breast streaks.



Short-eared owl (*Asio flammeus*)
Eric Hosking

Short-eared owls prefer open country and are often seen abroad in the daytime. They eat mice, birds, insects, and frogs and nest on the ground, often in colonies.

short-horned grasshopper, any insect of the orthopteran family Acrididae (more than 5,000 species); characterized by short, heavy antennae, a four-valved ovipositor for laying eggs, and three-segmented tarsi (distal segments of the leg). Short-horned grasshoppers are herbivorous and include some of the most destructive agricultural pests known. The plague (or migratory) species are called locusts. *See* locust.



Short-horned grasshopper (*Melanoplus differentialis*)
Lilyan Simmons—EB Inc.

Short-horned grasshoppers range in size from small (adults only 5 mm [0.2 inch] long) to large (adults up to 11 cm [4.3 inches] in length). The shape of the body may be long and slender or short and stout. Many species are green or straw-coloured, which helps them blend into their surroundings. The hind legs are adapted for jumping, with greatly enlarged femurs. Some species have wings, but others are wingless. Among the winged species, the males can produce characteristic noises by rubbing the front wings together or by drawing the hind legs across the edge of the wings. Most species have a pair of tympanal (hearing) organs at the base of the abdomen.

A female short-horned grasshopper lays about 100 eggs in the soil. The eggs hatch after a rest period, and newly hatched nymphs, miniature replicas of the adults, pass through a series of molts before they become adults. In temperate regions one to several broods are produced each year.

The family Acrididae contains three subfamilies. The spur-throated grasshopper, subfamily Cyrtacanthacridinae, includes some of the most destructive short-horned grasshopper species. In North America the eastern lubber grasshopper (*Romalea microptera*) is 5–7 centimetres long and has large red wings bordered in black; the western lubber grasshopper (*Brachystola magna*), also called

the buffalo grasshopper because of its size, has much smaller, pinkish wings. The slender grasshopper (*Leptysma marginicollis*), found in the southern United States, has clear wings. *Melanoplus*, the largest short-horned grasshopper genus, contains many of the most common and destructive grasshoppers of North America; these include the Rocky Mountain grasshopper or locust (*M. spretus*), the migratory grasshopper (*M. sanguinipes*), the two-striped grasshopper (*M. bivittatus*), and the red-legged grasshopper (*M. femurrubrum*).

The slant-faced grasshopper, subfamily Acridinae, is characterized by a slanted face and clear hindwings. It is usually found around marshes and wet meadows in small numbers and does little damage to vegetation.

The band-winged grasshopper, subfamily Oedipodinae, produces a crackling noise during flight. When this insect is not in flight, its conspicuous, brightly-coloured hindwings are covered by its forewings, which blend into surrounding vegetation. The band-winged grasshopper is the only type of short-horned grasshopper that can produce sound during flight. One of the common species, the Carolina grasshopper (*Dissosteira carolina*), has black hindwings with a pale border. The clear-winged grasshopper (*Camnula pellucida*) is a major crop pest in North America.

Articles are alphabetized word by word, not letter by letter

Short Parliament (April 13–May 5, 1640), parliament summoned by Charles I of England, the first to be summoned for 11 years, since 1629, and the prelude to the Long Parliament. Determined to impose the Anglican liturgy on the Scots, Charles sent an army northward in the first of the so-called Bishops' Wars. The campaign was abortive, and Charles then called a new parliament to grant the subsidies that he desperately needed for a second campaign. Parliament, led by such men as John Pym, balked, citing numerous grievances over the previous decade, including the Crown's questionable collection of a tax known as ship money. Moreover, it set May 7 as the date for a debate on the Scottish question, a debate that was apt to lead to a petition against the war. Charles thereupon dissolved Parliament on May 5. The dissolution further weakened Charles's position and strengthened the will of the Scots, who invaded England in the second Bishops' War. The result was the Long Parliament (*q.v.*).

short-range navigation: *see* shoran.

short story, brief fictional prose narrative to be distinguished from longer, more expansive narrative forms such as the novel, epic, saga, and romance. Unlike them, the short story is usually concerned with a single effect conveyed in a single significant episode or scene, involving a small number of characters, sometimes only one. The form encourages economy of setting and concise narrative; character is disclosed in action and dramatic encounter but seldom fully developed. The subject-matter may be fantastic and strange, remorselessly realistic, or both by turns.

A brief treatment of the short story follows. For full treatment, *see* MACROPAEDIA: Literature, The Art of.

Despite the precedent of ancient Greek fables and brief romances, the tales of the *Arabian Nights,* and the earthily realistic middle-class *fabliaux* that found their way into the collections of Chaucer and Boccaccio or were inserted within longer narratives in novels, the short story did not really emerge as a distinct literary genre until the 19th century. It seems to have been prompted both by literary romanticism and by literary realism. Romanticism stimulated interest in the strange and fantastic, in abnormal sensation and heightened experience that could be explored within the compass of a brief prose narrative but had not the duration appropriate to the scale of the novel. Poe's *Tales of the Grotesque and Arabesque* (1840) are of this order and were very influential not only in the United States but also in Europe, particularly in France. In Germany the tales of Heinrich von Kleist and E.T.A. Hoffmann made use of the fabulous as a means of exploring psychological and metaphysical problems. The Puritan-derived fascination with the ordeals of individual experience, particularly the experience of evil, encouraged later American writers such as Hawthorne, Melville, and Henry James to write short stories that emphasize subjective and possibly unreliable perception rather than action; James's *The Turn of the Screw* (1898) is a notable example.

Simultaneously with these developments, realistic fiction was aspiring to the function of investigative journalism, reporting on unfamiliar, unattractive, or neglected aspects of the contemporary situation with scrupulous fidelity. The reports could be effectively terse. In France Prosper Mérimée can be regarded as a pioneer of the short story of detached, dispassionate observation, a technique continued in the tales of Guy de Maupassant, whose special skill was to capture a particularly illuminating and revealing moment in the unremarkable, perhaps dreary or sordid lives of ordinary citizens. Similar, often painful, revelations flash or flicker in the unhopeful, even paralyzed urban world of Joyce's *Dubliners* (1914), a highly influential collection of short stories.

Short stories were often published in the first instance in magazines and newspapers, which encouraged the element of journalistic "local colour" to be found in the American Bret Harte's stories of mining camps, Kipling's early stories of life in India, or Mark Twain's yarns of the Mississippi and elsewhere. But Twain's early humorous sketches were succeeded by more sombre short stories, such as "The Man That Corrupted Hadleyburg" (1900), that used realistic narrative techniques to create timeless moral fables. More recent writers such as Hemingway have combined the particularities of scrupulous realism with hints of more universal significance, as implied in such titles as "The Light of the World." Some of Kipling's stories, such as "The Brushwood Boy" and "They," explore strange psychic phenomena beyond the thresholds of normal experience but within a framework of faithfully realistic description of ordinary life that serves to emphasize the strangeness.

In Russia the stories of Gogol combined the realistic emphasis on often humdrum people not usually regarded as of literary interest with a more subjective exploration of states of consciousness conveyed through dream and vision, a pattern subsequently developed in the work of Dostoyevsky. In the sketches of Turgenev and the stories of Chekhov, as well as in many later short stories, atmosphere and isolated moments of special awareness can be more important than anything that actually happens.

The concentration on the special moment, often achieved through ironic coincidence, provides opportunities for a surprise ending, a savage "twist in the tale," particularly in the enormously popular stories of O. Henry. The moment of revelation may also disclose to the reader some underlying pattern or significance drawn from history or myth. This is one of the ways in which the modern short story can explore the nature of fictionality itself, addressing a sophisticated and specialized rather than a popular audience. The erudite Argentinian Jorge Luis Borges has written many intricate and subtle stories to this end.

short-tailed shrew, also called AMERICAN MOLE SHREW (*Blarina brevicauda*), medium-sized North American shrew, belonging to the shrew family, Soricidae (order Insectivora). The robust grayish-brown body is about 10 centimetres (4 inches) long, the tail about 3 cm. The eyes are small and beadlike, and the ears are so tiny as to be almost invisible.

The short-tailed shrew inhabits the forests and grasslands of eastern North America. Active year-round, it is one of the most voracious eaters in the animal world. It preys upon invertebrates and various small vertebrates, immobilizing victims with a venomous bite from a toxin contained in the salivary glands. These shrews also eat plant material.

short-tailed-weasel: *see* stoat.

short takeoff and landing airplane: *see* STOL airplane.

shortening, fats and oils of animal or vegetable origin used in most doughs and batters to impart crisp and crumbly texture to baked products and to increase the plasticity, or workability, of doughs. Important commercial shortenings include butter, lard, vegetable oils, processed shortenings, and margarine. For most baking purposes, desirable characteristics include bland or pleasant flavour; freedom from objectionable odour; light or clear colour; a high degree of plasticity; long storage life; and good shortening power, or ability to weaken and lubricate the structure of baked products to produce tenderness. Firm fats produce flaky pastry; oils yield more compact pastry. The proportion of shortening in doughs and batters varies according to the product, with breads and rolls containing about 1–2 percent, cakes containing 10–20 percent, and piecrusts containing over 30 percent. Increasing shortening proportions increases tenderness, but very high proportions may cause cakes to fall.

Butter, with yellow colour, solid consistency, and about 80 percent fat content, is valued for its sweet flavour, pleasant aroma, and ability to contribute great tenderness to baked products. It is popular for specialty breads, cookies, pastries, and is rolled into doughs from which flaky and tender pastries, such as Danish pastry and puff-paste products, are made. Because of its high cost, it is used, alone or in shortening mixtures, mainly in higher priced baked goods. It is fairly perishable, requiring storage at low temperature, and is not easily creamed (blended with sugar), producing cakes with lower volume and coarser grain than those made with more easily creamed shortenings.

Lard, obtained from the fatty tissue of hogs, has solid consistency, white colour, about 98 percent fat content, and mild, pleasing flavour and odour considered desirable in breads, crackers, cookies (sweet biscuits), and pie-crusts.

Vegetable oils, obtained from such oil-bearing seeds as corn (maize), cottonseed, peanuts, palm nuts (coconuts), and soybeans, are 100 percent fat and remain liquid at fairly low temperatures. They are processed to achieve neutral to yellow colour and to eliminate odour or produce mild odour. Oils are used mainly in rolls, breads, and other fairly hard baked goods and in chiffon and other cakes in which their liquid consistency is useful.

Processed shortenings, suitable for most baking purposes, are usually vegetable oils treated to produce an odourless, white shortening, 100 percent fat, with solid, smooth consistency and good plasticity. They may have added ingredients to retard rancidity and to encourage moisture absorbency and retention. Hydrogenated shortenings are made by adding hydrogen gas to heated oil, producing firmness.

Margarines are emulsions containing about

80 percent fat, from either animal or vegetable sources, plus water, salt, emulsifiers, and sometimes milk solids. They are white to yellow in colour, with neutral or butter-like flavour and solid consistency. Margarine has a high melting point, produces tender products, and is especially popular for use in puff pastes.

shorthand, also called STENOGRAPHY, a system for rapid writing that uses symbols or abbreviations for letters, words, or phrases. Among the most popular modern systems are Pitman, Gregg, and Speedwriting.

A brief treatment of shorthand follows. For full treatment, *see* MACROPAEDIA: Writing.

Shorthand is any system of rapid writing using symbols or shortcuts that can be made quickly to represent letters of the alphabet, words, or phrases. It has been variously known as stenography (close, little, or narrow writing), tachygraphy (swift writing), or brachygraphy (short writing). Shorthand is now employed extensively in reporting the proceedings of legislative bodies and the trial of cases in courts of law and for taking dictated business correspondence.

Although the historian Xenophon (5th–4th century BC) used an ancient form of Greek shorthand, the earliest record of an organized system of shorthand dates from 63 BC, when Marcus Tullius Tiro, a freedman and friend of Cicero, invented a system of *notae* that was used in recording the speeches of Cicero, Seneca, and others of the Roman Senate. The system invented by Tiro was taught in the Roman schools, was learned by emperors, and was widely used. After the fall of the Roman Empire the Tironian system survived for several centuries.

England was the birthplace of modern shorthand. The publication by Timothy Bright of his *Characterie: an Arte of Shorte, Swifte, and Secrete Writing by Character* (1588) marked the beginning of this development there. In the next 50 years, 13 systems were known to have been published, a number of them passing through several editions. One of the best-known of these early systems was Thomas Shelton's *Short Writing* (1626), in which Samuel Pepys kept his famous diary. Nearly two centuries later another famous English author, Charles Dickens, learned shorthand and earned his living for a time as a reporter in the law courts and in Parliament.

Although most of the early systems of shorthand in England were orthographic or alphabetic, the idea of writing according to sound continued to gain in favour. The Reverend Phillip Gibbs (1736) was the first to break away from an alphabetic basis to a phonetic one by distinguishing between long and short vowels.

The publication by Isaac Pitman in 1837 of *Stenographic Sound-Hand* marked a new era in the development of phonetic systems. Not only did he classify the sounds of the language scientifically and arrange his material for writing accordingly, but he also introduced simple expedients of abbreviation that made for rapidity. Because the Pitman system is phonetic, all words are written according to their sounds. The words *lain, deal, may, knife* would therefore be written as if they were spelled *lān, dēl, mā, nīf.* The consonants are drawn from simple geometrical forms, straight lines, and shallow curves. As far as possible all consonants are paired: a lightly written stroke represents the sound of *f,* for example, and the same stroke, written slightly heavier, stands for the companion heavy sound of *v.* The Pitman system was introduced into the United States a few years after its publication. In the Eastern Hemisphere, including Australia, New Zealand, and India, Pitman is the predominant system of shorthand.

In 1888 John Robert Gregg published his *Light-Line Phonography* in England and soon thereafter brought his system to the United States. It is taught in more schools and practiced by more stenographers in the United States than any other system. It is published and taught in most of the nations of the world. The Gregg system is based on the following principles: (1) the system is phonetic; all words are written by sound; (2) there is a total absence of shading or thickening; all symbols are written light-line; (3) the characters are based on the elements of ordinary longhand; the strokes are familiar and the motion is uniform; (4) vowels are expressed by circles and hooks; the words are not (as in the Pitman system) placed on, above, or through the line of writing to imply the omission of certain vowels; (5) vowels are inserted in word outlines in their natural order without lifting the pen; and (6) there is a preponderance of curve motion to aid writing. The Gregg system makes use of brief forms for some of the commonest words, blended consonants, suffix and prefix forms, and an abbreviation principle in order to enable the writer to gain speed in writing.

A 20th-century trend in the development of shorthand systems makes use of longhand symbols for most, if not all, of the letters of the alphabet. Illustrations are: Abbreviatrix (1945), Baine's Typed Shorthand (1917), Carter Briefhand (1957), Forkner Alphabet (1952), Gersten's Alphabet Shorthand (1949), Hy-Speed Longhand (1932), Quickhand (1953), Speedhand (1952), Speedwriting (1923 and 1951), Stenoscript (1955), Stenospeed (1950), and Zinman (1950).

Actually, the idea of using longhand symbols in rapid writing dates back to *Cadmus Britannicus* by Simon George Bordley (1787), which comprised three systems. The first, called "Slower Shorthand," used letters of the alphabet; the second, "Swifter Shorthand," was a script shorthand; and the third was "Shorthand for Music." The main difference between Bordley's "Slower Shorthand" and modern systems of this type is that Bordley's letters were "printed" longhand and could not be joined.

The advantages claimed for alphabetic systems are ease of learning, because of the learner's familiarity with the forms, and ease of transcription. The chief disadvantage is limited speed.

Shorthorn, also called DURHAM, cattle breed raised for beef. The Shorthorn was developed during the last quarter of the 18th century through selective breeding of local cattle of the Teeswater District, Durham County, in the north of England. It is characterized by short horns, blocky conformation, and by colour ranging from red, red with white markings, white, or roan resulting from a mixture of red and white hairs. It is the only roan-coloured modern cattle breed.

Shorthorns are found in practically every country of the world. They are numerous in North America, in South America (particularly in Argentina), and in Europe, being one of the more popular breeds in the British Isles; in Australia they have long met with favour and have also been bred quite extensively in South Africa. In the United States, Shorthorns are most numerous in the Corn Belt states but have been used rather extensively in other areas for grading up native or unimproved cattle.

Within the breed, special strains have been developed, notably the Milking or Dairy Shorthorn, raised for both milk and beef production, and the Polled Shorthorn, a hornless variety.

Shorthouse, Joseph Henry (b. Sept. 9, 1834, Birmingham, Warwickshire, Eng.—d. March 4, 1903, Edgbaston, near Birmingham), novelist whose philosophical romance, *John Inglesant,* is one of the very few English examples of the novel of ideas. Set in England and Italy during the 17th century, it is concerned with conflicts between church and state, the Church of England and the Church of Rome, ritualism and simplicity, and different views of the sacraments, as well as other subjects. It takes the form of long dialogues, incorporating unacknowledged quotations from various 17th-century writers.



Shorthouse, lithograph

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

Shorthouse was brought up a Quaker, and, influenced by John Ruskin and members of the Pre-Raphaelite group of artists and writers and attracted by Anglicanism, he became a convert to the Church of England. The contrast between the author's upbringing and his adopted religion gives a particular colouring to *John Inglesant,* which Shorthouse began writing in 1866; it remained in manuscript until 1880, when 100 copies were privately printed. In 1881 it was published, and, highly praised by scientists, theologians, and politicians, it sold 9,000 copies within the year and has continued to attract readers. Shorthouse's other novels (including *Sir Percival,* 1886) were less successful.

Shortland Bluff (Australia): *see* Queenscliff.

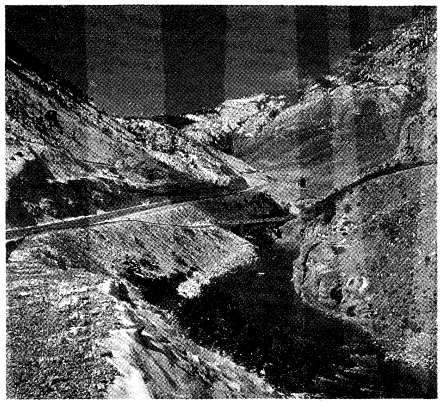
Shortland Islands, volcanic group in the northwestern Solomon Islands, southwestern Pacific Ocean, just southeast of Bougainville. The two largest islands are Alu (or Shortland; 10 miles [16 km] by 8 miles), rising to 680 feet (207 m), and Fauro (10 miles by 6 miles). The islands, comprising 160 square miles (414 square km), are planted with coconut palms and support a limited timber industry. The airfield on tiny Balalai Island provides local service. Korovou on the southeast end of Alu is the main settlement. Pop. (1986 prelim.) 3,131.

shortwave radio, transmission and reception of information by means of electromagnetic waves about 10 to 80 m (33 to 262 feet) in length having frequencies of approximately 29.7 to 3.5 megahertz. During the early 1920s attempts were made to transmit radio signals over long distances by bouncing them off the layers of charged particles in the Earth's ionosphere. The success of these experiments prompted the establishment of worldwide shortwave communication by the late 1930s.

Shortwave broadcasts provide the major source of news and popular entertainment in much of the world except in highly developed regions such as Western Europe, North America, and Japan, where government or commercial programming is transmitted within other bands of frequencies. Among the world's most powerful shortwave broadcasting stations are Radio Peking, Radio Moscow, the British Broadcasting Corporation, and the Voice of America. Besides their use in international broadcasting, shortwave radio frequencies and techniques are utilized to relay telephone and telegraph communications over great distances. Amateur radio stations and portable two-way radios also operate at shortwave frequencies.

Shoshenq I (ancient Egyptian king): *see* Sheshonk I.

Shoshone River, river in Wyoming, U.S., formed by North and South forks in the Absaroka Range in Yellowstone National Park. It flows northeast past Cody and Lovell, joining the Bighorn River (Bighorn Canyon Recreation Area) at Kane, near the Montana line, after a course of 100 mi (161 km). Buffalo Bill Dam and the Shoshone reservoir, which it impounds near Cody, are part of a power and irrigation project at the eastern end of Shoshone Canyon. The river was named for the Shoshoni Indian tribe.



Shoshone Canyon, on the Shoshone River near Cody, Wyo.
F. Wood—Shostal/EB Inc.

Shoshonean languages, Plateau: *see* Numic languages.

Shoshoni, also spelled SHOSHONE, North American Indian group that in historic times occupied the territory from southeastern California across central and eastern Nevada and northwestern Utah into southern Idaho and western Wyoming. A comparatively recent offshoot of the Wyoming Shoshoni are the Comanche (*q.v.*). The Shoshoni language belongs to the Numic group (formerly called Plateau Shoshonean) of the Uto-Aztecan family (*see* Numic languages. Shoshoni dialects are so similar that speakers from Death Valley, Calif., have no difficulty conversing with Comanche.

The Shoshoni of historic times may be roughly divided into four groups: Western (unmounted) Shoshoni, centring in Nevada, lacking horses, and early designated Diggers along with other far western Indians; Northern (mounted, or horse) Shoshoni of northern Utah and Idaho; Wind River Shoshoni in western Wyoming; and Comanche in western Texas.

The Western Shoshoni were divided into loosely affiliated family bands that subsisted on wild seeds, small mammals, fish, and insects. Each family was independently nomadic during most of the year and joined other families only briefly for rabbit drives, antelope hunts, or dancing. Hostilities were confined to feuds between families. A few Western Shoshoni obtained horses after whites settled Nevada and Utah.

Wind River Shoshoni and Northern Shoshoni probably acquired horses as early as 1680, before white settlers occupied their lands. They formed loosely organized bands of mounted buffalo hunters and warriors and adopted such Plains Indian traits as tepees, skin clothing, and counting coup (striking or touching an enemy in warfare in a prescribed way) as war honours.

After acquiring horses, the Comanche split off from the Wind River Shoshoni and moved south into Texas. The Comanche developed predatory bands that were feared by the Spaniards of the Southwest because they subsisted as much by plunder as by buffalo hunting.

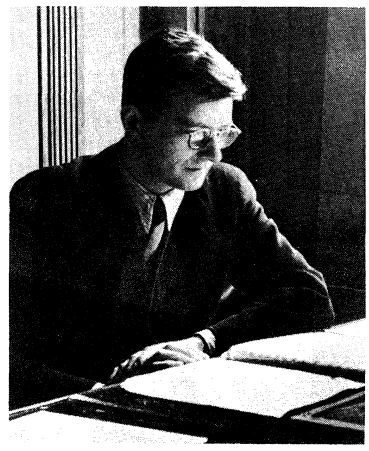
The Wind River Shoshoni population is estimated to have been 2,500 in the early 19th century, that of the Comanche 7,000. The Northern and Western Shoshoni together did not exceed 10,000 at that time. In the late 20th century the combined total was about 9,000 for all groups; most now live on reservations in territory they once held.

Shoshoni-Bannock, term used to describe bands of Shoshoni and Bannock (*qq.v.*) Indians living as one people.

Shostakovich, Dmitry (Dmitriyevich) (b. Sept. 25 [Sept. 12, old style], 1906, St. Petersburg, Russia—d. Aug. 9, 1975, Moscow), Russian composer, renowned particularly for his 15 symphonies, numerous chamber works, and concerti, many of them written under the pressures of government-imposed standards of Soviet art.

Early life and works. Shostakovich was the son of an engineer. He entered the Petrograd (formerly St. Petersburg, now Leningrad) Conservatory in 1919, where he studied the piano with Leonid Nikolayev until 1923 and composition until 1925 with Aleksandr Glazunov and Maksimilian Steinberg, the latter the son-in-law of Nikolay Rimsky-Korsakov. He participated in the Chopin International Competition for Pianists in Warsaw in 1927 and received an honourable mention but made no subsequent attempt to pursue the career of a virtuoso, confining his public appearances as a pianist to performances of his own works.

Even before his keyboard success in Warsaw, he had had a far greater success as a composer with the *First Symphony* (1924–25), which quickly achieved worldwide currency. The symphony's stylistic roots were numerous; the influence of composers as diverse as Tchaikovsky and Paul Hindemith (and, avowedly, Shostakovich's contemporary Sergey Prokofiev) is clearly discernible. In the music Shostakovich was to write in the next few years he submitted to an even wider range of influences. The cultural climate in the Soviet Union was remarkably free at that time; even the music of Igor Stravinsky and Alban Berg, then in the avant-garde, was played. Béla Bartók and Paul Hindemith visited Russia to perform their own works, and Shostakovich openly experimented with avant-garde trends. His satiric opera *The Nose,* based upon Nikolay Gogol's story, displayed a comprehensive awareness of what was new in Western music, although already it seems as if the satire is extended to the styles themselves, for the avant-garde sounds are contorted with wry humour. Not surprisingly, Shostakovich's incomparably finer second opera, *Lady Macbeth of the Mtsensk District* (later retitled *Katerina Izmaylova*), marked a stylistic retreat. Yet even this more accessible musical language was now too radical for the Soviet authorities.



Shostakovich, early 1940s
EB Inc.

From 1928, when Joseph Stalin had inaugurated his First Five-Year Plan, an iron hand fastened on Soviet culture, and in music a direct and popular style was demanded. Avant-garde music and jazz were banished, and for a while even the unproblematic Tchaikovsky was out of favour. Shostakovich did not experience immediate official displeasure, but when it came it was devastating. It has been said that it was Stalin's personal anger at what he heard when he attended a performance of *Lady Macbeth of the Mtsensk District* in 1936 that precipitated the official condemnation of the opera and of its creator.

Shostakovich was bitterly attacked in the official press, and both the opera and the until then unperformed *Fourth Symphony* (1935–36) were withdrawn. The composer's next major work was his *Fifth Symphony* (1937), which he described as "A Soviet artist's reply to just criticism." A trivial, dutifully "optimistic" work might have been expected; what emerged was compounded largely of serious, even sombre and elegiac music, presented with a compelling directness that scored an immediate success with the public and even the authorities.

With the *Fifth Symphony,* Shostakovich escaped from the stylistic instability of his earlier works, finally forging the personal style that he used in his subsequent compositions. Gustav Mahler was a clear progenitor of both the *Fourth* and *Fifth* symphonies, but the latter represented a drastic shift in technique. Whereas the earlier symphony had been a sprawling work, founded upon a free proliferation of melodic ideas, the first movement of the *Fifth* was marked by melodic concentration—certain particles providing the main bases of music that grows organically to a relentless climax. This singlemindedness is reflected elsewhere in Shostakovich's work in his liking for the monolithic Baroque structures of the fugue and chaconne, each of which grows from, or is founded upon, the constant repetition of a single melodic idea. This almost obsessive concern with the working out of a single expressive character can also be seen in the recurrence in his mature music of certain thematic ideas, notably various permutations founded upon the juxtaposition of the major and minor third (already clear in the *Fifth Symphony*), and the four-note cell D-E♭-C-B derived from the composer's initials in their German equivalent (D. Sch.), interpreted according to the labels of German musical notation (in which "S," spoken as "Es," equals E♭ and "h" equals B).

In 1937 Shostakovich was appointed a teacher of composition in the Leningrad Conservatory, and the German attack on the Soviet Union in 1941 found him still in that city. He composed his *Seventh Symphony* (1941) in beleaguered Leningrad during the latter part of that year, and the work achieved a quick fame, though more because of the quasi-romantic circumstances of its composition than because of its musical quality, which is often banal. Indeed, Shostakovich was always an uneven composer. When some extramusical force conditioned the music, empty rhetoric and impoverished invention all too often had been the result. After the evacuation to Kuybyshev in 1942, Shostakovich settled in Moscow in 1943 as a teacher of composition at the conservatory, and from 1945 he taught also at the Leningrad Conservatory.

Later life and works. Shostakovich's works written during the mid-1940s contain some of his best music, especially the *Eighth Symphony* (1943), the *Piano Trio* (1944), and the *Violin Concerto No. 1* (1947–48). Their prevailing seriousness, even grimness, was to contribute

to Shostakovich's second fall from official grace. When the Cold War began, the Soviet authorities sought to impose a firmer ideological control, demanding a more accessible musical language than some composers were currently using. In Moscow in 1948, at a now notorious conference presided over by Andrey Zhdanov, a prominent Soviet theoretician, the leading figures of Soviet music, including Shostakovich, were attacked and disgraced. As a result, the quality of Soviet composition slumped in the next few years. His personal influence was reduced by the termination of his teaching activities at both the Moscow and Leningrad conservatories. Yet he was not completely intimidated, and in his *String Quartet No. 4* (1949), and especially in his *Quartet No. 5* (1951), he offered a splendid rejoinder to those who would have had him renounce completely his style and musical integrity. His *10th Symphony,* composed in 1953, the year of Stalin's death, flew in the face of Zhdanovism, yet, like his *Fifth Symphony* of 16 years earlier, compelled acceptance by sheer quality and directness.

From that time on, Shostakovich's biography is essentially a catalog of his works. He was left to pursue his creative career largely unhampered by official interference. He did, however, experience some difficulty over the texts (*Baby Yar*) by the poet Yevgeny Yevtushenko on which he based his *13th Symphony* (1962), and the work was suppressed after its first performance. Yet he was undeterred by this, and his deeply impressive *14th Symphony* (1969), cast as a cycle of 11 songs on the subject of death, was not the sort of work to appeal to official circles. The composer had visited the United States in 1949, and in 1958 he made an extended tour of western Europe, including Italy (where he had already been elected an honorary member of the Accademia Nazionale di Santa Cecilia, Rome) and Great Britain, where he received an honorary doctorate of music at the University of Oxford. In 1966 he was awarded the Royal Philharmonic Society's Gold Medal.

Despite the brooding typical of so much of his music, which might suggest an introverted personality, Shostakovich was noted for his gregariousness. After Prokofiev's death in 1953, he was the undisputed head of Russian music. There was no reason to doubt that he was a sincere Communist, and he even participated in political conferences. Yet as a composer he always refused to be a mere cipher of official politics. Indeed, he appeared to flourish in tension, writing much of his best music when his fiercely independent creative thought, under the abiding pressure from his masters for comprehensible expression, was channeled into a musical language of the utmost directness. (Da.Br.)

MAJOR WORKS. *Operas. The Nose* (composed 1927–28; first performed 1930); *Lady Macbeth of the Mtsensk District* (composed 1930–32; first performed 1934; later renamed *Katerina Izmaylova,* and performed in the revised version, 1962).

Ballets. The Golden Age (1930); *Bolt* (1931); *Bright Rivulet* (1935).

Orchestral works. 15 symphonies, including *No. 1* (composed 1924–25), *No. 5* (1937), *No. 7* (*Leningrad,* 1941), *No. 10* (1953), *No. 14* (a cycle of 11 songs, 1969).

Concerti. Violin: *No. 1* (1948) and *No. 2* (1967). Cello: *No. 1* (1959) and *No. 2* (1965). Piano: *No. 1* (1933) and *No. 2* (1957).

Chamber music. 15 string quartets; *Piano Quintet* (1940); two piano trios, the first of which (Opus 8) was repudiated by the composer.

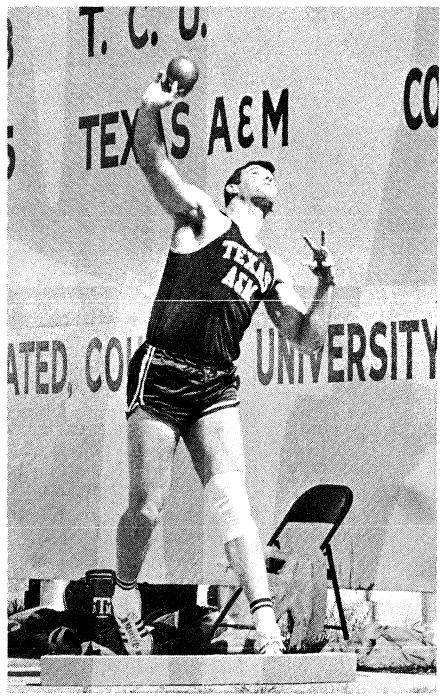
Piano. Two sonatas; *24 Preludes and Fugues* (1951).

Choral. The Execution of Stepan Razin (1964).

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Shostka, also spelled ŠOSTKA, city, Sumy *oblast* (administrative region), Ukrainian Soviet Socialist Republic, on the Shostka River. It became the site of a powder mill in 1730, but not until Soviet times did it become a considerable settlement, being incorporated in 1924. It now has varied industries, including food processing and the manufacture of photographic materials, veneers, building materials, and chemicals. It also has technical colleges and a music school. Pop. (1985 est.) 85,000.

shot put, track-and-field sport in which a spherical weight is thrown, or put, from the shoulder for distance. It derives from the ancient sport of putting the stone. First to use a shot (cannon ball) instead of a stone competitively were British military sports groups. Although the weight varied in early events from 8 to 24 pounds (3.63 to 10.9 kg), a standard, regulation-weight 16-pound (7.26-kilogram) shot was adopted for men in the first Olympic Games (1896) and in international competition. The weight of the shot used for women's competition is 4 kg (8.8 pounds) lighter weights are also used in school and college competition.



Randy Matson putting the shot in 1965
AP/Wide World Photos

The shot generally is made of solid iron or brass, although any metal not softer than brass may be used. It is put from a circle 2.13 m (7 feet) in diameter into a sector about 65° measured from the centre of the circle. The circle has a board 10 cm (4 inches) high around its front; if the competitor steps on or out of his circle his throw is invalidated. The shot is put with one hand and must be held near the chin to start. It may not drop below or behind shoulder level at any time.

Constant improvements in technique have resulted in better than doubled record distances. The International Amateur Athletic Federation recognizes the first official world record as 9.44 m by J.M. Mann (U.S.) in 1876. It had long been conventional to start from a position facing at right angles to the direction of the put. In the 1950s, however, Parry O'Brien (U.S.) developed a style of beginning from a position facing backward. Thus he brought the shot around 180°, rather than 90°, and found that the longer he pushed the shot, the farther it would travel. O'Brien was quite successful, and his style was almost universally imitated. By 1965 Randy Matson (U.S.) had pushed the record beyond 21 m; later athletes extended the world mark to more than 22 m. *See* Sporting Record: *Athletics. See also* Olympic Games.

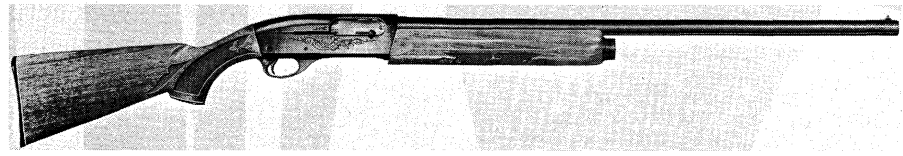
shotcrete, also called (trademark) GUNITE, concrete applied by spraying. Shotcrete is a mixture of aggregate and portland cement, conveyed by compressed air to the nozzle of a spray gun, where water is added. The wet mixture is then sprayed in place and may be carved or troweled almost immediately. For structural uses, shotcrete is usually applied over a framework of reinforcing bars and steel mesh. Because it can take any shape, is easily coloured, and can be sculptured after application, shotcrete is used for a variety of fancy concrete structures, including artificial rock walls, zoo enclosures, canopy roofs, refractory linings, pools, and dams. It is sometimes used in tunneling to bind the walls of the tunnel to prevent leaks and fragmentation.

shotgun, smoothbore shoulder weapon designed to fire a number of pellets, or shot, that spread in a diverging pattern after they leave the muzzle. It is used primarily against small moving targets, especially birds.

The earliest smoothbore firearms loaded with shot were the "fowling pieces" that appeared in 16th-century Europe. In the early 17th century, the barrels were made as long as 6 feet (1.8 m) in an attempt to gain maximum accuracy.

The modern shotgun evolved principally from a series of 19th-century improvements in gunpowder, cartridges, and guns. The barrel was shortened and lightened, making possible the double-barreled gun, in which two barrels shoot to the same point of aim at normal ranges. The choke bore was introduced to limit the spread of the shot and increase range and accuracy. Repeating shotguns, in which several cartridges could be loaded at once and successively positioned in the firing chamber by a cocking action, became available in the 1880s. In semiautomatic shotguns, firing a shot automatically positions the next round.

Effective range of a modern weapon is about 50 yards (45 m). The gauge of a shotgun, a measure of its bore, originally represented the number of lead pellets of the diameter of the barrel that would weigh one pound (0.45 kg);



Twelve-gauge, five-shot automatic shotgun
By courtesy of the Remington Arms Co., Inc.

thus a 12-gauge shotgun has a larger bore than a 20-gauge. Single balls of barrel-filling size are rare today, but cylindrical slugs are sometimes used for deer hunting.

The shotgun is also used in trap and skeet shooting and is used as a police weapon in many countries. The sawed-off shotgun, with truncated barrels, is easily concealed and is notorious as a criminal weapon.

Shōtoku, TAISHI (Crown Prince), original name UMAYADO (b. 574, Yamato, Japan—d. April 8, 622, Yamato), influential regent of Japan and author of some of the greatest contributions to Japanese historiography, constitutional government, and ethics.

Shōtoku promoted Buddhism and Confucianism in what had been an exclusively Shintō milieu and brought new political, religious, and artistic institutions to Japan. By means of persuasion and political maneuver, he emulated in his own country the giant bureaucratic empire of China and expanded the authority of the Imperial house, bringing back into its hands powers that had been delegated to the feudal lords.

Shōtoku was a member of the powerful Soga family and the second son of the short-reigned emperor Yōmei. When political maneuvering brought his aunt to the throne, he became crown prince and regent in 593. He remained in that position until his death. One of his first acts was to resume sending envoys to China, a practice that had been discontinued since the 5th century, thus opening up avenues for cultural, economic, and political exchange. He imported scores of Chinese artists, craftsmen, and clerks into Japan, adopted the Chinese calendar, created a system of highways, and erected many Buddhist temples, including the Hōryū-ji, built in 607 in Ikaruga, near Nara, which is now considered among the oldest surviving wooden structures in the world.

Shōtoku compiled the chronicles of the government, after the Chinese model, to make up the first book of Japanese history. He also instituted a system of 12 court ranks, each identified by the colour of the cap an official wore. This scheme became one of the most important changes in the Japanese government, for it meant a break with the old system of hereditary posts and implied a bureaucracy of merit along the Chinese model.

His "Seventeen Article Constitution" (*q.v.*; 604) instructed the Japanese ruling class in Confucian ethical concepts and the Chinese bureaucratic system, which he held up as an ideal for Japanese government. Although there is some doubt whether this document was the work of Shōtoku or perhaps a later forgery, it represents his thinking and resulted from his influence. He is remembered also for irrigation projects and social welfare measures. He worked for the spread of Buddhism and after his death was looked upon as a Buddhist saint.

Shōtoku Tennō (empress of Japan): *see* Kōken.

Shotwell, James Thomson (b. Aug. 6, 1874, Strathroy, Ont., Can.—d. July 15, 1965, New York City), Canadian-born American historian, diplomat, and outstanding scholar of international relations in the 20th century.

A graduate of the University of Toronto (B.A., 1898) and Columbia University (Ph.D., 1903), he taught history and international relations at Columbia University until his retirement in 1942.

Shotwell served as an adviser to U.S. Pres. Woodrow Wilson in 1917 on the political and historical aspects of potential postwar problems and later as a delegate to the Versailles peace conference. After the U.S. rejection of the League of Nations in 1919, Shotwell returned to Europe to edit the monumental *Economic and Social History of the World Wars,* 150 vol. (1919–29), sponsored by the Carnegie Endowment for International Peace. He simultaneously worked on outlining terms of both the Pact of Locarno (1925) and the Kellogg-Briand Pact (1928). Director of the Institute of Pacific Relations (1927–30) and of the Social Science Research Council (1931–33), he edited a series of volumes, *The Relations of Canada and the United States* (1936), also sponsored by the Carnegie Endowment.

In 1943 Shotwell was appointed assistant to U.S. Pres. Franklin D. Roosevelt in the project of organizing the United Nations, and in 1945 he served as chairman of consultants to the U.S. delegation at San Francisco. After 1945 he actively campaigned for the acceptance and success of the new international organization. President of the Carnegie Endowment between 1948 and 1950, he was the recipient of numerous honours from academic and international societies.

Among Shotwell's other books are *An Introduction to the History of History* (1922), *War as an Instrument of National Policy, and Its Renunciation in the Pact of Paris* (1929), and *Lessons on Security and Disarmament* (1947). He also edited *Records of Civilization, Sources and Studies,* 5 vol. (1915–21).

Shou Hsing, Pinyin SHOU XING, in Chinese mythology, one of three stellar gods known collectively as Fu-Shou-Lu; also called Nan-chi



Shou Hsing, wood figurine; in the Musée Guimet, Paris

By courtesy of the Musee Guimet, Paris

Lao-jen ("Old Man of the South Pole"). Though greatly revered as the god of longevity (*shou*), Shou Hsing has no temples. Instead, birthday parties for older people provide a fitting time for visitors to bow before his statue, which is draped in silk embroidered robes.

Artistic representations very often depict Shou Hsing as a bearded old man with a high brow and a crooked staff in one hand. He holds the peach of immortality in his other hand. A stork or turtle is often added as a further symbol of longevity, which Chinese view as a special blessing.

shoulder, in anatomy, joint between the arm, or forelimb, and the trunk, together with the adjacent tissue, particularly the tissue over the shoulder blade, or scapula. The shoulder, or pectoral, girdle is composed of the clavicles (collar bones) and the scapulae. In humans the clavicles join the sternum anteriorly and the scapulae laterally; the scapulae, however, are joined to the trunk by muscles. In many cursorial (running) mammals the clavicles are reduced or no longer present, to permit free movement of the humerus in a forward direction. The major joint of the shoulder is the glenohumeral joint, a ball-and-socket joint in which the humerus is recessed into the scapula. The flexibility of the shoulder has permitted various locomotor adaptations, such as digging in moles, running in antelopes, brachiation in gibbons, and flight in birds.

For a depiction of the shoulder in human anatomy, shown in relation to other parts of the body, *see* the colour Trans-Vision in the PROPAEDIA: Part Four, Section 421.

shoulder blade (anatomy): *see* scapula.

shovel lobster, any of several species of lobster of the family Scyllaridae. *See* lobster.

shovelboard (game): *see* shuffleboard.

shoveler, any of four species of dabbling ducks in the genus *Anas* (family Anatidae) with large, long, spoon-shaped bills. The northern shoveler (*A. clypeata*) nests in North America, Europe, and northern Asia, migrating to South America, North Africa, and southern Asia in winter. The male resembles a mallard, with its green head, white breast, and chestnut and blue back. It is not highly desired as a game bird, because of the poor flavour of the meat; hence, the hunters' sobriquet "neighbour's mallard," *i.e.,* best given away to one less discerning. Shovelers appear somewhat humpbacked in the air, although they are rapid fliers. They inhabit shallow marshes and lagoons, where they use their large bills, lined with platelike structures (lamellae), to sift small organisms and seeds from the mud. In deeper waters the northern shoveler skims the surface for plankton. Other species are the red shoveler (*A. platalea*) of South America; the Cape, or Smith's, shoveler (*A. smithii*) of South Africa; and the Australasian, or blue-winged, shoveler (*A. rhynchotis*) of New Zealand and Australia.

show jumping, competitive equestrian event in which horse and rider are required to jump, usually within a time limit, a series of obstacles that have been designed for a particular show.

After warming up for at least a half hour before entering the arena, the horse is guided by the rider toward the centre of each obstacle, his speed being contingent upon the breadth of each fence. The fences, which are not more than 5.6 feet (1.7 metres) high, often are placed less than 40 feet (12 metres) apart.

Competitions that test jumping ability within a specified time period either convert faults into seconds (Table C scoring) or convert extra seconds into faults (Table A scoring). In some contests, time is significant only when there is equality of faults.

The contest based on jumping ability alone, called Puissance, requires the horse to run over a set number of obstacles in progressively more difficult courses; there is a limit of four jump-offs for Puissance competitions.

All international shows are governed by the Fédération Équestre Internationale (International Equestrian Federation). Open to international teams of four riders, a Nations Cup is based on two rounds, with the worst score of each team in each round being discarded. The President's Cup, instituted in 1965, is based on the results of the several Nations Cup competitions each year and is considered a world team championship. The prize is awarded to the team with the six best scores.

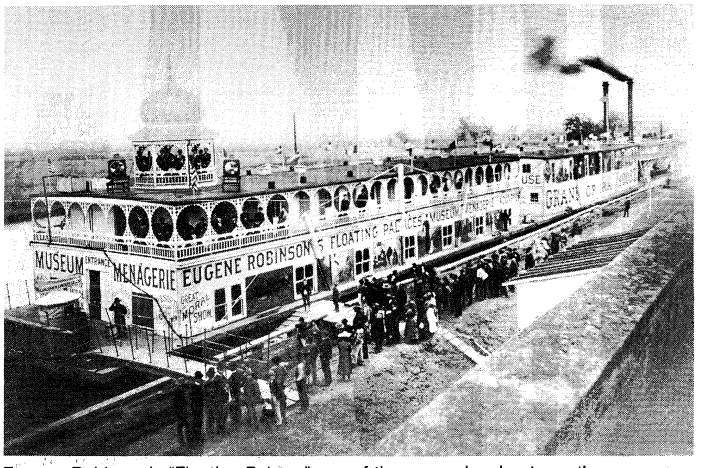
Greatly increased prize money and attendance from the 1960s reflected increased popularity of show jumping. For winners of various international show jumping events, *see* Sporting Record: *Show jumping;* for Olympic champions in equestrian jumping, *see* Olympic Games.

Shōwa period, Japanese artistic era during which the traditional art of Japan changed as a result of contact with the West. In the early Shōwa period (1926–45), Japan was exposed

to a large amount of modern European and American art, the effect of which was not overwhelming acceptance but a merger of local and Western styles.

After World War II, foreign artistic influences increased. The name, which means "bright peace," is the designation of the reign of the emperor Hirohito, who took the throne in 1926.

showboat, floating theatre that tied up at towns along the waterways of the southern and midwestern United States, especially along the Mississippi and Ohio rivers, to bring culture and entertainment to the inhabitants of river frontiers. The earliest of these entertainment boats were family-owned ventures into regions where theatres had not gone.



Eugene Robinson's "Floating Palace," one of the many showboats on the Mississippi River during the 19th century, featuring a museum, menagerie, and an opera house

By courtesy of the Special Collections Division, Howard-Tilton Memorial Library, Tulane University, New Orleans

The British-born actor William Chapman built the first showboat, the "Floating Theatre" (14 by 100 feet [4 by 32 metres]), at Pittsburgh in 1831. He and his family floated from landing to landing, playing dramas such as *The Stranger*, by August von Kotzebue, and Shakespeare's *Taming of the Shrew*, with music and dance specialties added. Upon reaching New Orleans late in winter, they junked the boat and returned by steamer to Pittsburgh to repeat the pattern the next year. One unusual example of a popular showboat of this early period was the "Floating Circus Palace" of Spaulding and Rodgers (built 1851) that featured large-scale equestrian spectacles. By the mid-19th century, showboats began to degenerate and then, because of the Civil War, disappeared entirely.

When showboats were revived (1878), they specialized in vaudeville and melodrama. Steamer tows and the steam calliope greatly increased territory and audiences, and Stephen Foster's songs added sentimental charm to their programs. Such boats as the "New Sensation," "New Era," "Water Queen," "Princess," and dozens of others, with seating capacities of 100 to 300, carried their rich cargoes of humour, music, and simple emotion on every river of the Ohio–Mississippi system, from the narrow Monongahela in the Northeast to the Atchafalaya bayous in the South.

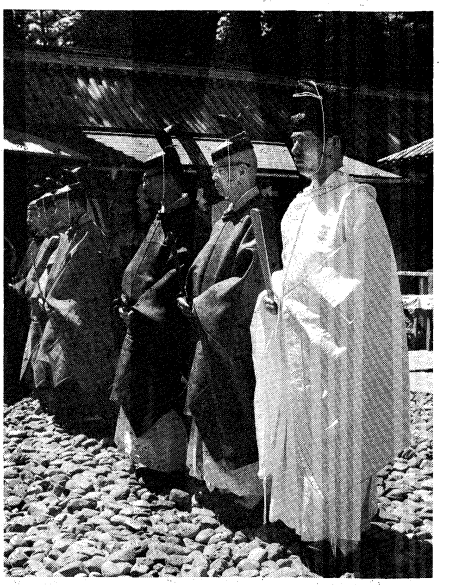
With the disappearance of river frontier conditions in the 1900s and with the coming of better roads, automobiles, and motion pictures, the number of showboats declined. To compete with land entertainment, they became larger and more elaborate. The "Golden Rod" seated 1,400 persons; the "Cotton Blossom," the "Sunny South," and the "New Showboat" were floating theatre palaces. All emphasized melodrama. With the burlesquing of these programs in the 1930s to attract sophisticated audiences, showboats ceased to perform their original function. The last one to travel the rivers in authentic pattern was the "Golden Rod" in 1943. Jerome Kern's musical comedy *Show Boat* (1927) and film version (1929, 1936) portrayed this kind of entertainment.

showbread (Judaism): *see* shewbread.

Shōyuken: *see* Matsunaga Teitoku.

shōzoku, vestments worn by the Shintō priests of Japan during the performance of religious ceremonies. Most of the costumes appear to date from the Heian period (794–1185) and originated as dress of the noblemen, the colours and cut often determined by court rank.

The basic garment is the *hakama*, a wide split skirt that falls to the ankles and is coloured white, light blue, or (for high dignitaries) purple. Over this is worn two or more layers of kimono-type garments, the most formal of which is the white silk *saifuku*. Over the *saifuku* is worn the *hō*, coloured black, red, or light blue. Less formal is the *jōe*, a robe of white silk and the varicoloured *kariginu* (which means "hunting garment," attesting to the usage made of it during the Heian period); these may be worn by laymen during visits to shrines or participation in religious ceremonies as well as by priests.



Shintō priests wearing the traditional *shōzoku* during the festival of One Thousand Samurai at the Toshogu Shrine

Paolo Koch—Rapho/Photo Researchers

The priest's headgear may be either the black lacquered-silk *eboshi*, for less formal attire, or the more elaborate *kanmuri*, worn with the *saifuku* costume. Priests usually carry a *shaku*, a flat wooden sceptre, either held in the hand or thrust into the belt.

Consult the INDEX *first*

shraddha (Hinduism): *see* Śrāddha.

shrapnel, originally a type of antipersonnel projectile named for its inventor, Henry Shrapnel (1761–1842), an English artillery officer. Shrapnel projectiles contained shot, usually of lead, along with an explosive charge to scatter the shot as well as fragments of the shell casing while the projectile was in flight. This lethal debris continued on the shell's original trajectory to the target. During World War II it was found that a high-explosive bursting charge fragmented the iron casing so effectively that the use of shrapnel balls was discontinued. The term shrapnel continued to be used to designate the shell casing fragments. Before explosive projectiles were used, the purposes of shrapnel were served by charging a cannon with small iron balls, called grapeshot, or with lengths of chain.

Shreve, Henry Miller (b. Oct. 21, 1785, Burlington County, N.J., U.S.—d. March 6, 1851, St. Louis, Mo.), U.S. river captain and pioneer steamboat builder who contributed significantly to developing the potential of the Mississippi waterway system.

Shreve's father was a Quaker who nevertheless served as a colonel in the Revolutionary War and lost all his possessions at the hands of the British. Destitute, the Shreves were forced to emigrate to the western Pennsylvania frontier. When his father died in 1799 Shreve began to make trading voyages by keelboat and barge down the Monongahela and Ohio rivers. In 1807 he inaugurated the fur trade between St. Louis and Philadelphia, by way of Pittsburgh, and in 1810 he began carrying lead from Galena, Ill., near the upper Mississippi. He became a stockholder and skipper of the "Enterprise" (the second steamboat on the Mississippi), carrying supplies in 1814 for Andrew Jackson's army and taking part himself in the Battle of New Orleans. In May 1815 the "Enterprise" with Shreve at the helm became the first steamboat to ascend the Mississippi and Ohio to Louisville, Ky. Shreve, however, saw the need for an entirely new design for river steamers and had built to his specifications the "Washington," with a flat, shallow hull, a high-pressure steam engine on the main deck instead of in the hold, and a second deck. His round trip in the "Washington" in 1816 from Pittsburgh to New Orleans and back to Louisville definitely established the Mississippi steamboat type.

In 1827 Shreve was appointed superintendent of western river improvements and designed the first snag boat to remove from the river system the sunken tree trunks that often wrecked steamboats. In the 1830s he undertook the removal of an accumulated underwater obstruction of the Red River known as the Great Raft; his success opened northern Louisiana to development, and his workcamp turned into a permanent settlement as Shreveport.

Shreveport, city, seat (1838) of Caddo Parish, northwestern corner of Louisiana, U.S., on the Red River, opposite Bossier City. In 1835 Henry Miller Shreve, a river captain and steamboat builder, opened the Red River for

navigation by clearing it of a 160-mi (257-km) jam of natural debris called the Great Raft. In 1837 he helped found the city on lands bought for $80,000 from the Caddo Indians in 1835. Cotton and river traffic served as the town's economic base. At the end of the Civil War, Shreveport was the Confederate state capital and headquarters for the Trans-Mississippi forces of the Confederacy. By 1900 the railroads had arrived, and river commerce, impeded by silt, had declined. In 1906 oil was discovered, and the city boomed. It is now the commercial and industrial centre for a three-state region (known as the Ark-La-Tex) that produces petroleum, natural gas, cotton, and lumber. In the 1970s the Red River was again rehabilitated to allow navigation of barge traffic from the Gulf to Shreveport. Barksdale Air Force Base is 4 mi southeast.

The city is the seat of Centenary College of Louisiana (1825), Louisiana State University in Shreveport (1967), and Baptist Christian College (1961). The (October) Louisiana State Fair, a spring festival, "Holiday in Dixie," and the "Red River Revel," an arts and crafts fair, are major annual events. Inc. town, 1839; city, 1878. Pop. (1980) city, 205,815; (1982 est.) metropolitan area (SMSA), 346,000.

shrew, any of the 290 species of mammals of the family Soricidae, order Insectivora. For ordinal relatives with this name, *see* elephant shrew; otter shrew. *See also* tree shrew. For rat shrew, *see* gymnure.



Common shrew (*Sorex araneus*)
Jane Burton—Bruce Coleman Inc.

Soricids, the true shrews, are mouselike creatures found throughout the Northern Hemisphere and in mountains of northwestern South America; a few have reached oceanic islands, chiefly by human agency. Shrews have tiny eyes and small, external ears. The skull is narrow, and the snout overhangs the lower lip. The 26 to 32 teeth are permanent from birth; the incisors are long and hook tipped. All shrews are small: Savi's pygmy shrew (*Suncus etruscus*) of the Mediterranean region and Africa to Malaya is perhaps the world's smallest mammal, with head and body length of 3.5 centimetres (1.5 inches) and a 2.5-cm tail (minimum measurements of adult male, Italy); it may weigh only 2 grams (about 0.07 ounce)—less than a U.S. dime. The American pygmy shrew (*Microsorex hoyi*) and the European pygmy shrew (*Sorex minuta*) are only a trifle larger.

Shrews are chiefly terrestrial, living among ground litter; some are burrowers, and a few are semi-aquatic or arboreal. They are active day and night, with regular periods of rest. Shrews feed mainly on invertebrates and help to control noxious insects; some also eat plant material or carrion. A number of species have toxic saliva (painful to humans) for quelling prey. A shrew has a high metabolic rate and may consume more than its own weight in food daily; it cannot live more than a few hours without eating, and in the absence of normal prey it turns cannibal.

Shrews have 2 to 10 blind, naked young in one or more litters toward the end of the female's brief life (about 18 months).

Few mammals will eat shrews, because many species have glands on the flanks that emit a disgusting scent; however, birds of prey and snakes will feed on them. A shrew may die from the shock of a rough touch or a loud noise.

The 40 species of the genus *Sorex* are found in North America (chiefly) and Eurasia. Examples are the common shrew (*S. araneus*) of Eurasia and, across northern North America, the common, or masked, shrew (*S. cinereus*) and the northern water shrew (*S. palustris*). From the eastern United States to the Andes are the 25 species of *Cryptotis.* The largest genus is *Crocidura,* the 160 species of musk shrews, which have a strong odour. If disturbed, the young may form a chain, each holding the tail of the one ahead in its mouth, with the mother as the forward anchor. The biggest species, the Goliath shrew (*Crocidura goliath*; sometimes *Praesorex goliath*) of Africa, is 37 cm long, including its 10-cm tail. Musk shrews range from Europe and Africa to the Philippines. Of similar range are the 20 species of thick-tailed shrews (*Suncus*); they, too, have the chain-forming habit.

The two armoured, or girder-backed, shrews (*Scutisorex*) of the Ituri Forest of central Africa have supernumerary and enlarged lumbar vertebrae; from these arise, uniquely, a mesh of interlocking spines. Thus armoured, the animal can support the weight of a person.

Shrewsbury, county town of the county of Shropshire, England, in the borough district of Shrewsbury and Atcham. Its strategic position on the English–Welsh border has made it a town of great importance. The older, central portion of the town lies on a peninsula within a southward loop of the River Severn. The Welsh princes of Powys made it their seat, called Pengwern in the 5th and 6th centuries. It was subsequently engulfed in the late 8th century by the Anglo-Saxon kingdom of Mercia. It had a mint during Edward the Elder's reign (899–924); and in Domesday Book (1086) it is styled a city. The Norman feudal lord Roger de Montgomery made Shrewsbury his headquarters and founded the abbey. During the next 200 years the county frequently was involved in wars with the Welsh, and Edward I (reigned 1272–1307) entirely rebuilt the castle. In 1403, Henry IV consolidated his throne in the Battle of Shrewsbury. In the late Middle Ages and in Tudor and Elizabethan times, the establishment of law and order in the Marches (the name given to the politically unstable belt of country along the border), along with the trade in Welsh wool and flax, brought great prosperity.

The town has many buildings of architectural interest, including 15th- and 16th-century timber-framed houses, the old Market Hall (*c.* 1596), and a number of Georgian and Regency houses. A considerable length of town wall, including a watch tower, remains. St. Mary's Church, in early Norman to Perpendicular Gothic styles, contains some remarkable stained and painted glass. In front of the old buildings of Shrewsbury School (1552), now in use as a library and museum, stands a statue of Charles Darwin, who was born in Shrewsbury in 1809.

Shrewsbury's main industries include malting and the manufacture of rolling stock, machine tools, safes, and electrical equipment. There is a large cattle market. Pop. (1981 prelim.) 59,826.

Shrewsbury, EARLS OF, titled English nobility of two creations, in the family of Roger de Montgomery and in the family Talbot, grouped below chronologically and indicated by the symbol •.

• **Shrewsbury, Roger de Montgomery, 1st earl of** (b. *c.* 1030—d. 1094), Norman lord and supporter of William I the Conqueror of England.

Roger de Montgomery, son of another Roger de Montgomery, known as "the Great," was a councillor of William, duke of Normandy, before his invasion of England and was probably entrusted by William with the government of Normandy during the expedition of 1066. Roger came to England in the following year and received extensive grants of land in different parts of the kingdom. He was created earl of Shropshire in December 1074, a position which gave him palatine control of that county and placed him among the greatest of the Marcher lords; but he and his successors were usually styled earls of Shrewsbury. A great patron of monasticism, he became a monk in his newly founded Abbey of Shrewsbury just before he died in 1094. His Norman inheritance passed to his eldest surviving son, Robert of Belesme (*q.v.*), and the title and the English lands went to Robert's younger brother, Hugh. Upon the latter's death in 1098, the title went to Robert.

• **Shrewsbury, Robert of Belesme, 3rd earl of:** *see* Robert of Belesme.

• **Shrewsbury, John Talbot, 1st earl of** (b. *c.* 1384—d. July 17, 1453, Castillon, Fr.), the chief English military commander against the French during the final phase of the Hundred Years' War (1337–1453).

The son of Richard, 4th Baron Talbot, he served in campaigns in Wales between 1404 and 1413 and as lieutenant of Ireland (1414–19), when he joined the English army in France. He fought at Verneuil in 1424 and took part in the unsuccessful siege of Orléans in 1429. Talbot's rashness was largely responsible for the severe English defeat at Patay (June 1429), where he was taken prisoner. Released in 1433, he captured Clermont the following year. By suppressing the revolt of the Pays de Caux in 1436, he prevented Normandy from falling under French control. As a reward, King Henry VI made him marshal of France.

The mainstay of the English cause for the next five years, Talbot defeated the Burgundians near Le Crotoy (1437) and captured Harfleur (1440). In 1442 he was created earl of Salop—Shrewsbury was the name that he himself used for the title. After spending another two years (1445–47) as lieutenant of Ireland, he returned to France. Shrewsbury was captured and held hostage by the French in 1449–50; during this time the English surrendered Normandy and began to lose their hold on Aquitaine. Rushing to relieve the besieged fortress of Castillon in July 1453, Shrewsbury impetuously attacked the enemy without waiting for artillery cover. He was killed in the battle—the last of the war—and soon thereafter the English yielded almost all their French possessions.

• **Shrewsbury, Charles Talbot, duke and 12th earl of,** MARQUESS OF ALTON (b. July 24, 1660—d. Feb. 1, 1718, London), English statesman who played a leading part in the Revolution of 1688–89 and who was largely responsible for the peaceful succession of the Hanoverian George I to the English throne in 1714. Although he displayed great determination in these crises, his curious timidity limited his effectiveness at other times.

He was the son of Francis Talbot, the 11th earl of Shrewsbury, and his second wife, Anna Maria, the notorious mistress of George Villiers, 2nd duke of Buckingham. Buckingham killed Francis Talbot in a duel in 1668, and thus the son succeeded to the earldom at the age of seven. Brought up a Roman Catholic

but converted to Anglicanism in 1679, he was one of the seven men who, on June 30, 1688,



Charles Talbot, duke of Shrewsbury, detail of an oil painting after Sir Godfrey Kneller, *c.* 1685; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

signed a document inviting the Protestant ruler William of Orange, stadholder of Holland, to seize power from England's Catholic king James II. In September he joined William in Holland. Returning to England with the invading forces in November, Shrewsbury quickly secured Bristol and Gloucester for the rebels. He served as secretary of state under William (by then King William III of England) in 1689–90 and from 1694 to 1699, resigning both times in order to avoid involvement in political feuds. The price of his return in 1694 was the King's agreement to a Triennial Act governing the calling of future Parliaments. William made him a duke in 1694.

During the reign of Queen Anne (1702–14) Shrewsbury shifted his allegiance from the Whigs to the Tory Party. In 1710 he helped bring about the dismissal of the Whig ministry that was directing the war against France (War of the Spanish Succession, 1701–14); a peace-seeking Tory administration then negotiated an end to the conflict. During this period Shrewsbury served as lord lieutenant of Ireland, returning in June 1714.

On July 30, 1714, Anne, on her deathbed, appointed Shrewsbury lord high treasurer, and through this office he was able to obtain the recognition of George I, great-grandson of King James I, as the legitimate royal heir. Soon thereafter the Duke retired from politics. He died without issue and the dukedom and marquesate became extinct.

BIBLIOGRAPHY. A.S. Turberville, *Charles Talbot, Duke of Shrewsbury* (1930); D.H. Somerville, *The King of Hearts* (1962).

Shrewsbury and Atcham, district (borough), county of Shropshire (formerly Salop), west central England, occupying an area of 233 sq mi (603 sq km) in the west central part of the county and bordering Wales to the west. Shrewsbury and Atcham district is an undulating plain covered with glacial drift and drained by the River Severn; it is edged on the west and south by a series of northeast–southwest oriented ridges including The Long Mynd and Long Mountain. The town of Shrewsbury, both the district and the county seat, is a market centre for the rich dairy-farming region to the north and has many specialized industries. Atcham parish (town) on the River Severn immediately southeast of Shrewsbury is the site of Attingham Park, a building noted for its late 18th-century interior decoration. Pop. (1983 est.) 88,500.

Shrewsbury School, in Shrewsbury, Shropshire, one of the major public (privately endowed) schools in England, founded in 1552 by Edward VI. Thomas Ashton, the first headmaster, gave it a classical and humanistic tone that has been retained, though sciences and other studies are now also prominent in the curriculum. Its students have included Sir Philip Sidney, soldier, statesman, and author; Fulke Greville Brooke, poet and humanist; and Charles Darwin, naturalist.

shrike, family name LANIIDAE, any of about 64 species of medium-sized predatory birds (order Passeriformes); in particular, any of the 25 species of the genus *Lanius*, constituting the subfamily of true shrikes, Laniinae. With their bills they can kill large insects, lizards, mice, and small birds. A shrike may impale its prey on a thorn, as on a meat hook; hence another name, butcherbird. True shrikes, solitary birds with harsh calls, are gray or brownish, often with black or white markings. The most widespread species is the great gray shrike (*L. excubitor*), called northern shrike in Canada and the United States, a 24-centimetre (9½-inch) black-masked bird. The only other New World species is the similar but smaller loggerhead shrike (*L. ludovicianus*) of North America. Several Eurasian species have reddish or brown markings.

Bush-shrikes, 40 species of African birds composing the subfamily Malaconotinae, are about 16 to 20 cm (6½ to 8 in.) long; they have brighter plumage and less raptorial bills than true shrikes, and they have long soft feathers on the rump. They are insect eaters that forage furtively in bushes. All have bright whistling calls. The many-coloured bush-shrike (*Chlorophoneus multicolor*) is noted for polymorphic variation in the colour of its underparts—a shade of red or yellow but sometimes black or white. The gorgeous, or four-coloured, bush-shrike (*Telophorus quadricolor*) is green above and golden below, with black-bordered red throat. Some authors equate the genus *Chlorophoneus* with *Telophorus.*

Bell-shrikes or bellbirds, members of the African genus *Laniarius,* also of the bush-shrike group, often have names imitative of the males' notes: boubou and gonolek. They are about 20 cm (8 in.) long, plain-coloured, often with a slash of white on the wings. All black forms include the sooty boubou (*L. leucorhynchus*). Black and white, with red-tinged underparts, is the tropical boubou (*L. aethiopicus*). Black above and bright red below are the black-headed, or Abyssinian, gonolek (*L. erythrogaster*) and the Barbary shrike (*L. barbarus*).

Helmet-shrikes, or woodshrikes, are any of about 10 African birds constituting the sub-

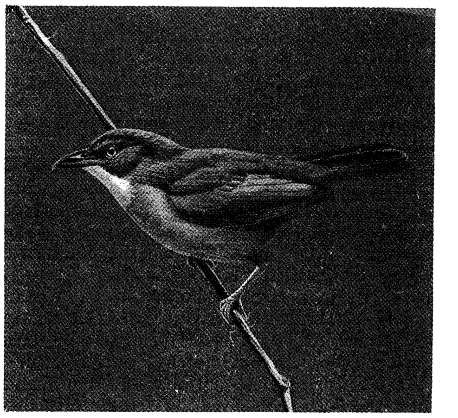


Red-backed shrike (*Lanius collurio*)

Frank Blackburn from the Natural History Photographic Agency—EB Inc.

family Prionopinae, sometimes separated as a family, Prionopidae (*see* helmet-shrike).

shrike-vireo, any of three species of tropical American songbirds, characterized by a stout, slightly hooked bill (like the true shrikes, family Laniidae) but with anatomical features that ally them with the vireos (family Vireonidae). Shrike-vireos are usually considered a distinct family, Vireolaniidae (order Passeriformes), but some authorities include them in the vireos.

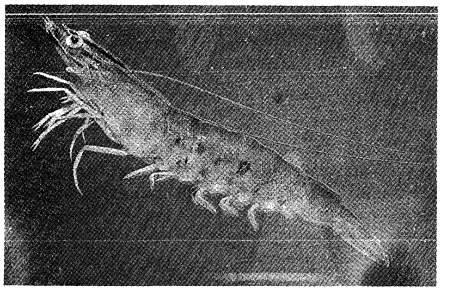


Green shrike-vireo (*Smaragdolanius pulchellus*)

Painting by John P. O'Neill

The emerald shrike-vireo and Baird's shrike-vireo are greenish above and yellow below, with a stripe of green or yellow through the eye. The chestnut-sided shrike-vireo is much more subdued in colouring, greenish brown above, white below, with a gray head and both black and yellow stripes through the eye. They range in length from 13 to 17½ centimetres (5½ to 7 inches). They inhabit young or mature forest from southern Mexico to central Brazil and Peru.

shrimp, any of the approximately 2,000 species of the suborder Natantia (order Decapoda of the class Crustacea). Close relatives include crabs, crayfish, and lobsters. Shrimps



Peneus setiferus; an edible shrimp

Marineland of Florida

are characterized by a semitransparent body flattened from side to side and a flexible abdomen terminating in a fanlike tail. The appendages are modified for swimming, and the antennae are long and whiplike. Shrimps occur in all oceans—in shallow and deep water—and in freshwater lakes and streams. Many species are commercially important as food. Shrimps range in length from a few millimetres to more than 20 centimetres (about 8 inches); average size is about 4 to 8 cm (1.5 to 3 in.). Larger species are often called prawns.

Shrimps swim backward by rapidly flexing the abdomen and tail. Food consists of small plants and animals; some shrimps feed on carrion. The female shrimp may lay from 1,500 to 14,000 eggs, which are attached to the swimming legs. The larvae pass through five developmental stages before becoming mature.

The common European shrimp, or sand shrimp, *Crangon vulgaris* (*Crago septemspinosus*), occurs in coastal waters on both sides of the North Atlantic and grows to about 8 centimetres (3 inches); it is gray or dark brown with brown or reddish spots. The shrimp *Peneus setiferus* feeds on small plants and

animals in coastal waters from North Carolina to Mexico; it attains lengths of 18 cm (7 in.). The young live in shallow bays and then move into deeper waters. *Crangon vulgaris* and *Peneus setiferus* are commercially important, as are the brown-grooved shrimp (*P. aztecus*) and the pink-grooved shrimp (*P. duorarum*). *Crangon franciscorum* is sold as the popular prawn on the Pacific Northwest coast.

Freshwater prawns (family Atyidae) occur mainly in warm regions, where some live in brackish water. They attain lengths of 20 cm (8 in.). *Ataephyra desmarestii,* 1.6 to 2.7 cm (0.6 to 1.1 in.) long, occurs in freshwaters of Europe, North Africa, and the Near East. It lives in schools among aquatic vegetation. Two notable U.S. freshwater prawns are California's *Syncaris,* 2–5 cm (1–2 in.) long, and *Palaemonias ganteri,* about half *Syncaris*'s size and unique to Mammoth Cave, Kentucky. *Xiphocaris* lives in freshwaters of West Indian islands, and the edible river shrimps or prawns of the genus *Macrobrachium* (*Palaemon*) are found in most tropical countries.

The pistol shrimp, *Alpheus,* which grows to 3.5 cm (1.4 in.), stuns prey by snapping together the fingers of the large chelae, or pincers. In the Red Sea, species of *Alpheus* share their burrows with goby fishes. The fishes signal warnings of danger to the shrimp by body movements. The coral shrimp, *Stenopus hispidus,* a tropical species that attains lengths of 3.5 cm (1.4 in.), cleans the scales of coral fish as the fish swims backward through the shrimp's chelae.

Fairy shrimp, so called because of their delicate, graceful appearance, superficially resemble true shrimp but belong to a separate order, Anostraca.

shrimp plant (*Justicia brandegeana*, sometimes called *Beloperone guttata*), of the family Acanthaceae, (*q.v.*), popular border and



Shrimp plant (*Beloperone guttata*)
Sven Samelius

greenhouse ornamental. Native to warm regions of the Americas and to the West Indies. Shrimp plants have several stems, about 45 centimetres (18 inches) tall, that bear clusters of white, spotted purple, tubular, two-lipped flowers enclosed or accompanied by numerous reddish-brown leaflike bracts that suggest the shape and colour of shrimps. Some popular varieties include the false hop, shrimp bush, and Mexican shrimp plant.

shrimpfish, also called RAZOR FISH, any of four species of small, tropical marine fishes of the family Centriscidae (order Gasterosteiformes), found in the Indo-Pacific. The name razor fish derives from the shrimpfishes' characteristic sharp-edged belly. Shrimpfishes are nearly transparent, long-snouted, shrimplike fishes, flattened from side to side and covered with a cuirass of fused, transparent armour plates. The armour ends in a long spine (one



Shrimpfish (*Aeoliscus strigatus*)
Douglas Faulkner

of the dorsal fin spines), beneath which are the tail and the rest of the dorsal fins.

Shrimpfishes characteristically swim in a vertical position, with their head down, but in a cave or similar enclosure, they swim head-up, oriented toward the roof. The species vary in length from about 14 centimetres (5½ inches) to about 30 centimetres.

Shrine Island (Japan): *see* Itsuku-shima.

Shrine Shintō, Japanese JINJA SHINTŌ, form of the Shintō religion of Japan that focusses on worship in public shrines, in contrast to folk and sectarian practices (*see* Sect Shintō); the successor to State Shintō, the nationalistic cult disbanded by decree of the Allied occupation forces at the end of World War II and subsequently in the Japanese constitution. More than 80,000 shrines, nearly all of those formerly administered by the government, have formed themselves into an Association of Shintō Shrines (Jinja Honchō). They no longer receive financial support from the government but are dependent on private contributions for their maintenance and for the support of their priests.

Shrīrāmpur, also called SERAMPUR, or SERAMPORE, town, Hooghly district, West Bengal state, northeastern India, just west of the Hooghly River, part of the Calcutta urban agglomeration. Originally a Danish settlement founded in the 18th century and called Frederiksnagar, the town was acquired by the British in 1845. A Baptist mission was begun there in 1793. Serampore College was established (1818) by three Baptist missionaries, who were also the first in India to cast type in an Indian alphabet; the earliest Bengali newspapers were issued in Shrīrāmpur in 1818. The first Indian paper mills were built there in the 1870s. It was constituted a municipality in 1865. Jute, rice, and cotton milling and the manufacture of chemicals, rope, jewelry, handlooms, and metal polish are important industries. Shrīrāmpur has a library, hospital, the Government Weaving Institute, and a textile-technology school. A large festival is held annually. Pop. (1981) 127,304.

Shriver, R(obert) Sargent, (Jr.) (b. Nov. 9, 1915, Westminster, Md., U.S.), administrator, diplomat, first director of the U.S. Peace Corps, and Democratic nominee for the U.S. vice presidency in 1972.

A graduate of Yale Law School (1940), Shriver served as a U.S. naval officer during World War II, and, after a brief association with a Wall Street law firm, he went to work as an assistant editor for *Newsweek* magazine in 1946. The same year he met millionaire Joseph P. Kennedy, who two years later asked him to manage the giant Merchandise Mart in Chicago. In 1953 he married Kennedy's daughter Eunice.

When his brother-in-law John F. Kennedy ran for the presidency in 1960, Shriver proved particularly adept in his work with minority groups throughout the country. After the election he first gained national prominence as director of the experimental overseas Peace Corps, one of the most popular ventures of the New Frontier program of the Kennedy administration. In 1964, after Kennedy's assassination, he accepted appointment as head of Pres. Lyndon B. Johnson's War on Poverty in the Office of Economic Opportunity. From 1968 to 1970 he served as ambassador to France under Republican Pres. Richard M. Nixon. In 1972 Shriver unsuccessfully ran for the vice presidency on the ticket with Sen. George McGovern. He was an unsuccessful candidate for the Democratic presidential nomination in 1976.

Shropshire, also called SALOP, county of western England bordering on Wales. Historically the county has been known as Shropshire as well by its older Norman derived name of Salop. It was officially designated as the county of Salop between 1974–80. Its area is 1,348 sq mi (3,490 sq km).

Shropshire is divided by the River Severn into the hilly southwest; a series of ridges and "hogsbacks" running northeast–southwest divided by deep valleys; and an undulating drift-covered plain in the northeast, with sluggish streams and large areas of former marsh (*e.g.,* the Wealdmoors), peat mosses, and meres (near Ellesmere). Toward the east the rivers have dissected the plain into a series of valleys and low ridges running generally north–south. The climate tends to be humid.

Portable objects of the Late Neolithic and Early Bronze Age have been discovered in considerable numbers. Other Bronze Age remains include round barrows near Ludlow and stone circles on Stapeley Hill. Early Iron Age hill forts survive at the Bury Ditches, Hopesay Burrow Camp, Caer Caradoc, The Wrekin, and Old Oswestry. The 1st-century AD Roman legionary fortress at Viroconium was one of the largest towns in Roman Britain; the Romans exploited silver-bearing lead ores and outcrop coal.

The medieval history of the county was shaped by its position on the boundary between England and Wales. The Saxon conquest was marked by the construction of Watt's Dyke and Offa's Dyke, which formed a boundary between the predominantly Saxon settlements of Mercia to the east and the indigenous Celtic peoples to the west. After the Norman Conquest of 1066, large areas of Shropshire were set aside as forests and hunting grounds under special jurisdiction, and a double line of castles against the Welsh was established. The subsequent history of medieval Shropshire is a chronicle of Welsh incursions and baronial rebellions. In the 13th century the high quality of Shropshire wool brought prosperity to Ludlow, Shrewsbury, and Bridgnorth, the main centres. Shrewsbury became a market for an extensive area including much of North Wales. Cattle raising became important in wetter areas. From the 15th to the 17th century, holdings gradually increased in size, some common lands were enclosed, and attempts were made to drain the marshes.

Modern industry had its origins in the early 18th century, when Abraham Derby went to Coalbrookdale and developed his method of smelting ironstone with coke. The area offered local supplies of ironstone, sulfur-free coal, limestone, charcoal, waterpower in the dale, and water transport on the Severn. Shropshire rapidly became the greatest iron-producing area in England. The world's first cast-iron bridge was erected at Ironbridge in 1779; the

first iron-built boat floated on the Severn in 1787; and one of the first experimental railway engines was built by the Coalbrookdale Company for Richard Trevithick in 1801. Goods were distributed along a network of canals linking the Severn with the Dee, Mersey, and Stour.

Despite its industrial heritage, Shropshire remains heavily agricultural. Sheep are bred in the lowlands and reared along with cattle in the southwestern uplands. Dairy farming predominates in the northern plain. There are many cattle markets, including Shrewsbury, Ludlow, and Oswestry. Craven Arms has some of the largest sheep sales in the country. The main crops are grains, sugar beets, and potatoes. Light industries include the processing of agricultural products. Iron founding and engineering remain important. Clay is excavated, agricultural limestone quarried, and some coal mined.

The six districts of the county are Bridgnorth, North Shropshire, Oswestry (borough), Shrewsbury and Atcham (borough), South Shropshire, and The Wrekin. Pop. (1983 est.) 382,500.

Shropshire, breed of medium-wool, dark-faced, hornless sheep originating in the Downs of England. It is one of the most popular farm sheep in the Middle Western United States. It produces good wool and mutton and subsists on sparse pasturage better than breeds such as the Hampshire or Suffolk. For crossbreeding it is better adapted to farms than to range conditions. The Shropshire's excessive face covering of wool is more easily dealt with on farms.

Shroud, Holy: *see* Turin, Shroud of.

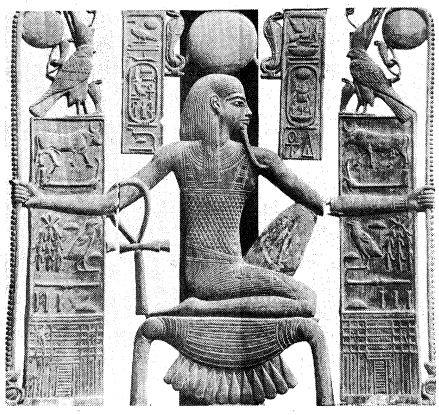
Shrove Tuesday, the day immediately preceding Ash Wednesday (the beginning of Lent in the Christian churches in the West); it occurs between February 2 and March 9, depending on the date of Easter. Shrove, derived from "shrive," refers to the confession of sins usual in the Middle Ages as a preparation for Lent.

Many customs developed in connection with this day that precedes the beginning of the Lenten fast. After the Reformation many of these popular customs continued in Protestant countries for some time. The custom of eating pancakes on this day (pancake day), which still survives, originally had a practical purpose, since eggs and fat, forbidden during the Lenten fast, were used.

Though this time corresponded with the carnival usual in European countries (Mardi Gras in France, Fetter Dienstag in Germany), the merrymaking in England never attained the proportions of the carnival. Football and other games, along with much horseplay in schools and universities, were the usual events.

shrub, any woody plant with several stems, none dominant, usually less than 3 metres (10 feet) tall. When much branched and dense it may be called a bush. Intermediate between shrubs and trees are arborescences, or treelike shrubs, from three to six metres tall. Trees are generally defined as woody plants more than six metres tall, having a dominant stem, or trunk, and a definite crown shape. These distinctions are not reliable, however, for there are some shrubs, such as lilacs and honeysuckles, that, under especially favourable environmental conditions, grow to the size of an arborescence or even a small tree. Some specimens of a plant species may take a tree form, whereas others, under different conditions, may assume a shrub or arborescent form—*e.g.,* sumacs, willows, and spruces.

Shu, in Egyptian religion, god of dry air and supporter of the sky, created by Atum by his own power, without the aid of a woman. Shu and his twin sister and wife, Tefnut (goddess of moisture), were the first couple of the group of nine gods called the Ennead of Heliopolis.



Shu seated on the sign for gold; carving on a royal chair from the tomb of Tutankhamen, 18th dynasty

Foto Marburg—Art Resource/EB Inc.

Of their union were born Geb, the earth god, and Nut, the goddess of the sky. Portrayed in human form with the hieroglyph of his name, an ostrich feather, on his head, Shu was usually represented separating Geb and Nut, supporting with uplifted arms the body of Nut arched above him. In later legends Shu was believed to be the personification of the divine intelligence and therefore the incarnation of the god Atum's supreme power.

Shu Ching (Chinese: "Classic of History"), Pinyin SHU JING, also called SHANG SHU ("Official History"), one of the Five Classics (*Wu Ching*) of Chinese antiquity. Though it has been demonstrated that certain chapters of the *Shu Ching* are forgeries, the authentic parts constitute the oldest Chinese writing of its kind.

The *Shu Ching* consists of 58 chapters. Of these, 33 (originally 29, but some chapters have been divided), called the "modern script" text, are considered by most scholars to be authentic works of the 4th century BC or earlier. The original "ancient script" text consisted of 16 chapters that were lost long ago; the forged version, which appeared in the 4th century AD, has 16 chapters bearing the titles of the original authentic version, plus 9 additional chapters.

The first five chapters purport to preserve the sayings and recall the deeds of such illustrious emperors as Yao and Shun, who reigned during China's legendary golden age. Chapters six to nine are devoted to the Hsia dynasty (*c.* 2205–*c.* 1766 BC), the historicity of which has not been definitively established. The next 17 chapters deal with the Shang dynasty and its collapse in 1122 BC. The blame for this is placed on the degradation of the last Shang ruler, who is described as oppressive, murderous, extravagant, and lustful. The final 32 chapters cover the Western Chou dynasty that ruled China until 771 BC.

Shu Ch'ing-ch'un (Chinese writer): *see* Lao She.

shu fu ware, Pinyin SHU FU, Chinese white porcelain made during the Yüan dynasty (1279–1368) at Ching-te-Chen. As the first known porcelain ordered by Imperial officials, it sometimes bears the characters *shu fu* ("central palace"). The body of the ware is covered with a bluish opaque glaze; the base is unglazed. Some extant examples have relief decoration.

Shu Maung (general): *see* Ne Win, U.

Shu She-yü (Chinese writer): *see* Lao She.

Shuang-ya-shan, Pinyin SHUANGYASHAN, city, Heilungkiang Province (*sheng*), China. It is a prefecture-level municipality (*shih*) situated in the territory of Ho-chiang Prefecture (*ti-ch'ü*). Shuang-ya-shan, also known as Chien-shan, is a new city that has grown up since 1949; its importance is based entirely on coal production. The Shuang-ya-shan coalfield, on the northern slopes of the Wan-ta Shan (mountains), covers an area of 115 sq mi (300 sq km), and has estimated reserves of 160,000,000 tons of high quality coal, which is particularly suitable for coking and for manufacturing synthetic by-products. Almost the entire population of the city depends on the coal industry. Most of the coal mined is transported by rail to the steelworks at An-shan in Liaoning Province, and to other industrial centres in the Manchurian (Northeast) region. In less than a decade in the 1950s, the city grew from nothing until it had a population of more than 100,000. By the early 1970s there had been some development of local industry, including the establishment of sawmills and food-processing plants, but it still remains essentially a single-industry mining city. Pop. (mid-1970s est.) 100,000–300,000.

Shu'aybah, ash-, also spelled SHUAIBA, town and port in al-Aḥmadī *muḥāfaẓah* (governorate) in southern Kuwait. Located on the Persian Gulf, it is the centre of an expanding industrial area and is the country's second most important port. Its industries include an oil refinery, a seafood packing plant, and a petrochemical plant producing fertilizers, primarily for export, since Kuwait has almost no arable land. Ash-Shu'aybah has one of Kuwait's largest electric power stations, as well as one of the world's largest seawater desalinization plants. Pop. (1980) 2,141.

Shubert BROTHERS, dominant managers and producers in American legitimate theatre during the first half of the 20th century.

Although all three later claimed to be native born, they entered the United States in 1882 as immigrants from Russia with their parents, David and Catherine Szemanski. Lee (originally Levi) Shubert was the oldest of the brothers (b. March 15, 1872, Russia—d. Dec. 25, 1953, New York City), Sam S. was the middle brother (b. 1875, Russia—d. May 12, 1905, Harrisburg, Pa.), and Jacob J. (or Jake) was the youngest (b. Aug. 15, 1880, Russia—d. Dec. 26, 1963, New York City).

Lee and Sam went from being newsboys and errand boys to working in theatres in Syracuse, N.Y., during the 1890s and then began leasing theatres and presenting plays there and in nearby Rochester, N.Y. By 1900 Jacob had joined his brothers in the business, and they leased their first New York City theatres. In so doing, they soon found themselves in conflict with the Syndicate, a group headed by Abraham Erlanger, which controlled much of the theatrical booking in the United States. The Shuberts became head of an independent movement, and a long period of protracted legal warfare ensued.

The Shuberts had several wealthy backers and were able to lease theatres in every major city in the country, and at one point they had operations in London as well. After Sam's death in 1905, Lee and Jacob began to build theatres across the United States and came to own more than 60 legitimate houses in addition to their extensive holdings in New York City. They also owned and operated many vaudeville and motion-picture theatres and produced more than 1,000 different productions—encompassing more than 600 plays, revues, and musicals—during their careers. Because of their propensity for sharp business practices, they were also instrumental in giving the infant theatrical unions a common sense of purpose. Actor's Equity and several other theatrical craft guilds came into being as a direct response to the business practices of the Shuberts and other theatrical managers of that era. In 1950 the U.S. government charged

the Shuberts with monopolizing the American theatrical industry. In 1956 the Shubert organization divested a number of theatres but retained prestigious houses in many cities.

Shubrā al-Khaymah, also spelled SHUBRA EL-KHEIMA, northern suburb of Cairo, in al-Qalyūbīyah *muḥāfaẓah* (governorate), on the east bank of the Nile, Lower Egypt. It was formerly a market town supplying Cairo with agricultural produce from the rich, alluvial delta area. In the 1820s Muḥammad ʿAlī, the Ottoman viceroy of Egypt, built the country's first European-type factories and schools in Shūbra al-Khaymah, and it developed as an industrial centre. Industries now include cotton ginning and the production of textiles, industrial specialty glass, and ceramics. Shubrā al-Khaymah is the site of the Cairo Polytechnic Institute (1961), and a teachers' college now occupies the old viceroy's palace. The town is on the Cairo–Alexandria superhighway and lies just west of the southern terminus of the Turʿat al-Ismāʿīlīyah (Ismailia Canal), which links the Suez Canal with the Nile River. Pop. (1983 est.) 486,400.

Shūbun, also called TENSHŌ SHŪBUN (b. late 14th century?, Ōmi Province, Japan—d. 1444–48?, Kyōto), priest-painter who was a key figure in the development of monochromatic ink painting (*suiboku-ga*) in Japan.

His career represents an intermediate stage between the early *suiboku-ga* artists, who followed their Chinese models quite closely, and the later masters, many of them his pupils, who handled their materials in a thoroughly Japanese manner. Shūbun was affiliated with



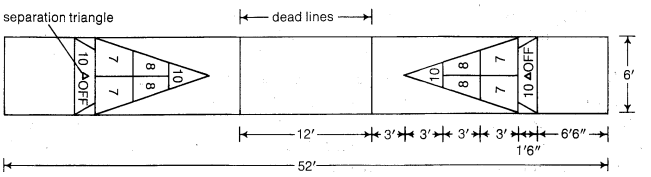
"Chikusai-dokusho-zu," painting by Shūbun, first half of the 15th century; in the Tokyo National Museum

By courtesy of the Tokyo National Museum

the Shōkoku-ji, a temple in Kyōto that was also the home of his painting teacher, Josetsu, and, later, of his most outstanding student, Sesshū. Shūbun became a professional painter around 1403, the year he went to Korea. After returning to Japan in the following year, he became the director of the court painting bureau, which had been established by the Ashikaga shoguns (family of military dictators who ruled Japan from 1338 to 1573), and, as such, used his influence to promote ink painting to the status of the official painting style.

shuffleboard, also called SHOVELBOARD, original name SHOVEBOARD, game in which disks are shoved by hand or with an implement so that they come to a stop on or within a scoring area marked on the board or court (on a table, floor, or outdoor hard surface such as concrete). It was popular in England as early as the 15th century, especially with the aristocracy, under the names shovegroat, slide-groat, and shovel-penny. Some of the great country houses had boards of exquisite workmanship; that at Chartley Hall, in Staffordshire, was over 30 ft (9 m) long. Shove-ha'penny, a later version of shovel-penny, in which a coin or disk is pushed along a polished board so that it stops between closely ruled lines, is still a popular game in English pubs.

In modern times, a modified form of the



shuffleboard court

old indoor game became popular among travellers on ocean liners and cruise ships as a deck game. For the shipboard version, called shuffleboard, courts of various designs were marked on the deck, with lined sections at either end, numbered one to 10; the section nearest the player, called 10 off, reduced scores by 10.

Shuffleboard was introduced about 1913 at Daytona Beach, Fla., as a game on land. So popular was the game that it spread rapidly through the United States, particularly in retirement communities, with each community devising its own rules of play. The modern form of shuffleboard was defined at St. Petersburg, Fla., in 1924.

The rules adopted then, and later by the National Shuffleboard Association (founded 1931 at St. Petersburg), defined the size and shape of courts (concrete or terrazzo, 6 by 52 ft); the maximum length of the cues (6 ft 3 in.); the disks (either wood or composition, 1 by 6 in. [2½ by 15 m]; four red, four black); and methods of play and scoring. Shuffleboard may be played by two persons (singles) or four (doubles), shooting alternately with red and black disks. In singles, when eight shots have been made, players move to the opposite end of the court. In doubles, team players remain at the ends they occupy at the beginning of the game, though the play alternates as in singles. Game may be 50, 75, or 100, as players desire. To count, disks must be entirely within scoring sections, clearing all lines. In match play (best two out of three games), the second game is started with a black disk.

Shugen-dō, a Japanese religious tradition combining folk beliefs with indigenous Shintō and Buddhism, to which have been added elements of Chinese religious Taoism. The Shugen-dō practitioner, the *yamabushi* (literally, "one who bows down in the mountains"), engages in spiritual and physical disciplines in order to attain magical power effective against evil spirits. Mountains, considered in folk religions "other worlds," were for the esoteric Buddhists training grounds for ascetics.

Shugen-dō flourished during the Heian period (AD 794–1185) and allied itself with the esoteric schools of Buddhism, Tendai, and Shingon. As a "mountain religion," Shugen-dō emphasized pilgrimages and retreats to sacred mountains. The *yamabushi* served as guides for pilgrims visiting Yoshino and Kumano, sacred mountains inhabited by Shintō *kami* (sacred power or gods). In this way the *yamabushi* helped the spread of Buddhism through northern Japan.

Many Buddhist priests belonging to esoteric traditions regularly spent some time in mountain retreats developing *yamabushi* techniques, and Shugen-dō practitioners often served as priests of Shintō shrines. This latter practice was discontinued by the Meiji government, which abolished the Shugen-dō in 1872. Three of the religious movements recognized by the Meiji regime under Sect Shintō, as distinguished from the nonreligious and nationalistic State Shintō—the Jikko-kyō, the Fusō-kyō, and the Ontake-kyō—are mountain cults, featuring practices similar to those found in Shugen-dō, such as pilgrimages to sacred mountains.

After 1945, with the establishment of complete religious freedom, some Shugen-dō groups that had survived within Buddhism once more attempted to establish Shugen-dō organizations. However, the membership and influence of Shugen-dō groups are now greatly diminished.

Where the same name may denote a person, place, or thing, the articles will be found in that order

shugo, hereditary military constable during Japan's Kamakura (1192–1333) and Ashikaga (1338–1573) periods. Originally appointed by Minamoto Yoritomo, the first Kamakura shogun (military dictator), from his personal warrior clique, the *shugo* occupied provincial military and civil supervisory posts. Their duties were to maintain peace, supervise the guard service, and command local retainers in battle. Empowered to investigate and judge cases ranging from treason to robbery, they constituted an administrative system, which gradually eroded the civil administrative structure of the emperor. Yoritomo and his descendants were able to rule without actually deposing the monarch.

The *shugo* eventually acquired even greater authority than Yoritomo had allowed them. Their success was a primary factor in the fall of the Kamakura regime. During the Ashikaga period, the *shugo* became entrenched as feudal lords; some of them controlled areas as large as 10 provinces. By the end of the period, however, their power was usurped by samurai (warriors), who had more direct control over local military and civil affairs. *See also* daimyo.

shuhūd (Islām): *see* mushāhadah.

Shuisky, Vasily Ivanovich, Knyaz (Prince): *see* Vasily (IV) Shuysky.

Shujāʿ Mirza, also called SHUJĀʿ-UL-MULK: *see* Shah Shojāʿ.

Shukulumbwe (people): *see* Ila.

Shula, Don, byname of DONALD FRANCIS SHULA (b. Jan. 4, 1930, Grand River, Ohio, U.S.), U.S. professional football player and coach, notably of the National Football League (NFL) Miami Dolphins from 1970.

At Harvey High School (Painesville, Ohio) Shula was an all-around athlete, playing baseball and basketball as well as football, and at John Carroll University (Cleveland) he played halfback and defensive back. He received his B.S. degree in 1951 and later an M.A. in physical education from Western Reserve University (later Case Western University, Cleveland; 1953).

Shula played professionally for the Cleveland Browns (1951–52), the Baltimore Colts (1953–56), and the Washington Redskins (1957). He began coaching in 1958 as an assistant

at the University of Virginia (Charlottesville) and, the following year, at the University of Kentucky (Lexington). He was defensive backfield coach for the Detroit Lions (1960–62). He became head coach of the Baltimore Colts in 1963. His Baltimore teams won division championships in 1964 and 1968; the 1968 team went on to capture the NFL Championship but lost the 1968–69 Super Bowl. Overall, the Colts under Shula won 71 games, lost 23, and tied 4.

As coach of the Miami Dolphins he became the first NFL coach to win 100 games in 10 seasons. In 1971 Miami won the conference championship but lost in the Super Bowl. The Dolphins in 1972–73 became the first team to go undefeated through an entire season and the playoffs, culminating with a win in the Super Bowl. His teams played in three other Super Bowls, winning in 1973–74 and losing in 1982–83 and 1984–85. By the mid-1980s Shula had scored his 250th career victory as an NFL coach.

Shulḥan ʿarukh (Hebrew: "Prepared Table"), a 16th-century codification of Jewish religious law and practice that is still the standard reference work for Orthodox observance. The *Shulḥan ʿarukh,* compiled and published by Joseph ben Ephraim Karo (1488–1575) as a compendium of his larger work *Bet Yosef* ("House of Joseph"), contains opinions of various other codifiers before his time as well as personal decisions on disputed points by Karo himself. Moses Isserles (*c.* 1525–72; *see* Isserles, Moses ben Israel) was one of many Ashkenazi (German-rite) rabbis who severely criticized the *Shulḥan ʿarukh* for its overemphasis on the customs of Sephardic (Spanish-rite) Jews. Accordingly, Isserles wrote a commentary (called *Mappa,* "Tablecloth") on the *Shulḥan ʿarukh* that was subsequently printed with Karo's work so that both rites would be represented. Thereafter, the *Shulḥan ʿarukh* became a universally accepted guide for Orthodox observance. A condensation of Karo's work, written for lay people by Solomon Ganzfried (1804–66) and called *Qitzur* ("Abbreviated") *Shulḥan ʿarukh,* gained wide popularity and has been translated into several languages.

Shuli (people): *see* Acholi.

Shull, George Harrison (b. April 15, 1874, Clark County, Ohio, U.S.—d. Sept. 28, 1954, Princeton, N.J.), American botanist and geneticist known as the father of hybrid corn (maize). As a result of his researches, corn yields per acre were increased 25 to 50 percent. He developed a method of corn breeding that made possible the production of seed capable of thriving under various soil and climatic conditions.

After acquiring his doctorate in 1904, Shull began work at the Carnegie Institute's Station for Experimental Evolution at Cold Spring Harbor, N.Y. He remained there until 1915, when he joined the faculty of Princeton University, where he taught for 27 years until his retirement.

Though Shull developed his first hybrids before 1910, commercial production of them did not begin until 1922. Since that time hybrids have been adopted in all the developed countries of the world. He founded the journal *Genetics* in 1916, acting as managing editor for nine years and for many years more as an associate editor. He was honoured in 1940 with the De Kalb Agricultural Association Medal and in 1949 with the Marcellus Hartley Medal of the National Academy of Sciences.

Shumen, formerly (1950–64) KOLAROVGRAD, also spelled ŠUMEN, town, northeastern Bulgaria. It lies in a valley in the eastern foothills of the Shumen limestone plateau. The town is a road and rail centre; its industries include tobacco processing, canning and brewing, furniture and the manufacture of enamelware. The city also has a factory that makes farm-machinery components; founded in 1958, it was the first such factory in Bulgaria. Various crafts flourish, and agricultural activity is important. The local beer is widely acclaimed.

Shumen has Thracian and subsequent Roman origins: it was a fortress (founded 927) during the First Bulgarian Empire. During Turkish rule (15th–19th century) it was one of four key Turkish forts. The Tombul Mosque, the largest in Bulgaria, was built in the mid-18th century. Other notable buildings are the historical museum and the house in which the Hungarian revolutionary leader Lajos Kossuth was temporarily exiled in 1849. There is a museum in the home of Vasil Kolarov, a Bulgarian revolutionary, for whom the town was named between 1950 and 1965. Northeast of the town are the impressive ruins of Pliska (AD 681–893), from the First Bulgarian Empire. Preslav, southwest of the town, succeeded Pliska as the Bulgarian capital in 893–972. Ten miles east is Madara, site of the "Horseman of Madara," a carving in rock 80 feet (24 m) in height. Pop. (1986 est.) 100,-122.

Shumway, Norman E(dward) (b. Feb. 9, 1923, Kalamazoo, Mich., U.S.), American surgeon and pioneer in cardiac transplantation who, on Jan. 6, 1968, at the Stanford Medical Center, Stanford, Calif., performed the first adult heart transplant in the United States. The 54-year-old recipient, whose heart had been damaged by virus infection, survived 15 days following surgery. Shumway's surgical team subsequently performed many other heart-transplant operations. Shumway's other major achievements include such open-heart surgery as the transplantation of valves.

Shumway obtained an M.D. degree from Vanderbilt University, Nashville, Tenn. (1949), and a Ph.D. degree in surgery from the University of Minnesota, Minneapolis (1956), where he studied under Owen Harding Wangensteen and Clarence Walton Lillehei, both distinguished innovators in surgery. In 1958 Shumway joined the faculty of the Stanford University School of Medicine. He became chairman of the department of cardiovascular surgery at the Stanford University Medical Center in 1974.

Shun, formally (Wade–Giles romanization) YU TI SHUN, in Chinese mythology, a legendary emperor (*c.* 23rd century BC) of the golden age of antiquity, singled out by Confucius as a model of integrity and resplendent virtue. His name is invariably associated with that of Yao, his legendary predecessor.

Though Shun's father repeatedly tried to murder him, the boy's filial piety never faltered. Because heaven and earth knew of his virtue, birds came to assist in weeding his paddies and animals appeared from nowhere to drag the plow. Yao bypassed his own son in choosing Shun as most worthy to rule; he likewise gave Shun his two daughters, O Huang and Nü Ying (also known as Hsiang Chün and Fu-jen), in marriage. Shun offered sacrifice to the Six Honoured Ones (whose identity is uncertain) and to the spirits of earth. He is credited with standardizing weights and measures, regulating waterways, and organizing the kingdom into 12 provinces or regions. During his reign marvelous phenomena occurred in the heavens and on earth.

Shun-chih, Pinyin SHUNZHI (reign name), personal name (Wade–Giles romanization) FU-LIN, temple name SHIH TSU, posthumous name, or *shih,* CHANG CH'ING TI (b. March 15, 1638, Manchuria—d. Feb. 5, 1661, Peking), first Manchu emperor of China.

The ninth son of Abahai (1592–1643), the great ruler of the Manchu kingdom of Manchuria, he succeeded to the throne in 1643 at the age of six and ruled under the regency of Dorgon (1612–50), a paternal uncle. The following year Manchu troops under Dorgon's command captured Peking, the former capital of the Ming dynasty (1368–1644), and the young ruler was proclaimed emperor of the Ch'ing dynasty (1644–1911/12) with the reign title of Shun-chih. Dorgon continued to exercise absolute authority, however, until his death in 1650. By this time, the conquest of North China had been completed, and in 1659 Shun-chih's armies drove the last Ming remnants from South China, leaving Ming supporters occupying only the island of Formosa.

Shun-chih was close to the German Jesuit missionary Adam Schall von Bell (Chinese name T'ang Jo-wang; 1591–1666), whom he called *mafa* ("grandfather"). The emperor frequently sought Schall's counsel, and he gave him permission to build a Roman Catholic church in Peking, occasionally attending services himself. Although Schall remained an intimate adviser, after 1657 the emperor turned increasingly to Ch'an (Zen) Buddhism.

A kindly man, the emperor Shun-chih was strongly influenced by eunuch officials and Buddhist priests. His major accomplishment was to increase the number of Chinese serving in the Manchu government. His death was clouded by rumours that the death of a favourite consort had caused him to retire to a Buddhist monastery.

Shun Ti (Chinese emperor): *see* Togon-Temür.

Shupashkar (Russian S.F.S.R.): *see* Cheboksary.

Shuppiluliumash I: *see* Suppiluliumas I.

shūrā (Arabic: "consultation"), title of the 42nd chapter of the Qur'ān in which believers are exhorted to conduct their affairs "by mutual consultation." In early Islāmic history the term was applied to the board of electors constituted by the second caliph (head of the Muslim community), ʿUmar I (634–644), to elect his successor. Thereafter, in Muslim states, *shūrā* variously designated a council of state, or advisers to the sovereign, a parliament (in modern times), and—in certain Arab states—a court of law with jurisdiction over claims made by citizens and public officials against the government.

Shurugwi, formerly SELUKWE, or SEBANGA POORT, town, central Zimbabwe. Established in 1899 by the British South Africa Company and Willoughby's Consolidated Company, its name was derived from a nearby bare oval granite hill that resembled the shape of a pigpen (*selukwe*) of the local Venda people. The terminus of a branch rail line from Gweru (formerly Gwelo), 22 miles (35 km) to the south, Shurugwi is Zimbabwe's largest producer of chrome; base metals also are mined there. The town is a marketing centre for livestock, corn (maize), and tobacco. Its healthful climate and scenic location attract tourists and retired people. Pop. (1982) 13,351.

Shuruppak, modern TALL FA'RAH, ancient Sumerian city located south of Nippur in what is now south-central Iraq and originally on the bank of the Euphrates River. Excavations there in the first half of the 20th century uncovered three levels of habitation extending in time from the late prehistoric period to the 3rd dynasty of Ur (*c.* 2112–2004 BC). The most distinctive finds were ruins of well-built houses, along with cuneiform tablets with administrative records and lists of words, indicating a highly developed society already in being toward the end of the 4th millennium BC.

Shuruppak was celebrated in Sumerian legend as the scene of the Deluge, which destroyed

all mankind except one survivor, Ziusudra. He had been commanded by a protecting god to build an ark, in which he rode out the disaster, afterward re-creating man and living things upon the earth, and was himself endowed with eternal life. Ziusudra corresponds with Utnapishtim in the Gilgamesh epic and with the biblical Noah.

Shush, also called SHUSHAN (Iran): *see* Susa.

Shushigaku (Japanese: "Chu Hsi school"), most influential of the Neo-Confucian schools that developed in Japan during the Tokugawa period (1603–1867). *See* Neo-Confucianism.

Shūshtar, town, west-central Iran. It is situated on a small plateau below the confluence of the Kārūn River with one of its minor tributaries. Many of the town's stately houses of stone and brick have cellars, called *zīr zamīn,* to provide a cool shelter from the terrible summer heat, which may reach 128° F (53° C). The town was once an important trade centre and dominated an extensive area of irrigated agriculture, but it is now declining.

Shūshtar is famous for its great engineering works constructed in ancient times for the disposal and use of the waters of the Kārūn River. Shūshtar's little plateau sits between the main arm of the Kārūn and an artificial channel more than 100 feet (30 m) deep, and the city itself is crossed by small canals that use the Kārūn's water. But the most impressive works are three large dams built in Sāsānian times (AD 224–651) to regulate the river and the artificial channel's flow and maintain water levels for irrigation. The greatest of these dams, the Band-e Qeyṣar, was originally 1,800 feet (550 m) long and supported on its numerous arches Valerian's Bridge, so-called because it was constructed under the Sāsānian king Shāpūr I (d. AD 272) using Roman engineers and other prisoners-of-war captured along with the emperor Valerian in 260. To prevent erosion of the riverbed above the dam, the bed was paved with huge stone slabs bound together with iron. The monumental dam was regarded by later Arab conquerors as one of the wonders of the world. But only about 35 of its arches remain, and it is now in ruins. The final decay of the dam system in the 19th century spelled the collapse of both Shūshtar's irrigation network and its prosperity, although several waterwheels on the canals are still used to drive numerous small flour mills and to generate electricity. Pop. (1986) 65,840.

Shute, Nevil, original name NEVIL SHUTE NORWAY (b. Jan. 17, 1899, Ealing, Middlesex, Eng.—d. Jan. 12, 1960, Melbourne, Vic., Australia), English-born Australian novelist who showed a special talent for weaving his technical knowledge of engineering into the texture of his fictional narrative. His most famous work, *On the Beach* (1957), reflected his pessimism for mankind in the atomic age.

Shute was educated at Shrewsbury, served in the British army late in World War I, and then completed his education at the University of Oxford. He became an aeronautical engineer, a job he combined with his career as a novelist. Following World War II he settled in Australia.

Marazan (1926) was the first of 25 books Shute wrote in a career that spanned 30 years. His major works include *So Disdained* (1928) and *What Happened to the Corbetts* (1939), a foretaste of World War II's bombing of civilians. His later novels—all set in Australia—reflected a growing feeling of despair about the future of humanity. *A Town Like Alice* (1950) dealt with the Far Eastern theatre of World War II. In *On The Beach* Shute describes the effect of an atomic war and vividly pictures the complete destruction of the human race.

shutter, in photography, device by which the lens aperture of a camera is opened to admit light and thus expose the film. Adjustable shutters control exposure time, or the length of time during which light is admitted. Optimum exposure time varies according to lighting conditions, movement of subject, and other factors and may be either selected in advance by the photographer or, in the case of automatic cameras, set by the camera itself on a signal from a built-in exposure-metering system. The mechanical shutter can usually be set only for indicated speeds throughout its range; some electronic shutters have a continuous operating range.

Modern shutters are of two principal types. The leaf shutter, positioned between or just behind the lens components, consists of a number of overlapping metal blades opened and closed either by spring action or electronically. The focal-plane shutter, located directly in front of the image plane, consists of a pair of overlapping blinds that form an adjustable slit or window; driven mechanically by spring or electronically, the slit moves across the film in one direction, exposing the entire frame in its sweep. The width of the slit determines exposure time; the narrower the slit, the shorter the exposure. The actual travel time is fairly constant for all exposure times; a mechanism triggers the release of the second blind. Exposures as brief as $^1/_{8,000}$ of a second are possible with the focal-plane shutter.

Shuvalov, Pyotr Andreyevich, Graf (Count) (b. June 27 [June 15, Old Style], 1827, St. Petersburg [now Leningrad], Russia—d. March 22 [March 10], 1889, St. Petersburg), diplomat and political-police director who became one of Alexander II's advisers and used his extensive power to oppose the enactment of liberal reforms in Russia.

Having entered the Russian army in 1845, Shuvalov served in the Crimean War (1853–56) and began his diplomatic career as a member of the Russian delegation to the Paris peace conference of 1856. The following year he was put in charge of the St. Petersburg police. His success there brought him the post of director of political police in the Ministry of the Interior (1860–61). There he became known as an opponent of the emancipation of the serfs. In 1866 he became chief of staff of the gendarmerie corps and head of the political police, or "3rd section" of the imperial chancery. While serving in this capacity he became a close adviser to Alexander II and used his influence to retard the carrying out of existing reforms and to appoint persons of reactionary views to important positions. Sent to London on a special diplomatic mission in 1873, Shuvalov was appointed ambassador to London in 1874 and served there effectively until 1879, when, because of his involvement in Russia's diplomatic failure following the Russo-Turkish War (1877–78), he was recalled and forced to retire.

Shuwaykh, ash-, also spelled SHUWAIKH, town and port in eastern Kuwait. Located just west of Kuwait city on Kuwait Bay of the Persian Gulf, it is the country's major port. The port's modern deepwater berths and container facilities accommodate oceangoing ships. Ash-Shuwaykh also has one of Kuwait's largest electric power stations and a water desalinization plant that supplies the Kuwait city area. Pop. (1980) 3,558.

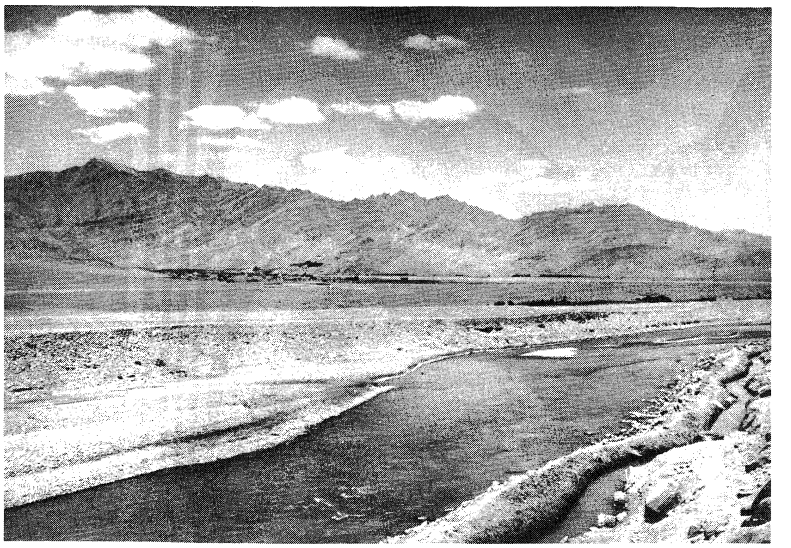
Shuya, also spelled ŠUJA, city and centre of a *rayon* (sector), Ivanovo *oblast* (province), Russian Soviet Federated Socialist Republic, on the Teza River. A trading centre dating from the 16th century, it now has numerous industries, including cotton and synthetic fabric processing, machine building, and various light industries. Shuya has a teacher-training institute and a medical school. Pop. (1987 est.) 72,000.

Shuysky, Vasily Ivanovich, Knyaz (Prince): *see* Vasily (IV) Shuysky.

Shwebo, town, north-central Myanmar (Burma). Shwebo is a rice-collecting centre on the railway about 50 miles (80 km) north-northwest of Mandalay. Shwebo is the birthplace of Alaungpaya, founder of the Alaungpaya dynasty (1752–1885), and is the site of his tomb. Originally it was named Moksobomyo ("Town of the Hunter Chief"), but it was given its present name, which means "Town of the Golden Leader," by Alaungpaya about 1753; it served for a time as his capital.

Shwebo is on the northern margins of the dry zone and stretches west from the Irrawaddy River. Rice is widely cultivated in the irrigated parts of the region, and millet, sesame, peanuts (groundnuts), peas, and cotton are grown in the nonirrigated areas. Pop. (latest census) 17,842.

Shyok River, river in Jammu and Kashmir state, in the northern part of the Indian subcontinent. Rising in the Karakoram Range, the Shyok, which flows generally northwestward, is fed by numerous glaciers on its journey through the range. At times the Chong Kumdan Glacier dams the river, causing serious floods in nearby areas. Near Khapalu, in the Pakistani-held sector, the river joins the In-



The Shyok River near Leh, Kashmir, India
Foto Features

dus. Its total length is 340 mi (550 km), and its main right-bank tributary is the Nubra.

Si Kiang (river, China): *see* Hsi Chiang.

Si Shu (Confucian text): *see* Ssu shu.

Si Suriyawong, Somdet Chao Phraya, original name CHUANG BUNNAG (b. Dec. 23, 1808—d. Jan. 19, 1883, Rat Buri, Siam), leading minister under King Mongkut and regent during the minority of King Chulalongkorn, who exercised tremendous influence during a crucial period when the Siamese kings were modernizing the country and trying to maintain its independence.

Members of the Bunnag family had held important posts at the Siamese court since the founder of the family immigrated from Persia in 1605. Suriyawong's father, Dit Bunnag, simultaneously held the *kalahom* (war and southern provinces) and *phrakhlang* (finance and foreign affairs) ministries in the reign of King Rama III. As a young court officer in the 1840s, Suriyawong was a close associate of the modernist prince Mongkut, and he and his father plotted to bring Mongkut to the throne in 1851. Suriyawong then succeeded his father as *kalahom*, and his younger brother Kham became *phrakhlang*. Suriyawong was largely responsible for concluding the treaties that opened Siam to the West, beginning in 1855. Relying on an extensive network of relatives in high positions, he was the most powerful official during Mongkut's reign, and effectively ran the day-to-day business of government. On Mongkut's death, he served as regent during the minority of King Chulalongkorn (1868–73). After Chulalongkorn came of age, Suriyawong became increasingly conservative, believing that sufficient accommodation to the West had taken place and that further reform was unnecessary, and he obstructed reform until his death.

SI system (in measurement): *see* International System of Units.

Si Votha, also spelled SI VATTHA (b. 1841, Cambodia—d. Feb. 2, 1892, along the Laos–Cambodia border), Cambodian prince and contender for the throne who fought unsuccessfully for the independence of his country during the rise of French supremacy in Indochina.

Si Votha was a son of King Duong. When Duong died in 1860, Si Votha's older half brother, Norodom, ascended the throne. In 1860–61 Si Votha marched from his headquarters in the remote province of Thum Ôdŏngk to the capital, Oudong, and pursued Norodom westward to Bătdâmbâng. The insurrection was not successful, and Si Votha was forced to retreat. Norodom returned to the capital aided by the French. By 1863 Cambodia had become a French protectorate.

In 1876 Si Votha's troops fought their way almost to the outskirts of the new capital, Phnom Penh, before being turned back by a force of more than 300 French soldiers. Si Votha then retired to a secluded life in Laos. In 1885, taking advantage of Cambodian dissatisfaction over a proposed French treaty, he headed another insurrection, which lasted for a year but was also defeated. Abandoned by his partisans and having limited funds, he retreated to mountains near the frontier of Laos, where he endured a harsh existence. In 1888 he was visited by the French scholar Jacques Taupin, who urged him to come to terms with the French and thus secure a better life for himself. Si Votha died four years later without reaching a decision on the matter.

Sia (Egyptian religion): *see* Hu, Sia, and Heh.

Siachen Glacier, one of the world's longest mountain glaciers, lying in the Karakoram Range system of Kashmir near the India–Pakistan border, extending for 44 mi (70 km) from north-northwest to south-southeast. It has a number of fast-flowing surface streams and at least 12 medial moraines. It is the source for the 50-mi-long Nubra River, a tributary of the Shyok, which is part of the Indus River system.

Siālkot, city and district, Lahore division, Punjab Province, Pakistan. The city, the district headquarters, lies just north of the Aik Nāla (Aik Stream) and south of the Jammu Hills and is connected by rail with Wazīrābād and Jammu and by road with Lahore and Gujrānwāla. It was once famous as a centre for the manufacture of damascened ware and paper; its modern industries include flour and cotton mills and the production of sporting goods. It is said to have been founded by Raja Sāla, uncle of the Pāṇḍavas of the epic *Mahābhārata,* and refounded by Raja Sālivāhan in the time of Vikramāditya; it may be the site of ancient Śākala (Sagul), capital of the Indo-Greek Menander (Milinda) and Mihirakula the Hun (died AD 540). Several townships have grown up around the original city, which was incorporated as a municipality in 1867. There are two libraries and several hospitals, and colleges affiliated with the University of the Punjab. Siālkot was the birthplace of the poet-philosopher Muḥammad Iqbāl and houses several shrines, including that of the first Sikh gurū, Nānak.

The district (area 2,067 sq mi [5,354 sq km]) stretches from the Rāvi valley on the southeast to the Chenāb River on the northwest. The northern portion is very fertile; the southern, less fertile, is irrigated by the Upper Chenāb Canal. About nine-tenths of the cultivable area is under crops. The chief crops are wheat, barley, rice, corn (maize), millet, and sugarcane. Pop. (1981 prelim.) city, 296,000; district, 2,706,000.

Siam (Southeast Asia): *see* Thailand.

Siam, Gulf of (South China Sea): *see* Thailand, Gulf of.

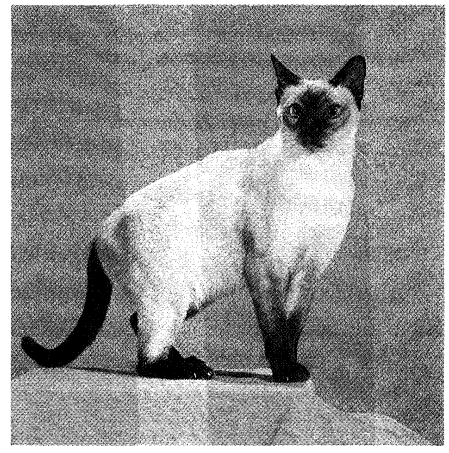
siamang (*Symphalangus syndactylus*), arboreal ape, family Hylobatidae, found in the forests of Sumatra and Malaya. The siamang



Siamang (*Symphalangus syndactylus*)
Anthony Mercieca—Shostal/EB Inc.

resembles the related gibbon but is more robust. The siamang is also distinguished by the webbing between its second and third toes and by a dilatable hairless air sac in its throat. The air sac is used in producing a resonant, booming call. The siamang is about 50–55 centimetres in head and body length. Its shaggy fur is completely black. Like the gibbon, the siamang is diurnal and arboreal and moves by brachiation, progressing from one point to another by swinging from its arms. It feeds mainly on fruit and has been observed to live alone or in small groups. The gestation period is about 230 days; births are typically single.

Siamese, popular short-haired breed of domestic cat originally from Siam (Thailand). Its origin as a breed is unknown. The Siamese is a lithe, long-bodied cat with slim legs and a long, slim tail. It has a long, wedge-shaped head and slightly slanted blue eyes that give it an "Oriental" expression. Some Siamese have



Siamese
John Gajda —EB Inc.

crossed eyes or kinked tails, but these features are discouraged by breeders of show animals. The breed is a partial albino; kittens are born white or cream coloured and later develop the dark points (ears, face, legs, and tail) characteristic of the breed. The points may be dark brown (seal point), blue gray (blue point), milk-chocolate brown (chocolate point), pinkish gray (lilac point), or reddish orange (red point). The colour and coat pattern are genetically recessive characteristics; that is, neither feature is apparent in the immediate offspring of a Siamese that is mated with some other breed.

Despite its graceful build and relatively small size, the Siamese is a muscular, agile cat. Characterized as affectionate and loyal, though sometimes destructive, it is regarded by some of its admirers as the most intelligent of domestic cats. It is highly vocal and possesses a range of cries, including a penetrating mating call.

Siamese fighting fish (*Betta splendens*), freshwater tropical fish of the family Belontiidae (classified by some authorities as Anabantidae; order Perciformes), noted for the pugnacity of the males toward one another. The Siamese fighting fish, a native of Thailand, was domesticated there for use in contests. Combat consists mainly of fin nipping and is accompanied by a display of extended gill covers, spread fins, and intensified colouring.

The fish, elongated and slender, grows to a length of about 6.5 centimetres (2.5 inches). In the wild it is predominantly greenish or brown with moderately sized red fins; under domes-



Siamese fighting fish (*Betta splendens*)
Douglas Faulkner

tication it has been bred with long, flowing fins and in a variety of colours, such as red, green, blue, and lavender. *See also* labyrinth fish.

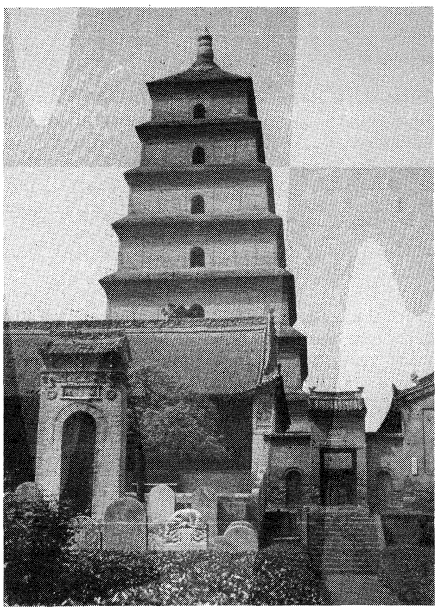
Siamese language: *see* Thai language.

Siamese twin, also called CONJOINED TWIN, one of a pair of identical twins who are physically joined and often share some organs. Fusion is typically along the trunk of the body or at the front, side, or back of the head. In the case of symmetrical conjoined twins, both children are relatively normal except for the areas of fusion. In some cases the individuals are successfully separated by surgery.

In the case of asymmetrical Siamese twins, one is fairly normal (called the host, or autosite), but the other, called the parasite, is severely underdeveloped, often tiny, and dependent on its host for nutrition. Such a parasite may often be surgically separated from the host in order to save the host.

The term Siamese twins originally referred to Chang and Eng (*q.v.*), born to Chinese and half-Chinese parents in Siam (now Thailand), who were joined by a ligament from breastbone to navel. As adults in the 19th-century United States, Chang and Eng each married and fathered several children. Another pair of twins, made famous in France, were Ritta and Christina, a Sardinian-born pair who lived only five months but were exhibited in Paris in 1829. Ritta and Christina had separate heads, arms, and vertebrae but shared a body below the navel and had but two legs.

Sian, Wade–Giles romanization HSI-AN, Pinyin XIAN, capital of Shensi Province, China, located on the loess plain of the Wei River. It was important in history as the capital of several ruling dynasties and as a market and trade centre.



The Temple of the Great Good Will and the Big Wild Goose Pagoda, Sian, Shensi Province, China

By courtesy of Andrew J. Watson

Cities have existed in the area since the 11th century BC. The Former Han dynasty capital of Ch'ang-an-ch'eng ("Walled City of Ch'ang-an"), built in 202 BC just northwest of modern Sian, was one of the greatest cities of the ancient world. It was largely destroyed during the disturbances that preceded Wang Mang's interregnum (AD 9–23). The Later Han dynasty, established in 23, moved its capital to Lo-yang.

For several centuries Ch'ang-an declined, despite its strategic importance to the northwestern barbarian principalities and its adoption as capital by the Western Wei and Northern Chou states in the 6th century. It was revived by the Sui emperors (581–618), who also made it their capital.

As the capital of the T'ang dynasty (618–907), the city was expanded and divided into three parts—the Palace City; the Imperial City, for the officials; and the Outer City, for artisans and merchants. It soon became one of the most splendid and extravagant cities in the world. The city declined after the downfall of the T'ang, though it continued as a market centre and broker of the Central Asian trade. In the 13th century Marco Polo described the city as a thriving trade centre. The popular name Sian ("Western Peace"), adopted after the Ming dynasty (1368–1644) but later changed to Siking, was restored in 1943.

From the 1920s the city was the chief port of entry for Communist ideology reaching China from the Soviet Union. The city was also the site of the Sian Incident, of December 1936, which marked the beginning of united Chinese Nationalist and Communist resistance against the Japanese and heralded the eventual end of the British, French, and Dutch empires in Southeast Asia.

Modern industries include a steelworks, a textile mill, an electrical-machinery plant, and a chemical industry that produces fertilizers and plastics. As the centre of an important agricultural region, Sian is engaged in crop processing, most notably of cotton, wheat, and tea. The city lies on the Lunghai railway, joining Sian with Soochow on the east coast; several railways extend to the west.

Located in the city is the Shensi Provincial Museum, housed in a former Confucian temple; it is noted for its Pei-lin, an important collection of inscribed stelae and Buddhist sculpture. Sites of interest include the Hsiao-yen t'a ("Little Wild Goose Pagoda"), Ta-yen t'a ("Big Wild Goose Pagoda"; 148 feet [45 m] high), and Ta-tz'u-en ssu ("Temple of Great Good Will"), constructed during the T'ang dynasty; the Bell Tower and Drum Tower built during the Ming dynasty; the Great Mosque, founded in 742 with the existing buildings dating from the 14th century; and three well-preserved 14th-century city gates. Sian is the seat of Jiaotong University, one of China's largest polytechnical institutions, Northwest Technical University, and numerous other colleges and research institutes.

About 20 miles (32 km) northeast of Sian lies the tomb of Shih Huang-ti, excavated by archaeologists beginning in 1974. The site contains an army of about 6,000 life-size terracotta figures arrayed in battle formation (*see* Ch'in tomb). Pop. (1985 est.) 1,686,300.

Sian Incident (Dec. 12–25, 1936), in Chinese history, seizure of the Nationalist generalissimo Chiang Kai-shek by one of his own generals, Chang Hsüeh-liang (*q.v.*). Chang, commander of the Northeastern (Manchurian) forces at Sian, in Northwest China, opposed Chiang's policy of continuing to fight the Chinese Communists rather than devoting full effort to fighting the Japanese, who had invaded northern China. The incident ended with Chiang's release and the formation of the second Communist–Nationalist United Front against the Japanese.

When Chiang visited Chang's headquarters at Sian to promote a new anti-Communist campaign, he was arrested by Chang's troops. Motivated by their concern for their Manchurian homeland then occupied by the Japanese, they demanded the cessation of the civil war between Nationalists and Communists, the establishment of a national united front to oppose the Japanese, and the reorganization of the Nationalist government. In full agreement with the rebels' requests, the Chinese Communists, represented by Zhou En-lai, joined the negotiations.

After giving his oral acceptance of the proposals, Chiang was released on Dec. 25, 1936. Although Chiang Kai-shek did establish a second United Front with the Communists, he arrested Chang Hsüeh-liang, who remained imprisoned throughout the war. Brought to Taiwan in 1949, Chang remained long under house arrest.

Šiauliai, German SCHAULEN, administrative centre of a *rayon* (district), Lithuanian Soviet Socialist Republic. The city, dating at least from the 13th century, may be identical with the "Saule" where a major military confrontation in 1236 between the Lithuanians and the Brothers of the Sword precipitated the merger of the latter order with the Teutonic Knights. Šiauliai was a textile centre in the 18th century, and a leather industry was introduced in the 19th century. Badly damaged in World Wars I and II, Šiauliai reemerged as an industrial centre. In addition to the leather and footwear industry, the city has metalworking, precision engineering, food-processing, and furniture industries. Teacher-training and polytechnic institutes and a medical school are located in the city. Pop. (1985 est.) 134,000.

sib, group of two or more lineages claiming common ancestry, whether the founder can be traced or not. European usage favours the term *clan* instead of *sib*, while Americans use *clan* in a special sense. *See* gens; phratry.

Sibasa, village, former administrative centre for black African affairs in northern Transvaal and former capital of the nonindependent black state of Venda (now the not internationally recognized republic of Venda), northeastern Transvaal, South Africa. A station was established there in 1872 by Carl Beuster of the Berlin Mission. The village is an industrial growth centre just northeast of Thohoyandou, the republic's capital (since 1979), and about 4 miles (7 km) north of the Luvuvhu River. Located at an elevation of 2,428 feet (740 m) and named after a Venda chief, Tshivhase, Sibasa is 45 miles (72 km) northeast of Louis Trichardt on the main road from Louis Trichardt to Kruger National Park. Industries include a bakery, a welding unit, a brick factory, a clothing factory, an upholstery plant, a sawmill, a furniture factory, and an automotive workshop. Sibasa also has the branch of the Employment Bureau of Africa that recruits mine workers for employment by the South African Chamber of Mines. As a result, there is considerable migration of the labour force. The village has a technical institute, and the burial ground of the Venda royal family is located nearby.

Sībawayh, byname of ABŪ BISHR 'AMR IBN 'UTHMĀN (b. 760?, al-Bayḍā', Iran—d. 793?, Shīrāz), celebrated grammarian of the Arabic language.

After study in Basra, Iraq, with a prominent grammarian Sībawayh received recognition as a grammarian himself. Sībawayh is said to have left Iraq and retired to Shīrāz after losing a debate with a rival on Bedouin Arabic usage. His monumental work is *al-Kitāb fī an-naḥw* ("The Book on Grammar") or, more simply, *al-Kitāb* ("The Book"). The work was frequently used by later scholars.

Sibbald, Sir Robert (b. April 15, 1641, Edinburgh—d. August 1722), Scottish physician and antiquarian, who became the first professor of medicine at the University of Edinburgh (1685), which became thereafter, for more than a century, one of the greatest centres of medical research in Europe.

Sibbald spent much of his early youth in Fifeshire and was educated at a high school in Edinburgh and at the University of Edinburgh. In 1660 he went to Leyden, where the following year he took an M.D., and then went on to Paris and, later, Angers, Fr., where he secured a doctorate (1662). Soon afterward he settled as a physician in Edinburgh.

In 1667, with Sir Andrew Balfour, he started a botanical garden for the purpose of locally

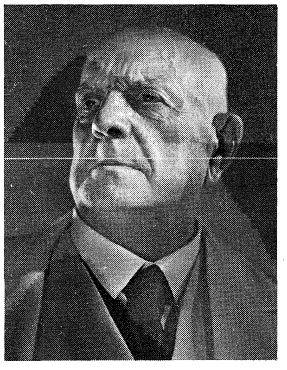
cultivating medicinal herbs. He also took a leading role in establishing the Royal College of Physicians of Edinburgh, which was chartered in 1681 and of which he was elected president in 1684. In 1685 he secured his professorship at the university. He was appointed physician to King Charles II in 1682 and to James II in 1685.

For many years before and after his appointment as geographer-royal of Scotland in 1682, he compiled collections of geographical and statistical data, much of which appear in such works as *An Account of the Scottish Atlas* (1683), *The History, Ancient and Modern, of the Sheriffdoms of Linlithgow and Stirling* (1710), *An Account of the Writers Ancient and Modern . . . of North Britain, called Scotland* (1710), and *Description of the Islands of Orkney and Zetland with the Maps of Them* (1711). Sibbald's most elaborate work, *Scotia Illustrata* (1684), which was a natural history of Scotland, perhaps relied too much on hearsay and unreliable correspondents and was severely attacked by critics.

Sibbald also wrote many medical and scientific treatises, many in Latin.

Sibelius, Jean, original name JOHAN JULIUS CHRISTIAN SIBELIUS (b. Dec. 8, 1865, Hämeenlinna, Fin.—d. Sept. 20, 1957, Järvenpää), Finnish composer, the most noted symphonic composer of Scandinavia.

Sibelius studied at the Finnish Normal School (Suomalainen Normaalilyseo), the first



Sibelius, photograph by Yousuf Karsh, 1949

© Karsh—Woodfin Camp and Associates

Finnish-speaking school in Russian-held Finland, where he came into contact with Finnish literature and in particular with the *Kalevala,* the mythological epic of Finland, which remained for him a constant source of inspiration. (Many of his symphonic poems, such as *Pohjola's Daughter* and *Luonnotar,* drew on this source.) Although intended for a legal career, he soon abandoned his law studies at Helsinki, devoting himself entirely to music. At first he planned to become a violinist. Under the guidance of Martin Wegelius he composed much chamber and instrumental music. He adopted the name Jean, which he used throughout his professional career in preference to his baptismal names. In his mid-20s he left Finland to continue his studies in Berlin and Vienna, where his teachers included the composers Robert Fuchs and Karl Goldmark.

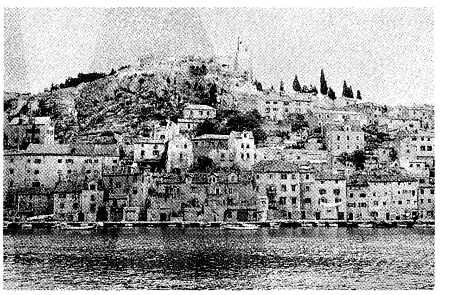
On his return to Finland a performance of his first large-scale orchestral work, the *Kullervo Symphony* (1892), created something of a sensation. This and succeeding works, *En Saga,* the *Karelia* music, and the *Four Legends,* established him as Finland's leading composer. In 1897, before the appearance of his *Symphony No. 1 in E Minor* (1899), the Finnish Senate voted him a small life pension in recognition of his genius. His tone poem *Finlandia* was written in 1899 and revised in 1900.

In the first decade of the 20th century Sibelius' fame penetrated the Continent. The pianist-composer Ferruccio Busoni, whose friendship he had made in Helsinki as a student, conducted his *Symphony No. 2 in D Major* (1901) in Berlin, and the British composer Granville Bantock commissioned his *Symphony No. 3 in C Major* (1907). With this work Sibelius turned his back on the national romanticism of the second symphony and the *Violin Concerto in D Minor* (1903) and moved toward the more searching and uncompromising mode of utterance of *En Saga* and the *Symphony No. 4 in A Minor* (1911). After World War I he published his greatest works, the last three symphonies (*No. 5 in E Flat Major, No. 6 in D Minor,* and *No. 7 in C Major*) and *Tapiola* (1925) but then lapsed into the long silence of his last years. Rumours of an eighth symphony (promised for performance in the early 1930s) and even a ninth symphony were unfounded. No manuscripts survived his death.

The 1930s saw a vogue for Sibelius prompted by such writers as Cecil Gray and Constant Lambert in England and Olin Downes in the United States. Despite a reaction against this vogue in the following generation, Sibelius retained his firm hold over the musical public. Although his inspiration is intimately connected with the Scandinavian landscape, it is not primarily as a nature poet that he is remembered. His achievement both in the symphonic poems and the seven symphonies lies principally in his remarkable mastery of form. The first movement of the third symphony has the clarity of construction of a Haydn or Mozart first movement, yet its organic unity and architecture even surpasses its models. It was in this capacity for organic growth that the secret of his genius lay.

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Šibenik, Italian SEBENICO, port in Croatia, Yugoslavia, on the estuary of the Krka River formed as it flows into the Adriatic Sea. Linked by a rail line to Zagreb, Šibenik is a coastal shipping station, with major exports of bauxite, timber, building stone, wines, and liqueurs. There is a shipyard, a ferrous-alloy plant, and an aluminum plant (at Lozovac). Electricity from Krka Falls powers an electrochemical plant. Tourist trade centres on the



Šibenik on the Krka estuary, Yugoslavia, overlooked by St. Anne's Fortress

Harrison Forman

local beaches and the offshore islands of Prvic and Zlazin, resort areas without a local water supply.

Although first documented in 1066, Šibenik was probably founded earlier by Slav migrants. It was chartered in 1167 and until 1412 was fought over by Venice and Hungary-Croatia. After 1412, when Venice prevailed, Šibenik grew and prospered despite unsuccessful assaults by the Turks. In 1797–1815 it became part of Napoleon's Illyrian Provinces, after which it was absorbed by the Austro-Hungarian Empire. After World War I, in 1918–21, it was Italian and then part of Yugoslavia.

Historically, the town has been distinguished for culture and scholarship. The Roman Catholic cathedral of St. Jakov (1431–1536) combines Gothic and Renaissance architectures. The City Gates, Loggia, and several Renaissance houses are well preserved. St. Anne's Fortress (12th–13th centuries) overlooks the town from the north. Pop. (1981) mun., 79,844.

Siberia, Russian SIBIR, vast region of the Soviet Union, comprising all of northern Asia between the Ural Mountains on the west and the Pacific Ocean on the east and extending southward from the Arctic Ocean to the hills of north central Kazakhstan and to the borders of the Soviet Union with Mongolia and China.

A brief treatment of Siberia follows. For full treatment, *see* MACROPAEDIA: Union of Soviet Socialist Republics.

All but the extreme southwestern area of Siberia lies in the Russian Soviet Federated Socialist Republic. In Soviet usage the administrative areas on the eastern flank of the Urals, along the Pacific seaboard, and within the Kazakh Soviet Socialist Republic are excluded from Siberia. The total area of Siberia in the wider sense is about 4,950,000 sq mi (12,800,000 sq km); in the narrower Soviet definition the area is 3,900,000 sq mi, consisting of two economic planning regions, Eastern and Western Siberia.

Siberia (Tatar: "Sleeping Land") falls into three major regions, all of great extent. In the west, abutting on the Ural Mountains, is the huge West Siberian Plain, drained by the Ob and Yenisey rivers, varying little in relief, and containing wide tracts of swampland. East of the Yenisey is the Central Siberian Plateau, which rises to 5,581 ft (1,701 m) in the Putoran Mountains of its northwestern corner. East of the plateau the basin of the Lena River separates the plateau from the complex series of mountain ranges, upland massifs, and intervening basins that make up the Soviet Far East. Other mountain ranges extend south of the plateau along the Mongolian border.

The major riverine basins of the Far East are those of the Amur, opening eastward to the Pacific, and of the Indigirka, Yana, and Kolyma, opening to the Arctic Ocean. The mineral resources of Siberia are enormous; particularly notable are the deposits of coal, petroleum, natural gas, diamonds, and gold.

Siberia is notorious for the length and severity of its winter: in Yakutiya, minimums of −89.9° F (−67.7° C) have been recorded. Rainfall decreases northeastward but rises again along the Pacific coast. Major vegetation zones extend east–west across the whole area—tundra in the north; swampy forest, or taiga, over most of Siberia; and forest-steppe and steppe in the south of Western Siberia and in the intermontane basins of the south.

Russian occupation of Siberia began in 1581 with a Cossack expedition that overthrew the small khanate of Sibir, which gave its name to the entire area. During the late 16th and 17th centuries, Russian fur trappers and traders and Cossack explorers penetrated throughout Siberia to the Bering Sea, although the Treaty of Nerchinsk (1689) with China halted the Russian advance into the Amur Basin until the 1860s. Although it was used as a place of exile for criminals and political prisoners, Russian settlement (by state peasants and runaway serfs) remained insignificant until the building of the Trans-Siberian Railroad (1891–1905), after which large-scale migration developed. After the First Soviet Five-Year Plan (1928–

32), industrial growth was considerable, but it was concentrated on the Kuznetsk Coal Basin and along the line of the Trans-Siberian Railroad. Although population has grown, the 1960s saw a considerable movement of people away from Siberia. Construction of the BAM (Baikal–Amur Magistral) railroad between Ust-Kut, on the Lena River, and Komsomolsk-na-Amure, on the Amur, a distance of 2,000 miles (3,200 km), was interrupted by World War II but completed in 1980. The population (1985 est.) of all Siberia, excluding the Kazakh Soviet Socialist Republic, was 39,736,000, including 22,916,000 in the Soviet-defined economic regions, 7,532,000 in the Far East, and 9,288,000 in the Urals (Kurgansk, Sverdlovsk, and Chelyabinsk *oblasti*).

Siberian anticyclone, also called the SIBERIAN HIGH, or ASIATIC HIGH, semipermanent system of high atmospheric pressure centred in northeastern Siberia during the colder half of the year. The anticyclone forms because of the intense cooling of the surface layers of air over the continent during this season. It is usually quite shallow in vertical extent, rarely persisting to altitudes of 3,000 metres (10,000 feet).

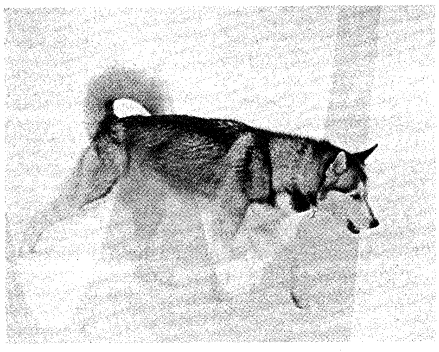
The Siberian anticyclone is one of the principal sources of polar air masses. Mean January temperatures at certain locations within this pressure system are the lowest in the Northern Hemisphere: many stations have averages lower than −46° C (−51° F). Outbreaks of polar air westward from this high-pressure area cause occasional severe cold spells in parts of the European continent.

In the summer, heating over the vast Asian land mass causes the anticyclone to dissipate.

Siberian Chronicles, a series of Russian chronicles dating from the late 16th through the 18th century and dealing with the history of Siberia. They individually go by such names as the Esipov, Kungur, Remezov, and Stroganov chronicles (about 40 in all) and collectively constitute the basic source for the study of early historical Siberia.

The origin, reliability, and interrelationships of the chronicles have long been a focus of historians' debate, for they are indeed complex and contradictory. The traditional—but not wholly accepted—hypothesis, proposed by historian S.V. Bakhrushin (1882–1950), is that the chronicles ultimately derive from a now-lost work, *Napisany, kako priydosha v Sibir* ("Description of How to Reach Siberia"), written in 1621 by survivors of the 16th-century expeditions into Siberia led by the Cossack hero Yermak Timofeyevich (*q.v.*). This work was purportedly copied and interpreted in later works, which in turn became the source of borrowings into the Siberian Chronicles. Whatever their origins, however, the chronicles do offer accounts of Yermak's campaigns and related information, along with elements of popular folklore.

Siberian husky, breed of working dog raised in Siberia by the Chukchi people, who valued it as a sled dog, companion, and guard. It was brought to Alaska in 1909 for sled-dog races and soon became established as a consistent winner. A graceful dog with erect ears and a dense, soft coat, the Siberian husky stands 20 to 24 inches (51 to 60 centimetres) and weighs 35 to 60 pounds (16 to 27 kilograms). It is usually gray, tan, or black and white, and it may have head markings resembling a cap, mask, or spectacles. The breed, kept pure for hundreds of years in Siberia, is noted for intelligence and a gentle temperament.



Siberian husky
Russ Kinne—Photo Researchers

Where the same name may denote a person, place, or thing, the articles will be found in that order

Siberut Island, Indonesian PULAU SIBERUT, also spelled SIBEROET, largest island in the Mentawai group of islands, Sumatera Barat *propinsi* (West Sumatra province), Indonesia. Siberut lies off the western coast of Sumatra, about 90 mi (145 km) west-southwest of and across the Selat (strait) Mentawai from Padang city. The island is 25 mi wide and 70 mi long. Its terrain is generally low, rising to about 1,260 ft (384 m) in the western portion. Rainfall is heavy, and the climate is warm and humid. The coastline is low and marshy, with mangrove swamps; clusters of palm trees rise from savannas farther inland. Agriculture is the principal occupation, and crops grown include sago, sugar, tobacco, cassava, sweet potatoes, pepper, peas, mango, and pineapple. There are coconut plantations along the coasts. Deep-sea fishing is practiced, and some cattle are raised. Cottage industry includes wood carving, weaving, copra and coir production, and basketry. Most of the populace are Muslims and belong to the Mentawai ethnic group, some of whom are Christians. The chief settlement and port is Muarasiberut, linked by road to Sigep, Simansih, and Taileleo. Communication with the mainland is through the port of Telukbayur on the western coast of Sumatera Barat province.

Sibi, town, district, and division, Baluchistan Province, Pakistan. The town, the district headquarters, lies on a plain just east of the Nāri River and is connected by rail with Quetta (80 mi [130 km] northwest) and Karāchi. Situated between the entrances of the Bolān and Harnai passes, it has suffered numerous sieges throughout history.

Sibi district was constituted in 1903, and includes the Marri–Bugti (Baluchi) tribal tracts to the southeast. Its almost entirely mountainous terrain rises in a series of terraces from the foothills of the Sulaimān Range and extends northwestward to the watershed of the Central Brāhui Range. Sibi proper is well irrigated and fertile, being drained by the Nāri River. The Nāri-Bolān Project supplies water for the irrigation of about 24,000 ac (9,700 ha) of sorghum, wheat, oilseeds, rice, and gram by using the monsoon flow of the Bolān River regulated by an earthen dam after it enters the Sibi plain. Camel breeding is widespread; coal, bauxite, and gypsum deposits are worked. Subordinate to Multān under the Mughals, the district passed successively to Kalhōṛō and Durrānī rule and was ultimately assigned to the British by the Treaty of Gandamak (1879), acceding to Pakistan with the rest of Baluchistan in 1947.

Sibi division comprises Sibi, Nasirābād, and Kachhi districts, and Kohlu Agency. The division in the southwest comprises part of the flat Kachhi plain, and in the northeast, consists of mountainous terrain rising from the foothills of the Sulaimān Range; the Nāri and Bolān rivers form its main drainage system. Pop. (1981 prelim.) town, 23,000; district, 129,000; division, 1,008,000.

sibilant, in phonetics, a fricative consonant sound, in which the tip, or blade, of the tongue is brought near the roof of the mouth and air is pushed past the tongue to make a hissing sound. In English *s, z, sh,* and *zh* (the sound of the *s* in "pleasure") are sibilants. Sometimes the affricates *ch* and *j* are also considered as sibilants. *See also* fricative.

Sibir (Russian S.F.S.R.): *see* Siberia.

Sibiryakov, Aleksandr Mikhaylovich, Sibiryakov also spelled SIBIRIAKOV (b. Oct. 8 [Sept. 26, old style], 1849, Irkutsk, Siberia, Russian Empire—d. 1893), Russian gold-mine proprietor, who was noted for both his financing of explorations in Siberia and for his own expeditions in the area.

Sibiryakov was a graduate of a polytechnic school in Zürich. A wealthy man, he financed the scientific expeditions of the Swedish explorer Adolf Erik Nordenskiöld (1878–79) and the Soviet explorer A.V. Grigoryev (1879–80) into the polar regions and facilitated the publication of works on Siberian history. In 1880 he made his first exploratory expedition—on the Kara Sea. In 1884, in his most famous trek, he sailed in a steamer to the mouth of the Pechora River, traveled by reindeer eastward to and across the Ural Mountains, and followed the Tobol River to Tobolsk, the traditional stepping-off point to Siberia. This route, later much traveled, became known as Sibiryakov's Route to the North.

An island in the Kara Sea is named for him. A famous icebreaker, built in 1909 in Glasgow and named the *Sibiryakov* after purchase by Russia in 1916, was used in both World Wars (being sunk by a German cruiser in 1942) and was the first ship to make a nonstop voyage across the North from the White Sea to the Bering Sea (1932).

Sibituane (African king): *see* Sebetwane.

Sibiu, *judeţ* (district), central Romania, occupying an area of 2,093 sq mi (5,422 sq km). The Transylvanian Alps (Southern Carpathians), including the ranges of Sebeşului, Lotrului, and Făgăraş, rise in the southern portion of the district. Settlement areas are situated in intermontane valleys. Sibiu (*q.v.*) city, a cultural and industrial centre, is the district capital. Metal products, chemicals, and machinery are manufactured in Sibiu, Mediaş, Avrig, Copşa Mică, and Ocna Sibiului. Building materials, timber, textiles, and leather goods are also produced in the district. A hydroelectric station operates at Sadu. Agricultural activities consist of livestock raising and cereal, orchard, and vineyard cultivation. The towns of Cisnădie and Cisnădiora are known for their historic churches, and Cisnădiora is surrounded by defensive walls and by cherry orchards. Răşinari commune is a centre for folk-art production and has an ethnographical museum. Păltiniş and Ocna Sibiului are resorts. Highway and railway connections extend in several directions through Sibiu and Mediaş cities. An airport is located near Sibiu. Pop. (1982 est.) 502,851.

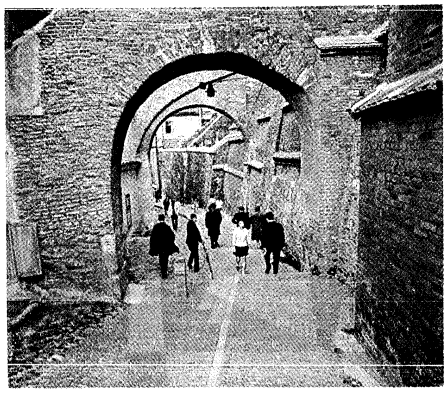
Sibiu, German HERMANNSTADT, Hungarian NAGYSZEBEN, city, capital of Sibiu *judeţ* (district), central Romania. On the Cibin River at an elevation of 1,350–1,400 ft (410–425 m) above sea level, it is on the northern side of the Turnu Roşu ("Red Tower") Pass, which links Transylvania to southern Romania across the Transylvanian Alps (Southern Carpathians).

Sibiu was initially a Roman city (Cibinium), whose name was derived from the river, a tributary of the Olt, which rises in the Cibin Mountains southwest of the city. Sibiu was refounded by Saxon (German) colonists in the 12th century as Hermannsdorf (later Hermannstadt). The old medieval town is in two parts, the upper town built on a terrace and the lower town on the banks of the Cibin, the

two being connected through an old district by narrow, cobbled alleys called the Fingerling Stairway.

A citadel, built by the Saxon settlers in the 13th century, was destroyed by the Tatars in 1241 and rebuilt in the 14th century. Massive brick walls erected around the upper town gave it the nickname "Red Town," after the colour of the walls, which repelled several Turkish attacks in 1432, 1438, and 1442. During this time, Sibiu was an important craft and cultural centre of the German communities in Transylvania, boasting 19 guilds in 1376. In 1541, Transylvania became an autonomous Turkish vassal state; but, as the Turks later withdrew from Hungary, Austria regained Transylvania after brief Romanian opposition in 1699. Sibiu then became the military centre of Transylvania; and on two occasions (1703–91 and 1849–65), the capital. With the rest of Transylvania, it was ceded to Romania in 1918.

Parts of the old fortifications remain, and many of the medieval houses within the walls



Cobbled alley in the old section of Sibiu, Romania
William Gelman—Black Star/EB Inc.

are historical monuments. The Brukenthal Museum was founded by Samuel Brukenthal, governor of Transylvania (1777–87), in his own Austrian Baroque residence with his collection of paintings, antiques, engravings, and books; it also houses important collections in ethnography, folk art, and natural science. Of the 40 watchtowers on the original inner city wall, three remain—the octagonal tower of the carpenters, the square tower of the potters, and the pentagonal tower of the cloth makers. Also in Sibiu are a massive Lutheran cathedral (built over the 14th and 15th centuries), an Orthodox cathedral (built 1906, modelled on Hagia Sofia in Istanbul), and an 18th-century Roman Catholic church.

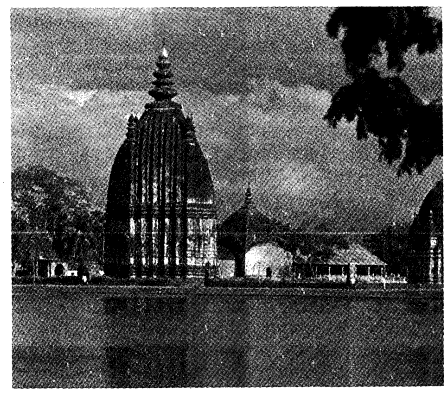
Sibiu has a large industrial base; products include machine tools, textile machinery, foodstuffs, leatherware, textiles, and clothing. The city is also a transportation hub, connected by road and railway to Cluj-Napoca to the northwest, to Braşov to the east, and to Bucharest to the southeast. Pop. (1982 est.) 158,025.

Sibley Provincial Park, park, southwestern Ontario, Canada, on Sibley Peninsula on the northern shore of Lake Superior, 20 mi (32 km) east of Thunder Bay. Established in 1950, the park has an area of 94 sq mi (243 sq km). It is the site of the 19th-century village of Silver Islet (including a restored hotel, store, and church), which was at one time the home of miners and lumbermen. Sibley has varied Canadian Shield landscape, including a rock formation called Sleeping Giant that played a prominent role in Indian legends. The park has trails and other recreational facilities, several types of wildlife (including moose), and rare plant life.

sibling rivalry, intense competition among siblings for recognition and the attention of their parents. Sibling rivalry normally begins when a baby is introduced to a family and the older sibling fears the baby will replace him or her. The older child may become extremely jealous and display aggressive behaviour toward the baby or such regressive acts as bed-wetting or baby talk. This regressive behaviour is considered the older child's way to try and reestablish himself in a dependent role with his parents. As the children grow, sibling rivalry can lead to extremely competitive or aggressive behaviour, which may become generalized to other life experiences (*e.g.,* career). Sibling rivalry is by no means universal or inevitable, but seems to depend in part upon how parents balance the sometimes competing needs of offspring.

Sibolga, *kotamadya* (city), Sumatera Utara *propinsi* (North Sumatra province), Sumatra, Indonesia, located 130 mi (209 km) south of Medan, the provincial capital. A port on Teluk (bay) Sibolga, an inlet of the Indian Ocean, it is linked by road with Tarutung and Pematangsiantar to the north and with Padangsidimpuan to the southeast. The city is protected by Pulau (island) Mursala nearby to the southwest. The population comprises Achinese, Minangkabau, and coastal Malay, and a few Indians, Arabs, and Chinese, who are mostly traders. The city is a centre of trade and transshipment; exports include rubber, coffee, timber, resin, camphor, and copra. Industries include sawmilling, weaving, wood carving, and mat and basket weaving. Deep-sea fishing is also important. A mosque is located in the city. Pop. (1980) 59,897.

Sibsāgar, town and district, Assam state, northeastern India. The district occupies 3,471 sq mi (8,989 sq km) in the Brahmaputra Valley. It is bounded by the Brahmaputra in the north. A major tea-growing area, it also produces rice, silk, and mustard. Much of the district is forested and provides valuable timber. Industry includes tea processing, oilseed milling, jewelry manufacturing, and oil and coal production.



Śiva temple in Sibsāgar town, Assam, India
Foto Features

Sibsāgar town lies on the Dikhu River, a tributary of the Brahmaputra, 30 mi (50 km) east-northeast of Jorhāt, the district headquarters. The Tai-speaking Ahoms came to the area from Yunnan, China, in the 13th century AD. Sibsāgar was the capital of the Ahom kingdom in the 18th century, when it was called Rangpur; several temples remain from that period. The town is now a tea-processing centre on the Northeast Frontier Railway and the national highway. Pop. (1971) town, 27,426; district, 1,837,389.

Sibu, town, southern Sarawak state, East Malaysia (northwest Borneo), at the confluence of the Rajang and Igan rivers, about 50 mi (80 km) from the South China Sea coast. As a river port, it serves small oceangoing vessels and exports timber, rubber, and pepper. Administrative headquarters for the central portion of the state (Third Division), Sibu has an airport and a technical nautical school. Pop. (1980) 85,231.

Sibyl, also called SIBYLLA, prophetess in Greek legend and literature. Tradition represented her as a woman of prodigious old age uttering predictions in ecstatic frenzy, but she was always a figure of the mythical past, and her prophecies, in Greek hexameters, were handed down in writing. In the 5th and early 4th centuries BC, she was always referred to in the singular; Sibylla was treated as her proper name, and she was apparently located in Asia Minor. From the late 4th century the number of sibyls was multiplied; they were localized traditionally at all the famous oracle centres and elsewhere, particularly in association with Apollo, and were distinguished by individual names, "sibyl" being treated as a title.

A famous collection of sibylline prophecies, the Sibylline Books, was traditionally offered for sale to Tarquinius Superbus, the last of the seven kings of Rome, by the Cumaean sibyl. He refused to pay her price, so the sibyl burned six of the books before finally selling him the remaining three at the price she had originally asked for all nine. The books were thereafter kept in the temple of Jupiter on the Capitoline Hill, to be consulted only in emergencies.

A Judaean or Babylonian sibyl was credited with writing the Judeo-Christian Sibylline Oracles. The sibyl came thus to be regarded by some Christians as a prophetic authority comparable to the Old Testament.

Sibyl, French SIBYLLE (b. 1160—d. autumn 1190), queen of the crusader state of Jerusalem (1186–90).

The daughter of Amalric I, Sibyl succeeded to the throne upon the death of her brother, Baldwin IV (1185). Baldwin had intended for the throne to pass directly to Sibyl's son Baldwin V, but Sibyl and her husband, Guy de Lusignan, conspired to seize the throne for themselves, embroiling the kingdom in a disastrous war with Saladin.

Sibylline Oracles, collection of oracular prophecies in which Jewish or Christian doctrines were allegedly confirmed by a sibyl (legendary Greek prophetess); the prophecies were actually the work of certain Jewish and Christian writers from *c.* 150 BC to *c.* AD 180 and are not to be confused with the Sibylline Books, a much earlier collection of sibylline prophecies (*see* Sibyl). In the Oracles the sibyl proved her reliability by first "predicting" events that had actually recently occurred; she then predicted future events and set forth doctrines peculiar to Hellenistic Judaism or Christianity. The Jewish apologist Josephus and certain Christian apologists thought the works were the genuine prophecy of the sibyls and were greatly impressed by the way in which their doctrines were confirmed by external testimony. Both Theophilus of Antioch and Clement of Alexandria, 2nd-century Christian theologians, referred to the sibyl as a prophetess apparently no less inspired than the Old Testament prophets.

In the Byzantine period 12 of the compositions were collected in a single manuscript containing 14 books (of which numbers 9 and 10 are lost). An incomplete text of this collection was first published in 1545.

Modern scholars have dated the various Oracles by comparing the actual historical events with what was predicted in the Oracles. At the point where errors begin, the oracle-writer was predicting the future, and it is possible to assign a date from the last correct prediction.

Sicani, English SICANS, according to ancient Greek writers, the aboriginal inhabitants of western Sicily, as opposed to the Siculi of eastern Sicily. Archaeologically there is no

substantial difference between Sicani and Siculi (Sicels) in historical times; but ancient authorities believed the Sicani to be Iberians from Spain who were driven by the invading Siculi into the western and southern parts of the island.

Sicard, Roch-Ambroise Cucurron, Abbé (b. 1742, Fousseret, near Toulouse, Haute-Garonne, Fr.—d. Sept. 20, 1822, Paris), French educator who was a pioneer in the teaching of deaf-mutes.

From 1786 to 1789, Sicard, an abbé, was principal of a Bordeaux school for deaf-mutes. He then succeeded Abbé de l'Epée in Paris. Although he long supported teaching deaf-mutes through sign language, Sicard turned to the oral method toward the end of his long career. His work influenced Thomas H. Gallaudet and the teaching of the deaf in America.

A member of the Institut de France (1795), Sicard wrote two important books: *Mémoire sur l'art d'instruction les sourds-muets de naissance* (1789; "Memoir on the Art of Teaching Deaf-Mutes from Birth") and *Théorie des signers pour l'instruction des sourds-muets* (1808–14; "Theory of Signs for the Instruction of Deaf-Mutes").

sicca syndrome: *see* Sjögren's syndrome.

Sicco: *see* John XVII (or XVIII) *under* John (Papacy).

Sicel language, language spoken by the ancient Siculi (Sicels) in Italy and Sicily. The language is known from four inscriptions dating from the 3rd century BC and from several coins dating from the 6th and 5th centuries BC.

After the Greek settlements in Sicily, the Siculi became Hellenized and substituted Greek for their original language. Scholars believe Sicel to have been an Indo-European language, primarily on the basis of the word *esti,* "is" (Latin *est;* Greek *esti*), and the grammatical endings of some words.

Sicels (people of ancient Sicily): *see* Siculi.

Sichote-Alin (Russian S.F.S.R.): *see* Sikhote-Alin.

Sichuan Pendi (China): *see* Szechwan Basin.

Sicilian school, a group of Sicilian, southern Italian, and Tuscan poets centred in the courts of Emperor Frederick II (1194–1250) and his son Manfred (d. 1266); they established the vernacular, as opposed to Provençal, as the standard language for Italian love poetry, and they also, under the influence of Provençal, northern French, and possibly Arabic poetic traditions, are credited with the invention of two major Italian poetic forms, the canzone and the sonnet. Among the outstanding poets of the Sicilian school were Giacomo da Lentino, Giacomino Pugliese, and Rinaldo d'Aquino.

The brilliant Frederick II, a writer himself, a master of six languages, the founder of the University of Naples, and a generous patron of arts, attracted to his court some of the finest minds and talents of his time. His circle included perhaps 30 men, most of them Sicilians, with added groups of Tuscans and southern Italians. Dante's terming the group Sicilian in *De vulgari eloquentia* ("Eloquence in the Vernacular") is not entirely accurate; some of the poets were mainlanders, the court was not always located in Palermo, and their dialect was influenced by Provençal and southern Italian dialects.

Acquainted with the poetry of the Provençal troubadours (Frederick had married the sister of the Count of Provence) and the northern French and German minstrels, Frederick's poets produced many poems, of which about 125 are extant, all in Sicilian dialect. About 85 of these are canzones (adapted from a Provençal form called the canso) and most of the rest are sonnets, the invention of which is usually attributed to Giacomo da Lentino, the author of most of them. The majority of the poems were formalized and lacking in genuine inspiration, but some—particularly those describing the pain, anguish, and uncertainty of love—have singular directness and emotional power.

The importance of the poetic forms bequeathed by the Sicilian school can scarcely be overstressed. The canzone became a standard form for Italian poets for centuries. The Sicilian-school sonnet became, with variations, the dominant poetic form not only in Renaissance Italy—where it was brought to perfection by Guido Cavalcanti, Dante, and Petrarch—but also elsewhere in Europe, particularly in Elizabethan England, where, after its introduction in the 16th century, it was modified to form the distinctive English, or Shakespearean, sonnet.

Sicilian Stage, major division of Pleistocene marine rocks and deposits in Mediterranean Europe (the Pleistocene Epoch began about 2,500,000 years ago and ended about 10,000 years ago). The Sicilian Stage follows the Calabrian in most chronologies, or the Emilian Stage, an interval sometimes inserted between the Calabrian and Sicilian stages. The Sicilian precedes the Tyrrhenian Stage. The Sicilian fauna is mixed; fossil indicators of both cold- and warm-water animals are found in Sicilian sediments; the significance of this fact is still uncertain.

Sicilian Vespers, massacre of the French with which the Sicilians began their revolt of 1282 against Charles I, Angevin king of Naples-Sicily; it precipitated a French–Aragonese struggle for possession of that kingdom. Its name derives from a riot that took place in a church outside Palermo at the hour of vespers on Easter Monday, March 30. Peter III of Aragon, Charles's rival for the Neapolitan throne, conspired to raise a rebellion against him in Sicily. The rising broke out prematurely when Sicilians, incensed by Charles's oppressive regime, killed some insulting French soldiers at vespers in the church of S. Spirito. The people of Palermo followed suit and massacred 2,000 French inhabitants of the city the night of March 30–31. All of Sicily soon revolted and sought help from the Aragonese, who landed at Trapani on August 30.

The War of the Sicilian Vespers ensued. The Angevins were supported by the papacy, the Italian Guelfs, and Philip III of France, while the Aragonese were helped by the Italian Ghibellines. The son of Peter III acceded to the throne of Aragon as James II and made peace with the papacy, France, and the Angevins (to whom he renounced Sicily), by the Treaty of Anagni (June 1295). But the Sicilians took as their king James's brother, Frederick III, who finally secured the kingdom for himself by the Peace of Catabellotta (Aug. 31, 1302), beginning a long period of Spanish hegemony on the island.

Siciliano, Angelo (body builder): *see* Atlas, Charles.

Sicily, Italian SICILIA, island of Italy, the largest and most populous in the Mediterranean Sea. Together with the Egadi, Lipari, Pelagie, and Panteleria islands, Sicily forms an autonomous region of Italy. The area is 9,830 sq mi (25,460 sq km). The island is separated from the mainland by the Strait of Messina (10 mi [16 km] wide). The capital is Palermo.

The following article summarizes the administrative history, geography, demographic patterns, economy, and culture of modern Sicily; for additional treatment of its geography and history, *see* MACROPAEDIA: Italy.

During the 8th century BC Sicily was colonized by the Phoenicians and Greeks. In the 3rd century BC the island became the first Roman province. Sicily was occupied during the early Middle Ages successively by the Vandals, the Ostrogoths, the Byzantines, and the Arabs, and in the 11th century it was conquered by the Normans. In the 12th and 13th centuries the island formed a part of the Kingdom of Sicily, and in the 18th century Sicily was ruled by the Bourbons. During the 19th century the island was a major centre of revolutionary movements: in 1860, as a result of Garibaldi's revolt, it was liberated from the Bourbons and in the following year was incorporated into the united kingdom of Italy. In 1947 Sicily gained regional autonomy.

The island is mostly mountainous, and seismic and volcanic activity is quite intense. Europe's highest active volcano is Mt. Etna (10,700 ft [3,261 m]). The only wide valley is the fertile plain of Catalina in the east. The climate is subtropical and Mediterranean. Annual precipitation on the plains is 16–24 in. (400–600 mm), and in the mountains 47–55 in. Natural vegetation has been greatly reduced by human influence, and forests occupy only 4 percent of the territory.

Sicily was inhabited 10,000 years ago. Throughout its history it has received people from the Mediterranean coast. The Sicilian population, estimated to be 4,597,510 in 1983, is the most urbanized of the southern provinces of Italy. Four cities (Syracuse, Messina, Catania, and Palermo) have populations of more than 100,000. The population generally has been decreasing, slightly—despite a considerable natural increase—because of continual emigration to Italy's industrial areas for employment. The birth rate (15.6 per 1,000) and infant mortality rate (6.7 per 1,000) are higher than the Italian average, and the death rate (8.9 per 1,000) is lower. The natural rate of increase is about 0.7 percent annually.

Isolation and distance from the rest of Italy account for some of the island's underdevelopment, but there has been a marked expansion of heavy industrial activity based on the oil-refining and chemical industries. Large quantities of natural gas and sulfur are produced, although the latter has been declining. Other industries include food processing, salt extraction, wine making, textiles, and shipbuilding. The region is mainly agricultural. Wheat, barley, corn (maize), olives, citrus fruit, almonds, wine grapes, and some cotton are produced, and cattle, mules, donkeys, and sheep are raised.

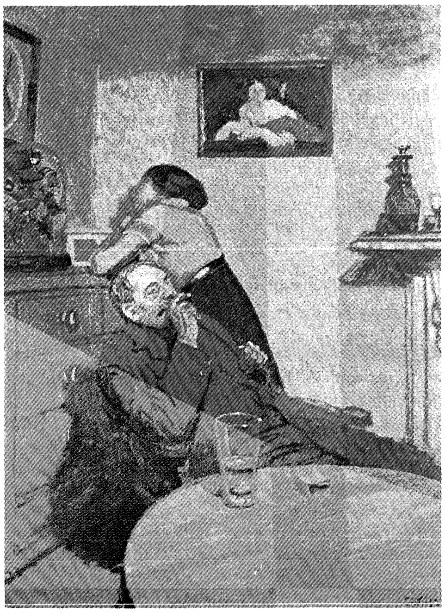
A peculiar feature of the separateness of Sicilian life is the persistence of the Mafia with its organizational links with political and social forces. The origin of the Mafia goes back to the 18th century. Over time the Mafia has lost much of its social influence, but its criminal activities have not been reduced. The family remains the basic element of Sicilian society. Sicily has strong traditions, which are expressed in folk art and popular religious festivals, as well as in its contributions to Italian literature and art.

Sickel, Theodor von (b. Dec. 18, 1826, Aken, Prussian Saxony—d. April 21, 1908, Merano, Austria), German historian of the early Middle Ages who is considered the founder of modern diplomatics, the critical method for determining the authenticity of documents.

Educated at the École des Chartes de Paris (1850–52) and in Berlin, Sickel, on grants from the French government, carried out research projects at the archives at Milan, Venice, and Vienna. He was appointed professor of history at Vienna (1867), later becoming director of the Institute for Austrian History (1869) and the Austrian Historical Institute in Rome (1883–1901). His principal works were the *Acta regum et imperatorum Karolinorum,* 2

vol. (1867), an examination of Carolingian documents still valuable for the study of the period, and *Beiträge zur Diplomatik,* 8 vol. (1861–62; "Contribution to Diplomatics"), a treatise on the science of interpreting records. Sickel also was associated with the direction of the *Monumenta Germaniae Historica,* writing in that series "The Diplomacy of Conrad I, Henry I, and Otto II" (1879–84).

Sickert, Walter Richard (b. May 31, 1860, Munich—d. Jan. 22, 1942, Bath, Somerset, Eng.), painter and printmaker who was the most important of the British Impressionists.



"Ennui," oil on canvas by Walter Sickert, *c.* 1913; in the Tate Gallery, London

By courtesy of the trustees of the Tate Gallery, London; photograph, J.R. Freeman & Co. Ltd.

Sickert was the son of Oswald Adalbert Sickert, a Danish-born German draftsman who settled in England in 1868. After several years on the stage, Sickert went in 1881 to the Slade School in London. In 1882 he became a pupil of Whistler and in 1883 met Degas in Paris; these artists much influenced his work and personality. His first pictures of London music-hall interiors, which became one of his most typical subjects, appeared in 1886 at the New English Art Club, where Sickert exhibited until 1917.

He was indebted to Degas for the ability to establish a situation merely by the attitudes of the figures. Sickert coupled this with a refreshing vein of satire, as can be seen in "Ennui" (*c.* 1913).

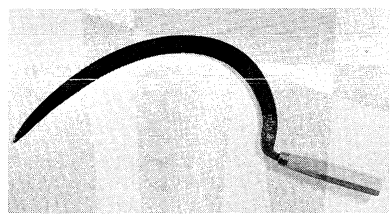
Between 1885 and 1905 Sickert spent most of his summers at Dieppe and worked in Venice. Returning to London in 1905 he became the focus of a group of painters that included Augustus John and Lucien Pissarro, the son of one of the leading French Impressionists, Camille Pissarro. Through contact with Pissarro, Sickert began to show in his work the influence of Neo-Impressionism. He was a founder of the Camden Town and London groups (1911 and 1913, respectively). Sickert painted at Brighton and Bath in the 1920s and 1930s and wrote occasional criticism, supporting the principles of drawing advanced by Degas.

Sickingen, Franz von (b. March 2, 1481, Ebernburg, Rhenish Palatinate—d. May 7, 1523, Landstuhl), prominent figure of the early years of the Reformation in Germany.

A member of the *Reichsritterschaft,* or class of free knights, Sickingen acquired considerable wealth and estates in the Rhineland as the result of campaigns against private individuals and against cities, including Worms (1513) and Metz (1518). In 1518 he led the army of the Swabian league against Ulrich I, duke of Württemberg. After the death of the Holy Roman emperor Maximilian I in 1519, Sickingen used his influence to support the election of Charles V as emperor.

Sickingen protected Martin Luther and harboured many Humanists and Reformers in his castles, which were, in the words of Lutheran Humanist Ulrich von Hutten, "a refuge for righteousness." Sickingen placed himself at the head of the German knights when they rose in defense of their class interests in 1522, declaring war against his old enemy Richard of Greiffenclau, archbishop of Trier. He sadly underestimated the opposition. Trier remained loyal to the Archbishop, and princes such as Philip of Hesse rallied to his support; Sickingen was repulsed, his support fell off, and he was declared an outlaw. He was forced on the defensive; his castles fell one by one; and finally he capitulated in his last stronghold at Landstuhl. He died the next day and was buried there. On the one hand a champion of the poorer classes, a sincere Lutheran, and genuine patriot, Sickingen was on the other hand an opportunist whose objective probably was high office.

sickle, one of the most ancient of harvesting tools, consisting of a metal blade, usually curved, attached to a short wooden handle. The short handle forces the user to harvest in a stooped or squatting position. The longer-handled scythe, the user of which remains upright, evolved from the sickle. Harvesting with a sickle is very slow, but because of its simplicity and low cost, it is still widely used



Sickle

By courtesy of the Smithsonian Institution, Washington, D.C.

over the world, especially to reap cereals such as wheat and rice and also as a gardening tool.

sickle-cell anemia, serious hereditary disease—occurring mainly in persons who are racially Negroid—caused by an abnormal hemoglobin (hemoglobin S, or Hb S; *see also* hemoglobin). Hb S is sensitive to deficiency of oxygen; when oxygen concentration is reduced, Hb S, in contrast to normal hemoglobin (Hb A), becomes stacked within the red cells in macromolecular filaments that twist into helical rods. These then become associated into parallel bundles that distort and elongate the red cells, causing them to become rigid and assume a sickle shape. This phenomenon is to some extent reversible if oxygen is supplied, but repeated sickling ultimately results in irreversible distortion of the red cells, obstruction of the microcirculation, and fragmentation of the red corpuscles.

Sickle-cell trait refers to the inheritance of the Hb S gene from only one parent. Sickle-cell anemia is caused by the inheritance of the abnormal gene from both parents. The red cells of persons with sickle-cell trait contain both Hb A and Hb S, and such cells require much greater deoxygenation to produce sickling than do those of patients with sickle-cell anemia. The great majority of persons with sickle-cell trait (the heterozygous state) have no symptoms of disease, although certain manifestations—mainly associated with local lowering of oxygen tension or exposure to high altitude—have been seen. The overall mortality rate of persons with sickle-cell trait is no different from that of a normal comparable population.

On the other hand, sickle-cell anemia (the homozygous state) is associated with chronic anemia (caused by excessive destruction of red cells), bone and kidney changes, and other symptoms caused by obstruction of small blood vessels. Couples harbouring the sickle-cell trait are at high risk of producing children who will have the disease. However, through amniocentesis (analysis of amniotic fluid surrounding a fetus), a testing procedure done in the early stages of pregnancy, it is possible to detect sickle-cell anemia in the unborn infant.

The Hb S gene geographically is distributed in a broad equatorial belt in Africa and is found, though less often, in other parts of the continent and in the Americas. The persistence of Hb S has been explained by the fact that heterozygous persons are resistant to malaria. When the red cells of a person with sickle-cell trait are invaded by the malarial parasite, the red cells adhere to blood vessel walls, become deoxygenated, assume the sickled shape, and then are destroyed, the parasite being destroyed with them.

In addition to the sickle-cell trait and sickle-cell anemia, Hb S may be inherited from one parent and another abnormal hemoglobin from the other parent (*see also* hemoglobinopathies). As a rule the clinical severity of such double heterozygosity is less great than that of sickle-cell anemia.

The treatment of sickle-cell anemia is complex, requiring analgesics and supportive measures during painful periods when blood vessels are occluded and periods of excessive blood destruction. The value of various agents designed to prevent sickling still remains to be shown. On the other hand, sickle-cell trait requires no treatment unless one of the rare complications has developed.

sicklebill (bird): *see* scythebill.

Sickles, Daniel Edgar (b. Oct. 20, 1825, New York City—d. May 3, 1914, New York City), U.S. politician, soldier, and diplomat remembered for acquiring the land for Central Park in New York City. He was also the first person in the United States acquitted of murder on the grounds of temporary insanity.

Sickles attended the University of the City of New York, later studied law, and in 1846 was admitted to the bar. He immediately became active in the Democratic Party, and in 1847 he launched his long political career by winning a seat in the state legislature.

In 1853 Sickles—then corporation counsel for the city of New York—acquired the land for Central Park. He resigned his post the same year to become secretary to the U.S. legation in London. Back in the United States in 1855, Sickles won consecutive terms in the New York state senate in 1856 and 1857 and then entered national politics, serving from 1857 to 1861 as a Democrat in the U.S. House of Representatives.

On Feb. 27, 1859, Sickles shot and killed Philip Barton Key—son of Francis Scott Key. Claiming temporary insanity (the first time that defense was used in the United States)—arising from what he believed were Key's amorous intentions toward his wife—Sickles was acquitted.

Sickles fought in the Civil War, rising from colonel to major general. From 1865 to 1867 he was military governor of North and South Carolina, but his performance displeased President Johnson, and he was relieved in 1867. Two years later he retired from the Army. From 1869 to 1873 he served as U.S. minister to Spain. In 1893–95 Sickles served a final term in the U.S. House of Representatives, then retired from national politics after defeat in his try for reelection in 1896.

Siculi, English SICELS, Greek SIKELOI, ancient Sicilian tribe, which in historical times occupied the eastern part of Sicily. Old tales related that the Siculi once lived in central Italy but were driven out and finally crossed to Sicily, leaving remnants behind—*e.g.,* at Locri. They are hard to identify archaeologically, although some words of their Indo-European language are known. The Siculi lived in independent towns; thus, they were easily displaced by the Greek colonists who migrated to Sicily, and they did not react en masse until the 450s BC under Ducetius. Their most important gods were the Palici, protectors of agriculture and sailors; Adranus, perhaps the father of the Palici; and the goddess Hybla, or Hyblaea. *See also* Sicani.

Siculus, Diodorus: *see* Diodorus Siculus.

Sicyon, also spelled SECYON, Modern Greek SIKIÓN, ancient Greek city in the northern Peloponnese about 11 miles (18 km) northwest of Corinth. Inhabited in Mycenaean times and later invaded by Dorians, Sicyon was subject to Argos for several centuries. In the 7th century BC, Sicyonian independence was established by non-Dorian tyrants, the Orthagorids. Under the Orthagorid ruler Cleisthenes (grandfather of the Athenian statesman of the same name), in the 6th century, the city gained its greatest power. After the fall of the tyranny, Sicyon joined the Peloponnesian League and remained a loyal ally of Sparta for about a century and a half; its plentiful coinage attests to its prosperity in this period. Theban intervention in 369 or 368 led to intermittent civil strife and tyrannies. During the 4th century BC, Sicyon was celebrated for its school of painters and sculptors, which included the master Lysippus. Aratus, the most distinguished statesman of Sicyon, freed it from a tyranny (251) and brought it into the Achaean League, in which it played a leading role until his death (213).

Sidamo, also spelled SIDAMA, all Cushitic-speaking peoples of southwestern Ethiopia who are not Galla; they are mostly concentrated in the Omo River and Rift Valley regions. Of mixed Caucasoid (Cushitic) and Negroid (probably Sudanic) stock, the Sidamo founded the Kefa kingdom around 1400. They were subsequently controlled by both the "Abyssinians" (Amhara and Tigre) and the Galla, whose invasions pressed them into their present geographic boundaries.

The Ethiopian state has established political domination over the Sidamo, and they have been the object of much Islāmic proselytizing; however, with the exception of four groups (the Muslim Garo, Tambaro, Hadya, and Alaba), most have retained their pagan religion based on worship of the sky god, beliefs similar to those of the Galla. Their political organization is monarchical: a divine king is a representative of the sky god. The region shows the extraordinary military-mindedness of past epochs, with entire communities surrounded by walls and garrisons.

Their staple crop is the *ensete,* or Abyssinian banana, but they also produce grains, cereals, vegetables, fruits, and spices. They also keep herds of cattle, horses, and sheep and consume milk and cheese.

Siddha, in Jainism, one who has achieved perfection. By right faith, right knowledge, and right conduct a siddha has freed himself from the cycle of rebirths and resides in a state of perpetual bliss in the *siddha-śīlā,* at the top of the universe. The siddha and the other ascetics constitute the *pañca-parameṣṭhin,* the five chief divinities of the Jainas. Their figures are represented on a silver or brass tray called a *siddha-cakra* (saint-wheel), to which great sanctity and magical power are attributed. In the twice-yearly ceremony known as *oḷī,* the images are washed and anointed, and offerings of rice, sweetmeats, and fruit are made.

In the Digambara sect the saint-wheel is called *navapada* ("nine dignities," or "nine virtues") and consists of the *pañca-parameṣṭhin* plus the Jina (saviour) image, temple, scriptures, and *dharma-cakra* (sacred wheel of the law).

Siddhānta school (Hindu philosophy): *see* Śaiva-siddhānta.

Siddhārtha Gautama: *see* Buddha.

Siddons, Sarah, *née* KEMBLE (b. July 5, 1755, Brecon, Brecknockshire, Wales—d. June 8, 1831, London), one of the greatest of English tragic actresses.

She was the eldest of 12 children of Roger and Sarah Kemble, who led a troupe of traveling actors (and were progenitors of a noted family of actors to a third generation, including a famous granddaughter, Fanny Kemble). Through the special care of her mother in sending her to the schools in the towns where the company played, Sarah received a remarkably good education, even though she was accustomed to making appearances on the stage while still a child. While still in her teens, she became infatuated with William Siddons, a handsome but somewhat insipid actor in her father's company; such an attachment, though, had the disapproval of her parents, who wished her to accept the offer of a squire. William Siddons was dismissed from the company, and she was sent to a situation as lady's maid at Guy's Cliff in Warwickshire. Here she recited Shakespeare, John



Sarah Siddons, chalk drawing by J. Downman, 1787; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

Milton, and Nicholas Rowe in the servants' hall and occasionally before aristocratic company, and here also she began to develop a talent for sculpture (which was subsequently developed, especially between 1789 and 1790, and of which she later provided samples in busts of herself). The necessary consent to her marriage to Siddons was at last obtained, and the marriage took place in Trinity Church, Coventry, in November 1773.

The new Mrs. Siddons, aged 18, now joined a new acting company. It was while playing at Cheltenham in 1774 that she met with the earliest decided recognition of her powers as an actress, when by her portrayal of Belvidera in Thomas Otway's *Venice Preserved* she won the appreciation of a party of "people of quality" who had come to scoff. When the theatrical producer David Garrick, told of her acting prowess, sent a representative to see her, she was playing Rosalind in *As You Like It* in a barn in Worcestershire and was also pregnant. Garrick nevertheless offered her an engagement, but she could not accept until after the child was born. When she appeared with Garrick at Drury Lane, London, in 1775, she was a failure. She then went back on tour in the country, where she earned great favour, becoming the tragedy queen of the English stage.

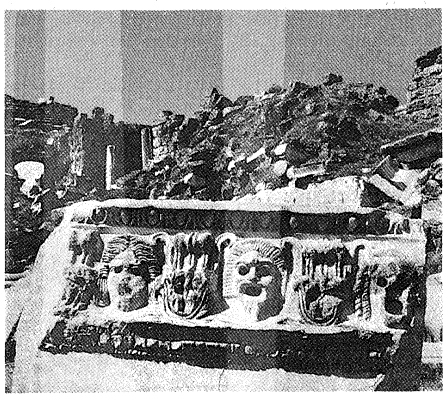
In 1782, at the request of Richard Brinsley Sheridan, who had succeeded Garrick, she consented reluctantly to appear again at Drury Lane as Isabella in Thomas Southerne's *Fatal Marriage,* and her success was phenomenal. From then on she reigned as queen at Drury Lane until, in 1803, she and her brother John Philip Kemble went to Covent Garden. In 1783 she was appointed to teach elocution to the royal children. She retired from the regular stage on June 29, 1812, with a farewell performance of Lady Macbeth in *Macbeth,* in which the audience would not allow the play to proceed beyond the sleepwalking scene, in which she gave an exhibition of perfection.

She played many of the great roles of tragedy, eschewing comedy. Lady Macbeth, Isabella, Belvidera in *Venice Preserv'd,* Jane Shore, Katharine in *Henry VIII,* Constance in *King John,* Zara in *The Mourning Bride,* and Volumnia in *Coriolanus* were her great parts; but it was as Lady Macbeth that she excelled. Her success was due to her complete concentration upon the character whom she played: she identified herself with a role and seemed possessed by it, oblivious of all else around her. Portraits of her were painted by Thomas Gainsborough, Sir Thomas Lawrence, and Sir Joshua Reynolds; Reynolds entitled his painting "Mrs. Siddons as the Tragic Muse." William Hazlitt wrote of her that "passion emanated from her breast as from a shrine. She was tragedy personified."

siddur (Hebrew: "order"), plural SIDDURIM, or SIDDURS, Jewish prayer book, which contains the entire Jewish liturgy used on the ordinary sabbath and on weekdays for domestic as well as synagogue ritual. It is distinguished from the mahzor, which is the prayer book used for the High Holidays. The prayers and benedictions of a siddur breathe Old Testament sentiments of praise, thanksgiving, petition, intercession, acknowledgment of sin, and prayers for forgiveness; numerous short verses from the Psalms express these religious feelings. Because tradition long allowed the addition of new prayers and hymns (piyyutim) to voice contemporary needs and aspirations, the siddurim reflect Jewish religious history expressed in liturgy and prayers. Thus, the Exodus still remains the central theme of Passover, a symbol and a sign of hope and trust in God.

Though a liturgy of prayer was long in use before the destruction of the Second Temple (AD 70), it was Amram bar Sheshna (9th century AD) of Babylonia who first composed a complete siddur at the request of a Spanish congregation. Variations persist in modern editions of siddurim because of ritual and denominational differences and local preferences for such things as non-obligatory prayers. But the basic elements are so unchanging that no *siddur* can be said to have lost its catholicity.

Side, modern SELIMIYE, principal city and port of ancient Pamphylia, originally situated on the Mediterranean coast west of the mouth of the Manavgat River, in southwestern Turkey. (The site is now inland.) Though the city was founded by Aeolian Greeks, a peculiar non-Greek language was spoken there. Having a good natural harbour and two artificial harbours for larger vessels, it was the most important port in Pamphylia. Alexander the Great occupied the city (333 BC), and the Rhodian fleet defeated that of the Seleucid king Antiochus III there (190 BC). In the 1st century BC Cilician pirates made Side their chief slave market. The great ruins—excavated by the Turks from 1947 to 1966—cover a large, walled promontory; one of the most



Theatrical masks on sculptural decoration from the ruins of the Roman theatre at Side, Tur., 2nd century AD

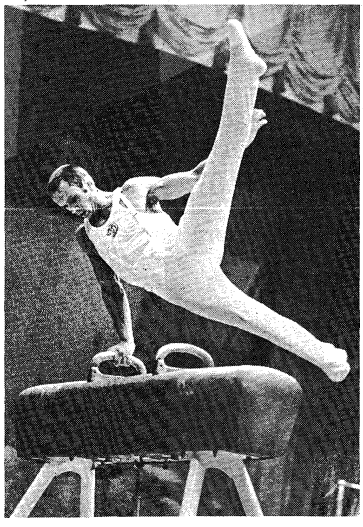
© 1976 George Holton—Photo Researchers, Inc.

prominent remains is a colossal theatre, built upon arches and considered one of the finest in Anatolia. Pop. (latest census) 443.

side drum: *see* snare drum.

side horse, also called POMMEL HORSE, gymnastic apparatus, a leather-covered form 1.6 m (63 inches) long, 34 to 36 cm (13.4 to 14.2 inches) wide, and (measured to its top) about 110 cm (43 inches) from the floor with a support in its centre. Curved wooden pommels (handholds), 12 cm (4.7 inches) high, are inserted in the top of the horse 40 to 45 cm (15.75 to 17.72 inches) apart.

The gymnast supports himself with his hands by holding the pommels over the horse and performs movements of the trunk and legs, without stops, such as single or double leg circles and crosses of the legs (scissors). These are combined with turns and changes of the hands' grasp to the forward part of the horse (neck), the centre (saddle), and the rear (croup). It is necessary to vary the movements and also to perform them both to the left (clockwise) and to the right.



Mikhail Voronin, U.S.S.R., performing on the side horse

Tass—Sovfoto

The apparatus stems from a wooden horse introduced by the Romans and used to teach mounting and dismounting. They added it to the ancient Olympic Games. The basic modern exercises were developed in the early 19th century by Friedrich Ludwig Jahn, founder of the German turnverein. It is a gymnastics event for men only. *See* Sporting Record: Gymnastics. *See also* Olympic Games.

side-necked turtle, any species of turtle belonging to the family Pelomedusidae. The name is derived from the method of protecting the head and neck by bending them to the side, rather than withdrawing them backward into the shell as do most other turtles. Sideways bending of the neck is also found in the snake-necked turtles (Chelyidae).

Pelomedusid turtles are aquatic reptiles found only in the Southern Hemisphere—mainly in Africa, Madagascar, South America, and several islands in the Indian Ocean. There are three genera and about 10 to 15 species. The genus *Pelomedusa* includes a single species, *P. subrufa,* a gray turtle up to 30 cm (12 inches) long, which is found on Madagascar and in sub-Saharan Africa. The genus *Pelusios,* also of Africa and Madagascar, includes several lake- and river-dwelling turtles characterized by a hinged section on the front of the lower shell. This section enables the turtles to close the shell tightly, in much the same way as the northern box turtles. The remaining genus, *Podocnemis,* includes about seven species of large South American river turtles and one freshwater species of Madagascar. The largest member of the genus, the arrau (*P. expansa*), lives in South America and grows to a shell length of about 80 cm (30 inches). Its eggs have long been a source of human food.

sideboard, piece of furniture designed to hold plates, decanters, side dishes, and other accessories for a meal and frequently containing cupboards and drawers. When the word first appeared in the Middle Ages as an alternative to "side table," it described a stepped structure used (as sideboards often have been) for the display of conspicuously valuable eating utensils. It preserved a basic table shape (sometimes with eight legs) until the 18th century. The first innovation was the substitution of hollow storage pedestals. Drawers (for napkins, cutlery, and the like) were added in the space beneath the main surface and between the pedestals. A serpentine front was popular in the latter half of the 18th century; other additions consisted of a marble top and a brass rail at the back, partly for protecting the wall, partly for propping up large plates and similar objects. In some examples a wine cooler is incorporated into the main structure of the sideboard, and there were often spaces for chamber pots.



Mahogany sideboard with satinwood inlays, *c.* 1790; in the Art Institute of Chicago

By courtesy of the Art Institute of Chicago

In the early 19th century sideboards became an established part of mass-produced dining room suites, and they themselves became much heavier in design. The whole of the lower section was divided into cupboards extending to the floor. The metal rails at the back were supplanted by massive panels, usually ornate in design, and the whole piece was covered in carvings. Elaborate fantasies of design often converted the sideboard into a replica of a medieval cathedral or something equally improbable. The sideboard still retains its function in the 20th century, but stylistically there has been a reversion to simpler types, closer in feeling to 18th-century designs.

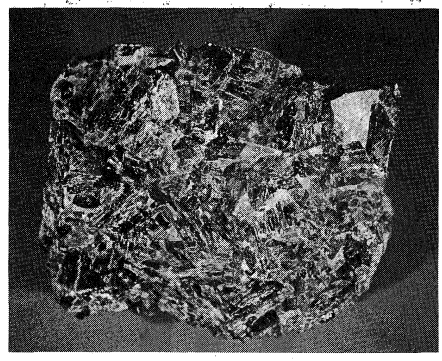
sidecar (carriage): *see* jaunting car.

sidereal period, the time required for a celestial body within the solar system to complete one revolution with respect to the fixed stars—*i.e.,* as observed from some fixed point outside the system. The sidereal period of a planet can be calculated if its synodic period (the time for it to return to the same position relative to the Sun and Earth) is known; the sidereal period of the Moon or an artificial satellite of Earth is the time needed for it to return to the same position against the background of stars. *See also* synodic period.

sidereal time, time as measured by the apparent motion about the Earth of the distant, so-called fixed, stars, as distinguished from solar time, which corresponds to the apparent motion of the Sun. The primary unit of sidereal time is the sidereal day, which is subdivided into 24 sidereal hours, 1,440 sidereal minutes, and 86,400 sidereal seconds. Astronomers rely on sidereal clocks because any given star will transit the same meridian at the same sidereal time throughout the year. The sidereal day is almost 4 minutes shorter than the mean solar day of 24 of the hours shown by ordinary timepieces.

Sidereal time may be defined for any place on the Earth, but in the international system used by astronomers each sidereal day begins at the instant the vernal equinox transits the prime meridian. The vernal equinox is the point on the celestial sphere at which the Sun crosses the plane of the Equator, moving from south to north.

siderite, also called CHALYBITE, iron carbonate ($FeCO_3$), a widespread mineral that is an ore of iron. The mineral commonly occurs in thin beds with shales, clay, or coal seams (as sedimentary deposits) and in hydrothermal metallic veins (as gangue, or waste rock). Manganese (Mn), magnesium (Mg), and calcium generally substitute in part for iron; siderite forms a complete solid-solution (chemical replacement) series with magnesite ($MgCO_3$), another with rhodochrosite ($MnCO_3$), and an incomplete one with ferroan calcite. For de-



Siderite from Ivigtut, Greenland

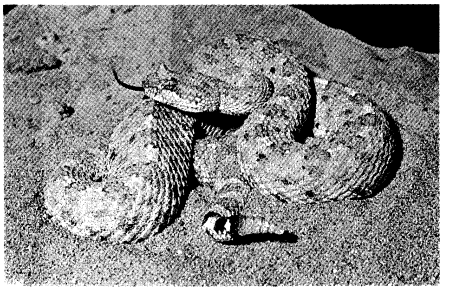
B.M. Shaub

tailed physical properties, *see* carbonate mineral (table).

siderophilin (biochemistry): *see* transferrin.

siderostat, any of a class of astronomical instruments consisting of a flat mirror that is turned slowly by a motor to reflect a given region of the sky continuously into a fixed telescope. In the traditional siderostat, the mirror is rotated by a lever arm connected to a motor that turns at a rate of one revolution every 24 hours. This so-called Foucault siderostat provides a fixed but rotating image. In recent years the Foucault siderostat has been largely supplanted by the heliostat (*q.v.*), which is a polar siderostat, and by the coelostat (*q.v.*).

sidewinder, also called HORNED RATTLESNAKE (*Crotalus cerastes*), small, nocturnal snake of the family Viperidae, found in sandy deserts of Mexico and the southwestern United States. The sidewinder is about 45 to

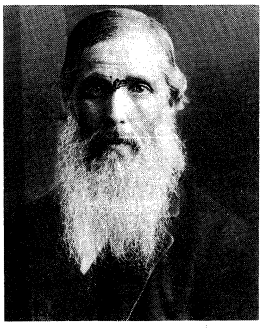


Sidewinder (*Crotalus cerastes*)
Anthony Mercieca from Root Resources—EB Inc.

75 cm (18 to 30 inches) long. It has hornlike scales above its eyes and is coloured pale tan, pinkish, or gray; it also has an inconspicuous spotted pattern on the back and sides.

The sidewinder is noted for its unusual method of locomotion, looping itself obliquely across the sand, leaving a characteristic j-shaped trail. It is venomous, but the bite is usually not fatal to humans.

Sidgwick, Henry (b. May 31, 1838, Skipton, Yorkshire, Eng.—d. Aug. 29, 1900, Cambridge, Cambridgeshire), English philosopher and author remembered for his forthright ethical theory based on Utilitarianism and his



Henry Sidgwick
BBC Hulton Picture Library

Methods of Ethics (1874), considered by some critics as the most significant ethical work in English in the 19th century.

In 1859 Sidgwick was elected a fellow at Trinity College, Cambridge, and later was made a lecturer in classics, a position he exchanged for one in moral philosophy in 1869. He was appointed praelector in 1875, and in 1883 he became Knightbridge professor of moral philosophy. He was active in promoting higher education for women, primarily through founding Newnham College, Cambridge (1871), of which his wife, Eleanor Balfour, became principal in 1892. A member of the Metaphysical Society, he was also interested in psychical phenomena and was a founder and first president of the Society for Psychical Research in 1882.

In philosophy Sidgwick followed the Utilitarianism of John Stuart Mill (1806–73) and adopted the ethical principle known as the categorical imperative from Immanuel Kant (1724–1804). He drew on the views of both men for his first and major work, *The Methods of Ethics.* By a method, Sidgwick meant the rational process of arriving at a means of making ethical decisions. All possible attempts at method, he believed, could be summarized by three approaches: egoism, Utilitarianism, and intuitionism. Egoism refers to the theory that justifies an action in terms of the happiness it produces in the agent of the act. Utilitarianism seeks to contribute to the happiness of all persons affected by the act. Intuitionism indicates that ends other than happiness might be acceptable, and that guidelines other than those that promote happiness might be suitable means to an end. Sidgwick argued that neither the first nor the last could, by itself, supply an adequate basis for rational conduct. Instead he proposed a system of "universalistic hedonism," which, in a manner parallel to Kant's categorical imperative, sought to reconcile the apparent conflict between the pleasure of self and that of others.

Sidgwick's other writings include *Principles of Political Economy* (1883); *The Scope and Method of Economic Science* (1885); *Elements of Politics* (1891); and *The Development of European Polity* (1903).

Sidgwick, Nevil Vincent (b. May 8, 1873, Oxford—d. March 15, 1952, Oxford), English chemist who contributed to the understanding of chemical bonding, especially in coordination compounds.

Sidgwick's work in organic nitrogen compounds, presented in his *Organic Chemistry of Nitrogen* (1910), was of enduring value. With Sir Ernest Rutherford he developed an interest in the forces that hold molecules together. After World War I he advanced the idea of the hydrogen bond to explain the behaviour of some organic molecules. During the 1920s he extended Gilbert N. Lewis' concept of electron sharing in covalent bonds and expressed the idea that one atom could donate a pair of electrons to another atom and thereby form a "coordinate link." Among his writings was the two-volume *Chemical Elements and Their Compounds* (1950).

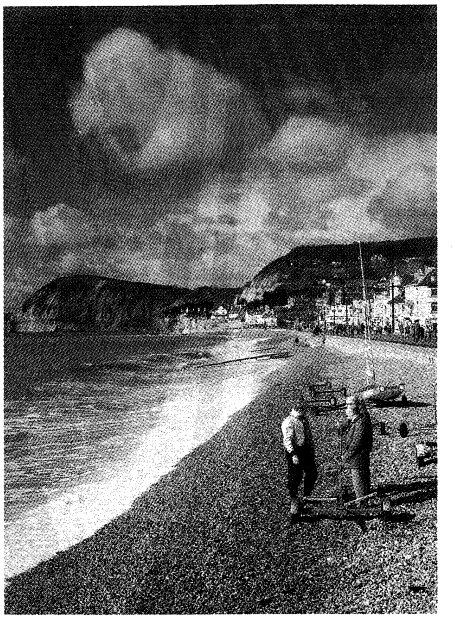
Sidi bel Abbès, town, northwestern Algeria, on the Wadi Mekerra in the Tell Atlas. Named for the tomb of the marabout (saint) Sīdī bel ʿAbbāss, it was established as a French military outpost in 1843 and became a planned agricultural town in 1849. Sidi bel Abbès was the headquarters of the Foreign Legion, whose barracks once housed the Legion Museum. After Algerian independence in 1962 all French troops and legionnaires were evacuated from the town, and the Legion Museum was transferred to Aubagne, Fr. The old walls and bastions were demolished in the 1930s and have been replaced by wide boulevards and squares, beyond which are spreading suburbs. Industry includes a farm-machine manufacturing complex. The surrounding area, once swampy, now produces cereals (mainly wheat and barley) and grapes. Pop. (1977) mun., 114,838.

Sidi Muḥammad Ben Yusuf: *see* Muḥammad V.

Siding Spring Observatory: *see* Mount Stromlo and Siding Spring Observatory.

Sidmouth, parish and coastal resort, East Devon district, county of Devon, Eng., 15 miles (24 km) east-southeast of Exeter by road. Lying in a hollow formed by the River Sid, the town is shut in by hills that terminate in the forelands of Salcombe Hill and Peak Hill, two sheer sandstone cliffs of deep red colour. The beach, on Lyme Bay on the English Channel, is pebbly, with sand at low tide.

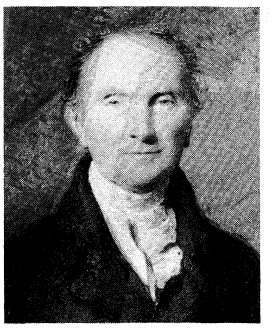
Traces of a Bronze Age camp have been found in the area. Tradition tells of an old town buried under the sea, and Roman coins



The shoreline of Lyme Bay, at Sidmouth, looking west toward Peak Hill
A.F. Kersting

and other remains have been washed up on the beach. In the 13th century Sidmouth was a borough governed by a port-reeve. Many of the fine Georgian houses and terraces now standing were built during the Regency period (1811–20), when the town first became a fashionable resort. Queen Victoria lived at Woolbrook Cottage (now Royal Glen Hotel) as a baby, and her father, the duke of Kent, died there in 1820. An esplanade is built along the sea wall, and the town possesses golf links and other recreation grounds. Norman Lockyer Observatory, belonging to the University of Exeter, is on Salcombe Hill. Pop. (1981) 12,484.

Sidmouth (of Sidmouth), Henry Addington, 1st Viscount (b. May 30, 1757, London—d. Feb. 15, 1844, Richmond, Surrey, Eng.), British prime minister from March 1801 to May 1804. Honest but unimaginative and inflexibly conservative, he proved unable



Sidmouth, detail of a watercolour by G. Richmond, 1833; in the National Portrait Gallery, London
By courtesy of the National Portrait Gallery, London

to cope with the problems of the Napoleonic Wars, and later, in his decade as home secretary, he made himself unpopular by his harsh measures against political and economic malcontents.

The son of a prominent physician who treated the Earl of Chatham (William Pitt the Elder), Addington was a friend of the younger Pitt from childhood. A member of the House of Commons from 1784, he became its speaker in 1789. The younger Pitt, whose position favouring Roman Catholic emancipation was opposed by King George III, left office on March 14, 1801; and the King chose Addington, an uncompromising Anglican, to replace Pitt as prime minister. The new government benefitted from British victories at Copenhagen, Cairo, and Alexandria, and its popularity was further enhanced by the Treaty of Amiens (signed March 27, 1802) with Napoleonic France. When the war was renewed (May 1803), Addington's incapacity became obvious, and the next year he surrendered the premiership to Pitt. Created Viscount Sidmouth in January 1805, he then served as lord president of the council (1805, 1806–07, 1812) and lord privy seal (1806).

As home secretary in the ministry of the earl of Liverpool, from June 1812 to January 1822, Sidmouth faced general edginess caused by high prices, business failures, and widespread unemployment. To crush demonstrations both by manufacturers and by Luddites (anti-industrial machine-smashing radicals) he increased the summary powers of magistrates. At his insistence the Habeas Corpus Act was suspended in 1817, and he introduced four of the coercive Six Acts of 1819, which, among other provisions, limited the rights of the people to hold public meetings and to circulate political literature.

After leaving office Sidmouth unsuccessfully opposed British recognition of the South American republics (1824), the Catholic Emancipation Act (1829), and the parliamentary Reform Act (1832).

Sidney, Algernon (b. 1622, Penshurst Place, Kent, Eng.—d. Dec. 7, 1683, London), English Whig politician executed for allegedly plotting to overthrow the government of King Charles II (ruled 1660–85). His guilt was never



Algernon Sidney, detail of an oil painting after J. van Egmont, 18th century; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

conclusively proved, and Whig tradition regarded him as a great republican martyr.

A descendant of the 16th-century poet Sir Philip Sidney, Algernon became a cavalry officer on the Parliamentary side in the English Civil War and was seriously wounded at the Battle of Marston Moor, Yorkshire, in July 1644. His refusal to serve as a commissioner in the trial of King Charles I angered Oliver Cromwell. Although Sidney sat on the Council of State of the Commonwealth in 1652, he withdrew from politics during the Protectorate (1653–59); he went into exile upon the Restoration of King Charles II in 1660.

At least once during his long residence on the Continent, Sidney applied to King Louis XIV of France for funds to finance an uprising in England. Nevertheless, in 1677 he was allowed to return to England on personal business. He was quickly drawn into the party—soon to be called the Whig Party—that opposed Charles II and his Roman Catholic brother James, duke of York, and in 1679–80 he accepted bribes from the French ambassador to encourage opposition to the English king. Sidney's relationship with the group that devised the Rye House Plot (1683) to assassinate Charles and James is not clear, but he was arrested as an accomplice in the scheme on June 26, 1683, tried, and sentenced to be beheaded. At his trial, passages from the manuscript of his *Discourses Concerning Government* (published in 1698) were introduced as evidence that he believed in the right of revolution. Although the treatise later became a popular "textbook of revolution" in the North American colonies, Sidney expressed in it a preference for a limited monarchy rather than a true republic. He also believed that political power is determined by the balance of property.

Sidney, Henry: *see* Romney, Henry Sidney, earl of.

Sidney, Sir Henry (b. July 20, 1529, probably London—d. May 5, 1586, Ludlow, Shropshire, Eng.), English lord deputy of Ireland from 1565 to 1571 and from 1575 to 1578 who cautiously implemented Queen Elizabeth I's policy of imposing English laws and customs on the Irish.



Sir Henry Sidney, painting by an unknown artist, 1573; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

His father, Sir William Sidney, was a courtier to King Henry VIII. Sidney became a favourite of young king Edward VI and in 1550 he was knighted. From 1556 to 1559 he was vice treasurer of Ireland under his brother-in-law, the lord deputy Thomas Radcliffe (later 3rd earl of Sussex).

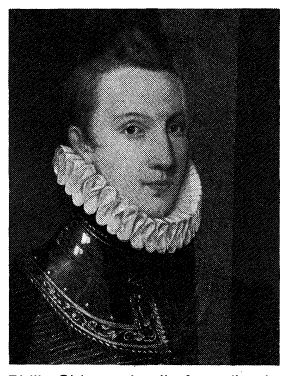
Appointed lord deputy by Elizabeth in 1565, Sidney faced a major rebellion in Ulster led by the powerful chieftain Shane O'Neill. Failing to subdue O'Neill by force, Sidney intrigued against him with his enemies, the O'Donnells of Tyrconnell and the MacDonnells of Antrim. Finally, O'Neill was assassinated by the MacDonnells in 1567. Nevertheless, Sidney was still not strong enough to destroy completely the power of Ulster's native chieftains. He did, however, persuade a number of Irish chiefs to submit to Elizabeth's authority, and he established English presidents of Munster and Connaught to control the chiefs. In addition, by refraining from introducing anti-Roman Catholic legislation in the Parliament of Ireland of 1569–71, Sidney made possible the containment and ultimate defeat (1573) of a rebellion of Munster Catholics led by James Fitzmaurice Fitzgerald.

Resenting the Queen's failure to provide him with an adequate military force, Sidney resigned in 1571, but he was reappointed lord deputy four years later. His arbitrary taxation aroused popular resentment and led to his recall in 1578. Thereafter he served only as president of the Council of Wales and of the Marches.

Sidney, Sir Philip (b. Nov. 30, 1554, Penshurst, Kent, Eng.—d. Oct. 17, 1586, Arnhem, Neth.), Elizabethan courtier, statesman, soldier, poet, and patron of scholars and poets, considered the ideal gentleman of his day. After Shakespeare's sonnets, Sidney's *Astrophel and Stella* is considered the finest Elizabethan sonnet cycle. His *The Defence of Poesie* introduced the critical ideas of Renaissance theorists to England.

Philip Sidney was the eldest son of Sir Henry Sidney and his wife, Lady Mary Dudley, daughter of the Duke of Northumberland, and godson of King Philip II of Spain. After Elizabeth I succeeded to the throne, his father was appointed lord president of Wales (and later served three times as lord deputy of Ireland), while his uncle, Robert Dudley, was created earl of Leicester and became the Queen's most trusted adviser. In keeping with such a family background, the young Sidney was intended for a career as a statesman and soldier. At the age of 10 he entered Shrewsbury School, where his classmate was Fulke Greville (later a court official under Elizabeth), who became his lifelong friend and was his early biographer. In February 1568 he began a three-year period of studies at Christ Church, Oxford, afterward travelling in Europe, between May 1572 and June 1575, perfecting his knowledge of Latin, French, and Italian. He also gained firsthand knowledge of European politics and became acquainted with many of Europe's leading statesmen.

His first court appointment came in the spring of 1576, when he succeeded his father as cupbearer to the Queen, a ceremonial position. Then in February 1577, when he was only 22, he was sent as ambassador to the German emperor Rudolf II and the elector palatine Louis VI, carrying Queen Elizabeth's condolences on the deaths of their fathers. But along with this formal task, he also had secret instructions to sound out the German princes on their attitude toward the formation of a Protestant league—the chief political aim being to protect England by associating it with other Protestant states in Europe that would counterbalance the threatening power of Roman Catholic Spain. Sidney apparently brought back enthusiastic reports on the possibilities of forming such a league, but the cautious queen sent other emissaries to check on his reports, and they returned with less optimistic accounts of the German princes'



Philip Sidney, detail of an oil painting, 1576; in the Warwick Castle Collection

By courtesy of the trustees of the Warwick Castle Resettlement; photograph, Courtauld Institute of Art, London

reliability as allies. He did not receive another major official appointment until eight years later.

He, nevertheless, continued to busy himself in the politics and diplomacy of his country. In 1579 he wrote privately to the Queen advising her against a proposal that she enter into a marriage with the Duke of Anjou, the Roman Catholic heir to the French throne. Sidney, moreover, was a member of Parliament for Kent in 1581 and 1584–85. He corresponded with foreign statesmen and entertained important visitors—including the French Protestant envoy Philippe de Mornay in 1577, the German Calvinist prince Casimir in 1578, the Portuguese pretender Dom Antônio in 1581, and later a number of Scottish lords. Sidney was among the few Englishmen of his time with any interest in the newly discovered Americas, and he supported maritime explorations by the navigator Sir Martin Frobisher. In 1582 Richard Hakluyt, who published accounts of English explorers' enterprises, dedicated his *Divers voyages, touching the discoverie of America* to him. Sidney later became interested in the project to establish the American colony of Virginia, sent out by Sir Walter Raleigh, and he intended to set out himself in an expedition with Sir Francis Drake against the Spaniards. He had wide-ranging intellectual and artistic interests, discussed art with the painter Nicholas Hilliard and chemistry with the scientist John Dee, and was a great patron of scholars and men of letters. More than 40 works by English and European authors were dedicated to him—works of divinity, ancient and modern history, geography, military affairs, law, logic, medicine, and poetry—indicating the breadth of his interests. Among the many poets and prose writers who sought his patronage were Edmund Spenser, Thomas Watson, Abraham Fraunce, and Thomas Lodge.

Sidney was an excellent horseman and became renowned for his participation in tournaments—elaborate entertainments, half athletic contest and half symbolic spectacle, that were a chief amusement of the court. He hankered after a life of heroic action, but his official activities were largely ceremonial—attending on the Queen at court and accompanying her on her progresses about the country. In January 1583 he was knighted, not because of any outstanding accomplishment but in order to give him the qualifications needed to stand in for his friend Prince Casimir, who was to receive the honour of admittance to the Order of the Garter but was unable to attend the ceremony. In September he married Frances, daughter of Queen Elizabeth's secretary of state, Sir Francis Walsingham. They had one daughter, Elizabeth.

Because the Queen would not give him an important post, he had turned to literature as an outlet for his energies. In 1578 he composed a pastoral playlet, *The Lady of May,* for the Queen. By 1580 he had completed a version of his heroic prose romance, the *Arcadia.* It is typical of his gentlemanly air of assumed nonchalance that he should call it "a trifle, and that triflingly handled," whereas it is in fact an intricately plotted narrative of 180,000 words.

Early in 1581 his aunt, the countess of Huntington, had brought to court her ward, Penelope Devereux, who later that year married the young Lord Rich. Some time afterward Sidney fell in love with her, and during the summer of 1582 he composed a sonnet sequence, *Astrophel and Stella,* recounting the first stirrings of his passion, his struggles against it, and his final abandonment of his suit to give himself instead to the "great cause" of public service. These sonnets, witty and impassioned, brought Elizabethan poetry at once of age. About the same time he wrote his *Defence of Poesie,* an urbane and eloquent plea for the social value of imaginative fiction, which remains the finest work of Elizabethan literary criticism. In 1584 he began a radical revision of his *Arcadia,* transforming its linear dramatic plot into a many-stranded, interlaced narrative. He left it half finished, but it remains the most important work of prose fiction in English of the 16th century. He also composed other poems and later began a paraphrase of the Psalms. He wrote for his own amusement and for that of his close friends; true to the gentlemanly code of avoiding commercialism, he did not allow his writings to be published in his lifetime.

The incomplete revised version of his *Arcadia* was not printed until 1590; in 1593 another edition completed the story by adding the last three books of his original version (the complete text of the original version remained in manuscript until 1926). His *Astrophel and Stella* was printed in 1591 in a corrupt text, his *Defence of Poesie* in 1595, and a collected edition of his works in 1598, reprinted in 1599 and nine times during the 17th century.

Although in July 1585 he finally received his eagerly awaited public appointment, his writings were to be his most lasting accomplishment. He was appointed, with his uncle, the Earl of Warwick, as joint master of the ordnance, an office that administered the military supplies of the kingdom. In November the Queen was finally persuaded to assist the struggle of the Dutch against their Spanish masters, sending them a force led by the Earl of Leicester. Sidney was made governor of the town of Flushing and was given command of a company of cavalry. But the following 11 months were spent in ineffective campaigns against the Spaniards, while Sidney was hard put to maintain the morale of his poorly paid troops. He wrote to his father-in-law that if the Queen did not pay her soldiers she would lose her garrisons but that for himself the love of the cause would never make him weary of his resolution, because he thought "a wise and constant man ought never to grieve while he doth play his own part truly, though others be out."

On Sept. 22, 1586, he volunteered to serve in an action to prevent the Spaniards from sending supplies into the town of Zutphen. The supply train was heavily guarded, and the English were outnumbered; but Sidney charged three times through the enemy lines, and, even though his thigh was shattered by a bullet, he rode his horse from the field. He was carried to Arnhem, where his wound became infected, and he prepared himself religiously for death. In his last hours he confessed:

> There came to my remembrance a vanity wherein I had taken delight, whereof I had not rid myself. It was the Lady Rich. But I rid myself of it, and presently my joy and comfort returned.

He was buried at St. Paul's Cathedral in London on Feb. 16, 1587, with an elaborate funeral of a type usually reserved for great noblemen. The universities of Oxford and Cambridge and scholars throughout Europe issued memorial volumes in his honour, while almost every English poet composed verses in his praise. He won this adulation even though he had accomplished no action of consequence—it would be possible to write a history of Elizabethan political and military affairs without so much as mentioning his name. It is not what he did but what he was that made him so widely admired: the embodiment of the Elizabethan ideal of gentlemanly virtue.

(W.A.Ri.)

MAJOR WORKS. *The Countesse of Pembrokes Arcadia* (1590, consisting of the revised books i, ii, and part of iii; 2nd ed., "augmented and ended," 1593, adds original books iii–v; 3rd ed., 1598, also includes *Certaine Sonets* and *The Lady of May*); *Syr P.S. His Astrophel and Stella* (1591), an unauthorized corrupt text; a slightly corrected edition of the same year; a better text also contained in the 1598 edition of the *Arcadia; The Defence of Poesie* (1595; another edition, of the same year, entitled *An Apologie for Poetrie*); *The Psalmes of David* (first printed 1823—only the first 43 by Sidney, the rest by his sister).

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Sidney, Robert: *see* Leicester, Robert Sidney, 1st earl of.

Sidon, Arabic ṢAYDĀ, also spelled SAIDA, or SAYIDA, ancient city on the Mediterranean coast of Lebanon and the administrative centre of al-Janūb (South Lebanon) *muḥāfaẓah* (governorate). A fishing, trade, and market centre for an agricultural hinterland, it has also served as the Mediterranean terminus of the Trans-Arabian Pipeline, 1,069 mi (1,720 km) long, from Saudi Arabia, and the site of large oil-storage tanks.

Sidon, one of the oldest Phoenician cities, was founded in the 3rd millenium BC and became prosperous in the 2nd. It is frequently mentioned in the works of the Greek poet Homer and in the Old Testament; and it was ruled in turn by Assyria, Babylonia, Persia, Alexander the Great, the Seleucids of Syria, the Ptolemaic dynasty of Egypt, and the Romans. At that time Sidon was famous for its purple dyes and glassware. Herod I the Great embellished the city, and Jesus visited it. During the Crusades, Sidon changed hands several times and was destroyed and rebuilt. Under Ottoman rule, it flourished almost continuously for 400 years from the year 1517, especially in the 17th century under Fakhr ad-Dīn II, a semi-independent Druze *amīr.* The French developed Sidon as the port for Damascus; in 1791, however, the Ottoman governor of Lebanon, Aḥmad al-Jazzār, drove the French merchants from its gates, thereby largely killing its trade. In 1837 the city was ravaged by an earthquake but was rebuilt.

A large necropolis has yielded numerous sarcophagi (stone coffins), including those of two Sidonian kings of the Phoenician period, Eshmunazar and Tennes, and the famous Alexander sarcophagus, depicting battle and hunting scenes, now at Istanbul. Other ruins include two crusader castles and the Phoenician Temple of Eshmun (Eachmoun).

A highway and railroad connect Sidon with Beirut, 25 mi north. The city has a sizable Christian (Maronite) community. Many residents are Palestinian refugees. Pop. (1982 est.) 80,000.

Ṣidqī, Bakr (b. 1890, Kirkūk, Iraq—d. Aug. 12, 1937, Mosul), Iraqi general.

Ṣidqī joined the Turkish army at age 18 but was already an ardent Arab nationalist who championed the cause of the Arabs against the Turks. He was named general by King Faysal I and put down tribal rebellions in 1933 (resulting in a massacre of Assyrian tribesmen), 1935, and 1936. As chief of the "National Reform Force" he directed a coup against the civilian cabinet on Oct. 29, 1936.

Although Ṣidqī was the chief support of the new government of Ḥikmat Sulaymān and was accused of having dictatorial ambitions, he was not interested in practical politics and devoted himself to reorganizing the army along the lines of that of Kemalist Turkey.

He was assassinated by an anti-administration soldier.

sidra, also spelled SIDRAH or SEDRA (Hebrew: "order," "arrangement"), plural SIDROT, SIDROTH, SEDROT, or SEDROTH, in Judaism, weekly readings from the Scriptures as part of the sabbath service. Each week a portion, or *sidra*, of the Pentateuch is read aloud in the synagogue; and it takes a full year to complete the reading.

The Pentateuch—consisting of the biblical books of Genesis, Exodus, Leviticus, Numbers, and Deuteronomy and known as the Torah—is the basis of Jewish history and religious beliefs and spells out the laws of the Jewish people. At one time public reading of the Torah was limited to festival days but was extended to all sabbath services in the third century BCE in order to make the laws of Jewish life accessible to all.

In early Palestine the complete reading of the Torah took three or three and a half years; but during the Babylonian Exile the time was shortened to one year, and this custom continues to be followed. Each week the *sidra*, or weekly portion, is divided into seven smaller sections, each dealing with a single topic. The name for each of these seven parts is *parasha* (plural *parashot*), the Hebrew word for "section." A different person is called to the altar to read each of the *parashot*, and this is considered an honour for the reader.

Sidra, Gulf of, Arabic KHALĪJ SURT, Italian GOLFO DELLA SIRTE, historically SYRTIS MAJOR, arm of the Mediterranean Sea, indenting the Libyan coast, northern Africa. It extends eastward for 275 mi (443 km), from Miṣrātah to Banghāzī. A highway links scattered oases along its shore, which is chiefly desert, with salt marshes. In August, the gulf's water temperature reaches 88° F (31° C), the warmest in the Mediterranean. The gulf is important for tuna (tunny) fishing and sponges; and the main port is Surt—a starting point of many Saharan caravan routes. Salt flats are scattered along the coast. During World War II, the gulf was the scene of the Battle of Sirte (March 1942), in which a British naval convoy thwarted attacks from Italian warships and German bombers.

SIDS: *see* sudden infant death syndrome.

Siebenbürger rug: *see* Transylvanian rug.

Siebengebirge, English SEVEN HILLS, cluster of hills southeast of Bonn, Germany. Volcanic in origin and actually about 40 in number, they rise on the right bank of the Rhine between Königswinter and the Cologne–Frankfurt am Main Autobahn. A popular tourist resort area and nature reserve, the hills form the northwestern part of the Westerwald region. The seven principal hills seen from Bonn, whence the name, are: Drachenfels (1,053 feet [321 m]), reached by rack railway from Königswinter and surmounted by a ruined castle; Wolkenburg (1,066 feet); Petersberg (1,086 feet), with a motor road to the summit hotel that was the seat (1945–52) of the tripartite Allied High Commission; and, to the south, Grosser Ölberg (1,509 feet), the highest of the group; Löwenburg (1,493 feet); Lohrberg (1,427 feet); and Nonnenstromberg (1,101 feet). Quarries yield basalt for paving and for building (*e.g.*, the Cologne and Limburg an der Lahn cathedrals). On the lower slopes behind Königswinter (King's Vineyards) are some of the northernmost vineyards in Europe.

Siebold, Carl Theodor Ernst von (b. Feb. 16, 1804, Würzburg, Ger.—d. April 7, 1885, Munich), German zoologist who specialized in invertebrate research and contributed significantly to the development of parasitology. Born in a family of biologists, Siebold studied at Berlin and Göttingen and practiced medicine briefly. Largely for his scientific writings, he was made professor of anatomy and physiology at Erlangen; later he held professorial positions at Freiburg, Breslau, and Munich. He founded the *Zeitschrift für wissenschaftliche Zoologie* ("Journal of Scientific Zoology"), which became one of the foremost periodicals for biological research. Siebold did the work on invertebrates and Friedrich Hermann Stannius did the work on vertebrates, in the book on which they collaborated, *Lehrbuch der vergleichenden Anatomie* (1846; "Textbook of Comparative Anatomy"), one of the first important texts in comparative anatomy. The book was notable in being based on solid, factual observation and in being a departure from the philosophical presentations common in the earlier years of the century. Siebold also did important work in parasitology; he was one of the first to make practical use of the newly developed idea that the stages in the life cycle of a parasite alternate between its hosts.

Siedlce, *województwo* (province), east central Poland. Created in 1975 from parts of Warsaw and Lublin provinces, Siedlce province occupies an area of 3,281 sq mi (8,499 sq km) and is drained by the Bug, Liwiec, and Swider rivers, all tributary to the Vistula. It is bounded by the provinces of Ostrołęka, Łomża, and Białystok on the north, Biała Podlaska on the east, Lublin and Radom on the south, and Warsaw on the west. Important industrial centres within the province include Siedlce (the provincial capital), Łuków, Łochów, and Mińsk Mazowiecki. The province's industries include the manufacture of agricultural and industrial machinery, textile milling, and food processing. Agriculture (grains, potatoes, sugar beets), the production of building materials, and porcelain and glass making are also economically important.

Siedlce city was first chronicled in 1448 as a settlement on the crossroads of several trade routes and received municipal rights in 1547. The city did not prosper until the mid-18th century, when its rulers, the Ogiński family, built a Neoclassical palace there. It passed to Austria in 1795 and was returned to Poland in 1918. Pop. (1982 est.) 620,400.

Siedlce, city, capital of Siedlce *województwo* (province), east central Poland. It is an economic centre for the southeastern section of the province, with food processing, textile milling, and toy production. It lies on the Warsaw–Moscow road and rail line.

Siedlce was first chronicled in 1448 as a settlement on the crossroads of several trade routes and received municipal rights in 1547, though it did not prosper until the mid-18th century. At that time the town's owners, the wealthy Ogiński family, built a Neoclassical palace there. Siedlce passed to Austria in 1795 and was returned to Poland in 1918. During World War II, five Nazi concentration camps were located there. Pop. (1982 est.) 57,800.

Siegbahn, Kai Manne Börje (b. April 20, 1918, Lund, Swed.), Swedish physicist, co-recipient with Nicolaas Bloembergen and Arthur Leonard Schawlow of the United States of the Nobel Prize for Physics for their revolutionary work in spectroscopy, particularly the spectroscopic analysis of the interaction of electromagnetic radiation with matter.

Siegbahn was the son of Karl Manne Siegbahn, who received the Nobel Prize for Physics in 1924 for his discoveries relating to X-ray spectroscopy. Kai was awarded his Ph.D. in physics by the University of Stockholm in 1944. In 1951 he was appointed professor at the Royal Institute of Technology in Stockholm, and in 1954 he moved to the University of Uppsala.

In his prize-winning work, Siegbahn formulated the principles underlying the technique called ESCA (electron spectroscopy for chemical analysis) and refined the instruments used in carrying it out. ESCA depends on a fundamental phenomenon, the photoelectric effect, which is the emission of electrons that occurs when electromagnetic radiation strikes a material. During the 1970s ESCA was adopted all over the world for analyzing materials, including the particles in polluted air and the surfaces of solid catalysts used in petroleum refining.

Siegbahn, (Karl) Manne (Georg) (b. Dec. 3, 1886, Örebro, Swed.—d. Sept. 26, 1978, Stockholm), Swedish physicist awarded the Nobel Prize for Physics in 1924 for his discoveries and investigations in X-ray spectroscopy.

In 1916 Siegbahn discovered a new group of wavelengths, the M-series, in X-ray emission spectra. He developed equipment and techniques that allowed him and subsequent researchers to determine accurately the wavelengths of X-rays. A year after he became professor of physics at Uppsala University, he and his colleagues furnished proof (1924) that X-rays are refracted (bent) when they pass through prisms, just as light rays are, though the effect is weaker and obscured by absorption of the X-rays. Later, Siegbahn also investigated the weaker X-rays that lie near the ultraviolet region of the spectrum.

In 1937 Siegbahn became professor of physics at the University of Stockholm. In the same year the Swedish Royal Academy of Sciences created the Nobel Institute of Physics, at Stockholm, and appointed Siegbahn director; he retired from that position in 1975. He served as a member of the International Committee on Weights and Measures from 1939 until 1964.

Siege of ———: *see under* substantive word (*e.g.*, Khartoum, Siege of).

Siegel, Bugsy, byname of BENJAMIN SIEGEL (b. Feb. 28, 1906, Brooklyn, N.Y., U.S.—d. June 20, 1947, Beverly Hills, Calif.), New York and California gangster who was the U.S. crime syndicate's initial developer of Las Vegas gambling.

Young Siegel began his career extorting money from Jewish pushcart peddlers on New York's Lower East Side; he then teamed up with Meyer Lansky about 1918 and took to car theft and later bootlegging and gambling rackets in New York, New Jersey, and Philadelphia; he and Lansky also ran a murder-for-hire operation, the forerunner of Murder, Inc. In 1931 he was one of the four executioners of Joe "the Boss" Masseria.

In 1937 the syndicate leaders sent him to the West Coast to develop rackets there. In California the handsome gangster successfully developed gambling dens, gambling ships (offshore beyond the 12-mile limit), narcotics smuggling, blackmail, and other illegal enterprises and equally successfully cultivated the company and friendship of Hollywood stars and celebrities. He developed a nationwide bookmakers' wire service and in 1945 began realizing his dream of a gambling oasis in the desert northeast of Los Angeles. In that year he built the Flamingo Hotel and Casino in Las Vegas, Nev., originally budgeted at $1,500,000 but costing eventually $6,000,000, much of it in syndicate funds from the East. The cost overruns involved extensive "skimming" by Siegel, who had his girlfriend Virginia Hill deposit the money in European banks; he also began writing bad checks to cover construction costs. Such actions and other duplicities angered Lansky and other eastern bosses. In the late evening of June 20, 1947, Siegel was killed in his palatial Beverly Hills home, brought down by a fusillade of bullets fired through his living-room window. At almost the same moment, three of Lansky's henchmen walked into the Flamingo Hotel in Las Vegas and declared that they were taking over.

Siegen, city, North Rhine-Westphalia *Land* (state), northwestern Germany, on the Sieg River. Its two castles were formerly seats of two branches of the House of Nassau-Siegen. The Lower Castle (former residence of the Protestant branch) has an interesting royal crypt, and the Upper Castle (Catholic branch) accommodates a local museum with a Rubens Gallery, a reproduction of ancient smelting works, and a model coal mine. The late Romanesque 13th-century Nikolaikirche (St. Nicholas Church) is one of the few hexagonal Romanesque churches north of the Alps. The foundations of St. Martin's Church are over 1,000 years old, on the evidence of the mosaic floor. The city is the centre of the rich Siegerland iron ore mining district and has metalworking and machine-building industries. In 1972 a university-level technical institution was founded. The Flemish painter Peter Paul Rubens was born in Siegen in 1577. Pop. (1989 est.) 106,160.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Siegen, Ludwig von, also called LUDWIG VON SECHTEN (b. 1609, Utrecht, Neth.—d. *c.* 1680, Wolfenbüttel, Ger.), German painter, engraver, and the inventor of the mezzotint printing method.

Siegen spent most of his early life in the services of the landgravine Amelia Elizabeth and the landgrave William of Hesse-Kassel. He lived in Amsterdam from 1641 to about 1644, when he was supposedly influenced by Rembrandt. Later he served the Elector of Mainz and the Duke of Brunswick in Wolfenbüttel, where he is mentioned for the last time in 1676.

His earliest dated mezzotint was a portrait of Amelia Elizabeth (1642); in its dedication he claimed the invention of the process, which he described as engraving by dots rather than lines and in which he used a small roulette, a tool with a fine-toothed wheel. Seven known rouletted mezzotint plates by Siegen survive.

Siegenian Stage, division of Devonian marine rocks and time (the Devonian Period began about 408,000,000 years ago and lasted about 48,000,000 years) named for exposures studied in the region of Siegen, Ger. The Siegenian, laid down after the Gedinnian Stage, is characterized by rocks containing fossils of the ammonoid cephalopod genus *Mimosphinctes.* Typically, the Siegenian Stage consists of about 9,000 metres (30,000 feet) of sandstones, graywackes, and shales that are very fossiliferous. Important Siegenian sections occur in central Europe and the U.S.S.R., where the shales and limestones of the Ural region contain faunas similar to those found in western Czechoslovakia. Other important exposures of Siegenian rocks occur in parts of Australia and Japan.

Siegfried, old Norse SIGURD, figure from the heroic literature of the ancient Germanic people. He appears in both German and Old Norse literature, although the versions of his stories told by these two branches of the Germanic tradition do not always agree. In the story of Brunhild (*q.v.*) he meets his death, but in others he is the leading character and triumphs. A feature common to all is his outstanding strength and courage.

One story tells of Siegfried's fight with a dragon, and another of how he acquired a treasure from two brothers who quarrelled over their inheritance. These two stories are combined in the Norse *Poetic Edda* and told in detail, whereas in German literature, where they are told separately, the information is scant and largely contained in allusions.

Siegfried plays a major part in the *Nibelungenlied* (*q.v.*), where this old material is much overlaid with more recent additions. *Das Lied vom hürnen Seyfrid,* not attested before about 1500, still retains the old material, although the poem's central theme is the release of a maiden from a dragon; and an *Edda* poem tells how Sigurd awakened a Valkyrie maiden from a charmed sleep. Here, too, many critics have tried to establish a connection between German and Norse; but besides important differences, there is doubt about the antiquity of both poems.

In the original stories Siegfried was presented as a boy of noble lineage who grew up without parental care; this background shows through clearly, although in the full accounts in both Norse and German it is overlaid with elaborate accounts of his courtly upbringing. As with Brunhild, it is still disputed whether the figure of Siegfried is of mythical or historical (Merovingian) origin.

Siegfried Line, system of pillboxes and strongpoints built along the German western frontier in the 1930s. In 1944 German troops retreating from France found it an effective barrier for a respite against the pursuing Americans, who did not break through it until the spring of 1945.

Siegmund (personal name): *see under* Sigismund.

Siegwart-Müller, Constantin (b. Oct. 10, 1801, Lodrino, Switz.—d. Jan. 13, 1869, Altdorf), Swiss politician who headed the Ultramontane Party at Luzern and became the architect and chief of the dissident Sonderbund.

A lawyer from the canton of Uri, Siegwart-Müller settled in 1832 at Luzern, where he soon rose to the position of state secretary (1834). In 1839 he abandoned the radical party for the clericalist Ultramontanes but subsequently lost his secretarial office in the liberal government. In 1841, on a wave of renascent clericalism, he was elected to the Luzern state council, and by 1844 he had become *Schultheiss* (chief magistrate) and, simultaneously, president of the Diet.

Siegwart-Müller pressed for clericalist objectives—the readmission of the Jesuits to Luzern and the restoration in Aargau of eight monasteries that had been dissolved by the local government—and led the organization of seven Roman Catholic cantons into a secret defensive league, the Sonderbund (December 1845), over which he presided as head of the war council. With the defeat of the league in the internecine Sonderbund War (October–November 1847), he fled the country but was able to return in 1857.

siemens, unit of electrical conductance. In the case of direct current, the conductance in siemens is the reciprocal of the resistance in ohms; in the case of alternating current it is the reciprocal of the impedance in ohms. Another term for the reciprocal of the ohm is the mho ("ohm" spelled backward). It is disputed whether the siemens was named after the German-born electrical engineer and theorist Sir William Siemens (1823–83) or his engineer-inventor brother, Ernst Werner von Siemens (1816–92).

Siemens, (Ernst) Werner von (b. Dec. 13, 1816, Lenthe, Prussia—d. Dec. 6, 1892, Charlottenburg, Berlin), German electrical engineer who played an important role in the development of the telegraph industry.

After attending grammar school at Lübeck, Siemens joined the Prussian artillery at age 17 for the training in engineering that his father could not afford. While in prison briefly at Magdeburg for acting as second in a duel between fellow officers, he carried out chemistry experiments in his cell. These led, in 1842, to his first invention: an electroplating process. The death of his father in 1840 left him responsible for the upbringing of nine younger children; thus he had to supplement his army pay. His appointment in about 1841 to the artillery workshops in Berlin gave him an opportunity to do research, which in turn set the direction of his life's work. When he saw an early model of an electric telegraph, invented by Sir Charles Wheatstone in 1837, he realized at once its possibilities for international communication and invented improvements for it. A specialist on the electric telegraph, he laid an underground line for the army in 1847



Werner von Siemens, drawing by Ismael Gentz, 1887
Interfoto-Friedrich Rauch, Munich

and, at the same time, persuaded a young mechanic named Johann Georg Halske (1814–90) to start a telegraph factory with him in Berlin. In 1848, during hostilities with Denmark at Kiel, he laid a government telegraph line from Berlin to the National Assembly of Frankfurt, and supervised the laying of lines to other parts of Germany. In 1849 he resigned his commission to become a telegraph manufacturer.

The firm of Telegraphenbauanstalt Siemens & Halske prospered rapidly, and in 1852 Werner married Matilda Drumann, a professor's daughter, by whom he had four children. When she died, he married another professor's daughter, by whom he had two more children. Werner and his brother Carl (1829–1906) established subsidiary factories in London, St. Petersburg, Vienna, and Paris. Under Werner's direction, the firm of Siemens & Halske laid cables across the Mediterranean and from Europe to India. Werner's continued research efforts and his inventions in electrical engineering appeared as new products, including in 1866 the self-excited generator, a dynamo that could be set in motion by the residual magnetism of its powerful electromagnet, which replaced the inefficient steel magnet.

In 1866 Siemens was a member of the Prussian Chamber of Deputies and, always a Liberal, voted against the increased military budget. Later (in 1888), he was raised to the rank of nobility (with the addition of *von* to his name) and received many honours.

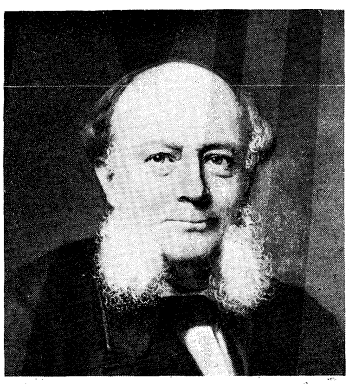
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Siemens, Sir (Charles) William, original name KARL WILHELM SIEMENS (b. April 4, 1823, Lenthe, Prussia—d. Nov. 19, 1883, London), German-born English engineer and inventor, important in the development of the steel and telegraph industries.

After private tutoring Siemens was sent to a commercial school at Lübeck in order to enter his uncle's bank. But his elder brother, Werner Siemens, deciding that engineering was more suitable, sent him to a technical school at Magdeburg for three years. Financed by his uncle, he then studied chemistry, physics, and

mathematics for a year at the University of Göttingen, where his brother-in-law was a professor of chemistry. Through his brother's influence he became an apprentice-student, without fee, in an engineering factory making steam engines in Magdeburg. While there, he determined to sell Werner's electroplating process; after modest success in Hamburg, William traveled to London, arriving in March 1843 with only a few pounds in cash. He sold the process to Elkingtons of Birmingham for £1,600. He returned to Germany to complete his studies and then went again to England in February 1844 with the intention of selling further inventions.

Finding that the patent laws in England were encouraging, William boldly decided to settle there as an inventor, but he found it difficult to make a living until his water meter, invented in 1851, began to earn large royalties. He could now afford an office in London



Sir William Siemens, engraving after a portrait by Rudolf Lehmann

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

and a house in Kensington, where he lived with his younger brothers, Carl (1829–1906) and August Friedrich (1826–1904), until his marriage in 1859 to Anne Gordon, the sister of an engineering professor at the University of Glasgow. The same year he also received British citizenship.

Beginning in 1847, William and his brother Friedrich had attempted to apply to industrial processes the regenerative principle, by which heat escaping with waste gases was captured to heat the air supplied to a furnace, thus increasing efficiency. In 1861 William used this principle in his patent for the open hearth furnace that was heated by gas produced by low-grade coal outside the furnace. This invention, first used in glassmaking, was soon widely applied in steelmaking and eventually supplanted the earlier Bessemer process of 1856. William's achievements were recognized by his membership in the Institution of Civil Engineers in 1860 and by his election as a fellow of the Royal Society in 1862. Tempted by the prospect of profits as well as royalties, he started his own steelworks at Landore, South Wales, in 1869; but, although it flourished for some years, he was losing money by the 1880s.

Meanwhile, he had made yet another reputation and fortune in electric telegraphy. Beginning in 1850, he had acted as English agent for his brother Werner's firm, Siemens & Halske of Berlin, a connection he maintained until 1858, when he became managing partner of the separate London firm founded under the same name; the firm was engaged in electrical testing for cable firms and in the manufacturing of apparatus. The English firm laid, in 1874, the electrical cable from Rio de Janeiro to Montevideo and, in 1875, the first direct link from Britain to the United States.

Thereafter, William worked on electric lighting and electric traction. He invented improvements in arc lights and had them installed in the British Museum and elsewhere. A few months before he died he was responsible for the Portrush electric railway in Northern Ireland. He played a full part in professional life; he acted as president of professional organizations including the British Association for the Advancement of Science, received degrees from various universities and many foreign orders, and was knighted in the year of his death. He left a large fortune but no children.

Siemens AG, German electrical equipment manufacturer formed on Oct. 1, 1966, in the merger of Siemens & Halske AG (founded 1847), Siemens-Schuckertwerke AG (founded 1903), and Siemens-Reiniger-Werke AG (founded 1932). Operating manufacturing outlets in some 35 countries and sales organizations in more than 125 countries, it engages in a wide range of manufacturing and services, with groups for electrical components, computer data systems, power engineering, microwave devices, telegraph and signaling systems, electrical installations, medical engineering, and telecommunications. Headquarters are in Munich.

The first Siemens company, Telegraphen-Bau-Anstalt von Siemens & Halske ("Telegraph Construction Firm of Siemens & Halske"), was founded in Berlin on Oct. 1, 1847, by Werner Siemens (1816–92), his cousin Johann Georg Siemens (1805–79), and Johann Georg Halske (1814–90); its purpose was to build telegraph installations and other electrical equipment. It soon began spreading telegraph lines across Germany, establishing in 1855 a branch in St. Petersburg for Russian lines and in 1858 a branch in London for English lines, the latter headed by Werner's brother William (1823–83). As the firm grew and introduced mass production, Halske, who was less inclined toward expansion, withdrew (1867), leaving control of the company to the four Siemens brothers and their descendants.

Meanwhile, the company's activities were enlarging to include dynamos, cables, telephones, electrical power, electric lighting, and other advances of the later Industrial Revolution. In 1890 it became a limited partnership, the senior partners being Carl Siemens (Werner's brother) and Arnold and Wilhelm Siemens (Werner's sons); in 1897 it became a limited-liability company, Siemens & Halske AG.

In 1903 Siemens & Halske transferred its power engineering activities to a new company, Siemens-Schuckertwerke GmbH (having absorbed a Nürnberg firm, Schuckert & Co.); from 1919 on, the two companies were usually chaired by the same officer, always a member of the Siemens family. In 1932, after seven years of collaboration, an Erlander firm, Reiniger Gebbert & Schall, merged with the Siemens interests to form Siemens-Reiniger-Werke AG, engaged in producing medical diagnostic and therapeutic equipment, especially X-ray machines and electron microscopes.

The House of Siemens, as the companies were collectively called, expanded greatly during the Third Reich (1933–45), all plants running to full capacity during the war and dispersing throughout the country to avoid air strikes in 1943–44. At war's end, Hermann von Siemens (1885–1986), the head of the group, was briefly interned (1946–48), and Siemens officials were charged with recruiting and employing slave labour from captive nations and associating in the construction and operation of the death camp at Auschwitz and the concentration camp at Buchenwald. As much as 90 percent of the companies' plants and equipment in the Soviet-occupied zone of Germany was expropriated. The Western powers also removed and destroyed some facilities until the Cold War sparked Western interest in West Germany's economic reconstruction and cooperation. During the 1950s the House of Siemens gradually expanded its share of the electrical market in Europe and overseas, so that by the 1960s it was again one of the world's largest electrical companies. In 1966 all constituent companies were merged into the newly created Siemens AG.

Siemens–Martin process: *see* open-hearth process.

Siemianowice Śląskie, town, Katowice *województwo* (voivodeship), south-central Poland. It is a northern suburb of Katowice city and is situated in the Górny Śląsk (Upper Silesia) coalfield and industrial district. Local industry includes coal mining, ironworking, the manufacture of such metal products as boilers and hardware, and brewing. The town was known as Laurahütte during World War II after its capture by the Germans. Pop. (1987 est.) 81,600.

Siĕmréab, also spelled SIEM REAP, town, northwestern Kampuchea (Cambodia). It is situated on the Siĕmréab River and is linked to Phnom Penh, the national capital, and neighbouring provinces by a national highway. The town has a national pharmaceutical production centre, a hog-breeding facility, agricultural machinery workshops, a crocodile farm, and an international airport. Nearby, before 1975, there was a school of electrical engineering. Just north of Siĕmréab are 40 square miles (105 square km) of ruins of the premodern Khmer capital, Angkor Thom, as well as the monumental temple complex of Angkor Wat. Pop. (1971 est.) 12,504.

Siena, agricultural centre and capital of the province of Siena, central Italy, in the region of Tuscany (Toscana). It lies about 30 miles (48 km) south of Florence. The city was important in history as a commercial and banking city until surpassed by Florence in the 13th–14th century.

The site of Siena was an Etruscan settlement that later became the Roman city of Sena Julia. This colony disappeared, but the new Siena that later developed flourished under the Lombard kings. In the 12th century it became a self-governing commune. Economic rivalry and territorial conflict with neighbouring Florence, which was anti-imperial, or Guelf, made Siena the centre of pro-imperial Ghibellinism in Tuscany. The Sienese reached the peak of political success on Sept. 4, 1260, when their army crushed the Florentines at Montaperti.

Siena became an important banking centre in the 13th century but was unable to compete with its rival, Florence. The imperial cause declined, and the popes imposed economic sanctions against Siena's Ghibelline merchants. Soon afterward, Siena itself turned Guelf, and the Ghibelline nobility lost its share of power. The city suffered from wars and famines and from the general economic decline that afflicted Italy in the early 14th century, and it was also devastated by outbreaks of the Black Death, which began in 1348. Struggles for power between factions of nobles, merchants, and the people replaced the strife between Guelfs and Ghibellines but did little to give Siena internal stability.

Despite these problems, the Sienese maintained an overall prosperity that enabled them to embellish their city with beautiful churches, palaces, towers, and fountains. In the decades of economic and moral depression following the Black Death, Siena entered an era of heightened religiosity, during which the city produced two renowned saints, Catherine and Bernardino. Siena retained its independence during the 15th century, but economic stagnation continued. In 1487 an exiled aristocrat, Pandolfo Petrucci, seized power and ruled with brutal tyranny through a period of French and Spanish invasions until his death in 1512. His regime was continued by his family until



The Public Palace with the Mangia Tower rising from it on the Piazza del Campo, Siena, Italy
Foto Grassi

1524. After a long and heroic defense, Siena surrendered to the Spaniards in 1555, and two years later Philip II of Spain ceded the city to Florence. In 1861 Siena, together with the rest of Tuscany, was absorbed into the new Kingdom of Italy.

Because Siena's building activity was largely suspended in the 16th century, and because most modern building has taken place outside the city walls, Siena's original character remains unspoiled, and Siena remains essentially a medieval town. The walls and gates enclose a city centre that is composed of narrow, winding streets and old buildings and palaces. The centre of the city is dominated by a large, shell-shaped square called the Piazza del Campo, which is the focus of Siena's civic life. Tourists come to Siena in large numbers to view the Corsa del Palio, the famous horse races of medieval origin that are held twice annually on the Piazza del Campo amid colourful festivities. Standing alongside the square is the massive Public Palace (Palazzo Pubblico; 1297–1310), which is the seat of civil government. The interior of the Public Palace is decorated by works of the great masters of Sienese painting, including the "Maestà" of Simone Martini and frescoes by Ambrogio Lorenzetti. The palace also contains the remains of the Gaia Fountain, which was one of the finest fountains carved by the Sienese sculptor Jacopo della Quercia. To one side of the Public Palace rises the slender, 334-foot (102-metre) bell tower known as the Mangia Tower (1338–48). Among the city's other impressive palaces are those of the Tolomei, Buonsignori, Sansedoni, and Salimbeni.

Siena's great cathedral was begun in the 12th century in the Romanesque style but was transformed in the 13th century into one of the finest examples of Italian Gothic. The walls and columns of the church's interior are covered with black and white marble, and its marble floors have decorative inlays by Domenico Beccafumi. Pinturicchio painted frescoes for the Piccolomini Library, which adjoins the cathedral and which was founded in 1495 by Cardinal Francesco Piccolomini, who later became Pope Pius III. A magnificent baptismal font with bas-reliefs by Jacopo della Quercia, Donatello, and Lorenzo Ghiberti distinguishes the Church of San Giovanni, which serves as the crypt for the cathedral.

Siena produced some of the greatest Italian painters of the 13th and 14th centuries; many masterpieces by Duccio di Buoninsegna, Simone Martini, Pietro and Ambrogio Lorenzetti, and Sassetta are found in Siena's art gallery (in the Buonsignori Palace) as well as in the Public Palace and the Museum of Works of the Duomo. The latter museum also contains Duccio's great "Maestà," which was painted (1308–11) to celebrate the Sienese victory at Montaperti.

Siena was fortunate in escaping damage during World War II, and it now survives as a provincial town of great beauty and charm. It is also an archbishopric. The University of Siena was founded in 1240. The city has some light industry, but it is not on a major national highway or major rail route, although there is a road to Florence. Siena thrives on the visitors attracted by its artistic treasures and medieval monuments. It also serves as a market town for the surrounding agricultural area, which produces cattle, cereal grains, olives, and, above all, wines, its Chianti being perhaps the best known of all Italian wines. Pop. (1987 est.) mun., 59,225; province, 252,715.

Siena, University of, Italian UNIVERSITÀ DEGLI STUDI DI SIENA, coeducational autonomous state institution of higher learning at Siena, in central Italy. Like many other Italian universities, Siena was founded (1240) as a result of a 13th-century migration of students from the University of Bologna, which it emulated as a studium generale, accepting scholars from all parts of Europe and conferring a generally recognized degree. Unlike Bologna and other offshoots of Bologna, however, Siena was not completely controlled by the students; the university masters acted as a board of examiners to license students who intended to teach the arts or medicine. The university's charter was confirmed by Holy Roman Emperor Frederick II in 1248 and by Pope Innocent IV in 1252. In 1859 it became a state institution. The university now has faculties of jurisprudence; medicine and surgery; mathematics, physics, and natural sciences; pharmacy; economics; education; and letters and philosophy.

Sienkiewicz, Henryk (Adam Alexander Pius), pseudonym LITWOS (b. May 5, 1846, Wola Okrzejska, Pol.—d. Nov. 15, 1916, Vevey, Switz.), Polish author of novels which achieved great popularity, and winner of the Nobel Prize for Literature in 1905.

Sienkiewicz studied literature, history, and philology at Warsaw University but left in 1871 without taking a degree. He had begun to publish critical articles in 1869 showing the influence of positivism, a system of philosophy popular in Poland and elsewhere at the time,



Sienkiewicz, detail of an oil painting by Kazimierz Pochwalski, 1890; in the Muzeum Narodowe, Warsaw
By courtesy of the Muzeum Narodowe, Warsaw

emphasizing in particular the achievements of science. His first novel, *Na marne* (*In Vain*), appeared in 1872, and his first short story, "Stary sługa" ("An Old Retainer"), in 1875. He traveled in the United States (1876–78) as special correspondent of the *Gazeta polska* ("Polish Gazette") and, after his return to Poland, via Italy and France, published a number of successful short stories, among them "Janko Muzykant" (1879; "Yanko the Musician"), "Latarnik" (1882; "The Lighthouse-Keeper"), and "Bartek Zwyciezca" (1882; "Bartek the Conqueror"). From 1882 to 1887 he was coeditor of the daily *Słowo*. In 1900, to celebrate the 30th year of his career as a writer, he was presented by the Polish people with the small estate of Oblegorek, near Kielce, where he lived until 1914. During World War I he promoted the cause of Polish independence and organized relief for Polish war victims.

Sienkiewicz's great trilogy of historical novels began to appear in *Słowo* in 1883. It is composed of *Ogniem i mieczem* (1884; *With Fire and Sword*), *Potop* (1886; *The Deluge*), and *Pan Wołodyjowski* (1887–88; *Pan Michael*). Set in the later 17th century, the trilogy describes Poland's struggles against Cossacks, Tatars, Swedes, and Turks, stressing Polish heroism in a vivid style of epic clarity and simplicity. The finest of the three works, *With Fire and Sword,* describes the Poles' attempts to halt the rebellion of the Zaporozhian Cossacks led by Bohdan Khmelnitsky. Sienkiewicz's other novels include the widely translated *Quo Vadis?* (1896), a historical novel set in Rome under Nero, which established Sienkiewicz's international reputation. Although Sienkiewicz's major novels have been criticized for their theatricality and lack of historical accuracy, they display great narrative power and contain vivid characterizations.

Sieradz, *województwo* (province), south-central Poland. Established in 1975, it comprises an area of 1,880 square miles (4,869 square km). It is bordered by the provinces of Konin and Płock on the north, Piotrków Trybunalski and Łódź on the east, Częstochowa on the south, and Kalisz on the west. Created from the western part of former Łódź province, Sieradz is located in the fertile Middle Polish Lowlands and encompasses the rich farmland between the Warta and Ner rivers. The economy is based on agriculture (grains, potatoes, sugar beets), textile manufacturing, lumber milling, and the production of building materials. Numerous health and recreational spas are located in the southwestern forested areas of the province. The province's capital is Sieradz (*q.v.*), one of the oldest settlements in Poland. Other urban centres are Zduńska Wola, Poddębice, Wieluń, and Działoszyn. Pop. (1987 est.) 402,600.

Sieradz, city, capital of Sieradz *województwo* (province), south-central Poland. Sieradz is one of the oldest cities in Poland. About 1025 a fortified township was founded on the present site. Although reinforced in the 14th century, the fortress town was destroyed by Swedish invaders. Surviving examples of 14th-century Baroque and Rococo architecture and art in the city include the Dominican church with a monastery, the Market Square, and the Royal House (Krolewska Kamienica); there is also a regional museum. The urban economy is based on the manufacture of knitted textiles and farm machinery and on food processing. Pop. (1987 est.) 38,200.

Sierra, Gregorio Martínez (Spanish playwright): *see* Martínez Sierra, Gregorio.

Sierra Club, American organization for the conservation of natural resources. Headquarters are in San Francisco.

The Sierra Club was founded in 1892 by a group of Californians who wished to sponsor wilderness outings in "the mountain regions of the Pacific Coast." The naturalist John Muir was its first president (1892–1914) and very soon involved the club in political action to further nature conservation. By the late 20th century the Sierra Club had branches in all 50 U.S. states and was working to educate the public on environmental issues and lobbying local, state, and federal bodies for environmental legislation.

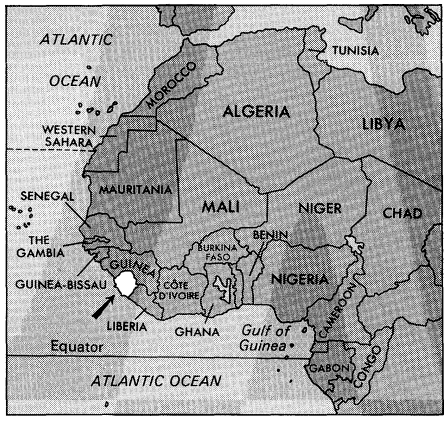
Sierra de Soconusco (Mexico): *see* Sierra Madre de Chiapas.

Sierra Leone, officially REPUBLIC OF SIERRA LEONE, republic of western Africa, covering an area of 27,699 square miles (71,740 square km). The capital is Freetown. Facing the Atlantic Ocean to the west with a coast 210 miles (340 km) long, Sierra Leone is bordered by Guinea to the north and east and Liberia to the southeast. The population in 1990 was estimated at 4,033,000.

A brief treatment of Sierra Leone follows. For full treatment, *see* MACROPAEDIA: Western Africa.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. Sierra Leone has four physical regions: the coastal-swamp region, a flat, low-lying, frequently flooded plain 20 to 40 miles (32 to 64 km) wide; the Sierra Leone Peninsula, the site of Freetown and a region of thickly wooded mountains that rise from coastal swamps to an elevation of 2,913 feet (888 m)



Sierra Leone

at Picket Hill; the interior plains, consisting of featureless grasslands, rolling wooded country, and a variety of landforms ranging from savanna-covered low plains to rocky scarp and hill country; and the plateau region, encompassing roughly the eastern half of the country and including several mountain masses such as the Loma Mountains, crowned by Bintimani Peak at 6,390 feet (the highest peak in the country), and the Tingi Hills, which rise to 6,079 feet (1,853 m) at Sankanbiriwa Peak. Numerous rivers flow in a general northeast-to-southwest direction across Sierra Leone to empty into the Atlantic Ocean.

Sierra Leone has a tropical climate. Temperatures and humidity are high, and normal rainfall is quite heavy. Mean monthly temperatures range from 77° to 83° F (25° to 28° C) in coastal areas; inland the range can be from 73° to 82° F (23° to 28° C). Along the coast where rainfall is the heaviest, especially on the Peninsula Mountains, as much as 200 inches (5,080 mm) may fall annually. The dry season lasts from November to April, and the wet season comprises the remainder of the year, with maximum precipitation from July to September. More than one-fourth of Sierra Leone is forest. Among many valuable timber species are Khaya (African mahogany) and African teak. Large game animals such as elephant, leopard, lion, hyena, and buffalo are rarely seen. Other animal life includes monkey, chimpanzee, tiger cat, porcupine, antelope, crocodile, and many species of birds.

Sierra Leone has some 1,160 square miles (3,000 square km) of forest reserve and about 50 square miles (130 square km) of protected forest. It is self-sufficient in timber. About one-fourth of the land is arable. Almost 30 percent of the total land is permanent pasture. Mineral resources are fairly widespread. Alluvial diamonds occur mainly along the upper Sewa River and have been mined commercially since the 1930s. Other important deposits include iron ore, bauxite, and rutile (titanium dioxide).

The people. There are about 18 ethnic groups in Sierra Leone; the major ones are the Mende and Temne. The Mende, found in the east and south, form the largest group, constituting together with the related Kono, Kuranko, Susu, and Yalunka about one-half of the country's total population. They are closely followed in numbers by the Temne in the north, constituting together with Limba about two-fifths of the population. Minor groups exhibit similar cultural features to the Temne. The Creoles (less than 2 percent of the total population) are descendants of freed slaves who colonized the coast in the 19th century and play an important role in the political and administrative life of the country.

English is the official language. Krio, a language derived from English and a variety of African languages, is the mother tongue of the Creoles and the country's lingua franca. Apart from traditional animist religions, the two main religious groups are Christians and Muslims. The greater proportion of those who recently were animists have joined the Muslims.

Population is dense in the east-central part of the country, but the western capital area has the highest density, largely as a result of immigration to Freetown. Urban population comprises more than one-fourth of the country's total, and the rate of urbanization is increasing.

Sierra Leone's birth rate is about average for western Africa, but, because of its comparatively high death rate, it has one of the lowest rates of population growth on the continent. The population is young, with more than two-fifths younger than 15 years of age.

Economy. Sierra Leone has a developing mixed economy based largely on agriculture and mining. Rising import costs, declining mining industries, and inefficient public administration all contribute to a low rate of economic growth. The gross national product (GNP) is not growing as rapidly as the population; the GNP per capita is among the lowest in the world.

Agriculture accounts for more than one-third of the GNP and employs approximately two-thirds of the work force, largely in subsistence-level farming. The major crops are rice, cassava, millet, and peanuts (groundnuts). Coffee, cacao, and oil palm are the main crops grown for export. Government price-fixing and high taxation on export crops have tended to keep agricultural output low.

Industry, accounting for about one-fifth of the GNP and employing a comparable fraction of the work force, is dominated by mineral production. Mineral exports provide more than one-half of Sierra Leone's foreign-exchange earnings. The diamond industry has been declining in terms of volume since 1970 largely because of heavy taxation, rising fuel costs, and smuggling. Bauxite production, petroleum refining, and recent rutile production are all of increasing importance.

Manufacturing is largely limited to import-substitution industries such as brewing, cigarette making, and flour milling. Electricity is generated primarily by thermal plants that are supplemented by a few small hydroelectric installations.

Services account for about 45 percent of the GNP and employ one-sixth of the work force. Recent improvements in the transportation network include a direct road link between Freetown and Monrovia, Liberia; a major quay extension at Freetown harbour; and modernization of the international airport at Lungi.

Government and social conditions. The 1978 constitution established Sierra Leone as a one-party republic headed by a president elected to a seven-year term by the National Delegates Conference of the All-People's Congress (APC), the only political party permitted. The president appoints two vice presidents and the Cabinet, of which he is the presiding officer. Legislative powers are vested in the 127-member House of Representatives, of which 105 members are designated by the APC and then elected to five-year terms; 12 paramount chiefs also sit in the House, as do 10 representatives appointed by the president. Only candidates approved by the APC may stand for election; the House serves until dissolved by the president.

Formerly deleterious health conditions have gradually improved as the government has developed and promoted a comprehensive health-care program, including expanded hospital facilities, increased medical personnel, and health centres in each chiefdom. Infant mortality, nonetheless, remains high by both world and African standards, and life expectancy is only about 47 years for men and 50 years for women.

Primary education is available free in public schools or for low fees in private schools, but in the late 20th century only about 60 percent of children between 5 and 11 years old were enrolled, and of these only about one-third went on to attend secondary schools. The University of Sierra Leone (1967) was formed from Fourah Bay College (1827), the first in western Africa, and Njala University College (1963). The government is attempting to extend the primary-school system to the whole country. Most adults have no formal schooling, and only one in four adults is literate, a comparatively low figure for a nation in western Africa.

The daily Freetown newspaper is government owned, but a number or periodicals are privately owned. The government regulates the news media through mandatory registration and licensing. Government-owned radio and colour television broadcast from Freetown.

Cultural life. Fine wood, ivory, and soapstone sculpted heads and figurines and reliefs are known from the 15th century onward and remain an active art form to the present. Music and dance, linked to tribal religious ceremonies, are highly developed and known worldwide through the performances of the Sierra Leone Dance Troupe. Traditional Gara cloth (woven by the Mende and Kono peoples and dyed with natural colours), leatherwork, basketry, pottery, and rug craft work are well developed.

History. The Bulom people on the coast were probably among the earliest inhabitants of Sierra Leone. During the 15th century the Mende and Temne peoples moved in waves into Sierra Leone. The Fulani, originally from Senegal, moved into the northern part of the country. The coastal region was visited by the Portuguese, and by 1495 there was a Portuguese fort on the site of modern Freetown. From the late 15th century, European ships visited the coast regularly to trade manufactured goods for slaves and ivory. Although the English built trading posts on Bund and York islands in the 17th century, no European power exercised control over Sierra Leone. British abolitionists and philanthropists founded Freetown in 1787 as a private venture for freed and runaway slaves. After the British Parliament made the slave trade illegal in 1807, the government took over the settlement as a base for naval operations against the slave trade. In 1808 the coastal settlement became a British colony. The hinterland was gradually explored and was proclaimed a British protectorate in 1896. Sierra Leone achieved independence in 1961 but remained in the Commonwealth of Nations. The civilian government was overthrown by military forces in 1967. The military government was ousted a year later, and civilian rule

was reestablished. Sierra Leone became a republic in 1971 and a single-party republic in 1978.

Sierra Leone River, river, an estuary on the Atlantic, in western Sierra Leone, West Africa. Formed by Port Loko Creek and the Rokel River, it is from 4 to 10 mi (6 to 16 km) wide and 25 mi long and contains Sierra Leone's two major ports—Freetown harbour and the port at Pepel. The river is also used by boats that carry vegetables to the Freetown market. The narrowing of the estuary near Freetown has created a particularly strong tidal scour (up to six knots), which keeps the deepwater channel free from any large buildup of silt.

Sierra Madre, principal mountain system of Mexico, including the three ranges of the Sierra Madre Occidental (to the west), the Sierra Madre Oriental (to the east), and the Sierra Madre del Sur (to the south). These ranges enclose the great central Mexican Plateau, which is itself a part of the system and is broken by blocks of mountain ranges and large populated basins. The Sierra Madre constitutes the greater part of Mexico.

A brief treatment of the Sierra Madre follows. For full treatment, *see* MACROPAEDIA: North America.

Sierra Madre Occidental. The Sierra Madre Occidental is a rugged mountain range forming the dissected western border of the Mexican Plateau. Extending about 700 mi (1,100 km) northwest to southeast, parallel to the Gulf of California and the Pacific Ocean and varying in width from 100 mi to 300 mi, the mountain range rises from elevations of 5,000 ft (1,500 m) near the Mexico–Arizona border in the north to more than 10,000 ft near the border of the Nayarit and Jalisco states at the southern end of the range. Much of the summit area is rolling to nearly level plateau composed of volcanic strata. On its eastern side the Sierra Madre Occidental rises gradually from the *bolsónes* ("depressions") of Chihuahua and Durango states. On the west a bold escarpment of high, steep slopes, broken only occasionally by deeply incised stream canyons, presents a formidable barrier. There, some *barrancas* ("gorges") reach depths of 1,500 ft. Among the most renowned of these canyons is the Barranca de Cobre in southern Chihuahua state. The Sierra Madre Occidental is a fairly dry region, covered mainly by grass and brush, except on higher slopes, where heavier rainfall supports forests of pine, cedar, and oak. Several important rivers originate in the mountainous belt, including the Yaqui, Mayo, and Fuerte on the west and the Conchos, Nazas, and Aguanaval on the east. From pre-Columbian times the mountain range has been a refuge for Indians seeking protection from aggressive foes; it remains the home for the Tarahumara, Tepehúan, Huichol, and Cora Indians that live in the northern part of the range. Plans for a railroad through the Sierra Madre were made in the 1880s, but a line was not actually built until 1962. Two main roads run through the mountains, linking the Mesa del Norte (Northern Plateau) with the Sinaloa and Sonora plains.

Sierra Madre Oriental. The Sierra Madre Oriental forms the dissected eastern border of the vast Mexican Plateau. Originating in the barren hills of the Río Grande to the north, the Sierra Madre Oriental extends about 700 mi, is roughly parallel to the Gulf of Mexico, and blends into the Cordillera Neo-Volcánica to the south. Consisting of folded sedimentary rocks, largely limestone, the range has an average elevation of about 7,000 ft; the peak of Cerro Peña Nevada, west of Ciudad Victoria, rises to 13,300 ft. The valleys are narrow and steep-sided, often running north–south, although deep gorges (part of the Pánuco River drainage system) in the southern section of the range run eastward to the sea. Several crops, including corn (maize), wheat, and sugarcane, are grown commercially in the area immediately south and east of the city of Monterrey, as well as around the town of Orizaba farther south. The Sierra Madre Oriental contains significant deposits of copper, lead, and zinc. Routes through the mountains were first established early in Mexico's colonial period, and the city of Monterrey rapidly developed into the region's largest and most important town after rail connections with the city of Laredo, Texas, were completed in 1888.

Sierra Madre del Sur. The Sierra Madre del Sur is a mountain range in the southern Mexican states of Guerrero and Oaxaca. Extending southward from the Río Balsas to the Isthmus of Tehuantepec, the Sierra Madre del Sur is composed largely of folded Cretaceous sediments with many igneous intrusions and large areas capped with lava. The mountains reach an elevation of 12,630 ft above sea level and extend westward almost to the Pacific Ocean, leaving only a narrow coastal plain. In the northwest the Sierra Madre del Sur blends into the southern portion of the Sierra Madre Occidental, and in the northeast with the southern Gulf of California lowlands. The range is deeply dissected by rivers, such as the Balsas, its tributaries, and the other short, swift streams of the Pacific slope. There are numerous steep ravines and little level land. The area has been sparsely inhabited since pre-Columbian times, and the relative inaccessibility of the region has allowed local Indians to retain much of their traditional culture. Agriculture is mainly of the subsistence type, although there is some commercial production of coffee, rice, and pineapples. Mineral deposits include iron ore, lead, silver, and gold. Among the most notable pre-Columbian ruins in the area are Monte Albán and Mitla near the city of Oaxaca. In places such as Acapulco and Manzanillo, the steep and rocky coast has formed first-class natural harbours. The Mexico City–Acapulco expressway is one of the few roads traversing the mountain range from north to south. The Pan-American Highway passes southeastward from Mexico City through the mountains to Guatemala City.

Sierra Madre de Chiapas, also called SIERRA DE SOCONUSCO, mountain range in Chiapas state, southern Mexico. The Sierra Madre de Chiapas is a crystalline range of block mountains extending to the southeast along the Pacific Coast from the Isthmus of Tehuantepec to the Guatemalan border. Rising sharply from the coastal lowlands on the west to elevations of more than 9,000 ft (2,700 m), then sloping down to the Valle Central de Chiapas on the east, the mountain range forms the westernmost section of the Chiapas Highlands. The Tacaná volcanic cone, located at the Mexico–Guatemala border, rises to 13,300 ft. The coastal mountain slopes and those leading into the valley were inhabited by small groups of Mayas between AD 300 and 900. By the late 1400s the Aztec dominated the region. The first Spanish explorers appeared in 1524. Cacao, grown since Aztec times on the coastal slopes where the rainfall is heaviest, makes a major contribution to the economy of Chiapas state. Coffee is also produced at higher elevations. The inter-American railway and a paved highway run along the western slopes of the Sierra Madre de Chiapas, the Pan-American Highway extends through the Valle de Chiapas on the eastern side, and there are several connecting roads traversing the mountains.

Sierra Nevada, mountain range in southeastern Spain, near the Mediterranean coast, the highest division of the Penibético Mountain System. The range itself is a domed mountain elongated for about 26 mi (41 km) from east to west. It is clearly defined by the faulted troughs of the vega (plain) of Granada to the northwest, the Guadix tableland to the northeast, and the Alpujarras depression to the south. The main peaks of the range are the Cerro de Mulhacén (11,411 ft [3,478 m]), the highest point of the Iberian Peninsula, and the Veleta (11,128 ft). Several other summits rise above the snow line of 10,000 ft and have given significance to the name, which means Snowy Range. The range of elevations is reflected in a sequence of flora from subtropical to alpine species.

Sierra Nevada, also called SIERRA NEVADAS, western mountain system of the United States, extending for more than 250 mi (400 km) along the eastern edge of the state of California from the Mojave Desert in the south to the Cascade Range in the north.

A brief treatment of the Sierra Nevada follows. For full treatment, *see* MACROPAEDIA: North America.

The range is bounded by the plateaus and mountains of the Basin and Range province on the east and by the Coast Ranges of California on the west. Averaging about 50 mi across, the Sierra Nevada's magnificent skyline and spectacular landscapes make it one of the most beautiful physical features of the United States. Its peaks range from 11,000 to 14,000 ft above sea level; Mt. Whitney, the highest peak of the conterminous United States, rises to 14,494 ft (4,418 m).

Glaciers formed in the Sierra Nevadas at least five times during the Pleistocene Epoch (about 2,500,000 to 10,000 years ago), leaving behind ice-carved, U-shaped valleys and other glacial features responsible for much of the scenic beauty of the Yosemite, Kings Canyon, and Sequoia national parks. The range's gentle west-facing slope has been dissected by a series of streams that drain into the Sacramento River in the Great Valley (Central Valley) of California to the north and into the San Joaquin Valley to the south. These two systems ultimately drain the mountains westward to the Pacific Ocean. Moist Pacific winds drop many feet of snow on them annually, making the Sierras the life-sustaining watershed for California's ever burgeoning population and providing water not only for the state's massive irrigation systems and most of its drinking water but also for the many hydroelectric plants constructed in its higher reaches. The site of Sutter's Fort on the Coloma River was the focus of the Gold Rush in 1849; the 150-mi Mother Lode vein system along the western reaches of the Sierra Nevadas is still being mined.

Sierra Nevada National Park, park occupying 618 sq mi (1,600 sq km) in the Cordillera de Mérida of the Andes in Mérida and Barinas states, northwestern Venezuela. It was established in 1952. The highest point in Venezuela, Pico Bolívar (16,427 ft [5,007 m]), is located in the park; other peaks, notably Humboldt and Bonpland, also rise above 16,000 ft. Their lower slopes are heavily forested, while glacier lakes and alpine vegetation are found above the timberline. Wildlife includes deer, bear, and many birds. A four-stage cable car, said to be the highest in the world, carries tourists from Mérida to Pico Espejo ("Mirror Peak"; about 15,600 ft). Skiing and mountain climbing are among the other recreational activities.

Sierra redwood: *see* big tree.

Sierra San Pedro Mártir, mountain range in central Baja California peninsula, northwestern Mexico. The range stretches southward about 90 mi (145 km) from south of Ensenada to Sebastian Vizcaino Bay. The rugged, granitic mountains, forming the divide between the Gulf of California and the Pacific Ocean, rise to an elevation of 10,069 ft (3,069 m) above sea level at the peak of

La Encantada. Although the surface is largely barren, some valley bottoms have fertile soil, and the mountains are rich in minerals (copper, silver, gold, and lead). Settlement in the area is sparse, and only a rough track crosses the southern reaches.

sieve of Eratosthenes: *see* Eratosthenes, sieve of.

sieve tube, in flowering plants, elongated living cells (sieve-tube elements) of the phloem, the nuclei of which have fragmented and disappeared and the transverse end walls of which are pierced by sievelike groups of pores (sieve plates). They are the conduits of food (mostly sugar) transport.

In nonangiospermous vascular plants—*e.g.,* gymnosperms and ferns—rows of sieve cells, showing more primitive structural features, perform the same function. Sieve-tube elements are almost always adjacent to nucleus-containing companion cells, which have been produced as sister cells with the sieve element from the same mother cell. Companion cells apparently function with the enucleate sieve-tube elements and die when they break down. The sieve cells of nonangiospermous vascular plants lack true companion cells, although other adjacent cells may serve a similar function.

The small pores of sieve cells and the larger ones of sieve elements are traversed by strands of cytoplasm called P-protein. It is not known whether P-protein is active in transport or merely serves as a seal against leakage in case of injury. *See also* phloem.

sievert, unit of radiation dose equivalent in the International System of Units. The sievert (Sv) has been recommended by the International Commission on Radiation Units and Measurements (ICRU) as a substitute for the rem, the long-standing special unit of biologic dose of ionizing radiation. Like the rem, the sievert takes into account the relative biologic effectiveness (RBE) of ionizing radiation, since each form of such radiation—*e.g.,* X rays, gamma rays, neutrons—has a slightly different effect on living tissue. Accordingly, one sievert is generally defined as the amount of radiation roughly equivalent in biologic effectiveness to one gray (or 100 rads) of gamma radiation. The sievert is inconveniently large for various applications, and so the millisievert (mSv), which equals 1/1000 sievert, is frequently used instead. One millisievert corresponds to 10 ergs of energy of gamma radiation transferred to one gram of living tissue. *See also* gray.

Sieyès, Emmanuel-Joseph (b. May 3, 1748, Fréjus, Fr.—d. June 20, 1836, Paris), churchman and constitutional theorist whose concept of popular sovereignty guided the French bourgeoisie in their struggle against the monarchy and nobility during the opening months of the French Revolution. He later played a major role in organizing the coup d'état that brought Napoleon Bonaparte to power (1799).



Sieyès, engraving by J.-A. Allais, 19th century
H. Roger-Viollet

The son of a notary of Fréjus, Sieyès was educated for an ecclesiastical career at the Sorbonne and rose in the church to become vicar-general (1780) and chancellor (1788) of the diocese of Chartres. Nevertheless, because he was not of noble birth, his opportunities for further advancement in the church were limited. Hence, he was already embittered against the aristocracy by the time the States General were summoned in 1788. During the ensuing public controversy over the organization of the States General, Sieyès issued his pamphlet *Qu'est-ce que le tiers état?* (January 1789; "What Is the Third Estate?"), in which he identified the unprivileged Third Estate with the French nation and asserted that it alone had the right to draft a new constitution.

The pamphlet won Sieyès immense popularity and ensured his election as a representative of the Third Estate to the States General, which convened on May 5, 1789. On Sieyès' motion, the delegates from the Third Estate proclaimed themselves (June 17) a National Assembly empowered to legislate for the French people. King Louis XVI refused to recognize the legitimacy of the Assembly on June 23, but Sieyès helped persuade his colleagues to stand firm in the face of the royal challenge. The Revolution had begun. In the months that followed, the Assembly passed decrees abolishing feudalism and restricting the royal prerogative. Sieyès' distinction between "active" (those eligible to vote) and "passive" citizens was adopted in decrees establishing property qualifications for voting—thereby guaranteeing that power would be kept in the hands of the bourgeoisie.

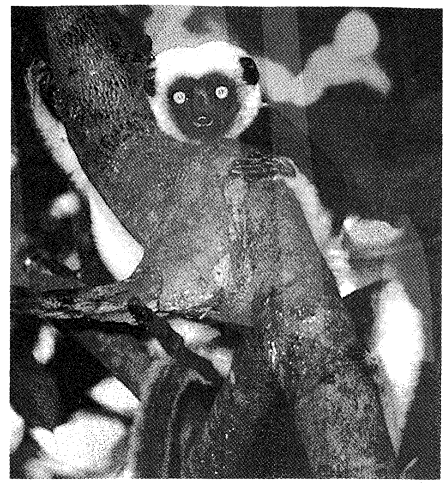
Although Sieyès enjoyed fame as a theorist, his vanity and lack of oratorical skill reduced his political effectiveness. He did vote with the majority of deputies for the king's execution (January 1793), but, when the radical democrats of the Jacobin Club seized control of the Revolution in June 1793 and launched the Reign of Terror, Sieyès withdrew from politics. Later he is said to have summarized his conduct during this period in the ironical remark "J'ai vécu" ("I remained alive").

In 1795 Sieyès served for six months on the Committee of Public Safety, where he advocated an expansionist foreign policy. He was elected (October 1795) to the Council of Five Hundred set up under the republican constitution of 1795, and in May 1799 he won a seat on the five-member Directory, France's ruling executive board. Nevertheless, he had already concluded that the executive must be strengthened at the expense of the legislative bodies. Conspiring with General Napoleon Bonaparte, Joseph Fouché, and C.M. de Talleyrand, he helped organize the military coup d'état that overthrew the Directory on 18 Brumaire (Nov. 9, 1799). The next day Sieyès, Bonaparte, and Pierre-Roger Ducos were made provisional consuls. A new constitution drafted by Sieyès provided for an elaborate balance of powers within the executive, but Bonaparte quickly altered the constitution to make himself first consul and supreme ruler of France. Thereafter, Sieyès' influence declined. He remained a senator and was nominated grand officer of the Legion of Honour (1804) and count of the empire (1808).

After the restoration of King Louis XVIII in 1815, Sieyès was banished as a regicide. He settled in Brussels but returned to Paris upon the overthrow of King Charles X in July 1830.

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sifaka (*Propithecus*), either of two species of arboreal primates, family Indriidae, found in coastal Madagascan forests. Sifakas are about



Coquerel's sifaka (*Propithecus verreauxi coquereli*)
Gerald Cubitt

1 m (3 feet) long, roughly half of the length being tail. They have small heads, large eyes, and large ears partially hidden in their long, silky fur. Colour varies both in and between species but is usually white with darker markings. Diurnal vegetarians, sifakas live in family groups. They can leap 9–10 m (30–33 feet) from tree to tree. One young, usually, is born after about five months' gestation.

Verreaux's sifaka (*P. verreauxi*) is listed as critically endangered and under threat of extinction in the *Red Data Book.*

Ṣiffīn, Battle of (May–July 657), series of negotiations and skirmishes during the first Muslim civil war (*fitnah;* 656–661), ending in the arbitration of Adhruḥ (February 658–January 659), which undermined the authority of ʿAlī as fourth caliph and prepared for establishment of the Umayyad dynasty.

Muʿāwiyah, governor of Syria, refused to recognize ʿAlī as the new caliph, calling instead for vengeance for the blood of his murdered kinsman, the third caliph, ʿUthmān. ʿAlī responded by invading Syria. The two armies met along the Euphrates River at Ṣiffīn (near the Syrian-Iraqi border), where they engaged in an indecisive succession of skirmishes, truces, and battles, culminating in the legendary appearance of Muʿāwiyah's troops with copies of the Qurʾān impaled on their lances—supposedly a sign to let God's word decide the conflict. ʿAlī delegated Abū Mūsā al-Ashʿarī as his representative, while Muʿāwiyah sent ʿAmr ibn al-ʿĀṣ. The two men, on the basis of the Qurʾān and the traditions (Ḥadīth) of the Prophet and in the presence of witnesses, were to decide whether ʿUthmān had been guilty of abusing the divine law. If he had sinned and his murder was justified, then ʿAlī's position as caliph would be secure; a verdict of innocence, however, would justify Muʿāwiyah's attempts at vengeance and dislodge ʿAlī. In a meeting at Adhruḥ (in present Jordan; some suggest Dūmat al-Jandal, in present Saudi Arabia) in February 658, the arbitrators decided on ʿUthmān's innocence. ʿAlī immediately denounced the decision as invalid and reneged on his oath to be bound by the arbitration; Muʿāwiyah, meanwhile, was proclaimed caliph by some of his Syrian supporters. In January 659 the arbitrators met at Adhruḥ, formally deposed both ʿAlī and Muʿāwiyah, then discussed the candidacy of ʿAbd Allāh ibn ʿUmar and Muʿāwiyah for the caliphate; no decision was reached.

ʿAlī and Muʿāwiyah retained their own partisans, but, as Muʿāwiyah's authority began to expand into Iraq and the Hejaz (western Saudi Arabia), ʿAlī's diminished to Kūfah, his capital. With ʿAlī's assassination in 661, Muʿāwiyah was free to establish himself as the first caliph of the Umayyad house.

Sífnos (Greece): *see* Síphnus.

Sig, formerly SAINT-DENIS-DU-SIG, town, northwestern Algeria, on the Wadi Sig just below the confluence of the Wadi el-Mebtoûh and the Wadi Matarah. To the north, the Sig plains stretch 20 miles (32 km) to the Gulf of Arzew, and to the southeast Mount Touakas rises to 1,145 feet (349 m). The town has wide streets, tree-filled squares, and a public garden along the river. In the centre of a fertile lowland, Sig trades in grains, cotton, flax, tobacco, and wine and is surrounded by olive groves. The area is irrigated by the Barrages (dams) des Cheurfas, 17.5 miles (28 km) upriver, and the overflow is stored in the Petit Barrage, 2 miles (3.2 km) south of the town. Local industry includes flour mills and cotton gins, and olive oil is produced and exported. The Kieselguhr (diatomite) quarries are nearby. Pop. (1987 prelim.) mun., 46,989.

Sigebert, Anglo-Saxon SIGEBERHT, name of rulers grouped below by country or dynasty and indicated by the symbol •.

EAST ANGLIA

• **Sigebert** (d. 637?), king of the East Angles. Before his reign Sigebert lived the life of an exile in Gaul, becoming Christianized and learned. He returned to an East Anglia troubled by anarchy and heathenism and became king in 630 or 631. Temporarily resigning his kingship (yielding it to his kinsman Ecgric) in order to follow the monastic life, he was recalled to fend off the invasion of King Penda of Mercia and was slain along with Ecgric, and his army destroyed.

ESSEX

• **Sigebert I,** also called SIGEBERT THE LITTLE, or SIGEBERT PARVUS (d. before *c.* 653), king of the East Saxons, or Essex, who succeeded when his father and uncles were slain in battle with the West Saxons (*c.* 617). He probably reigned as a dependent of the West Saxon king Cynegils (*q.v.*).

• **Sigebert II,** also called SIGEBERT THE GOOD, or SIGEBERT SANCTUS (d. 653–664), king of the East Saxons, or Essex (from *c.* 653), who succeeded his kinsman Sigebert I. He became a Christian, was baptized (*c.* 653), and invited such missionaries as Saint Cedd into his land, which became a centre for their work. The date and occasion of Sigebert's death are unknown.

MEROVINGIAN DYNASTY

• **Sigebert I** (b. 535—d. November? 575, Vitry, near Arras, Fr.), Frankish king of the Merovingian dynasty, son of Chlotar I and Ingund; he successfully pursued a civil war against his half brother, Chilperic I.

When Chlotar I died in 561, his kingdom was divided, in accordance with Frankish custom, among his four sons; Sigebert became king of the northeastern portion, known as Austrasia, to which he added further territory on the death of his brother, Charibert I, in 567 or 568. Incursions by the Avars, a fierce nomadic tribe related to the Huns, compelled him to move his capital from Reims to Metz; he had twice to repel their attacks (562 and *c.* 568). About 567 he married Brunhild, daughter of the Visigothic king Athanagild, whose other daughter, Galswintha, married Chilperic. When Chilperic had Galswintha murdered in order to marry Fredegund, Sigebert was obliged to seek revenge. The two brothers had already fought each other, but this hostility was elevated by the incident into a long and bitter war that was continued by the descendants of both. Sigebert defeated Chilperic, conquered most of his kingdom, and compelled him to hide in Tournai. But at his moment of triumph, when he had just been acclaimed king by Chilperic's subjects at Vitry, he was struck down by two assassins in the service of Fredegund.

• **Sigebert II** (b. 601—d. late 613), ephemeral successor to his father, Theodoric II, as king of Austrasia and Burgundy; he reigned only a matter of weeks before the hostility of the Austrasian nobility, led by Arnulf of Metz and Pepin I, to his great-grandmother Brunhild led to his overthrow and the reunification of the Frankish lands under Chlotar II. Both Sigebert and Brunhild were killed by Chlotar.

• **Sigebert III** (b. 630/631—d. Feb. 1, 656, Metz, Fr.), one of the first so-called *rois fainéants* ("sluggard kings") of the Merovingian dynasty, who held no real power of his own but was ruled by whoever was his mayor of the palace.

Made king of Austrasia by his father, Dagobert I, in 634, Sigebert was governed first by Bishop Chunibert of Cologne and Duke Adalgisile; then, on Dagobert's death, by Chunibert and Pepin I, the mayor of the palace (d. 640); and finally by Pepin's son, Grimoald, mayor of the palace from 642 or 643 until the king's death.

In the early 640s, when a certain Otto was mayor of the palace, Thuringia succeeded in gaining effective autonomy at Austrasian expense. After Sigebert's death, his young son, Dagobert II, was sent off to an Irish monastery by Grimoald, who briefly established his own son, Childebert (adopted by Sigebert when the king was still childless) on the throne.

WESSEX

• **Sigebert** (d. 757?), king of the West Saxons, or Wessex (from 756), who succeeded his kinsman Cuthred and was himself overthrown by Cynewulf. Known for his corruption and cruelty, he soon faced a rebellion of his nobles and was formally deposed by the witan, which chose Cynewulf in his stead. After murdering one of the leading ealdormen, Cumbran, he fled and was pursued into a forest in Hampshire, where he was slain. Some 30 years later, Cynewulf was killed by Sigebert's brother Cyneheard.

Sigebert OF GEMBLOUX (b. *c.* 1030, Brabant, Lower Lorraine—d. Oct. 5, 1112, Gembloux), Benedictine monk and chronicler known for his *Chronicon ab anno 381 ad 1113,* a universal history widely used as a source by later medieval historians, and for his defense (1075) of Holy Roman Emperor Henry IV's role in the Investiture Controversy, the struggle between emperors and popes for control over the investiture of bishops.

After receiving his education at the monastery of Gembloux, Sigebert taught at the monastery at Metz from 1050 to 1070; during these years he began to write idealized biographies of the lives of saints. In 1070 he returned to Gembloux, where he continued to write and teach. Among his hagiographies are: *Vita Wicberti* ("The Life of Wicbert," the founder of the monastery, who died in 962); *Gesta abbatum Gemblacensium* ("History of the Abbots of Gembloux" to 1048); *Vita Sigiberti III, regis Austrasiorum* ("The Life of Sigibert III of Austrasia," a Merovingian king and saint who died in 656); and *De viris illustribus* ("Concerning Illustrious Men," a survey of ecclesiastical historians, *c.* 1105). He also wrote a treatise (1103) in support of imperial investiture and against Pope Paschal II.

Siger DE BRABANT (b. *c.* 1240, duchy of Brabant—d. between 1281 and 1284, Orvieto, Tuscany), professor of philosophy at the University of Paris and a leading representative of the school of radical, or heterodox, Aristotelianism, which arose in Paris when Latin translations of Greek and Arabic works in philosophy introduced new material to masters in the faculty of arts.

Beginning about 1260 Siger and some of his colleagues inaugurated purely rational lectures that reinterpreted works of Aristotle without regard for established teachings of the church, which had blended orthodox Aristotelianism with Christian faith. In addition to Aristotle, Siger's sources include such philosophers as Proclus (410–485), Avicenna (980–1037), Averroës (1126–98), and Thomas Aquinas (1225?–74).

From 1266, when his name first appears, to 1276, Siger was prominent in the disputes at Paris over Aristotelianism. Bonaventure, the minister general of the Order of Friars Minor, and Aquinas, head of the Dominicans, both attacked Siger's teachings. In 1270 the bishop of Paris, Étienne Tempier, condemned 13 errors in the teaching of Siger and his partisans. Six years later the inquisitor of the Roman Catholic Church in France summoned Siger and two others suspected of heterodoxy, but they fled to Italy, where they probably entered an appeal before the papal tribunal. A few months later, in March 1277, Tempier announced condemnation of 219 more propositions. Siger is believed to have been restricted to the company of a cleric, for he was stabbed at Orvieto by his cleric, who had gone mad, and he died during Martin IV's pontificate, sometime before Nov. 10, 1284. Dante, in the *Divine Comedy,* put Siger in the Heaven of Light in the brilliant company of 12 illustrious souls.

Siger's written works gradually came to light, and 14 authentic works and 6 probably authentic commentaries on Aristotle were known by the mid-20th century. Among them are *Quaestiones in metaphysicam, Impossibilia* (six exercises in sophistry), and *Tractatus de anima intellectiva* ("Treatise on the Intellectual Soul"). The last discusses his basic belief that there is only one "intellectual" soul for mankind and thus one will. Although this soul is eternal, individual human beings are not immortal. This view, though not lucidly expressed, suggests Siger's disregard for doctrines of the church and his emphasis on maintaining the autonomy of philosophy as a self-sufficient discipline.

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A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

Sighişoara, German SCHÄSSBURG, Hungarian SEGESVÁR, town, Mureş *judet* (county), central Romania. Situated in the old region of Transylvania, it is 40 miles (65 km) northeast of Sibiu city and 110 miles (175 km) northwest of Bucharest. The town circles a hill, on the summit of which stands a citadel with three rings of walls, nine extant towers (including the "Tower of the Clock"), and a number of medieval churches. Settlement of the area dates from the Bronze Age and, later, the era of Roman Dacia, but the town itself originated in the 12th century. In the 13th century it was colonized by Saxon Germans, who in the 14th century secured its designation as a free city, enabling it to become an important centre of trade by the second half of the 16th century. Much of the lower town had to be rebuilt after being ravaged by earthquake (1668) and fire (1676). Pop. (1985 est.) 35,258.

sight, physiological process of distinguishing, usually by means of an organ such as the eye, the shapes and colours of objects. *See* eye; photoreception; perception.

Sigibert (name of Merovingian kings): *see under* Sigebert.

Sigillaria, a genus of extinct treelike club mosses, order Lepidodendrales (class Lycop-

sida). Dating from the Carboniferous Period (360 million to 286 million years ago), it resembled *Lepidodendron* but differed in the form and pattern of leaf scars and in cone structure. It had a single trunk (or was sparsely branched), a terminal cluster of grasslike leaves, and a conspicuous pattern of spirally arranged leaf bases. Stem impressions are widely found, but petrified remains are less common.

Consult the INDEX *first*

sigillography, the study of seals. A sealing is the impression made by the impact of a hard engraved surface on a softer material; the word seal can refer to either the hard surface or the impression. Sigillography is helpful in historical studies because the seal attached to a document may provide proof of its authenticity.

A brief treatment of sigillography follows. For full treatment, *see* MACROPAEDIA: History, The Study of.

Sigillography is the study of both the instrument (matrix, or die) that makes the impression and the mark that is imprinted on the wax or other soft material. The seal was used as the signature is today: to authenticate a document.

The matrix was made of either bronze or silver in medieval times and of steel after the 17th century. The soft substance that took the impression of the seal in the Middle Ages was a green or red wax made of beeswax and resin. After the 16th century, shellac was, and continues to be, used. Medieval charters or deeds were authenticated by the official seal attached to them. By the 12th century, documents were folded and wax seals affixed to ensure secrecy. Letters sealed in this way attested to the identification and origin of people in 14th-century England.

Seals attached to documents are of historical interest, especially in dating and validating them. More wax seals have survived than matrices, and these imprinted pictures often give clues to the dress, arms, tools, ships, and architecture of the period. Seals were either cylinders or stamps, although scarabs were used in Egypt and signet rings in Rome. Prominent men and women, as well as kings and administrators, had their own seals and used them as modern man uses his signature. Wax seals were also used to secure the knots of the cord that tied bales, jars, and boxes.

When written documents were introduced in ancient Mesopotamia, they were usually inscribed on clay tablets. The appropriate seal was pressed into the clay before it hardened. Tablets of this kind, mainly contracts, accounts, and letters, were encased in an outer clay "envelope" that also bore the seal. Letters were marked with the sender's seal on the outside to identify him and to verify the contents. Treaties between nations that bear royal seals have been recovered.

Papyrus sheets used for Egyptian documents were pasted together, written on, rolled, and tied with cord. The knot was covered with wax and imprinted with a seal. The use of this type of document spread outside Egypt, and it is possible to trace the development of seals through them. They are particularly interesting to art historians, but because of the wide range of objects depicted on the seals, they also help trace the cultural development of nations. When seals bear inscriptions, they confirm the existence of rulers, define trade negotiations, and provide genealogical information.

Medieval European seals, like those of ancient Rome, were used in law courts. From the 11th to the 14th century, the use of seals became so widespread that, by 1400, ready-made metal matrices were available even to small landowners. However, the highest level of artistry in making seals occurred in the 13th century, and the names of the craftsmen who produced those singular objects are still known today.

Medieval seals were either single or double; that is, they could imprint one or both sides of the wax. Double sealing made it more difficult to detach and therefore provided more security. Sealing both sides was possible only when the seal was appended to the document, hanging from it by a strip of parchment or cord. Seals were either appended or applied to the surface of the document and often bore the name of the owner.

The growth of the government in England can be traced by its use of seals. The Great Seal (showing a seated monarch and royal insignia), first used in the 11th century, was augmented by smaller seals and finally by the Privy Seal, the keeper of which was a minister of state. As the power of the seal grew, the king found it necessary to adopt a private, sometimes secret, seal for his correspondence. Religious seals, like royal ones, had appropriate designs: a bishop, a saint, or a religious scene. Monastic seals, town seals, commercial seals, and personal seals all offer a gallery of scenes from medieval life. As more people learned to write, signatures replaced seals, but as late as the 19th century, tiny seals were kept in men's watch pockets to seal letters before there were sealable envelopes.

Seals in China and Japan did not have the status of those in other parts of the world. They confirmed a signature but were not accepted as legal proof of identification. Their fanciful designs in red ink marked possessions—boxes, books, and paintings.

Sīgiriya, site in central Sri Lanka, consisting of the ruins of an ancient stronghold known as the Lion Mountain that was built about the 6th century AD on a remarkable rock pillar. The rock, which is so steep that its top overhangs the sides, rises 1,144 feet (349 m) above sea level and 600 feet (180 m) above the surrounding plain. On the several acres of ground at the summit, Kāśyapa I built a palace in AD 477 as a safeguard against his enemies. Visitors began the final ascent through the open jaws and throat (*giriya*) of a monumental lion (*sinha*), thus Sigiriya.

Sigismund, also spelled SIEGMUND, name of rulers grouped below by country and indicated by the symbol •.

Foreign-language equivalents:

Czech	Zikmund
German	Sigismund, or Sigmund
Hungarian	Zsigmond
Polish	Zygmunt
Swedish	Sigismund

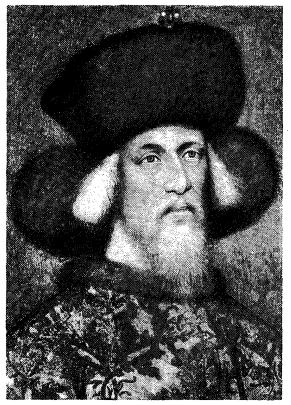
BOHEMIA

• **Sigismund:** *see* Sigismund (Germany/Holy Roman Empire).

GERMANY/HOLY ROMAN EMPIRE

• **Sigismund** (b. Feb. 15, 1368, probably Nürnberg—d. Dec. 9, 1437, Znojmo, Bohemia), Holy Roman emperor from 1433, king of Hungary from 1387, German king from 1411, king of Bohemia from 1419, and Lombard king from 1431. The last emperor of the House of Luxembourg, he participated in settling the Western Schism and the Hussite wars in Bohemia.

Sigismund, a younger son of the Holy Roman emperor Charles IV, received from his father the margravate of Brandenburg. Engaged to Maria, daughter of King Louis I of Hungary and Poland, he was sent on his father's death (1378) to the Hungarian court, where he married Maria. On her father's death in 1382, Maria became queen of Hungary, and Sigismund was finally crowned as king consort in 1387. The crown of Poland went to Maria's sister Hedwig (Jadwiga). Sigismund's throne was seriously challenged for a number of years by the rulers of Naples. In 1388 the king pawned Brandenburg to his cousin Jobst, margrave of Moravia, to raise funds to defend his realm.



Sigismund, portrait attributed to Pisanello; in the Kunsthistorisches Museum, Vienna

By courtesy of the Kunsthistorisches Museum, Vienna

Sigismund's expansionist policy led him to intervene in the struggles between his half brother, the German king Wenceslas, who was also king of Bohemia (as Wenceslas IV), and the Bohemian nobility. After changing sides several times, Sigismund made peace with his brother in 1396 at the Battle of Nicopolis and was appointed vicar general of Germany. He then led a European army against the Turks, who had broken into Serbia and Bulgaria, but was decisively defeated in September 1396, barely managing to escape capture. Although the Bohemian rivalries had deterred Sigismund from preventing Wenceslas' deposition as German king (1400), he soon exploited the situation and attempted to take Bohemia, imprisoning Wenceslas in 1402. Recalled to Hungary by an invasion, Sigismund released Wenceslas in 1403.

After the death (1410) of Rupert (Wenceslas' successor to the German crown), both Sigismund and Jobst were elected king by different factions, but at Jobst's death in 1411 Sigismund became German king. From 1412 to 1413, he campaigned against the Venetians in Italy, where he also persuaded one of the three rival popes, John XXIII, to call a church council at Constance to settle the Western Schism. After his coronation as German king at Aachen (November 1414), he went to Constance to participate in the council. The extent of his complicity in the burning of the Czech reformer Jan Hus (1415), whom the king had invited to the council to defend his views, has never been determined. With the unity of Western Christendom restored (1417), Sigismund hoped to lead a new crusade against the Turks. The campaign that he led against them in 1428, however, was no more successful than the first.

On the death of Wenceslas in 1419, Sigismund inherited the Bohemian crown, but the series of wars fought against the Hussites during the decade of the 1420s, most of which were military disasters for the king's party, delayed his coronation. Sigismund's frequent absence from Germany in these years finally caused the princes to form the Union of Bingen, ostensibly to conduct the war against the Hussites but also to protect themselves against the king's inroads.

In 1431 Sigismund returned to Italy, where he received the Lombard crown. He was

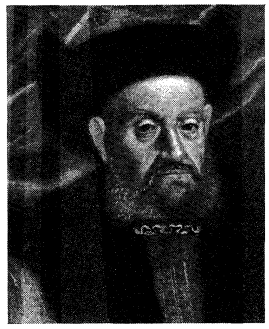
crowned emperor two years later and was finally received in Prague as king of Bohemia in 1436.

HUNGARY

• **Sigismund:** *see* Sigismund (Germany/Holy Roman Empire).

POLAND

• **Sigismund I,** byname SIGISMUND THE OLD, Polish ZYGMUNT STARY (b. Jan. 1, 1467—d. April 1, 1548, Kraków, Pol.), king who established Polish suzerainty over Ducal Prussia (East Prussia) and incorporated the duchy of Mazovia into the Polish state.



Sigismund I, detail of a painting by Andrzej, 1546; in the State Collections of Art in the Wawel, Kraków, Pol.

By courtesy of the Panstwowe Zbiory Sztuki Na Wawelu, Krakow, Pol.

Sigismund I, the fifth son of Casimir IV and Elizabeth of Habsburg, had ruled Głogów, Silesia, since 1499 and became margrave of Lusatia and governor of all Silesia in 1504. In a short time his judicial and administrative reforms transformed those territories into model states. He succeeded his brother Alexander I as grand prince of Lithuania and king of Poland in 1506. Although he established fiscal and monetary reforms, he often clashed with the Polish Diet over extensions of royal power. At the Diet's demand he married Barbara, daughter of Prince Stephen Zápolya of Hungary, in 1512, to secure a defense treaty and produce an heir. She died, however, three years later, leaving only daughters. In 1518 Sigismund married the niece of the Holy Roman emperor Maximilian, Bona Sforza of Milan, by whom he had one son, Sigismund II Augustus (elected co-king in 1530), and four daughters. One of them later married John III of Sweden, from whom the Vasa kings of Sweden were descended.

In 1521 Sigismund's army, led by one of the principal advisers and commanders, Jan Tarnowski, subdued the Order of the Teutonic Knights, a paramilitary religious order that ruled East Prussia. In 1525 the Teutonic grand master Albert became a Lutheran and agreed to do public homage to Sigismund in return for being granted the title of secular duke of Prussia; Albert then dissolved the order, and Ducal Prussia came under Polish suzerainty. Sigismund added the duchy of Mazovia (now the province of Warsaw) to the Polish state after the death, in 1529, of the last of its Piast dynasty rulers. Again under the command of Tarnowski, Sigismund's army defeated the invading forces of Moldavia at Obertyn in 1531 and Muscovy in 1535, thereby safeguarding Poland's eastern borders.

A lover of the fine arts, especially of architecture and sculpture, Sigismund brought Italian artists to Kraków and promoted the development of the Polish variety of the Italian Renaissance. Although a devout Catholic, he accorded religious toleration to Greek Orthodox Christians and royal protection to Jews. At first he vigorously opposed Lutheranism but later resigned himself to its growing power in Poland.

• **Sigismund II Augustus,** Polish ZYGMUNT AUGUST (b. Aug. 1, 1520, Kraków, Pol.—d. July 7, 1572, Knyszyn), last Jagiellon king of Poland, who united Livonia and the duchy of Lithuania with Poland, creating a greatly expanded and legally unified kingdom.

The only son of Sigismund I the Old and Bona Sforza, Sigismund II was elected and crowned coruler with his father in 1530. He ruled the duchy of Lithuania from 1544 and became king of Poland after his father's death in April 1548. After his first wife died childless (1545), he secretly married Barbara Radziwiłł, of a Lithuanian magnate family (1547). When he announced his marriage in 1548, the *szlachta* (Polish gentry constituting the lower house of the Sejm, or Diet) tried to force an annulment because it feared the influence of the Radziwiłłs. He overcame the Sejm's opposition, but Barbara died childless in 1551, allegedly poisoned by Sigismund's mother. A third marriage (1553), to his first wife's sister Catherine, also proved childless, and at his death the direct Jagiellon line ended.

In 1559, when the Livonian Order (a branch of the Teutonic Knights) became too weak to protect itself from Muscovite attacks, it sought and obtained Sigismund's previously offered protection. The Polish king intervened, but, as Livonia continued to be menaced by Muscovy as well as Sweden and Denmark, the Livonian Order and Sigismund II Augustus concluded the Union of Wilno (Vilnius) in 1561: thereby the Livonian lands, north of the Dvina (Daugava) River, were incorporated directly into Lithuania, while Courland, south of the Dvina, became a secular duchy and Polish fief.

The subsequent war (*see* Livonian War) with Tsar Ivan IV the Terrible over Livonia compelled Sigismund to strengthen his position by constitutionally uniting all the lands attached to the Polish crown. Supported by the Polish and Lithuanian gentry, Sigismund ceded his hereditary rights in Lithuania to Poland (1564), thus placing the two states in constitutional equality but not in a complete union. In 1569 he formally incorporated Podlasie, Volhynia, and Kiev provinces into the Polish kingdom, thereby giving their representatives seats in the Sejm; the enlarged Sejm then enacted the Union of Lublin (*q.v.;* 1569), uniting Poland and Lithuania as well as their respective dependencies.

• **Sigismund III Vasa,** Polish ZYGMUNT WAZA, Swedish SIGISMUND VASA (b. June 20, 1566, Gripsholm, Swed.—d. April 30, 1632, Warsaw, Pol.), king of Poland (1587–1632) and of Sweden (1592–99) who sought to effect a permanent union of Poland and Sweden but instead created hostile relations and wars between the two states lasting until 1660.



Sigismund III, detail of a painting, school of Rubens; in the Bayerische Staatsgemäldesammlungen, Munich

By courtesy of the Bayerische Staatsgemaldesammlungen, Munich

The elder son of King John III Vasa of Sweden and Catherine, daughter of Sigismund I the Old of Poland, Sigismund belonged to the Vasa dynasty through his father and to the Jagiellon dynasty through his mother, who brought him up as a Catholic. He was elected king of Poland in August 1587, succeeding his uncle King Stephen Báthory. To obtain the throne he had to accept a reduction of royal power and a consequent increase of the power of the Sejm (Diet). In 1592 he married the Austrian archduchess Anna, and, after his father's death the same year, he received the Sejm's permission to accept the Swedish throne. He was crowned king of Sweden in 1594, but only after promising to uphold Swedish Lutheranism.

Leaving his paternal uncle Charles (later Charles IX) as regent in Sweden, Sigismund returned to Poland in July 1594. Charles, however, rose in rebellion, and, when Sigismund returned to Sweden with an army, Charles defeated him at Stångebro (1598) and deposed him in 1599. Sigismund's subsequent foreign policy was aimed at regaining the Swedish throne, and from 1600 Poland and Sweden were involved in an intermittent war. He also attempted to maintain an alliance with the Austrian Habsburgs. When his first Austrian wife died (1598) and he married her sister Constantia (1605), he provoked his opponents, already aroused by his efforts to introduce majority rule in place of unanimity in the Sejm, to engage in a civil war (1606–08).

Shortly after his victory over his internal enemies, Sigismund took advantage of a period of civil unrest in Muscovy (known as the Time of Troubles) and invaded Russia, holding Moscow for two years (1610–12) and Smolensk thereafter. In 1617 the Polish-Swedish conflict, which had been interrupted by an armistice in 1611, broke out again. While Sigismund's army was also fighting Ottoman forces in Moldavia (1617–21), King Gustavus II Adolphus of Sweden (Charles IX's son) invaded Sigismund's lands, capturing Riga (1621) and seizing almost all of Polish Livonia. Sigismund, who concluded the Truce of Altmark with Sweden in 1629, never regained the Swedish crown. His Swedish wars resulted, moreover, in Poland's loss of Livonia and in a diminution of the kingdom's international prestige.

SWEDEN

• **Sigismund:** *see* Sigismund III Vasa (Poland).

Sigismund, John: *see* John Sigismund.

Siglo de Oro (Spanish literature): *see* Golden Age.

Siglufjördhur, town, northern Iceland, situated on a small inlet of the Greenland Sea. The town is somewhat isolated from the rest of the country. At one time it was a major fishing port and the centre of Iceland's herring-fishing industry, with several freezing, curing, and canning plants and exported herring meal and oil. After 1970, however, the industry diminished in importance and size because of the decline in herring fishing. Pop. (1983 est.) 1,915.

sigma bond, in chemistry, a mechanism by which two atoms are held together as the result of the forces operating between them and a pair of electrons regarded as shared by them. In a sigma bond, the electron pair occupies an orbital—a region of space associated with a particular value of the energy of the system—located mainly between the two atoms and symmetrically distributed about the line determined by their nuclei.

Sigmund (German personal name): *see under* Sigismund.

sign, in marketing and advertising, device placed on or before a premises to identify its occupant and the nature of the business done there or, placed at a distance, to advertise a business or its products.

The ancient Egyptians and Greeks used signs for advertising purposes, as did the Romans, who also, in effect, created signboards by whitewashing convenient sections of walls for suitable inscriptions. Early shop signs were developed when tradesmen, dealing with a largely illiterate public, devised certain easily recognizable emblems to represent their trades. Many examples of Roman signs are preserved, including the famous sign of a bush that was mounted before a tavern to indicate the availability of wine. Some signs, like the Roman bush, the three golden balls of the pawnbroker, and the red and white stripes of the barber—representing blood and bandages, since barbers once also did bloodletting—early became identified with particular trades. Other fields were never so identified, and the signs developed for them reflected coats of arms, if the proprietor could plausibly claim one, or simply the most compelling graphic device that a signpainter could contrive.

Sign was a word slow to enter the English language; by 1225 it signified a gesture or motion, and by the end of the 13th century it meant either the sign of the cross or any other device on a banner or shield. As early as the 1390s English merchants were required to label their premises with their own signs, and in the late 16th century such signs were required in France as well. A hundred years later, both Paris and London ruled that signs—save for those designating inns for the convenience of the traveler—might no longer sway boldly from a stanchion outside the premises but must be mounted flat on the face of the building, safely out of the public way.

These restrictions led to, or at least coincided with, a diminution in the popularity and ubiquity of signs marking shops and dwellings, and thereafter the practice of numbering buildings sequentially by street gained steadily in popularity. Although it had been undertaken spottily in France as early as 1512, such numbering was not widespread until the 18th century, by the end of which it was virtually universal in France and England, and within a few years it was required in France. In Gascony and Spain's Basque country, however, a tradition of placing over the door of a house a sign bearing its owner's name (or at least the date of construction) survived down to modern times.

In Europe, after the invention of printing by movable type, it was not long before printed handbills, flyers, broadsheets, and posters were affixed to walls and fences and even signboards carried by people, by which they advertised an assortment of goods and services, public executions, sailings and dockings, and the like. By the 19th century the scramble for bill-posting space and the proliferation of "post no bills" caveats on many walls had put available space in such demand that entrepreneurs constructed billboards and purchased the right to mount them on private property.

When practical electric generators were invented in the late 19th century, illumination became possible for shop signs and billboards, and by 1910 the French scientist Georges Claude was experimenting with the neon tube and other gas-filled illuminating devices. In less than a decade, signs were being fashioned of glass tubes bent to form words and designs that glowed red or green or blue when the gases inside them were subjected to an electric current.

Government regulation grew apace with lighting technology, and as signs had once been prohibited for businesses other than inns, illuminated signs and indeed any signs came to be precluded from residential neighbourhoods in much of the world by the mid-20th century. Sign designers took to highways and airways, introducing various techniques of animation to the static skills of the electric-sign maker. Headlines or sales messages ran along electronic billboards atop downtown buildings. The nighttime skyline of every city in the world changed as electric signs came to dominate the main commercial streets.

sign language, any means of communication through bodily movements, especially of the hands and arms, used when spoken communication is impossible or not desirable. The practice is probably older than speech. Sign language may be as coarsely expressed as mere grimaces, shrugs, or pointings; or it may employ a delicately nuanced combination of coded manual signals reinforced by facial expression and perhaps augmented by words spelled out in a manual alphabet. Wherever vocal communication is impossible, as between speakers of mutually unintelligible languages or when one or more would-be communicators is a deaf-mute, sign language can be used to bridge the gap.

Language barrier. Chinese and Japanese, whose languages use the same body of characters but pronounce them entirely differently, can communicate by means of a sign language in which one watches while the other traces mutually understood characters in his or her palm. Evidence of long use of sign language to communicate around mutually unintelligible languages exists for Africa, Australia, and North America. The most generally known model is that of the Plains Indians of 19th-century North America. Although their languages were dissimilar, the mode of life and environment of all groups had many shared elements, and, consequently, finding common symbols was easy. Thus, a cupped hand leaping and bobbing away from the "speaker" was familiar to all as the rump of a bounding deer; a circle drawn against the sky meant the moon—or something as pale as the moon. Two fingers astride the other index finger represented a person on horseback; two fingers spread and darting from the mouth like the forked tongue of a snake meant lies or treachery; and the gesture of brushing long hair down over the neck and shoulder signified a woman. This sign language became so familiar that long and complex narratives—in monologue or dialogue—could be signed and understood within large groups of Indians otherwise unable to communicate.

Inability to speak. The Indian sign language was codified by use into an explicit vocabulary of gestures representing or depicting objects, actions, and ideas, but it made no attempt to "spell out" or otherwise represent words that could not be conveyed by gestures. Several forms of sign language were developed to enable deaf-mutes to spell out words and sounds, however. Most of these are as complex and flexible as spoken languages.

It was long thought in many cultures that deaf-mutes were ineducable, and the few teachers willing to try were available only to the wealthy. In the mid-18th century, however, the first educator of poor deaf children, Charles-Michel, abbé de l'Epée, developed a system for spelling out French words with a manual alphabet and expressing whole concepts with simple signs. From l'Epée's system developed French Sign Language (FSL), still in use in France today and the precursor of American Sign Language (ASL) and many other national sign languages.

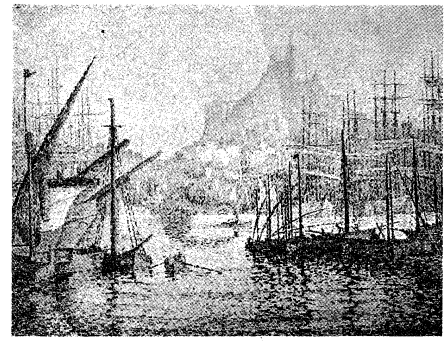
FSL was brought to the United States in 1816 by Thomas Gallaudet, founder of the American School for the Deaf in Hartford, Conn. The new sign language was combined with the various systems already in use in the United States to form ASL, which today is used by more than 500,000 deaf people in the United States and Canada; it is the fourth most common language in the United States. National sign languages such as ASL have more in common with one another than with the spoken languages of their country of origin, since their signs represent concepts and not English or French or Japanese words. One system, Cued Speech, first developed by the American physicist R. Orin Cornett in 1966, does, however, successfully employ hand signs representing only sounds (not concepts), used in conjunction with lipreading. It has been adapted to more than 40 languages.

Abstinence from speech. Members of religious orders who have taken vows of silence, as well as others who for reasons of piety or humility have forsworn speech, have need of sign language. Often, in a silent monastic order, for instance, natural gestures such as passing food or pointing to some needed object have sufficed for effective communication, leaving little need for specially coded signs. Meher Baba, an Indian religious figure, abstained from speech in the last decades of his life but "dictated" voluminous writings to disciples, at first by pointing to letters on an English-language alphabet board; but, after evolving a suitable sign language of gestures, he relied on that alone. The medieval English cleric Venerable Bede worked out a coded sign language based on manual signs representing numbers, with the numbers in turn signifying letters of the Latin alphabet in sequence, *i.e.*, 1 for *A*, 7 for *G*, etc. It is not known, however, whether he devised the system to communicate with the deaf or merely to maintain silence.

sign of the cross: *see* cross, sign of the.

Signac, Paul (b. Nov. 11, 1863, Paris—d. Aug. 15, 1935, Paris), French painter who developed with Georges Seurat the technique called pointillism.

When he was 18, Signac gave up architecture for painting and, through Armand Guillaumin, became a convert to the colouristic principles of Impressionism. In 1884 Signac helped found the Salon des Indépendants. There he met Seurat, whom he initiated into



"View of the Port of Marseille," oil painting by Paul Signac, 1905; in the Metropolitan Museum of Art, New York City

By courtesy of the Metropolitan Museum of Art, New York, gift of Robert Lehman, 1955; permission S.P.A.D.E.M. 1971, by French Reproduction Rights, Inc.

the broken-colour technique of Impressionism. The two went on to the method they called pointillism, in a fashion that came to be called Neo-Impressionism. They continued to apply pigment in minute dabs of pure colour, as had the Impressionists, but they adopted an exact, almost mathematical system of applying the dots instead of the somewhat intuitive application of the earlier masters. In watercolours Signac used the principle in a much freer manner. After 1886 he took part regularly in the annual Salon des Indépendants, to which he sent landscapes, seascapes, and decorative panels. Being a sailor, Signac traveled widely along the European coast, painting the

landscapes he encountered. In his later years he painted scenes of Paris, Viviers, and other French cities.

Signac produced much critical writing and was the author of *D'Eugène Delacroix au néo-impressionnisme* (1899; "From Eugène Delacroix to Neo-Impressionism") and *Jongkind* (1927). The former book is an exposition of Pointillism as developed by Seurat and himself.

Signal Companies, Inc., The, major American conglomerate corporation engaged mostly in automotive and aerospace engineering, energy development, and environmental improvement. Headquarters are in La Jolla, Calif.

The company was incorporated in 1928 as the Signal Oil and Gas Company, to continue the business of Signal Gas Company. Within a few months it became involved in the production side of the petroleum industry. It assumed its present name in 1968.

Over the years the company has grown through acquisition into a highly sophisticated technological concern. In 1964 it acquired Garrett Corporation, thus entering the aerospace field. Garrett makes engines, control systems, and other aircraft and missile components. Its products are used on nearly all U.S. commercial and military aircraft and on many of foreign design. In 1975 the company acquired controlling interest in UOP Inc. (formerly Universal Oil Products Company), which provides technology for the petroleum-refining and petrochemical industries, as well as producing environmental control systems. In 1981 The Signal Companies acquired Ampex Corporation, which manufactures audio and video, data-memory, and magnetic-tape products. Signal also owns Dunham-Bush, manufacturer of refrigerating and cooling equipment, and Wheelabrator-Frye, an engineering and construction concern.

signal generator, electronic test instrument that delivers an accurately calibrated signal at frequencies from the audio to the microwave ranges. It is valuable in the development and testing of electronic hardware. The signal generator provides a signal that can be adjusted according to frequency, output voltage, impedence, waveform, and modulation.

Signal generators are of five major types: oscillators, which generate sine waves useful in measuring the response of loudspeakers, amplifiers, microphones, transducers, and acoustic systems; standard signal generators, which generate sine waves over a wide range of output power and modulation, used, for example, to test radio receivers and measure gain, bandwidth, and signal-to-noise ratio; frequency synthesizers, which generate highly precise output frequencies over wide ranges; pulse generators, which produce pulsed signals at precise duration at precise frequencies; and random-noise generators, which produce a wideband noise for various types of electronic, mechanical, and psychological testing.

signinum, opus (mosaic): *see* opus signinum.

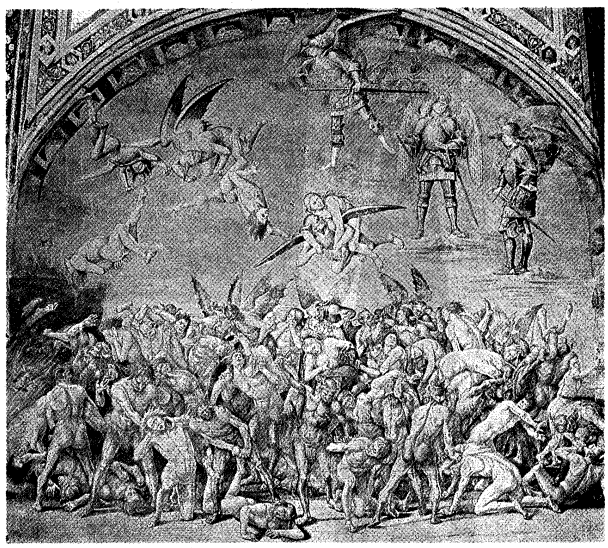
Signorelli, Luca, in full LUCA D'EGIDIO DI VENTURA DE' SIGNORELLI, also called LUCA DA CORTONA (b. 1445/50, Cortona, Republic of Florence—d. Oct. 16, 1523, Cortona), Renaissance painter, best known for his nudes and for his novel compositional devices.

It is likely that Signorelli was a pupil of Piero della Francesca in the 1460s. The first certain surviving work by him, a fragmentary fresco (1474) now in the museum at Città di Castello, shows a strong influence from Piero. His first signed work was a processional banner with a Madonna on one side and a Flagellation on the other; these hang in the Brera, Milan, as separate pictures. They still show links with the style of Piero, but the dominant influence is that of Florence and especially the scientific naturalism of the Pollaiuoli brothers, which suggests that Signorelli visited Florence in the 1470s. In 1479 he was elected to the Council of 18 in his native Cortona, and for the rest of his life he was active in politics.

About 1483 he went to Rome, where the "Testament of Moses" fresco in the Sistine Chapel is unanimously attributed to him. By that date his style had become fixed, his interest in dramatic action and the expression of great muscular effort marking him as an essentially Florentine naturalist. The S. Onofrio altarpiece (1484) for Perugia cathedral shows the same qualities. Between 1497 and 1498 he was at work on a fresco cycle of scenes from the life of St. Benedict in the monastery at Monteoliveto Maggiore, near Siena.

His masterpiece, the frescoes of "The End of the World" and the "Last Judgment" (1499–1502), is in the chapel of S. Brizio in Orvieto cathedral. Those frescoes, which greatly influenced Michelangelo, are crowded with powerful nudes painted in many postures that accentuate their musculature. Signorelli had little sense of colour, but here his greenish and purple devils add to the horror induced by the strained poses and the anatomical details in the decayed bodies.

When commissions in Rome and Florence became infrequent, Signorelli returned to his less sophisticated Umbrian clientele. Most of his later works betray the hands of his numerous assistants.



"The Condemned in Hell," fresco by Luca Signorelli, 1500–02; in the chapel of S. Brizio, Orvieto, Italy

SCALA—Art Resource/EB Inc.

Signoret, Simone, original name SIMONE KAMINKER (b. March 25, 1921, Wiesbaden, Ger.—d. Sept. 30, 1985, Eure, Fr.), French dramatic actress of the stage and motion pictures, noted for her ability to play women of warmth and courage.

Born in Germany to French nationals, Signoret was reared in Paris. She studied at the Sorbonne, engaged in left-wing causes, and played a number of dramatic roles before achieving stardom in the film *Casque d'or* (1951; "Golden Helmet"). For *Room at the Top* (1958) she was honoured as best actress by the British and American film academies and by the Cannes Film Festival; she was also nominated for another best actress Oscar in 1965 for *Ship of Fools.*

Meanwhile, in 1951, after divorcing her first husband, the director Yves Allegret, she had married the singer and actor Yves Montand. Together they campaigned against the execution of the Rosenbergs, the Vietnam War, and the Algerian war—attracting at times violent hostility in France. Events in Hungary in 1956 disillusioned them with Communism and, as she recounted in her autobiography, *La Nostalgie n'est plus ce qu'elle était* (1976; *Nostalgia Isn't What It Used to Be*), they made no secret of their feelings to Soviet leader Nikita Khrushchev when they visited the Soviet Union.

Signoret also appeared in some successful television series. She won critical acclaim for her best-selling books, including her second novel, *Adieu, Volodia,* which appeared in 1985.

signoria (Italian: "lordship"), in the medieval and Renaissance Italian city-states, a government run by a signore (lord, or despot) that replaced republican institutions either by force or by agreement. It was the characteristic form of government in Italy from the middle of the 13th century until the beginning of the 16th century.

The development of the signoria marked the final stage in the evolution of the Italian city-state. The bitter factional struggles within the republican communes made it seem desirable to transfer power into the hands of one man strong enough to preserve peace. Often an individual began by holding a communal office, such as Captain of the People, and gradually extended his authority until it was permanent and made hereditary in his family. He would then seek papal or imperial titles to legitimize his position.

By the beginning of the 14th century, a number of cities in northern Italy were ruled by signori: Milan by the Visconti family, Ferrara by the Este, Verona by the Della Scala, Padua by the Carrara. The earliest signori in Tuscany were the condottieri (mercenary generals) Uguccione della Faggiuola at Pisa and Lucca (1313–16), and Castruccio Castracani, also at Lucca (1320–28).

The Visconti, who ruled Milan until 1447, were the most notable of the signori in centralizing and consolidating their power. So successful were the signori in controlling the areas of administration, justice, and the military that historians have considered them to be among the originators of the modern state. Many of the signori are famous as patrons of arts and letters who contributed to the cultural achievements of the Renaissance.

In areas that escaped the rule of one lord, the name signoria often refers to the ruling body of magistrates. For example, in the commune of Florence, the Signoria was the supreme executive council, chosen from among the members of the *arti,* or guilds, in the various districts of the city every two months.

Sigourney, L(ydia) H(oward), *née* HUNTLEY (b. Sept. 1, 1791, Norwich, Conn., U.S.—d. June 10, 1865, Hartford, Conn.), popular writer, known as "the sweet singer of Hartford," and one of the first American women to succeed at a literary career.

Lydia Huntley worked as a school teacher and published her first work, *Moral Pieces in Prose and Verse,* in 1815. After her marriage in 1819 to Charles Sigourney (died 1854), a merchant, she devoted her life to writing. She wrote some 67 books and more than a thousand articles during her career; many were widely read in Europe as well as in the United States. Sigourney's writing relied on sentimental conventions of moral and religious themes; death and piety were her most popular subjects. Her best-known prose work was *Letters to Young Ladies* (1833); her *Illustrated Poems* (1849) was published in a series that included the poems of Henry Wadsworth Longfellow.

A biography by Gordon S. Haight, *Mrs. Sigourney: The Sweet Singer of Hartford,* was published in 1930.

Siguiri, town, northeastern Guinea, western Africa. A port on the Niger River, it lies at the intersection of roads from Bamako (Mali), Kankan, and Dinguiraye, and is 5 miles (8 km) north of the confluence of the Tinkisso River with the Niger. Siguiri is the chief market town for the cattle, maize (corn), millet, and kola nuts produced in the surrounding agricultural area. It is also a major exporter of rice grown in the river valleys. It is the site of a hospital, a central mosque, and a Roman Catholic mission (1924). The region in which Siguiri is situated is mostly savanna and is inhabited by the Malinke, Diula, and Dialonke peoples. Alluvial gold has been worked in the area since the 13th century. Pop. (1983 prelim.) 37,361.

Sigurd (literary hero): *see* Siegfried.

Sigurd I MAGNUSSON, byname SIGURD JERUSALEMFARER, or THE CRUSADER, Norwegian SIGURD JORSALFARE (b. *c.* 1090, Norway—d. 1130, Oslo), king of Norway (1103–30) and the first Scandinavian king to participate in the Crusades. He strengthened the Norwegian Church by building cathedrals and monasteries and by imposing tithes, which provided a reliable source of income for the clergy.

An illegitimate son of the Norwegian king Magnus III Barefoot, Sigurd succeeded to the throne with his elder and younger brothers, Eystein and Olaf Magnusson, in 1103. Olaf died in 1115 while still a youth and never actually ruled, leaving Sigurd and Eystein to reign jointly until Eystein's death in 1122, the longest joint rule in Norwegian history.

In 1107 Sigurd sailed for Palestine with 60 ships, leaving Eystein to rule Norway. He visited England, France, Spain, and Sicily on the way, fighting against Moorish pirates off the Balearic Islands. He also bestowed the title of king on the Norman ruler Roger II of Sicily. Arriving in Palestine in 1110, he was warmly received by Baldwin I, king of Jerusalem, and assisted the Franks in their capture of Sidon (now Ṣaydā, Lebanon). Leaving men and his entire fleet in Constantinople (now Istanbul) as a gift to the Byzantine emperor Alexius I, Sigurd returned overland to Norway in 1111.

As sole ruler after Eystein's death Sigurd built several cathedrals, including one at Stavanger, where he also established a bishopric, greatly contributing to the city's growth. In his later years he became mentally unbalanced.

Sigurdsson (king of Norway): *see* Sverrir Sigurdsson.

Sigurdsson, Jón (b. June 17, 1811, western Iceland—d. Dec. 7, 1879, Copenhagen), Icelandic scholar and statesman who collected and edited many Old Norse sagas and documents. He was also the leader of the 19th-century struggle for Icelandic self-government under Denmark.

Educated in classical philology, ancient history, and political theory and economics in Copenhagen, Sigurdsson spent much of his life gathering and editing old Icelandic manuscripts as a member and then as secretary of the Arnamagnaean Foundation, which had been established for that purpose. Alone or with others he edited such collections as *Íslendinga sögur* (vol. 1–2, 1843–47; "Icelandic Sagas") and *Lovsamling for Island* (1853–57; "Collection of Icelandic Laws").

An advocate of Icelandic autonomy under Denmark, Sigurdsson took part in discussions that led to the Danish king Christian IX's restoration of the old Icelandic Althing (parliament) as an advisory body in 1843. Sigurdsson was elected to that body for its first session in 1845, later becoming its speaker. As a leader of the Patriotic Party, Sigurdsson successfully agitated for Iceland's freedom of trade (1854); he also led in the modernization of Iceland's agriculture and fishing techniques. Always pressing Denmark for self-government, he undoubtedly influenced the granting by Denmark in 1874 of a constitution that provided for Iceland's control of its finances and for legislative power shared with the Danish crown.

Sigurjónsson, Jóhann (b. June 19, 1880, Laxamýri, Ice.—d. Aug. 31, 1919, Copenhagen), Icelandic playwright who became internationally famous for one play, *Fjalla-Eyvindur* (1911; Danish *Bjærg-Ejvind og hans hustru,* 1911; *Eyvind of the Hills*), which created a sensation in Scandinavia and in Germany and was later produced in England and the United States. Some contemporary critics hailed him as a peer of Henrik Ibsen, B.M. Bjørnson, and August Strindberg—but his other plays were less successful.

The son of a wealthy farmer, Sigurjónsson was sent to the University of Copenhagen where he joined a group of young intellectuals who looked to the Danish critic Georg Brandes and the philosophy of Nietzsche for guidance. He soon concluded that the Icelandic language provided too small an audience for an ambitious dramatist and began to write his plays in both Icelandic and Danish.

After two unsuccessful plays came *Fjalla-Eyvindur,* which took Copenhagen by storm. *Fjalla-Eyvindur* is a dramatization of a popular Icelandic folktale of a wealthy young woman who gives up everything to join her outlaw lover, a sheep thief, in the hills. Sigurjónsson gave the story new life for the stage and wrote a final act that lifts it to great tragedy. *Galdra-Loftur* (1915; "Loftur the Sorcerer"), also based on a folktale, is about a student at the Cathedral School at Hólar who sells his soul to the devil. Sigurjónsson died prematurely of tuberculosis.

Sihanouk, Prince Norodom: *see* Norodom Sihanouk, Prince.

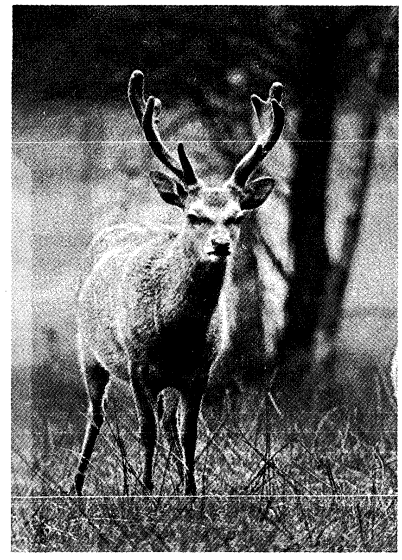
Sihanoukville (Kampuchea): *see* Kâmpóng Saôm.

Sihor (India): *see* Sehore.

Siirt, city, southeastern Turkey. It lies along the Bühtan River, in the southeastern foothills of the Taurus Mountains. Under the Ottoman Empire, Siirt was a major commercial centre for a large region that included northern parts of Iraq and Syria. It is now a local market for the livestock and agricultural products of a much smaller area; its chief industrial activity is the manufacture of goat-hair blankets, which are well-known throughout Turkey. It has a number of interesting buildings, including the Ulu Cami (Great Mosque), built by the Seljuqs in the 13th century. The city is linked by road with Diyarbakır to the west, Bitlis to the north, and northern Iraq through Cizre.

The region in which Siirt is situated is drained by several tributaries of the Tigris River. It is well-forested and mountainous northeast of the city and gives way to a series of broad plateaus with steppe vegetation in the south. Livestock raising and the cultivation of cereals are the chief activities. The area is the centre of the nation's oil-producing region, with large fields in operation in Garzan, Kurtalan, and Ramandağı. Oil is piped to the refinery in Batman and for 320 miles (515 km) to the port of Iskenderun. In addition to Turks, the region has a large Kurdish population. Pop. (1980) 42,291.

sika (*Cervus nippon*), gregarious, forest-dwelling deer, family Cervidae (order Artiodactyla), native to eastern Asia. The sika was long considered sacred in Japan and is valued



Japanese sika (*Cervus nippon nippon*)
Kirtley-Perkins from The National Audubon Society Collection/ Photo Researchers—EB Inc.

in China for its antlers, which are used in traditional medicine. A small to medium-sized deer, it has a white rump and a white-spotted coat. The male has four-tined antlers.

Several of the races of sikas, which vary in size and coloration, are listed as endangered in the *Red Data Book.* The Japanese sika, or Japanese deer (*C. n. nippon*), is widely kept in zoological gardens and has been introduced into England and Europe. The smallest of the sikas, it stands 80–86 cm (31–34 inches) at the shoulder. Its coat is reddish brown with white spots in summer and brown without spots in winter. The largest sika is the Dybowski's, or Ussuri, sika (*C. n. hortulorum*), which stands about 110 cm (43 inches) at the shoulder. This deer is pale brown and spotted in summer and dark brown, with or without spots, in winter.

Sikanese, also called SIKA, people inhabiting the mountains and coastal areas between the Bloh and Napung rivers in east-central Flores, one of the Lesser Sunda Islands, in Indonesia. Numbering about 100,000 in the late 20th century, they speak a language related to Solorese, which belongs to the Timor-Ambon language group. In 1929 the Nita and Kangae mountain domains were united with Sika territory to form an autonomous region under the Radja of Sika, which survives today as the Indonesian administrative region of Maumere. The Sikanese practice a slash-and-burn agriculture, growing rice, corn (maize), and cassava; copra is produced along the coast. Villages are centred around offering stones, a remnant of the traditional religion, which today has been largely replaced by Roman

Catholic ritual. The majority of Sikanese live in the western portion of the region and have markedly different kinship traditions from the eastern Sikanese. In the west, descent groups are nonlocalized and non-exogamous, based on a common patrilineal ancestor. Marriage is regulated by numerous incest taboos. The descent groups of the eastern Sikanese are endogamous and localized. They have no class system, whereas western Sikanese have a class of nobles related to the Radja of Sika.

Sīkar, town, administrative headquarters of Sīkar district, Rājasthān state, northwestern India. The town is a major rail and road junction and engages in agricultural trade. Its handicrafts include textiles, pottery, enamel work, and lacquered goods. Sīkar has two colleges affiliated with the University of Rājasthān.

Sīkar district (2,985 sq mi [7,732 sq km]) comprises part of a plains area west of the Arāvalli Range that was previously known as the Shekhawati tract of Jaipur princely state. Agriculture is the principal occupation; bajra (pearl millet), pulses (legumes), barley, and cotton are the chief crops. The district has cement and cotton-ginning factories, and beryllium, mica, marble, and fluorite deposits are worked. Pop. (1981) town, 102,970; district, 1,377,245.

Sikasso, town and capital of Sikasso *région,* southern Mali, West Africa. Sikasso town was a small village before becoming the capital of the Kingdom of Kénédougou in the late 19th century. Today it constitutes a centre for cotton ginning and textile manufacturing. A road links Sikasso with Bamako, the national capital.

Sikasso *région* borders the Bamako and Segou *régions* on the north, and the countries of Burkina Faso (formerly Upper Volta) (east), Ivory Coast (south), and Guinea (west). The *région*'s elevation varies from about 1,000 ft (300 m) in the lowland valleys of the central area to about 1,650 ft (500 m) in the flat-topped sandstone plateaus of the east and west. Much of Sikasso's area of 76,480 sq mi (198,080 sq km) is devoted to subsistence agriculture; important crops include sorghum, corn (maize), and, more recently, rice; cash crops grown include cotton and tea. Large numbers of cattle are exported from Sikasso *région* to the Ivory Coast and gold is mined (since 1980) in southwest Sikasso, near the town of Kalana. The Bambara and Senufo peoples are the *région*'s main inhabitants. Pop. (1976) town, 46,503; *région,* 1,098,068.

Sikelianós, Angelos (b. March 28, 1884, Leucas island, Greece—d. June 19, 1951, Athens), one of the leading 20th-century Greek lyrical poets.

Sikelianós' first important work, the *Alafroískiotos* ("The Light-Shadowed"), was published in 1909, and revealed his lyrical powers. It was followed by a group of outstanding lyrics. His next period was introduced by the philosophic poem *Prólogos tés zoí* (1917; "Prologue to Life") and includes the long works *Meter Theou* ("Mother of God") and *Pascha ton Hellenon* ("The Greek Easter"), culminating in the *Delphikós lógos* (1927; "Delphic Utterance"). In the last, Greek tradition and the national historic and religious symbols are given a mystic turn and a universal significance.

In the 1930s and 1940s there appeared a second group of lyrics, which display the full power of Sikelianós' art. They express in rich and incisive language and with forceful imagery the poet's belief in the beauty and harmony of the world. The tragedies of Sikelianós (*Sibylla, Daedalus in Crete, Christ in Rome, The Death of Digenis* and *Asklepius,* which are introduced by the long dramatic poem *The Dithyramb of the Rose*) are more notable for their lyric than their dramatic qualities. In his mature works Sikelianós tried to express in poetry the aspirations of the Demotic movement of the 1880s, which sought to combine Greek tradition with Western thought, and to introduce as a consciously literary language the idiom of the people. Although occasionally Sikelianós' grandiloquence blunts the poetic effect of his work, some of his finer lyrics are among the best in Western literature.

Sikeloi (ancient people): *see* Siculi.

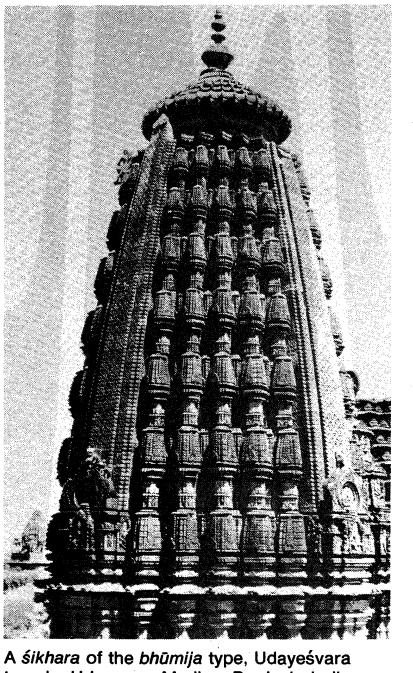
Sikh Wars (1845–46; 1848–49), two campaigns fought between the Sikhs and the British. They resulted in the conquest and annexation by the British of the Punjab in northwestern India.

The first war was precipitated by mutual suspicions and the turbulence of the Sikh army. The Sikh state in the Punjab had been built into a formidable power by the maharaja Ranjit Singh, who ruled from 1801 to 1839. Within six years of his death, however, the government had broken down in a series of palace revolutions and assassinations. By 1843 the ruler was a boy, the youngest son of Ranjit Singh, whose mother was proclaimed queen regent. Actual power, however, resided with the army, which was itself in the hands of "punches," or military committees. Relations with the British had already been strained by the refusal of the Sikhs to allow the passage of British troops through their territory during the First Anglo-Afghan War (1838–42). Having determined to invade British India under the pretext of forestalling a British attack, the Sikhs crossed the Sutlej River in December 1845. They were defeated in the four bloody and hard-fought battles of Mudki, Fīroz Shāh (Fīrozpur), Alīwāl, and Sobrāon. The British annexed Sikh lands east of the Sutlej and between it and the Beās River; Kashmir and Jammu were detached and the Sikh army was limited to 20,000 infantry and 12,000 cavalry. A British resident was stationed in Lahore with British troops.

The Second Sikh War began with the revolt of Mulrāj, governor of Multān, in April 1848 and became a national revolt when the Sikh army joined the rebels on September 14. Indecisive battles characterized by great ferocity and bad generalship were fought at Rāmnagar (November 22) and at Chiliānwāla (Jan. 13, 1849) before the final British victory at Gujrāt (February 21). The Sikh army surrendered on March 12, and the Punjab was then annexed.

śikhara, also spelled SHIKARA (Sanskrit: "mountain peak"), also called SIKAR, in North Indian temple architecture, the superstructure, tower, or spire above the sanctuary and also above the pillared *maṇḍapa*s (porches or halls); it is the most dominant and characteristic feature of the Hindu temple in the north. The North Indian *śikhara* is basically of two types: (1) the *latina,* curvilinear in outline, the type most usually found above the sanctuary; and (2) the *phāmsanā,* rectilinear in outline and capped by a bell-shaped member, the form more usually found above the *maṇḍapa.*

The *latina śikhara* is composed of a series of horizontal roof slabs gradually receding toward the top and provided with projections that extend from the base and wall of the temple. The surface of the *śikhara* is covered with a vinelike tracery composed of diminutive *candraśālā*s (ogee arches). Above the truncated top (*skandha*) projects a necking on which rests a large grooved disk (*āmalasāraka*), and above it sits a pot with a crowning finial. Each story is indicated by miniature *āmalasāraka*s at the four corners, repeated all the way to the top. The *latina śikhara* has two further variations: the *śekharī* and the *bhūmija.* The *śekharī* consists of the central *latina* spires with one or more rows of half spires added on either side and miniature *śikhara*s clustered along the base and corners. The *śekharī* was popular from the 10th century onward and can be observed on most Central Indian temples; the Lakṣmaṇa and Kaṇḍārya Mahādeva



A *śikhara* of the *bhūmija* type, Udayeśvara temple, Udayapur, Madhya Pradesh, India, 1059–82
P. Chandra

temples at Khajurāho, Madhya Pradesh, have excellent examples.

The *bhūmija* variation has a flat vertical projection in the centre of each of the four sides, the quadrants between being filled with rows of miniature shrines all the way up to the top of the tower. The *bhūmija* temple was particularly popular in Mālwa, in the western part of Madhya Pradesh, and in the Deccan; a handsome example is the 11th-century Udayeśvara temple at Udayapur, Madhya Pradesh.

According to South Indian architecture texts, the term *śikhara* is reserved for the dome-shaped crowning cap, though art historians have generally used the term to designate all temple spires, north and south. The South Indian spire, known as the *kūṭina* type, is quite different in shape from the North Indian *śikhara,* having a pyramidal storied arrangement, with each story (*bhūmi*) stepped and relatively realistically delineated.

Sikhism, an Indian religion combining Islāmic and Hindu elements, founded in the Punjab (Pañjāb) in the late 15th century AD by Nānak.

A brief treatment of Sikhism follows. For full treatment, *see* MACROPAEDIA: Sikhism.

Sikhs consider themselves disciples of Nānak and his nine successors, who are called the Ten Gurūs. The writings of the early Gurūs were compiled in the *Ādi Granth* (*q.v.*), the Sikh sacred book, by Arjun (1563–1606), the fifth Gurū. After Arjun's execution by the Mughal emperor, the Sikhs began to change from a pacifist to a militant sect, a process that culminated under the 10th Gurū, Gobind Rāī (1666–1708). It was he who founded the fraternity known as the Khālsā (*q.v.;* "Pure"), which has remained the principal Sikh order. Its members adopted the additional name Singh ("Lion") or Kaur ("Lioness") and observed a strict discipline. Gobind Singh, as Gobind Rāī became, lost all his four sons in his lifetime and declared the succession of Gurūs at an end. He invested the *Ādi Granth* (or *Granth Sahib*) as the immortal Gurū of

the Sikhs and also compiled his writings in the *Dasam Granth* (*q.v.*).

After virtually destroying the Muslim landed class in southern Punjab and defying domination for some eight years, Gobind Singh's successors fell to savage persecution by the Muslim governors of the region. This situation eased with successive invasions by Persians and Afghans in the mid-18th century. The Sikhs, who had kept out of the way of the invaders, organized themselves into 12 *misl*s, or militias, each with its own sphere of operation. The *misl*s built chains of forts and levied protection money from towns and villages.

It was the absorption of the *misl*s under Ranjit Singh (1780–1839) that led to the formation of the Sikh state of the early 19th century. After the death of Ranjit Singh, however, the state rapidly disintegrated into anarchy. The British, apprehending hostilities, began to move their forces to the Punjab frontier, and there followed what are known in English history as the Sikh Wars (*q.v.*) of 1845–46 and 1848–49. After the Sikh defeat, the Punjab was annexed to British India.

Sikhism under British rule was characterized by several factional movements, some violently political. The Singh Sabha movement, which enjoyed the patronage of English administrators and which stimulated European scholarly interest in the religion, was essentially educational and literary. Anglo-Sikh relations were closest during World War I, when many Sikhs fought with distinction in the British army. Cooperation diminished considerably after the British massacre of civilians at Amritsar in 1919.

British relinquishment of power in India was accompanied by the partition of the country; the western part of the Punjab became Pakistani territory, the eastern part Indian. The Sikhs left in Pakistan (about 2,500,000) moved to India and in turn ejected Muslims living in East Punjab. This mass exchange of populations was accompanied by extreme violence and heavy loss of life. Most of the refugee Sikhs were resettled in East Punjab; in many districts bordering on Pakistan the Sikhs came to form a majority of the population. In subsequent decades the Sikhs turned the Punjab into a highly productive agricultural area that became known as the breadbasket of India, and Sikhs also achieved prominence in the Indian business community and in the military. Their success emboldened some Sikhs to seek autonomy within the greater Indian federation and even to agitate for the creation of a separate Sikh nation in the Punjab. Violence consequently erupted between Sikh extremists and the Indian government, climaxing in the assault by the Indian army on the Harimandir (Golden Temple) of Amritsar, the Sikhs' holiest shrine (June 1984), and the Sikhs' assassination of Prime Minister Indira Gandhi (October 1984). In the following years the Sikh community was disrupted by the terrorist activities of Sikh extremists, whom the Indian government continued to try to suppress.

The Sikh religion is an amalgam of the Muslim faith and Hinduism, simply and clearly expressed in the Panjabi language. There is one God, who is not represented by idols or images. Man should serve him by leading a good life in obedience to his commands and by prayer, in particular by repeating the name of God, until, after his soul has passed through various existences by transmigration, he ultimately becomes one with God.

There is no professional Sikh priesthood: adults of either sex are eligible to carry out religious ceremonies, which consist largely in the reading of the *Granth*. The place of worship is the gurdwara, the chief example being the Harimandir, which was founded by Gurū Arjun, several times destroyed, and finally rebuilt by Ranjit Singh. Sikhs keep the Hindu festivals by performing ceremonies in the gurdwaras, and they also celebrate festivals on their own holy days, such as the birthdays of some of the Gurūs, by taking the *Granth* in procession through the streets. Sikh boys and girls undergo initiation into the Khālsā at the age of puberty.

Sikhote-Alin, also spelled SICHOTE-ALIN, mountain complex of the Russian Soviet Federated Socialist Republic in the Soviet Far East, fronting the Tatar Strait and the Sea of Japan for 750 miles (1,200 km) northeast–southwest. Major geological fault lines bound the area, and the structural trench of the Ussuri River Valley lies along the northwest. The relief is complicated; the features of the region include eight main ranges, rising to a maximum height of 6,814 feet (2,077 m) in Mount Tordoki-Yani. Although the highest summits are bare, most of the mountains are densely forested with birch and conifers on higher slopes and mixed deciduous forest lower down. The mountains are one of the leading lumbering areas of the Soviet Far East.

A number of minerals are exploited including lead, zinc, and tin. The population is extremely sparse.

Sikiṓn (Greece): *see* Sicyon.

Sikkim, one of the smallest states of the Republic of India. Located in the eastern Himalayan Mountains, it is bounded by the independent Himalayan kingdoms of Nepal to the west and Bhutan to the east; by the Tibet Autonomous Region of the People's Republic of China to the north and northeast; and, in India, by West Bengal state to the south. Because of its sensitive location, Sikkim possesses a strategic and political importance out of all proportion to its size.

A brief treatment of Sikkim follows. For full treatment, *see* MACROPAEDIA: India.

Three tribes—the Naong, Chang, and Mon—are believed to have inhabited Sikkim in prehistoric times. Other tribes may have entered from the trans-Himalayas during that period, followed by numerous others during historic times. The largest migration took place between the mid-18th and the 19th century, principally from northern and eastern Nepal.

As a small but independent country, Sikkim had to fight to maintain its territorial integrity. In the 18th and 19th centuries, it fought prolonged wars with Bhutan and Nepal. British penetration began in 1839, and, although the British took over part of the area, Sikkim remained an independent buffer between British India and Tibet. The period following Indian independence was one of political turmoil in Sikkim. By the terms of a 1950 treaty, Sikkim was deemed to be an Indian protectorate, but in 1975 more than 97 percent of the electorate voted for the merger of Sikkim with India, and a month later Sikkim became a state of the Indian Union.

Sikkim stretches about 70 miles (113 km) from north to south and about 40 miles (64 km) from east to west. Its horseshoe-shaped mountain ranges offer no sizable level areas, and about two-thirds of the total territory of the state consists of perpetually snow-covered mountains without year-round human habitation. The most significant mountain group is that dominated by Kānchenjunga, at 28,169 feet (8,586 m) above sea level. It is the highest mountain peak in India and the third loftiest in the world. Within the mountain ranges on the east and west are deep valleys, of which the Tista Valley is the largest. While only in the south is the state not separated from its neighbour by a mountain wall, a number of passes connect Sikkim with neighbouring areas. Much of the state forms the drainage basin of the Tista River, which drops from its source near the Chinese border about 15,700 feet (4,800 m) within its 65-mile (105-kilometre) course to Rongphu (Rangpo).

The climate varies with elevation and ranges from tropical in the low valley bottoms to Arctic-like conditions of perpetual snow and ice in the higher reaches. Depending on elevation and aspect, annual rainfall varies from 50 to 200 inches (1,270 to 5,080 mm), and snow in the upper levels often accumulates to a thickness of 100 feet (30 m). Sikkim is one of the most humid regions in the Himalayas, with most of its annual rainfall coming during the months of May through October.

Most of Sikkim's people—mainly Hindus and Buddhists—live in villages in the central, western, and southern parts of the state. The land is uninhabitable in the far north. The villages consist of many hamlets of small homesteads scattered over the slopes of the hills. Until 1951 there were no urban areas. At that time Gangtok, the capital, was accorded urban status. Although other towns have since been designated urban centres, most of Sikkim's urban population lives in Gangtok.

Agriculture is the basis of the Sikkim economy. On terraced slopes farmers grow corn (maize), paddy rice, buckwheat, wheat, and barley. Sikkim is one of the world's main producers of cardamom, and the region has also become an important exporter of mandarin oranges, apples, and potatoes. Beans, cabbage, ginger, cauliflower, peas, and tomatoes are also grown. Domesticated animals—buffalo, yaks, sheep, goats, pigs, mules, ponies, and poultry—provide for a crude mixed farming that sustains a large number of people.

Sikkim is rich in mineral wealth. Copper, lead, zinc, coal, iron ore, garnet, graphite, pyrites, marble, and steatite have been found in the state. Forests, which cover about one-third of Sikkim's area, have great economic value in sawn timber and wood pulp. Sikkim has a scattering of light and consumer-goods industries.

The Sikkimese are noted for their cotton and wool weaving, carpets, rugs, blankets, and bamboo work. The Cottage Industries Institute offers instruction in these crafts, as well as in doll making, embroidery, ceramics, traditional scroll painting, handmade-paper preparation, and other arts.

Although road transport is the primary mode of travel, Sikkim has only about 1,000 miles (1,600 km) of roads. Gangtok is nearly 75 miles (120 km) from the nearest airport at Bāghdogra in West Bengal, while Siliguri—70 miles (110 km) away in West Bengal—is the nearest railway station to Gangtok.

The state's cultural life is related to Tibetan religious and aesthetic traditions. The cultural climax of the year comes with the two-day Phanglhapsol festival, when masked dances are performed in honour of Kānchenjunga, the presiding deity and the mountain. There are also many secular folk dances. The Namgyal Institute of Tibetology has the largest collection of Tibetan books in the world outside the libraries of Leningrad and Peking. Many monasteries are repositories of artistic treasures, including wall paintings, *tanka*s (religious paintings mounted on brocade), and bronze images.

Few students live more than 2 miles (3 km) from a primary or secondary school, and Sikkim's only university college, affiliated with the University of North Bengal at Darjeeling, is located at Gangtok. Area 2,740 square miles (7,096 square km). Pop. (1981) 316,385.

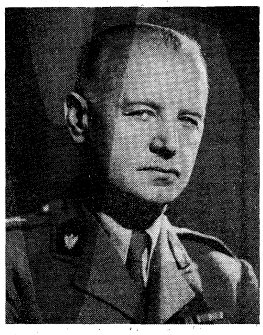
Siklós, Albert, original name ALBERT SCHÖNWALD (b. June 26, 1878, Budapest—d. April 3, 1942, Budapest), Hungarian cellist, composer, and musicologist.

Siklós began composing at the age of six and started studying the pianoforte and music theory at seven. He took up the cello in 1891 and began lecturing while a student at the Hungarian Music School in 1895. He joined the

staff of the Fodor Conservatory in Budapest in 1905 and that of the Academy of Music in 1910; from 1918 until his death, he was in charge of one of the two composition courses at the academy.

Siklós' early works reflected the influence of his training in the Brahmsian Romantic tradition, but the later ones showed the effects of his 20th-century contemporaries Debussy and Richard Strauss. The bulk of his works were written for full orchestra, chamber groups, or the piano, but his catalog ranges from pieces for other solo instruments and voice all the way to choral works, ballets, and operas.

Sikorski, Władysław (Eugeniusz) (b. May 20, 1881, Tuszów Narodowy, Pol., Austria-Hungary—d. July 4, 1943, Gibraltar), Polish soldier and statesman who led Poland's government in exile during World War II.



Sikorski, 1942

By courtesy of the Polish Institute and Sikorski Museum, London

Born and educated in Austrian Poland, Sikorski served in the Austrian Army. In 1908 he founded a secret military organization of Polish nationalists, in which Józef Piłsudski was also prominent. During World War I, Sikorski was war commissioner of the Polish Legion, which served with the Austrian Army against Russia. He later distinguished himself in the Polish–Soviet War (1920–21), and in 1921 he was named chief of the Polish general staff.

In 1922–23 Sikorski served briefly as prime minister of Poland. In 1924–25, as minister of military affairs, he guided the modernization of the army. Sikorski remained neutral during Piłsudski's 1926 take-over of the government; but he joined the anti-Piłsudski opposition in 1928, after being dismissed from his command.

When the Germans overran Poland in 1939, Sikorski became prime minister of the government in exile, establishing good relations with Allied leaders. But in the later course of World War II the Soviet dictator Stalin broke off Soviet–Polish diplomatic contact in April 1943, using as pretext Sikorski's request that the International Red Cross investigate the murder at Katyn of thousands of Polish officers previously in Russian hands. Sikorski was killed in an air crash at Gibraltar the following July.

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Sikorsky, Igor (Ivan) (b. May 25, 1889, Kiev—d. Oct. 26, 1972, Easton, Conn., U.S.), Russian-born U.S. pioneer in aircraft design who is best known for his successful development of the helicopter.

Education and early career. Sikorsky's father was a physician and professor of psychology. His mother also was a physician but never practiced professionally. Her great interest in art and in the life and work of Leonardo da Vinci undoubtedly stimulated her son's early interest in experimenting with model flying



Sikorsky

By courtesy of Sikorsky Aircraft

machines; when he was 12 years old he made a small rubber-powered helicopter that could rise in the air.

In 1903 Sikorsky entered the Naval Academy in St. Petersburg (now Leningrad), with the intention of becoming a career officer, but his interest in engineering led to his resignation from the service in 1906. After a brief period of engineering study in Paris, he entered the Kiev Polytechnic Institute. Following a reasonably successful academic year, however, he concluded that the abstract sciences and the higher mathematics as then taught had little relationship to the solution of practical problems, and he left the school, preferring to spend his time in his own shop and laboratory.

A trip through Europe in the summer of 1908 brought him into contact with the accomplishments of the Wright brothers and the group of European inventors who were trying to match their progress in flight. Returning to Kiev, Sikorsky came to the conclusion that the way to fly was "straight up," as Leonardo had proposed, a concept that called for a horizontal rotor. Assisted financially by his sister Olga, he returned to Paris in January 1909 for further study and to purchase a lightweight engine.

Back in Kiev in May of 1909 he began construction of a helicopter. Its failure revealed some of the practical obstacles. A second machine with a larger engine was tested in 1910, but it also failed to fly. He then made a major decision: "I had learned enough to recognize that with the existing state of the art, engines, materials, and—most of all—the shortage of money and lack of experience . . . I would not be able to produce a successful helicopter at that time." In fact, he had to wait 30 years before all conditions could be met.

For the time being Sikorsky decided to enter the field of fixed-wing design and began construction of his first airplane. Sikorsky's S-1 biplane was tested early in 1910, and, although its 15-horsepower engine proved inadequate, a redesigned airframe with a larger engine (S-2) carried him on his first short flight. The S-3, S-4, and S-5 followed in quick succession, each a refinement of its predecessor, and each adding to his piloting experience. Finally, by the summer of 1911, in an S-5 with a 50-horsepower engine, he was able to remain in the air for more than an hour, attain altitudes of 1,500 feet (450 metres), and make short cross-country flights. This success earned him International Pilot's License Number 64.

The subsequent S-6 series established Sikorsky as a serious competitor for supplying aircraft to the Russian Army. Characteristically, he soon took a giant step: the first four-engined airplane, called "Le Grand," the precursor of many modern bombers and commercial transports, which he built and flew successfully by 1913. Among its innovative features, not adopted elsewhere until the middle 1920s, was a completely enclosed cabin for pilots and passengers.

In the period of disruption following the Russian Revolution and the collapse of Germany, Sikorsky saw little opportunity for further aircraft development in Europe. He decided to start over again in the United States and in March 1919 landed in New York as an immigrant.

Work in the United States. After several lean years as a lecturer and schoolteacher, while trying to find a place for himself in the contracting postwar aircraft industry, he and a few associates, some of them former Russian officers, formed their own company, the Sikorsky Aero Engineering Corporation. They set up shop in an old barn on a farm near Roosevelt Field on Long Island. Sikorsky became a U.S. citizen in 1928. By 1929 the company, having become a division of United Aircraft Corporation, occupied a large modern plant at Bridgeport, Conn., and was producing S-38 twin-engined amphibians in considerable numbers. In 1931 the first S-40, the "American Clipper," pioneered Pan American World Airways mail and passenger routes around the Caribbean and to South America. By the summer of 1937 Pan American began transpacific and transatlantic service with the first four-engined S-42 "Clipper," the last of the Sikorsky series, the ancestor of which had been "Le Grand" of 1913.

By the late 1930s changing requirements for military and commercial air transport forecast the termination of the large flying boat, and Sikorsky returned to his first love, the helicopter. Once again he was involved in "advanced pioneering work . . . where extremely little reliable information and no piloting experience whatever were available." The essential aerodynamic theory and construction techniques that had been lacking in 1910, however, were now available. Early in 1939, with a well-trained engineering group at his disposal, he started the construction of the VS-300 helicopter. As he said later, "There was a great satisfaction in knowing that, within a short period of time, good engineering along a novel line produced encouraging results." On Sept. 14, 1939, the VS-300 lifted off the ground on its first flight. Its designer was at the controls; during his entire career Sikorsky always insisted on making the first trial flight of any new design himself. On May 6, 1941, in an improved machine, he established an international endurance record of 1 hour 32.4 seconds.

It is doubtful that Sikorsky at that time fully envisioned the remarkable development of the vertical-lift machine in the next 30 years. Certainly he did not anticipate widespread use of the helicopter as an offensive military weapon. He regarded it as a useful tool for industry and air commerce but primarily as an effective device for rescue and relief of human beings caught in natural disasters, such as fire, flood, or famine. He estimated that more than 50,000 lives had been saved by helicopters.

Igor Sikorsky's active professional life covered virtually the entire span of practical flight by man, from the Wright brothers to space exploration. Few in aviation can claim such a span of personal participation, or personal contribution with such a wide range of innovative ideas. He only complained that, of all his past predictions, those that he lived to regret were on the "too conservative" side.

Sikorsky retired as engineering manager for his company in 1957 but remained active as a consultant until his death. In addition to his wife (married in 1924), he left one daughter and four sons. Sikorsky received many honorary doctorates in science and engineering,

honorary fellowships in leading scientific and technical societies in the United States and Europe, and the highest medals and awards in aviation, including the Cross of St. Vladimir from Russia; the Sylvanus Albert Reed Award for 1942 from the Institute of Aeronautical Sciences in New York; the United States Presidential Certificate of Merit in 1948; the Daniel Guggenheim Medal and Certificate for 1951; the Elmer A. Sperry Award for 1964; and the National Defense Award in 1971.

(S.P.J.)

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Sikwayi (Cherokee Indian): *see* Sequoyah.

Sikyatki (Hopi: Yellow House), ruined pueblo extending over 10 to 15 ac (4 to 6 ha) in present Navajo County, northeastern Arizona. The site was occupied by members of the Firewood, or Kokop, clan of the Hopi during the Regressive Pueblo stage (*c.* 1300–1700) of the Anasazi culture. Archaeological exploration of the site in the 1890s revealed earthenware bowls, jars, and ladles decorated with distinctive polychrome designs. The patterns, which suggest the heads, beaks, wings, and feathers of birds, were produced with paints containing black, red, or white mineral pigments on a yellow or orange background that resulted from firing of an iron-bearing clay. The beauty of the decorations has inspired their imitation by 20th-century craftsmen.

sīla (Pāli), Sanskrit ŚĪLA, in Buddhism, morality, or right conduct; *sīla* comprises three stages along the Eghtfold Path (*q.v.*)—right speech, right action, and right livelihood. Evil actions are considered to be the product of defiling passions (*see* āsrāva), but their causes are rooted out only by the exercise of wisdom (*prajñā*).

Buddhist morality is codified in the form of 10 precepts (*dasa-sīla*), which require abstention from: (1) taking life; (2) taking what is not given; (3) committing sexual misconduct (interpreted as anything less than chastity for the monk and as sexual conduct contrary to proper social norms, such as adultery, for the layman); (4) engaging in false speech; (5) using intoxicants; (6) eating after midday; (7) participating in worldly amusements; (8) adorning the body with ornaments and using perfume; (9) sleeping on high and luxurious beds; and (10) accepting gold and silver.

Laymen are to observe the first five precepts (*pañca-sīla*) at all times. Occasionally, such as during the fortnightly fast day, they may observe eight precepts (*aṣṭā-sīla*; the first nine, with the seventh and eight combined as one). Normally, the full 10 vows are observed only by monks or nuns, who also follow the detailed monastic rules (*see* pātimokkha) that are a further elaboration of the precepts.

silage, also called ENSILAGE, forage plants such as corn, legumes, and grasses that have been chopped and stored in tower silos, pits, or trenches for use as animal feed. Since protein content decreases and fibre content increases as the crop matures, forage, like hay, should be harvested in early maturity. The green material should be chopped fine enough to assure good packing and the exclusion of air from the mass of chopped material. A high-moisture content in the ensiled material facilitates compaction and the exclusion of air. However, excess moisture (above 70 percent) seeps away and carries valuable nutrients with it. Excess moisture in the silo may also interfere with the fermentation processes that produce the best quality silage. Under proper storage conditions the silage ferments slightly and keeps for several months.

silane, also called SILICON HYDRIDE, any of a series of covalently bonded compounds containing only the elements silicon and hydrogen, having the general formula Si_nH_{2n+2}, in which n equals 1, 2, 3, and so on. The silanes are structural analogues of the saturated hydrocarbons, but are much less stable. The term silane is extended to include compounds in which any or all of the hydrogen atoms have been replaced by other atoms or groups of atoms, as in tetrachlorosilane, $SiCl_4$.

Silanes have been prepared by the reaction of magnesium silicide (Mg_2Si) with acids or by the reduction of silicon chlorides with lithium aluminum hydride. All the silanes burn or explode upon contact with air, and they are decomposed by alkaline solutions with formation of hydrogen and hydrous silica. Upon heating, the silanes decompose into hydrogen and silicon; they react with the halogens or hydrogen halides to form halogenated silanes, and with olefins to form alkylsilanes.

The simplest silane, monosilane (SiH_4), is also the stablest; it is a colourless gas that liquefies at −112° C (−170° F) and freezes at −185° C (−301° F). It decomposes slowly at 250° C (482° F), rapidly at 500° C (932° F).

The instability of the silanes results from the lability of the silicon–hydrogen bond; derivatives in which all the hydrogen atoms have been replaced by organic groups, such as tetramethylsilane, $Si(CH_3)_4$, resemble the saturated hydrocarbons. The compound dimethyldichlorosilane, $(CH_3)_2SiCl_2$, is important as the starting material for the dimethylpolysiloxanes, members of the silicone family of polymers. Chlorotrimethylsilane and vinyltrichlorosilane are used to impart water repellency to numerous materials such as cloth, paper, and glass.

Silao, city, west central Guanajuato state, north central Mexico. Founded in 1537, Silao lies on the Río Silao, at 5,830 ft (1,777 m) above sea level. By virtue of its location in the Bajío region, known as the granary of Mexico, Silao is an important agricultural centre. A wide variety of crops, including corn (maize), beans, wheat, chick-peas, avocados, peaches, and strawberries, thrive in the temperate climate. Livestock are also raised in the vicinity. The principal industry is the weaving of serapes. The main Mexico City–Ciudad Juárez railroad and highway pass through the city, from which a branch railroad and road lead 15 mi (24 km) east-northeast to Guanajuato (*q.v.*) city, the state capital. Pop. (1970) 31,-825.

Silas, SAINT, also called SAINT SILVANUS (b. possibly Rome—d. traditionally Macedonia; fl. AD 50; Western feast day July 13, Eastern feast day July 30), early Christian prophet and missionary, companion of the Apostle St. Paul.

It is generally believed that the Silas in Acts and the Silvanus in II Cor., I and II Thess., and I Pet. are the same. Acts 15:22 first mentions him as one of the "leading men among the brethren" (*i.e.,* the Christian community at Jerusalem) who sent him to Antioch (now Antakya, Tur.), where he is identified as a prophet (Acts 15:32) preaching to the Antiochene Christians.

He supposedly remained in Antioch until he was chosen to join Paul on his second journey. According to Acts, he replaced St. Barnabas, who had broken away from Paul. With Paul, Silas travelled through what is now Turkey, visiting Syria and Cilicia, whose churches they strengthened; from Derbe they went to Lystra where they were joined by St. Timothy. Their journey brought them to Galatia and Troas, from where they sailed to Macedonia.

At Philippi (near present-day Kavála, Greece), where Paul first preached the gospel in Europe, Silas and Paul were beaten and imprisoned for healing a slave girl possessed by "a spirit of divination." After their release, they missioned in Thessalonica. Expelled, they went to Beroea, where Silas remained with Timothy while Paul travelled to Athens. He later rejoined Paul at Corinth. Silas and Timothy are mentioned in II Cor. 1:19 as co-workers and in I and II Thess. as co-authors.

Nothing further is known about Silas' work with Paul. Sometime later he apparently joined the Apostle St. Peter, whom he seems to have served as secretary; I Pet. 5:12 suggests that he wrote this letter with Peter, and some scholars give him a prominent place among the New Testament writers. Subsequent legend designates him first bishop of Corinth.

Silay, chartered city, western Negros Occidental province, Negros island, Philippines. Situated on Guimaras Strait, just north of Bacolod, Silay is a busy commercial and fishing port and the site of a large sugar mill, which handles the crop of the Silay–Talisay area, part of the country's leading sugarcane regions. The city is linked to other population centres by the main coastal highway. Inc. city, 1957. Pop. (1980) 111,131.

Silbermann, Gottfried (b. Jan. 14, 1683, Kleinbobritzsch, Saxony—d. Aug. 4, 1753, Dresden), outstanding German builder of keyboard instruments and member of an important family of musical instrument makers.

Gottfried worked in Strasbourg in the shop of his brother Andreas, also a noted builder, before moving to Freiberg in 1710. There he made spinets, clavichords, and harpsichords and experimented in pianoforte construction. Two of his pianos were played by J.S. Bach, who criticized their construction; Silbermann thereafter improved the instruments, and eventually Bach even acted as Silbermann's agent in selling a piano. Silbermann became court organ builder in 1736, the year of Bach's visit, and his reputation spread widely. Bach's son Carl Philipp Emanuel wrote a rondo expressing his sadness at having to part with a fine Silbermann clavichord. Gottfried died unmarried in 1753, leaving his business in the hands of a nephew, Johann Daniel Silbermann. Another nephew, Johann Heinrich, likewise built and played keyboard instruments, gaining independently a wide reputation and orders from as far away as India.

Silchar, town, administrative headquarters of Cāchār district, southern Assam state, northeastern India. Situated on the Surma River near the Bangladesh border, it is a trade and processing centre for tea, rice, and other agricultural products. There is limited industry, principally papermaking and tea-box manufacturing. Communications include an airport, a rail line, and a motor road connecting Aizawl in Mizorām union territory with Shillong, the state capital of Meghālaya. Pop. (1971) 52,596.

Silchester, parish in Basingstoke and Deane district, in the northern part of the county of Hampshire, England, southwest of Reading. Near the small modern village is the deserted site of the important Roman-British town of Calleva Attrebatum, a node of the Roman road system in Britain. Most of the antiquities recovered from the site are in the Reading Museum; the local Calleva Museum (1957) illustrates the life of the Roman town. Pop. (1971) 766.

silcrete, silica-rich duricrust, an indurated, or hardened, layer in or on a soil. It generally occurs in a hot, arid climate where infrequent waterlogging causes silica to dissolve and be redeposited to cement soil grains together. Silcrete is extremely hard and resistant to weathering and erosion but eventually weathers spheroidally to produce boulders and angular fragments. Inselbergs and other residual hills are often capped by a silcrete layer. In the semidesert of Western Australia, an extensive deposit, almost 10 m (30 feet) thick, has developed from a granite-gneiss parent material.

silencer (automotive engineering): *see* muffler.

silent trade, also called DUMB BARTER, or DEPOT TRADE, specialized form of barter in which goods are exchanged without any direct contact between the traders. Generally, one group goes to a customary spot, deposits the goods to be traded, and withdraws, sometimes giving a signal such as a call or a gong stroke. Another group then comes to leave a second set of articles and retreats. The first group returns, removing these new goods if satisfied, or leaving them until additions are made. The second group then takes the original wares to conclude the transaction.

The classical description of silent trade comes from the works of Herodotus, who mentioned the exchanges of goods between the Carthaginians and peoples of the west coast of Africa. This widespread institution has also been reported from Siberia, Lapland, west Africa, Timor, Sumatra, India, Sri Lanka, and New Guinea. Silent trade is often a response to difficulties in communication due to language barriers or to inequality of cultural advancement between neighbouring peoples.

Silenus (Greek mythology): *see* Satyr and Silenus.

Sileru River, also called MACHKUND, river, Andhra Pradesh state, southern India. The river rises as the Machkund in the Eastern Ghāts in northwestern Andhra Pradesh. Leaving the Machkund reservoir, it flows (as the Sileru) parallel to the mountain ranges at an elevation of 2,000–3,000 feet (600–900 m) in a northeast to southwest direction to empty into the Sābari River, opposite Konta, in Madhya Pradesh state, 60 miles (100 km) north-northwest of Rajāhmundry. The river is 190 miles (305 km) long. There is a small hydroelectric project and dam on the river at Jalaput.

Silesia, Polish ŚLĄSK, Czech SLEZKO, German SCHLESIEN, historic region that is now in southwestern Poland. Silesia was originally a Polish province that became a possession of the Bohemian crown in 1335, passed with that crown to the Austrian Habsburgs in 1526, was taken by Prussia in 1742, and was returned to Poland in 1945. Silesia consists largely of the basin of the upper and middle Oder River, which flows from southeast to northwest. The region is bounded by the Sudeten mountains to the southwest, by the Beskid range to the south, and by the Kraków-Wielun plateau to the northeast. Silesia is now divided into nine Polish provinces, with capitals at Katowice, Bielsko-Biała, Opole, Wrocław (Breslau), Wałbrzych, Legnica, Jelenia Góra, Zielona Góra, and Kalisz; the remainder forms part of the Brandenburg and Saxony *Länder* (states) of Germany and part of the Northern Moravian district of Czechoslovakia. The chief city of the region is Wrocław.

By the 9th century AD Silesia was exclusively inhabited by Slavic peoples: the Dziadoszanie and the Bobrzanie in the north, the Ślęzanie (from whom it got its name), the Opolanie, and the Golensicowie in the south. In the 10th century the Czech dynasty of the Přemyslids and the Polish dynasty of the Piasts contested the territory. Mieszko I, prince of Poland, was able to acquire the region from Boleslav II, prince of Bohemia, between 989 and 992. The Polish king Bolesław I consolidated this possession by founding a bishopric in 1000 with its seat first at Smogorzów and later at Wrocław. Following the death of the Polish king Bołeslaw III in 1138, a succession dispute arose that eventually resulted in Silesia's being divided in 1163 into Lower (northwestern) and Upper (southeastern) Silesia, each ruled by a Piast prince. A third Silesian principality was created in 1203. The subsequent princes of Lower Silesia, Henry I and his son Henry II, tried without success to reunite the territory. In 1241 Henry II was killed in the Battle of Legnica (Liegnitz), in which his army of Polish and German knights halted an invasion of Mongols who had ravaged the country.

All of the Silesian Piast rulers encouraged the immigration of Germans, who increased the region's agricultural productivity, developed its coal-mining industry and textile manufacturing, and populated new towns. The population thus took on an increasingly German character.

As the Silesian Piasts were prolific, the three existing principalities were subdivided again and again, until by the end of the 15th century there were no less than 16 Silesian principalities. The petty Silesian princes often sought the help of the powerful kings of Bohemia against their brothers and cousins, thus enabling those monarchs to revive their old claims to the overlordship of Silesia. In 1335 an arbitral award rendered by Charles I of Hungary assigned all Silesia to the Bohemian crown, thus making it part of the Holy Roman Empire. The change, however, was only one of overlordship; the Silesian princes continued to rule their individual principalities, and on occasion they even took positions different from those of the king of Bohemia in important matters. Silesia thus joined the Holy Roman emperor Sigismund in his struggle against the Bohemian Hussites, and consequently the region was devastated in the Hussite Wars between 1425 and 1435. The Silesians' alienation from the Bohemian crown enabled Hungary to rule the area between 1469 and 1490. Silesia was subsequently reacquired by Bohemia, however, and it passed to the Habsburgs in 1526 with the accession of the Austrian archduke Ferdinand (later Holy Roman emperor Ferdinand I) to the Bohemian throne.

The Reformation turned Silesia almost entirely Protestant, and Silesia aligned itself with Protestant Bohemia and Saxony in rebellion against the Habsburgs in the Thirty Years' War (1618–48). Still, the Silesian Protestants were assured freedom of worship after the war. By the 18th century Silesia's flourishing mining and textile industries had made it the richest of all the Habsburgs' Austrian provinces.

It was chiefly its wealth that tempted Frederick II the Great of Prussia to wrest Silesia from the Habsburg heiress Maria Teresa in the War of the Austrian Succession (1740–48). After Prussia's victory, Austria retained only the Silesian districts of Krnov (Jägerndorf), Opava (Troppau), and Cieszyn (Teschen), comprising extreme south-southeastern Silesia. These districts were united to Moravia until 1849 and afterward made a separate crown land. The Silesian Germans and Protestants welcomed Prussian rule, which brought a more efficient administration and great attention to the region's economic development. Expanded coal, iron-ore, lead, and zinc mining and manufacturing in time made Silesia the second most important industrial area in Germany.

Lower (northwestern) Silesia was by this time almost entirely German. In Upper (southeastern) Silesia the population was mixed, with Germans concentrated in the towns, Poles in the agricultural areas, and the latter comprising a large proportion of the miners and unskilled industrial workers.

After the defeat of Germany and Austria-Hungary in World War I, several conflicting claims for Silesian territory were addressed to the chief Allied Powers. The former Austrian districts of Cieszyn and Opava were divided between Poland and Czechoslovakia. This left the important question of the conflicting claims of Germany and Poland to the bulk of Upper Silesia. As finally amended concerning the Silesian question, the Treaty of Versailles (1919) called for the population of Upper Silesia to declare, by plebiscite, whether it wished to belong to Germany or Poland. In the actual plebiscite (March 20, 1921), about 706,000 votes were cast for Germany and about 479,000 for Poland. In all, 792 communes voted for Germany and 682 for Poland, but the Poles secured a majority of votes in the southeastern area, which was economically the most important part of Silesia. In May 1921 the Silesian Poles staged an armed uprising which only ended on October 20, 1921, when the Allied Powers endorsed the inclusion of the southeastern part of Upper Silesia into the new nation of Poland. This area held three-quarters of Silesia's coal production and nearly two-thirds of its steelworks. Lower Silesia, meanwhile, was left entirely to Germany.

Nazi Germany reacquired Upper Silesia with its conquest of Poland in 1939. The Germans killed or deported many educated Silesian Poles during World War II and filled the area with German settlers. But German-held Silesia was overrun in early 1945 by the Soviet Red Army. In August 1945 the Allied Powers agreed to assign nearly all of Silesia to Poland and to transfer the region's German population to Allied-administered Germany. The Red Army and the Poles then forcibly expelled the Silesian Germans to the west, in the process committing atrocities as serious as those previously perpetrated by the Germans on the Silesian Poles. More than 3,000,000 Germans left Silesia, and the area was repopulated by Poles from the east and north. Silesia's devastated industries were subsequently rebuilt. Modern Silesia contained almost one-fourth of the total population of Poland in the late 20th century.

Silesian Wars, 18th-century contests between Austria and Prussia for the possession of Silesia. The First Silesian War (1740–42) and the Second Silesian War (1744–45) formed parts of the great European struggle called the War of the Austrian Succession (*see* Austrian Succession, War of the). The Third Silesian War (1756–62) similarly formed a part of the Seven Years' War (*q.v.*).

Resurrecting an old Brandenburg testamentary claim to Silesia, Frederick II the Great of Prussia invaded the Austrian province in December 1740 and, after several months of warding off Austrian counterattacks, was left in virtual control of Silesia by the Truce of Klein Schnellendorf (Oct. 9, 1741). After further warfare from December 1741 to June 1742, the empress Maria Theresa of Austria decided to make peace with Frederick, ceding in the Treaty of Breslau (June 11, 1742) all of Silesia except the districts of Troppau, Teschen, and Jägerndorf. The Second Silesian War, climaxed by a series of Prussian victories, again confirmed Frederick's conquest of Silesia (Treaty of Dresden, Dec. 25, 1745).

A decade later, Maria Theresa's tenacious endeavour to recover her lost province again proved unsuccessful, although in the Seven Years' War she came near to success. An armistice (November 1762) ended the protracted conflict, which was formally concluded by the Treaty of Hubertusburg (Feb. 16, 1763), acknowledging the *status quo ante.* Prussia retained Silesia.

Silhak, also spelled SIRHAK (Korean: "Practical Learning"), school of thought that came into existence in the midst of the chaotic con-

ditions of 18th-century Korea, dedicated to a practical approach to statecraft, instead of the blind and uncritical following of Confucian teachings.

The Silhak school attacked Neo-Confucianism, particularly its formalism and concern with ritual. Members of the school originated many ideas for social reform, especially for land reform and the development of farming. Several important books on these subjects were written that give a good picture of farming practices in the 17th and 18th centuries.

The greatest contribution to the Silhak school came from Yi Ik (1681–1763) and Pak Chi-won (1737–1805). Yi's concern was largely with such matters as land reform, farming, and the abolition of class barriers and slavery. Pak advocated the development of commerce and technology.

With the introduction of Western culture in the late 19th century, Silhak, along with Sŏhak (*q.v.*), or Western Learning, contributed to the development and spread of ideas that stimulated the gradual modernization of Korea.

silhouette, an image or design in a single hue and tone, most usually the popular 18th- and 19th-century cut or painted profile portraits done in black on white or the reverse.



Silhouette portrait by Charles Willson Peale; in the Library of Congress, Washington, D.C.
By courtesy of the Library of Congress, Washington, D.C.

Silhouette also is any outline or sharp shadow of an object. The word was satirically derived from the name of the parsimonious mid-18th-century French finance minister Étienne de Silhouette, whose hobby was the cutting of paper shadow portraits (the phrase *à la Silhouette* grew to mean "on the cheap").

The collecting of silhouettes became widespread, especially among world celebrities, the collection of Goethe being an example. Leading silhouette artists of the second half of the 18th century and the early 19th century, the golden age of the art, included Francis Torond, A. Charles, John Miers, C. Rosenburg, Mrs. Brown, Auguste Edouart, T. Hamlet, and Mrs. Beetham (*née* Isabella Robinson).

The development of silhouettes is linked to that of outline drawing and shadow painting. Possibly originating in the cave murals of Stone Age peoples, especially those in France and Spain, realistic representation appears to have been first achieved by tracing the outline of an object's shadow, which was generally filled in with a flat colour. Representation by profile drawing continued in the more developed images of the tomb paintings, relief sculpture, and pottery decoration of the ancient Egyptians, Mesopotamians, Minoans, Greeks, and Etruscans. Ancient Greek and Roman painters devised methods of drawing the outline of a person's shadow cast by sunlight, as well as by candlelight or lamplight. The last two techniques became widespread in 17th-century Europe. These shadow portraits were painted on diverse materials (plaster, wax, vellum, and paper) and were frequently elaborately mounted and framed.

Beginning in the Renaissance period, various mechanical devices, such as the physionotrace, were invented and used to facilitate correct outline drawing. When paper became generally available, shadow portraits and scenes were often cut out, frequently freehand, directly from life. The painted "shade" and the paper-cut silhouette were very fashionable in 18th-century Europe and America as personal mementos. After the mid-19th-century development of the daguerreotype and photography, shadow pictures and silhouettes became a type of folk art, largely executed by itinerant artists on street corners, in cafés, and at fairs. Occasionally, professional caricaturists, such as the Englishman Phil May, continued to use the painted-shadow style; but the underlying principles of silhouette art were mainly to persist in the 20th-century animated cartoons of Walt Disney and Lotte Reiniger.

Silhouette Island, granitic island, third largest of the Seychelles archipelago, Republic of Seychelles, in the western Indian Ocean. It has an area of 7.6 sq mi (20 sq km), rises to 2,467 ft (751 m), and is 12 mi (19 km) northwest of Mahé Island. Virgin forests still grow in the more inaccessible parts of its mountainous terrain. The island is protected as a national park. Copra and fish are the main products. Pop. (1982 est.) 255.

Siliana (Tunisia): *see* Siliyānah.

silica, also called SILICON DIOXIDE, compound of the two most abundant elements in the Earth's crust, silicon and oxygen, SiO_2. The mass of the Earth's crust is 59 percent silica, the main constituent of more than 95 percent of the known rocks. Silica has three main crystalline varieties: quartz (by far the most abundant), tridymite, and cristobalite. Other varieties include coesite, keatite, and lechatelierite. Silica sand is used in buildings and roads in the form of portland cement, concrete, and mortar, as well as sandstone. Silica also is used in grinding and polishing glass and stone; in foundry molds; in the manufacture of glass, ceramics, silicon carbide, ferrosilicon, and silicones; as a refractory material; and as gemstones.

silica gel, a highly porous, noncrystalline form of silica used to remove moisture from gases and liquids, to thicken liquids, to impart a dull surface to paints and synthetic films, and for other purposes.

Silica gel was known as early as 1640, but it remained a curiosity until its adsorbent properties were found useful in gas masks during World War I. It is generally prepared by acidification of a solution of a silicate, such as water glass; the resulting silicic acid forms either a rigid mass or a gelatinous precipitate from which soluble materials are removed by washing with water. The water is finally removed by heating, leaving a glassy, granular solid. For highest activity as a desiccant, the gel is not completely dehydrated but is left with a small percentage of combined water.

The true density of silica is 2.2 grams per millilitre (137 pounds per cubic foot), but the porosity of silica gels gives them much lower bulk densities. A common commercial form has a bulk density of about 0.7 gram per millilitre and a surface area of about 750 square metres per gram, more than five acres per ounce.

silica mineral, any one of the forms of silicon dioxide (SiO_2), including quartz, tridymite, cristobalite, coesite, stishovite, melanophlogite, lechatelierite, and chalcedony. Various kinds of silica minerals have been produced synthetically, among which are keatite and silicalite.

A brief treatment of silica minerals follows. For full treatment, *see* MACROPAEDIA: Minerals and Rocks.

Except for stishovite, all silica minerals are made up of tetrahedral groups comprised of four oxygen atoms surrounding a central silicon. Each tetrahedral group shares an oxygen atom with another tetrahedral group, forming a three-dimensional structure. The principal difference among the various silica minerals is the detailed geometry of the arrangement of tetrahedra, which gives rise to different crystal structures and thus physical properties. Quartz has a relatively dense packing of tetrahedra compared to tridymite and cristobalite, which exhibit relatively large open cavities. This packing difference is reflected in their densities: 2.65, 2.32, 2.26 grams per cubic centimetre for quartz, cristobalite, and tridymite, respectively.

Each of these three polymorphs of silica has a field of stability under equilibrium conditions, but because transformation from one structure to another is sluggish, tridymite and cristobalite are found within the stability field of quartz. Each of the polymorphs also has high- and low-temperature modifications that are only slightly different structurally. Therefore, under low-pressure conditions, low-quartz is stable until 573° C (1,063° F), at which point

Table 1: Silica polymorphs

name	crystal system	space group	stability range	remarks
low-quartz (α-quartz)	hexagonal	$C_3^1 2$ and $C_3^2 2$	up to 573° C	commonest form of silica
high-quartz (β-quartz)	hexagonal	$C_6^2 2$ and $C_6^4 2$	573°–870° C	metastable above 870° C
low-tridymite (α-tridymite)	orthorhombic			exists metastably up to 117° C
middle-tridymite (β_1-tridymite)	hexagonal			exists metastably between 117° and 163° C
high-tridymite (β_2-tridymite)	hexagonal	$C_{6/m}^{6}mc$	870°–1,470° C	exists metastably from 163° to 870° C; unstable over 1,470° C; melts at 1,670° C
low-cristobalite (α-cristobalite)	tetragonal	$P4_12_1$		exists metastably up to 200°–250° C
high-cristobalite (β-cristobalite)	isometric	$P2_13$	1,470°–1,713° C	exists metastably from 200°–250° to 1,470° C; melts at 1,713° C
keatite (silica K)	tetragonal	$P4_12_1$ and $P4_32_1$		not yet found in nature; high-pressure phase
coesite (silica C)	monoclinic	C_c^2 or Cc		characteristic mineral of meteoritic shock; high-pressure phase
silica O				common at room temperatures in synthetic products; forms solid solution series from SiO_2 to $LiAlO_2$
lechatelierite (silica glass)				unstable glass below 1,713° C

high-quartz becomes stable. At 867° C (1,593° F), high-quartz transforms to tridymite. The high-low transformations require only slight displacements of the tetrahedral groups and occur rapidly. Compositionally, quartz is usually quite pure, with only traces of other elements. In contrast, tridymite and cristobalite may contain up to about one percent by weight of impurities because of the open nature of their framework which easily accommodates other atoms, especially those of aluminum, sodium, potassium, and lithium. Quartz is the second most abundant mineral in the Earth's crust and is present in many igneous rocks (*e.g.,* granite and syenite) and in hydrothermal vein deposits. Because it is both chemically and mechanically stable at low temperature, quartz persists in clastic sedimentary rocks. Tridymite and cristobalite occur in volcanic rocks such as rhyolite and slowly invert to quartz polymorphs.

Of the other silica phases, coesite and stishovite are high-pressure polymorphs found where quartz was shocked by meteorite impact. Coesite also occurs in some eclogite xenoliths from the Earth's upper mantle. Stishovite is unlike other silica phases in that silicon is in octahedral rather than tetrahedral coordination, resulting in a high density of 4.3 g/cc. Keatite is a high-pressure polymorph, but it has not been found in nature. Chalcedony is cryptocrystalline silica consisting of minute quartz crystals and submicroscopic pores. Melanophlogite has an open structure large enough to occlude sulfur species. Lechatelierite is silica glass (amorphous) and is only rarely found in nature.

silicate mineral, any of a large group of silicon–oxygen compounds that are widely distributed throughout much of the solar system.

A brief treatment of silicate minerals follows. For full treatment, *see* MACROPAEDIA: Minerals and Rocks.

The silicates make up about 95 percent of the Earth's crust and upper mantle, occurring as the major constituents of most igneous rocks and in appreciable quantities in sedimentary and metamorphic varieties as well. They also are important constituents of lunar samples, meteorites, and most asteroids. In addition, planetary probes have detected their occurrence on the surfaces of Mercury, Venus, and Mars. Of the approximately 600 known silicate minerals, only the feldspars, amphiboles, pyroxenes, micas, olivines, feldspathoids, and zeolites are significant in rock formation.

The basic structural unit of all silicate minerals is the silicon tetrahedron in which one silicon atom is surrounded by and bonded to (*i.e.,* coordinated with) four oxygen atoms, each at the corner of a regular tetrahedron. These SiO_4 tetrahedral units can share oxygen atoms and be linked in a variety of ways, which results in different structures. The topology of these structures forms the basis for silicate classification. For example, sorosilicates are silicate minerals consisting of double tetrahedral groups in which one oxygen atom is shared by two tetrahedrons. Inosilicates show a single-chain structure wherein each tetrahedron shares two oxygen atoms. Phyllosilicates have a sheet structure in which each tetrahedron shares one oxygen atom with each of three other tetrahedrons. Tectosilicates show a three-dimensional network of tetrahedrons, with each tetrahedral unit sharing all of its oxygen atoms.

Details of the linkage of tetrahedrons became known early in the 20th century when X-ray diffraction made the determination of crystal structure possible. Prior to this, the classification of silicates was based on chemical and physical similarities, which often proved to be ambiguous. Although many properties of a silicate mineral group are determined by tetrahedral linkage, an equally important factor is the type and location of other atoms in the structure.

Silicate minerals can be thought of as three-dimensional arrays of oxygen atoms that contain void spaces (*i.e.,* crystallographic sites) where various cations can enter. Besides the tetrahedral (4-fold coordination) sites, 6-fold, 8-fold, and 12-fold sites are common. A correlation exists between the size of a cation (a positively charged ion) and the type of site it can occupy: the larger the cation, the greater the coordination, because large cations have more surface area with which the oxygen atoms can make contact. Tetrahedral sites are generally occupied by silicon and aluminum; 6-fold sites by aluminum, iron, titanium, magnesium, lithium, manganese, and sodium; 8-fold sites by sodium, calcium, and potassium; and 12-fold sites by potassium. Elements of similar ionic size often substitute for one another. An aluminum ion, for example, is only slightly larger than a silicon ion, allowing substitution for silicon in both tetrahedral and 6-fold sites. For a table of silicate minerals, *see* pages 806–808.

siliceous rock, any of a group of sedimentary rocks that consist largely or almost entirely of silicon dioxide (SiO_2), either as quartz or as amorphous silica and cristobalite; included are rocks that have formed as chemical precipitates and excluded are those of detrital or fragmental origin.

A brief treatment of siliceous rocks follows. For full treatment, *see* MACROPAEDIA: Minerals and Rocks.

The most common siliceous rock is chert, which is a dense, microcrystalline rock composed of chalcedony and quartz. Chert is the second most abundant chemically precipitated rock after limestone. It occurs in beds and in nodules. Bedded chert consists of siliceous fossils such as diatoms and radiolaria, which form siliceous oozes on the sea floor. As these organisms sink, portions of their shells dissolve near the bottom and reprecipitate in void spaces between shell fragments, resulting in a hard bedded rock. Bedded cherts are common in areas enriched in silica-bearing organisms, as for example near volcanoes where volcanic glass is rapidly altered to produce high-silica concentrations. Similar processes occur in freshwater lakes associated with volcanoes.

Nodular cherts appear to be produced by the alteration of preexisting sedimentary rock. In this process silica distributed throughout the rock dissolves and reprecipitates to form nodules. Mixed sediments, such as siliceous shales and limestones, also appear to be a diagenetic redistribution of siliceous organisms.

siliceous sponge, any sponge in which the main skeletal component is silica as opposed to calcium carbonate or fibrous organic materials only. More than 95 percent of all known sponge species have a siliceous skeleton and belong to the class Demospongiae (phylum Porifera). The siliceous skeleton is usually composed of discrete elements known as spicules that vary greatly in size and shape from species to species and are hence often used to aid species identification.

Siliceous sponges are mainly marine, but there are a few freshwater species. The siliceous glass sponges of the class Hexactinellida are found in deep water and include such spectacular forms as the glass rope sponge (*Hyalonema*) and the Venus's flower basket (*Euplectella*), whose beautiful lattice-like skeleton was highly prized as a collector's item in Victorian times. *Compare* calcareous sponge; horny sponge.

silicic acid, a compound of silicon, oxygen, and hydrogen, regarded as the parent substance from which is derived a large family—the silicates—of minerals, salts, and esters. The

Table 2: Properties of selected silica minerals

name	colour	lustre	Mohs hardness	specific gravity	habit or form	fracture or cleavage	refractive indices	remarks
coesite	colourless	vitreous	near 8	2.9–3.0	transparent, fine-grained matrix material		$\alpha = 1.593$ $\gamma = 1.597$	unlike other silica polymorphs, will not dissolve in 5% hydrofluoric acid at room temperatures; characteristic mineral of meteoritic shock
cristobalite (low-temperature form)	white or milky	vitreous	6½	2.2–2.3	small octahedral crystals; also, see below	no apparent cleavage	$\omega = 1.484$ $\epsilon = 1.487$	has high-temperature form
lussatite (fibrous low-cristobalite)	white, gray, bluish, yellowish			2.0–2.1	translucent to opaque, fibrous crusts and botryoidal aggregates			
opal (submicrocrystalline low-cristobalite)	white to colourless; milky to bluish-white; variable pale shades	vitreous to subvitreous, resinous, or pearly	5½–6½	2.0–2.3	submicrocrystalline aggregates; globular or kidney-like crusts; irregular concretions	conchoidal fracture	$n = 1.435–1.455$	chemical formula: $SiO_2 \cdot nH_2O$
quartz (low-temperature form)	variable	vitreous to greasy (coarse-grained); waxy to dull (fine-grained)	7 (a hardness standard)	2.65	prismatic and rhombohedral crystals; massive	conchoidal fracture	$\omega = 1.544$ $\epsilon = 1.553$	piezoelectric; pyroelectric; enantiomorphous; has high-temperature form
tridymite (low-temperature form)	colourless to white	vitreous	7	2.26	thin, transparent plates (pseudomorphs of high-tridymite)	conchoidal fracture	$\alpha = 1.468–1.479$ $\beta = 1.469–1.480$ $\gamma = 1.473–1.483$	has high-temperature form

Silicate minerals

name formula	colour	lustre	Mohs hardness	specific gravity	habit	fracture or cleavage	refractive indices	crystal system space group	remarks
Tectosilicates (three-dimensional networks)									
feldspar (for other examples, *see* feldspar)									
orthoclase $KAlSi_3O_8$	flesh-red, white to pale yellow, red, green	vitreous	6–6½	2.6	twinned crystals	two good cleavages of 90°	$\alpha = 1.518–1.529$ $\beta = 1.522–1.533$ $\gamma = 1.522–1.539$	monoclinic $C\frac{2}{m}$	forms a solid solution series with albite in which sodium replaces potassium in the molecular structure
feldspathoid (for other examples, *see* feldspathoid)									
nepheline $Na_3KAl_4Si_4O_{16}$	light-coloured; reddish, greenish, brownish	vitreous to greasy	5½–6	2.6–2.7	small glassy crystals or grains	poor cleavage	$\omega = 1.529–1.546$ $\varepsilon = 1.526–1.542$	hexagonal $P6_3$	forms a solid solution series with kalsilite in which potassium replaces sodium in the molecular structure
silica (for other examples, *see* silica mineral)									
quartz SiO_2	variable	vitreous to greasy (coarse-grained); waxy to dull (fine-grained)	7 (a hardness standard)	2.65	prismatic and rhombohedral crystals; massive	conchoidal fracture	$\omega = 1.544$ $\varepsilon = 1.553$	hexagonal $C3_12$ and $C3_22$	piezoelectric; pyroelectric; enantiomorphous
zeolite (for other examples, *see* zeolite)									
chabazite $(Ca, Na_2)Al_2Si_4O_{12} \cdot 6H_2O$	white; flesh-red	vitreous	4½	2.0–2.1	single, cube-like rhombohedrons	poor cleavage	$\left.\begin{matrix}\omega\\ \varepsilon\end{matrix}\right\} = 1.470–1.494$	hexagonal $R\bar{3}m$	
Phyllosilicates (sheet structures)									
clay (for other examples, *see* clay mineral)									
chlorite hydrous Mg, Fe aluminosilicate	green	vitreous or pearly	2–3	2.6–3.0	large crystalline blocks; fine-grained, flaky aggregates	platy cleavage	$\alpha = 1.57–1.64$ $\gamma = 1.575–1.645$	monoclinic or triclinic	ion-exchange capacity = 10–40 meq/100 g; layers of trioctahedral mica alternate with layers of brucite
smectite $Al_4Si_8O_{20}(OH)_4 \cdot nH_2O$				2.2–2.7	broad undulating mosaic sheets that break into irregular fluffy masses of minute particles		$\alpha = 1.480–1.590$ $\gamma = 1.515–1.630$		ion-exchange capacity = 80–150 meq/100 g; two sheets of oriented silica tetrahedra sandwich a sheet of alumina
mica (for other examples, *see* mica)									
apophyllite $KCa_4Si_8O_{20}F \cdot 8H_2O$	colourless, white, pink, pale yellow, or green	pearly iridescent	4½–5	2.3–2.4	tabular, prismatic, or granular crystals; prisms and bipyramids when well-formed	one perfect, one poor cleavage	$\omega = 1.534–1.535$ $\varepsilon = 1.535–1.537$	tetragonal $P\frac{4}{m}nc$	often occurs with zeolites and has a high water content
muscovite hydrous Al, Ca aluminosilicate	commonly white or colourless; light shades of green, red, or brown	vitreous to silky or pearly	2–2½	2.8–3.0	large tabular blocks (called books); pseudohexagonal crystals; fine-grained aggregates	one perfect, platy cleavage	$\alpha = 1.552–1.574$ $\beta = 1.582–1.610$ $\gamma = 1.587–1.616$	monoclinic $C\frac{2}{c}$	doubly refractive; highly resistant to acid; forms solid solution series both with lepidolite (in which Li and Si replace Al) and with illite
prehnite $Ca_2Al_2Si_3O_{10}(OH)_2$	pale green to gray, white, or yellow	vitreous	6–6½	2.9–3.0	rosettes of small radiating crystals; tabular or prismatic crystals; lamellar or botryoidal massive	one good cleavage	$\alpha = 1.611–1.632$ $\beta = 1.615–1.642$ $\gamma = 1.632–1.665$	orthorhombic P2cm	has been classed with the zeolites and the brittle micas
pyrophyllite $Al_2(OH)_2Si_4O_{10}$	white and various pale colours	dull and glistening	1–2	2.6–2.9	lamellar massive; granular to compact massive	one perfect cleavage	$\alpha = 1.534–1.556$ $\beta = 1.586–1.589$ $\gamma = 1.596–1.601$	monoclinic $C\frac{2}{c}$	greasy feel
talc $Mg_3Si_4O_{10}(OH)_2$	colourless; white; pale or dark green; brown	pearly	1 (a hardness standard)	2.6–2.8	compact foliated masses	one perfect cleavage	$\alpha = 1.539–1.553$ $\beta = 1.589–1.594$ $\gamma = 1.589–1.600$	monoclinic $C\frac{2}{c}$	greasy feel
Inosilicates (chain structures)									
amphibole (for other examples, *see* amphibole)									

Silicate minerals (continued)

name formula	colour	lustre	Mohs hardness	specific gravity	habit	fracture or cleavage	refractive indices	crystal system space group	remarks
Inosilicates (chain structures) (continued)									
common hornblende complex Ca, Mg, Fe, Al metasilicate	pale to dark green	glassy	5–6	3.0–3.4	massive	one good cleavage of 56°	$\alpha = 1.615–1.705$ $\beta = 1.618–1.714$ $\gamma = 1.632–1.730$	monoclinic $C\frac{2}{m}$	
mullite $3Al_2O_3 \cdot 2SiO_2$	white			3.0	elongated prismatic crystals; melts	one distinct cleavage	$\alpha = 1.642–1.653$ $\beta = 1.644$ $\gamma = 1.654–1.679$	orthorhombic Pbam	
pyroxene (for other examples, *see* pyroxene)									
augite $(Ca, Mg, Fe, Ti, Al)_2(Si, Al)_2O_6$	brown, green, black	vitreous	5½–6	3.2–3.5	short, thick, tabular crystals	one good cleavage of 87°	$\alpha = 1.671–1.735$ $\beta = 1.672–1.741$ $\gamma = 1.703–1.761$	monoclinic $C\frac{2}{c}$	continuous variation between augite and the diopside-hedenbergite series
rhodonite $(Mn, Fe, Ca)SiO_3$	pink to brownish-red	vitreous	5½–6½	3.6–3.8	rounded tabular crystals; cleavable to compact massive; embedded grains	two perfect cleavages	$\alpha = 1.711–1.738$ $\beta = 1.715–1.741$ $\gamma = 1.724–1.751$	triclinic $P\bar{1}$	
wollastonite $CaSiO_3$	white; also colourless, gray, or very pale green	vitreous	4½–5	2.9–3.1	cleavable, fibrous, or compact massive; tabular crystals	one perfect, two good cleavages	$\alpha = 1.616–1.640$ $\beta = 1.628–1.650$ $\gamma = 1.631–1.653$	triclinic $P\bar{1}$	
Cyclosilicates (ring structures)									
axinite $(Ca, Mn, Fe)_3Al_2BO_3(SiO_3)_4OH$	clove- or lilac-brown; pearl-gray; yellowish	highly glassy	6½–7	3.3–3.4	broad, sharp-edged, wedge-shaped crystals; lamellar massive	one good cleavage	$\alpha = 1.674–1.693$ $\beta = 1.681–1.701$ $\gamma = 1.684–1.704$	triclinic $P\bar{1}$	pyroelectric
beryl $Be_3Al_2(SiO_3)_6$	various greens; variable, including deep-green (emerald), blue-green (aquamarine), pink (morganite), yellow (heliodore)	vitreous	7½–8	2.7–2.8	long hexagonal crystals	conchoidal to uneven fracture	$\omega = 1.569–1.598$ $\varepsilon = 1.565–1.590$	hexagonal $P\frac{6}{m}cc$	
cordierite $Al_3(Mg, Fe)_2Si_5AlO_{18}$	various blues	vitreous	7	2.5–2.8	short prismatic crystals; embedded grains; compact massive	one distinct cleavage	$\alpha = 1.522–1.558$ $\beta = 1.524–1.574$ $\gamma = 1.527–1.578$	orthorhombic Cccm	
tourmaline complex B and Al silicate	extremely variable	vitreous to resinous	7–7½	3.0–3.2	parallel or radiating groups of striated, elongated hexagonal prisms, often rounded or barrel-shaped; massive	subconchoidal to uneven fracture	$\omega = 1.635–1.675$ $\varepsilon = 1.610–1.650$	hexagonal R3m	strongly pyroelectric
Sorosilicates (double tetrahedral structures)									
hemimorphite $Zn_4Si_2O_7(OH)_2 \cdot H_2O$	white, sometimes tinted bluish or greenish; yellow to brown	vitreous	5	3.4–3.5	sheaflike crystal aggregates	one perfect cleavage	$\alpha = 1.614$ $\beta = 1.617$ $\gamma = 1.636$	orthorhombic Imm2	strongly pyroelectric
melilite	colourless; grayish green; brown	vitreous to resinous	5–6		short prismatic crystals; tablets	one distinct cleavage		tetragonal $P\bar{4}2_1m$	continuous chemical variation between gehlenite and åkermanite
gehlenite $Ca_2Al_2SiO_7$				3.1			$\omega = 1.669$ $\varepsilon = 1.658$		
åkermanite $Ca_2MgSi_2O_7$				2.9			$\omega = 1.632$ $\varepsilon = 1.640$		
Nesosilicates (independent tetrahedral structures)									
andalusite Al_2OSiO_4	pink, white, or rose-red; also variable	vitreous	6½–7½	3.1–3.2	coarse prisms; massive	one good cleavage of 89°	$\alpha = 1.629–1.640$ $\beta = 1.633–1.644$ $\gamma = 1.638–1.650$	orthorhombic Pnnm	has the same chemical composition as but different symmetry than sillimanite and kyanite
chrysocolla $CuSiO_3 \cdot 2H_2O$	green, bluish-green	vitreous	2–4	2.0–2.8	crusts; botryoidal masses	conchoidal fracture	$\omega = 1.46$ $\varepsilon = 1.54$	orthorhombic?	
datolite $CaBSiO_4(OH)$	colourless or white; also various pale tints	vitreous	5–5½	2.9–3.0	tabular or short prismatic crystals; botryoidal and globular or divergent and radiating massive	conchoidal to uneven fracture	$\alpha = 1.622–1.626$ $\beta = 1.649–1.654$ $\gamma = 1.666–1.670$	monoclinic $P\frac{2_1}{c}$	

Silicate minerals (continued)

name formula	colour	lustre	Mohs hardness	specific gravity	habit	fracture or cleavage	refractive indices	crystal system space group	remarks
Nesosilicates (independent tetrahedral structures) (continued)									
epidote $Ca_2(Al, Fe, Mn)_3(SiO_4)_3OH$	yellowish-green to dark green	vitreous	6–7	3.3–3.5	striated elongated crystals; fibrous or granular massive; disseminated	one perfect cleavage	$\alpha = 1.712–1.756$ $\beta = 1.720–1.789$ $\gamma = 1.723–1.829$	monoclinic $P\frac{2_1}{m}$	forms solid solution series with clinozoisite in which aluminum replaces iron in the molecular structure
garnet	variable	vitreous to resinous	6–7½		crystals; irregular embedded grains; compact, granular, or lamellar massive	subconchoidal fracture		isometric Ia3d	the garnet group has been divided into two separate solid solution series: pyralspite (*py*rope, *al*mandine, *s*pessartite) and ugrandite (*u*varovite, *gr*ossularite, *a*ndradite); each series has continuous chemical variation within it, but no continuous variation exists between the two
almandine $Fe_3Al_2Si_3O_{12}$				4.3			$n = 1.830$		
andradite $Ca_3(Fe, Ti)_2Si_3O_{12}$				3.9			$n = 1.887$		
grossularite $Ca_3Al_2Si_3O_{12}$				3.6			$n = 1.734$		
pyrope $Mg_3Al_2Si_3O_{12}$				3.6			$n = 1.714$		
spessartite $Mn_3Al_2Si_3O_{12}$				4.2			$n = 1.800$		
uvarovite $Ca_3Cr_2Si_3O_{12}$				3.9			$n = 1.86$		
kyanite Al_2OSiO_4	blue; white; also variable	vitreous to pearly	4–7 (variable)	3.5–3.7	elongated tabular, bladed crystals	one good, one perfect cleavage	$\alpha = 1.712–1.718$ $\beta = 1.719–1.723$ $\gamma = 1.727–1.734$	triclinic $P\bar{1}$	has the same chemical composition as but different symmetry than sillimanite and andalusite
olivine (for other examples, *see* olivines									
forsterite–fayalite series $(Mg, Fe)_2SiO_4$	various greens and yellows	vitreous	6½–7	3.2 (forsterite) to 4.4 (fayalite)	flattened crystals; compact or granular massive; embedded grains	one indistinct cleavage	forst fayal $\alpha = 1.631–1.827$ $\beta = 1.651–1.869$ $\gamma = 1.670–1.879$	orthorhombic Pbnm	
phenacite Be_2SiO_4	colourless; also wine-yellow, pale rose, brown	vitreous	7½–8	3.0	rhombohedral crystals	one distinct cleavage	$\omega = 1.654$ $\varepsilon = 1.670$	hexagonal $R\bar{3}$	
sillimanite Al_2OSiO_4	colourless or white; also various browns and greens	vitreous to subadamantine	6½–7½	3.2–3.3	vertically striated, square prisms; long, slender parallel crystal groups to fibrous or columnar massive	one perfect cleavage	$\alpha = 1.654–1.661$ $\beta = 1.658–1.670$ $\gamma = 1.673–1.684$	orthorhombic Pbnm	has the same chemical composition as but different symmetry than andalusite and kyanite
sphene $CaTiSiO_4(O, OH, F)$	colourless, yellow, green, brown, black	adamantine to resinous	5	3.4–3.6	wedge-shaped crystals, often twinned; compact massive	one good cleavage	$\alpha = 1.843–1.950$ $\beta = 1.870–2.034$ $\gamma = 1.943–2.110$	monoclinic $C\frac{2}{c}$	
staurolite $(Fe, Mg)_2(Al, Fe)_9O_6(SiO_4)_4(O, OH)_2$	dark red-brown; yellow-brown; brown-black	subvitreous to resinous	7–7½	3.7–3.8	cruciform twins	one distinct cleavage	$\alpha = 1.739–1.747$ $\beta = 1.744–1.754$ $\gamma = 1.750–1.762$	monoclinic $C\frac{2}{m}$	
thorite $ThSiO_4$	black; also orange-yellow (orangite)		4½–5	4.5–5.0; 5.2–5.4 (orangite)	square prismatic crystals; small masses	one distinct cleavage	$\omega = 1.8$	tetragonal $I\frac{4_1}{a}md$	
topaz $Al_2(F, OH)_2SiO_4$	straw- or wine-yellow; white; grayish, greenish, bluish, reddish	vitreous	8 (a hardness standard)	3.5–3.6	prismatic crystals	one perfect cleavage	$\alpha = 1.606–1.629$ $\beta = 1.609–1.631$ $\gamma = 1.616–1.638$	orthorhombic Pbnm	
vesuvianite $Ca_{10}(Mg, Fe)_2Al_4(SiO_4)_5(SiO_7)_2(OH)_4$	yellow, green, brown	vitreous	6–7	3.3–3.4	prismatic crystals; massive	subconchoidal to uneven fracture	$\omega = 1.703–1.752$ $\varepsilon = 1.700–1.746$	tetragonal $P\frac{4}{n}nc$	
willemite Zn_2SiO_4	white or greenish yellow	vitreous to resinous	5½	3.9–4.2	hexagonal prismatic crystals; disseminated grains; fibrous massive	one easy cleavage	$\omega = 1.691–1.714$ $\varepsilon = 1.719–1.732$	hexagonal $R\bar{3}$	sometimes strongly fluorescent
zircon $ZrSiO_4$	reddish brown, yellow, gray, green, or colourless	adamantine	7½	4.6–4.7	square prismatic crystals; irregular forms; grains	conchoidal fracture	$\omega = 1.923–1.960$ $\varepsilon = 1.968–2.015$	tetragonal $I\frac{4_1}{a}md$	
zoisite $Ca_2Al_3(SiO_4)_3OH$	white; gray; green-brown; pink (thulite)	vitreous	6–6½	3.2–3.4	striated prismatic crystals; columnar to compact massive	one perfect cleavage	$\alpha = 1.685–1.705$ $\beta = 1.688–1.710$ $\gamma = 1.697–1.725$	orthorhombic Pnmc	

acid itself, having the formula $Si(OH)_4$, can be prepared only as an unstable solution in water; its molecules readily condense with one another to form water and polymeric chains, rings, sheets, or three-dimensional networks that constitute the structural units of silica gel (*q.v.*) and many minerals that have very low solubility in water.

Several esters of silicic acid, made from alcohols and silicon tetrachloride, are thermally stable liquids employed as lubricants and hydraulic fluids. *See also* water glass.

silicon (Si), a nonmetallic chemical element in the carbon family (Group IVa of the periodic table), comprising 27.7 percent of the Earth's crust, being second in abundance to oxygen.

Silicon was first isolated and described as an element in 1824 by Jöns Jacob Berzelius, a Swedish chemist. Silicon does not occur uncombined in nature; but it is found in practically all rocks as well as in sand, clays, and soils, combined either with oxygen as silica (SiO_2, silicon dioxide) or with oxygen and other elements, such as aluminum, magnesium, calcium, sodium, potassium, or iron as silicates. Its compounds also occur in all natural waters, in the atmosphere (as siliceous dust), in many plants, and in the skeletons, tissues, and body fluids of some animals.

Pure silicon is a hard, dark gray solid with a metallic lustre and with a crystalline structure the same as that of the diamond form of carbon, to which silicon shows many chemical and physical similarities. Although a brown, powdery form of silicon has been described, it also has a microcrystalline structure. The element is prepared commercially by reducing (removing the oxygen from) the oxide by its reaction with coke in electric furnaces. On a small scale, silicon can be obtained from the oxide by reduction with aluminum.

Silicon, like carbon, is relatively inactive at ordinary temperatures; but when heated it reacts vigorously with the halogens (fluorine, chlorine, bromine, and iodine) to form halides and with certain metals to form silicides. It is unaffected by acids except hydrofluoric. At red heat, silicon is attacked by water vapour or by oxygen, forming a surface layer of silicon dioxide. When silicon and carbon are combined at electric furnace temperatures (2,000°–2,600° C [3,600°–4,700° F]), they form silicon carbide (carborundum, SiC), which is an important abrasive. In union with hydrogen, silicon forms a series of hydrides, the silanes, that are gaseous at ordinary temperatures; when united with hydrocarbon groups, silicon forms a series of organic silicon compounds.

Elemental silicon has few applications; it is used in metallurgy as a reducing agent and as an alloying element in steel, brass, and bronze; highly purified silicon is used in photoelectric devices, transistors, and other electronic components. The most important compounds of silicon are the dioxide (silica) and the various silicates. Silica in the form of sand and clay is used to make concrete and bricks as well as refractory materials for high-temperature applications. As the mineral quartz, the compound may be softened by heating and shaped into glassware. Silicates, most of which are insoluble in water, are employed in making glass as well as in the fabrication of enamels, pottery, china, and other ceramic materials. Sodium silicates, commonly known as water glass or silicate of soda, are used in soaps, in the treatment of wood to prevent decay, for the preservation of eggs, as a cement, and in dyeing. Silicones are synthetic organosilicon oxides composed of the elements silicon, oxygen, carbon, and hydrogen; they are used as lubricants, hydraulic fluids, waterproofing compounds, varnishes, and enamels because, as a class, they are chemically inert and unusually stable at high temperatures.

Three stable isotopes of silicon are known: silicon-28, which makes up 92.21 percent of the element in nature; silicon-29, 4.70 percent; and silicon-30, 3.09 percent. Four radioactive isotopes are known.

atomic number	14
atomic weight	28.086
melting point	1,410° C (2,570° F)
boiling point	2,355° C (4,270° F)
density	2.42 gMl
oxidation state	+4
electron config.	2-8-4 or $1s^2 2s^2 2p^6 3s^2 3p^2$

silicon carbide, trade name CARBORUNDUM, exceedingly hard, clear, green-tinged crystalline compound of silicon and carbon. Its chemical formula is SiC. From the time it was discovered (by the American inventor Edward G. Acheson) in 1891 until boron carbide was discovered in 1929, silicon carbide was the hardest synthetic material known. While attempting to produce artificial diamonds, Acheson heated a mixture of clay and coke in an iron bowl with an ordinary arc-light carbon. He found bright, hexagonal crystals attached to the carbon electrode and thought that he had prepared some new compound of carbon and alumina from the clay. He called the new compound Carborundum because the natural mineral form of fused alumina is called corundum. Finding that the crystals approximated the hardness of diamond and immediately realizing the significance of his discovery, Acheson applied for a U.S. patent. His early product initially was offered for the polishing of gems and sold at a price comparable with natural diamond dust. Obtainable from cheap raw materials and in good yields, the new compound soon became of industrial importance as an abrasive of wide application.

About the same time Acheson made his discovery, Henri Moissan in France produced a similar compound from a mixture of quartz and carbon; but in a publication of 1903, Moissan ascribed the original discovery to Acheson. Some natural silicon carbide was found in Arizona in the Canyon Diablo meteorite and bears the mineralogical name moissanite.

Besides being very hard, silicon carbide crystals are mechanically strong and have fracture characteristics that make them extremely useful in grinding wheels and in abrasive paper and cloth products. The high thermal conductivity of silicon carbide, along with its resistance to fluxing, fusion, or oxidation, makes it valuable in the manufacture of high-temperature bricks and other refractories. When cold, silicon carbide is a fair electrical insulator; but as it is heated up it becomes more conductive, and at 2,000° C (3,632° F) it is as conductive as graphite and is thus classed as a semiconductor, for which there are many uses.

Silicon carbide is manufactured by heating pure silica sand and carbon in the form of coke in an electric furnace.

silicon dioxide (chemistry): *see* silica.

silicon hydridé (chemistry): *see* silane.

Silicon Valley, industrial conurbation in west-central California, stretching for about 25 miles (40 km) from San Jose in the southeast to Palo Alto in the northwest. Silicon Valley occupies the San Jose and Santa Clara valleys and includes the communities of Sunnyvale, Santa Clara, Los Altos, and Mountain View. Silicon Valley derived its name from the dense concentration of electronics and computer corporations and their factories that sprang up there in the 1970s and '80s (silicon is the basic material of the semiconductor elements in computer circuits). By the early 1990s the economic emphasis in Silicon Valley had partly switched from computer manufacturing to research, development, and marketing of computer products and software.

silicone, also called POLYSILOXANE, any of a diverse class of chemical polymers manufactured in the form of fluids, resins, or elastomers. Although they are partially organic in composition, the molecules of silicones differ from those of most polymers in that the backbone of their structure does not contain carbon, the characteristic element of organic compounds, but is a polysiloxane chain, in which atoms of silicon and oxygen alternate. In most members of the class, two organic groups, usually methyl ($-CH_3$) or phenyl ($-C_6H_5$), are attached to each silicon atom.

Silicone fluids are exceptionally stable to decomposition by heat, water, or oxidizing agents and are good electrical insulators; they are used as components of hydraulic fluids and emulsion-breaking compositions and to impart water-repellency to textiles, paper, and many other substances.

Silicone rubbers are valued for their electrical insulating properties, chemical stability, and the wide temperature range over which they retain resiliency. Silicone resins are employed in protective coatings and electrically insulating varnishes and for laminating glass cloth.

silicosis, a chronic disease of the lungs that is caused by the inhalation of silica dust over long periods of time. (Silica is the chief mineral constituent of sand and of many kinds of rock.) Silicosis is a form of pneumoconiosis. The disease occurs most commonly in miners, quarry workers, stone cutters, tunnelers, and workers whose jobs involve grinding, sandblasting, polishing, and buffing. Silicosis is one of the oldest industrial diseases, having been recognized in knife grinders and potters in the 18th century, and it remains one of the most common dust-induced respiratory diseases in the developed world.

In most instances, 10 to 20 years of occupational exposure to silica dust are needed for silicosis to develop. The disease rarely occurs with exposures to concentrations of less than 6,000,000 particles of silica per cubic foot (about 210,000 per litre) of air. Only very small silica particles less than 10 microns (0.0004 inch) in diameter penetrate to the finer air passages of the lungs, and particles of one to three microns in diameter do the most damage.

The symptoms of silicosis are shortness of breath that is followed by coughing, difficulty in breathing, and weakness. These symptoms are all related to a fibrosis that reduces the elasticity of the lung. In the actual disease process, the tiny particles of inhaled silica are taken up in the lungs by scavenger cells, called macrophages, that serve to protect the body from bacterial invasion. Silica particles, however, cannot be digested by the macrophages and instead kill them. The killed cells accumulate and form nodules of fibrous tissue which gradually enlarge to form fibrotic masses. These whorls of fibrous tissue may spread to involve the area around the heart, the openings to the lungs, and the abdominal lymph nodes. Lung volume is reduced, and gas exchange is poor. Silicosis predisposes a person to tuberculosis, emphysema, and pneumonia. In the past a large proportion of sufferers of silicosis died of tuberculosis, though this has changed with the availability of drug therapies for that disease.

There is no cure for silicosis, and since there is no effective treatment, control of the disease lies mainly in prevention. The use of protective face masks and proper ventilation in the workplace and periodic X-ray monitoring of workers' lungs has helped lessen the incidence of the disease.

Silifke, also called SELEUCIA, town, south-central Turkey. It is located on the right bank of the Gösku River, overlooking the Tauras Mountains. An irrigation scheme supplying the fertile lowland of the Gösku delta is located

at Silifke. The town is a market centre for agricultural produce of its hinterland, including cotton, tobacco, grapes, olives, beans, and lentils. Industrial products include beverages, textiles, footwear, wearing apparel, chemicals, electrical appliances, transport equipment, plastics, glass, pottery, and canned fruit and vegetables. About 3 miles (5 km) south of the modern town is the site of ancient Seleucia Tracheotis founded by Seleucus I Nicator at the beginning of the 3rd century BC. On the top of the hill above the town are the remains of a Byzantine castle. Pop. (1985) 28,111.

Silīguri, town, northern West Bengal state, northeastern India, just west of the Mahānanda River. The terminus of the cart road from Kālimpong and Sikkim and of road and rail connections with Darjeeling and Jalpaiguri, Silīguri is the hub for trade among Darjeeling, Sikkim, and Tibet. Sawmilling and jute milling are important industries. Declared a municipality in 1931, it has a college affiliated with the University of North Bengal. After partition of the subcontinent into India and Pakistan in 1947 and the creation of Bangladesh in 1971, the town became a crowded refugee centre. It has grown in strategic importance because of the international border troubles. Pop. (1981) 154,378.

Silistra, town, extreme northeastern Bulgaria, on the Danube River opposite Romania. To the south and southeast are the remains of the old fortifications. The Romans founded a fortified camp at Durostorum in the early 2nd century AD. The Turks gained possession of the town in the early 15th century, and it became a trade centre and a major Turkish fortress. It was fought over several times in the Russo-Turkish War (1877–78) and passed to Bulgaria in 1878. After the Second Balkan War (1913) it became part of Romania, reverting to Bulgaria in 1940.

The present town is modern, with industries that produce textiles, furniture, brick, and tile, as well as matting, packaging materials, and boards from rushes. Its river port has a large grain traffic, and the town has a rail link to the Ruse–Varna line. Silistra lies in a fertile agricultural region that is especially noted for livestock, grains, beans, sugar beets, and viticulture. Pop. (1988 est.) 56,863.

Silius Italicus, in full TIBERIUS CATIUS ASCONIUS SILIUS ITALICUS (b. AD 25/26, Patavium, Italy—d. 101), Latin epic poet whose 12,000-line *Punica* on the Second Punic War (218–201 BC) is the longest poem in Latin literature.

Silius was a distinguished advocate in his earlier years. He later took to public service and was a consul in 68, the year of Nero's death. His association with the emperor Nero was a stain on his reputation that he later expunged through his successful governorship of Asia. He then retired from public life.

As a man of wealth, Silius was able to indulge his tastes as a patron of literature and the arts. He so venerated Virgil and Cicero that he bought and restored Virgil's tomb at Neapolis (now Naples) and Cicero's estate at Tusculum. His friends included Martial, Epictetus (who thought well of him as a philosopher), and Cornutus (who dedicated a commentary on Virgil to him). He was a Stoic, but his Stoicism is not as marked in his writing as in that of Lucan. It was evident in his own life, however, when, suffering from an incurable disease, he starved himself to death.

Silius draws heavily on the historian Livy for his material. He recounts all six battles of the Second Punic War, imitating Virgil's *Aeneid* in form and mythology. His Hannibal is drawn with some dramatic skill, stealing the place of hero from Scipio. The epic has been harshly judged by critics and has been scarcely edited since the 18th century. Though the last three books show signs—as well they might—of fatigue, there are at least a half dozen magnificent pieces of verse, mostly in dramatic scenes of war.

Siljan, lake in the administrative *län* (county) of Kopparberg and the traditional *landskap* (province) of Dalarna, central Sweden. Covering an area of 112 square miles (290 square km; including Orsa and In lakes, 137 square miles [345 square km]), it is Dalarna's largest lake and Sweden's sixth. After receiving the Österdal River at Mora, the lake stretches for a length of 25 miles (40 km) toward the southeast and extends into two bays, the wide Rätt to the northeast and the narrow Öster to the south at Leksand. The lake's breadth varies from 1 to 7 miles (1.6 to 11 km). Sollerön is a large island in the northwestern part of the lake. Deeply indented wooded shores interspersed with meadows and quaint villages have given Siljan one of the most attractive settings in Sweden, making it a noted tourist centre.

silk, animal fibre produced by certain insects as building material for cocoons and webs. In commercial use it is almost entirely limited to filament from cocoons produced by the caterpillars of several moth species belonging to the genus *Bombyx* and commonly called silkworms.

History. The origin of silk production and weaving is ancient and clouded in legend. The industry undoubtedly began in China, where, according to native record, it existed from sometime before the middle of the 3rd millennium BC. For many centuries the Chinese zealously guarded the source and methods of production of silk, but by the lst millennium BC they had begun trading silk cloth abroad. Within a few centuries, caravans were regularly carrying silk to India, Turkistan, and Persia. According to legend, in about 140 BC, sericulture as well as silk spread overland from China to India. By the 2nd century AD India was shipping its own raw silk and silk cloth to Persia. (Japan, too, acquired and developed a thriving sericulture a few centuries later.)

Persia became a centre of silk trade between East and West under the Parthians (247 BC–AD 224). Silk dyeing and weaving developed as crafts in Syria, Egypt, Greece, and Rome. The workers used some raw silk from the Orient, but they derived most of their yarn by unraveling silk fabrics from the East. Silk culture remained a secret of Asia.

Eventually a strong demand for the local production of raw silk arose in the Mediterranean area. Justinian I, Byzantine emperor from 527 to 565, persuaded two Persian monks who had lived in China to return there and smuggle silkworms to Constantinople in the hollows of their bamboo canes (*c.* AD 550). These few hardy silkworms were the beginning of all the varieties that stocked and supplied European sericulture until the 19th century.

Silk culture flourished in Europe for many centuries, especially in the Italian city-states and (from 1480) in France. In 1854, however, a devastating silkworm plague appeared. Louis Pasteur, who was asked to study the disease in 1865, discovered the cause and developed a means of control. The Italian industry recovered, but that of France never did. Meanwhile Japan was modernizing its methods of sericulture, and soon it was supplying a large portion of the world's raw silk. During and after World War II the substitution of such man-made fibres as nylon in making hosiery and other garments greatly reduced the silk industry. Still, silk has remained an important luxury material and remains an important product of Japan, South Korea, and the Soviet Union.

Sericulture. Production of silk involves (1) the care of the domesticated silkworm (*Bombyx mori*) from the egg stage through completion of the cocoon and (2) the production of mulberry trees that provide leaves upon which the worms feed. The silkworm builds its cocoon by producing and surrounding itself with a long, continuous fibre, or filament. Liquid secretions from two large glands within the insect emerge from the spinneret, a single exit tube in the head, hardening upon exposure to air and forming twin filaments composed of fibroin, a protein material. A second pair of glands secretes sericin, a gummy substance cementing the two filaments together. Because an emerging moth would break the cocoon filament, the larva is killed in the cocoon by steam or hot air at the chrysalis stage.

Silk is a a continuous filament within each cocoon, having a usable length of about 600 to 900 m (2,000 to 3,000 feet). It is freed by softening the binding sericin and then locating the filament end and unwinding, or reeling, the filaments from several cocoons at the same time, sometimes with a slight twist, forming a single strand. Several silk strands, each too thin for most uses, are twisted together to make thicker, stronger yarn in the process called throwing, producing various yarns differing according to the amount and direction of the twist imparted.

Silk containing sericin is called raw silk. The gummy substance, affording protection during processing, is usually retained until the yarn or fabric stage and is removed by boiling the silk in soap and water, leaving it soft and lustrous, with weight reduced by as much as 30 percent. Spun silk is made from short lengths obtained from damaged cocoons or broken off during processing, twisted together to make yarn. The thickness of silk filament yarn is expressed in terms of denier, the number of grams of weight per 9,000 m (9,846 yards) of length. Silk is sometimes—in a process called weighting—treated with a finishing substance, such as metallic salts, to increase weight, add density, and improve draping quality.

The degumming process leaves silk lustrous and semitransparent, with a smooth surface that does not readily retain soil. Silk has good strength, resisting breakage when subjected to weights of about 4 g (0.5 ounce) per denier. Wetting reduces strength by about 15–25 percent. A silk filament can be stretched about 20 percent beyond its original length before breaking but does not immediately resume its original length when stretched more than about 2 percent. Silk, lower in density than such fibres as cotton, wool, and rayon, is moisture absorbent, retaining as much as a third of its weight in moisture without feeling damp, and has excellent dyeing properties. It is more heat resistant than wool, decomposing at about 170° C (340° F). Silk loses strength over a long period of time without appropriate storage conditions and tends to decompose with extensive exposure to sunlight but is rarely attacked by mildew. It is not harmed by mild alkaline solutions and common dry-cleaning solvents. Friction imparts a static charge, especially in low humidity. The rustling sound, or scroop, associated with crisp silk fabrics is not a natural property of the fibre but is developed by processing treatments, and it does not indicate quality, as is sometimes believed.

Silk Road, also called SILK ROUTE, ancient trade route that, linking China with the West, carried goods and ideas between the two great civilizations of Rome and China. Silk came westward, while wools, gold, and silver went east. China also received Nestorian Christianity and Buddhism (from India) via the road.

Originating at Sian, the 4,000-mile (6,400-kilometre) road, actually a caravan tract, followed the Great Wall of China to the northwest, bypassed the Takla Makan Desert, climbed the Pamirs (mountains), crossed Afghanistan, and went on to the Levant; from

there, the merchandise was shipped across the Mediterranean Sea. Few persons travelled the entire route, and goods were handled in a staggered progression by middlemen.

With the gradual loss of Roman territory in Asia and the rise of Arabian power in the Levant, the Silk Road became increasingly unsafe and untravelled. In the 13th and 14th centuries the route was revived under the Mongols, and at that time Marco Polo used the road to travel to Cathay (China).

The road now partially exists in the form of a paved highway connecting Pakistan and Sinkiang Uighur Autonomous Region, China. The old road has inspired a United Nations plan for a trans-Asian highway.

silk spider, also called GOLDEN SILK SPIDER (*Nephila*), any of a genus of the class Arachnida (phylum Arthropoda), so named because of the great strength of their silk and the golden colour of their huge orb webs. These webs often measure one metre (about three feet) or more in diameter and are suspended between trees by guy lines. About 60 species are known to live in the warmer regions of the world. Adult females are very large with a body length of 25 to 50 millimetres (1 to 2 inches). Males are dwarfs, measuring only 4 to 6 mm. As adults they build no webs but rather live in the web of the female, where they are sometimes captured and eaten while attempting to mate. Juvenile silk spiders build complete orbs, whereas the older ones construct only the bottom portion, which is frequently repaired but not rebuilt every day, as in the case of most other orb weaver (*q.v.*) spiders.

Šilka River (Russian S.F.S.R.): *see* Shilka River.

Silkeborg, city, Århus *amtskommune* (county), eastern Jutland, Denmark, on the Gudenå (river) and Langsø, a small lake, west of Århus. An episcopal town of some importance in the Middle Ages, its castle became a royal hunting and fishing base after the Reformation. The present city, dating from 1845 (chartered 1900), grew up around a paper mill. Now a rail junction, its products in addition to paper include farm machinery, textiles, and beer. It is also a noted health resort and a centre for the Silkeborg Langsø, a chain of lakes on the Gudenå. The surrounding well-wooded country, the heather, and the hills, including Himmelbjerget (Hill of Heaven; 482 ft [147 m]) and Yding Skovhøj (Denmark's highest point, 568 ft [173 m]), make this one of the nations most scenic and popular resort districts. A few miles west of Silkeborg is a memorial to Denmark's distinguished dramatist Kaj Munk, murdered here by the Nazis in 1944. Pop. (1981) city, 33,304; (1982 est.) mun., 46,791.

silken fungus beetle, also called CRYPTOPHAGID BEETLE, any member of the approximately 800 insect species belonging to the family Cryptophagidae (order Coleoptera). Adults range from 1 to 5 millimetres (1/25 to 1/5 inch) in length and are covered with fine, silky hairs.

These oval beetles are yellowish brown in colour and usually feed on fungi and decaying vegetable matter. Some species live in wasp or bee nests.

silkworm moth (*Bombyx*), insect and source of commercial silk and an important member of the family Bombycidae (order Lepidoptera). Because of its centuries-old role in sericulture (silk production), the native Chinese silkworm has been introduced throughout the world and approaches complete domestication. The adult attains a wingspan of 40 to 50 millimetres (about 2 inches) and has a thick, hairy body. In its brief adulthood of two or three days, it does not eat and seldom flies. The female lays between about 300 and 500 eggs.



Silkworm larvae (*Bombyx*) feeding on mulberry leaves
UPI—EB Inc.

Besides its natural food of mulberry leaves, the silkworm may sometimes eat the foliage of the Osage orange or lettuce. The pale naked larva has a characteristic caudal (posterior) horn. It attains a maximum length of 75 mm (about 3 in.) during a 45-day growing period. Pupation occurs within a cocoon that is made of one continuous white or yellow silken thread, averaging about 915 metres (1,000 yards). The thread is preserved intact for commercial use by killing the pupa with hot air or steam. The giant silkworm moth, or saturniid moth (*q.v.*), species belong to the family Saturniidae.

silky flycatcher, any of four bird species that constitute the subfamily Ptilogonatinae (family Bombycillidae), found in dry, brushy regions from Nevada south to Panama. These soft plumaged, broad-billed, crested birds are about 19 centimetres (7.5 inches) long. All are arboreal. Their basic diet consists of mistletoe berries, supplemented with insects taken by darting from a perch like a true flycatcher.

In the best known of the group, the phainopepla (*Phainopepla nitens*), the male is black and the female gray; both parents incubate the dark-spotted, pale-gray eggs and help care for the young. *Ptilogonys* species are gray with yellow sides, and the black-and-yellow silky flycatcher (*Phainoptila melanoxantha*) is similar, but the male has purplish-black upper parts and the female a dark-green back.

silky oak, also called SILK OAK (*Grevillea robusta*), large tree native to Australia and also grown as a street tree in warm areas and, in its juvenile stage, as an indoor pot plant. It belongs to the family Proteaceae (*q.v.*).

In Australia it is cut for timber, but elsewhere it is valued for its graceful, feathery foliage and orange flower clusters at the ends of leafless branches.

silky terrier, Australian breed of toy dog, first shown in 1907. It originated in Sydney and was once known as the Sydney Silky. A rather low-set dog, the silky terrier stands 9 to 10 inches (23 to 25.5 centimetres) and weighs 8 to 10 pounds (3.5 to 4.5 kilograms). Its silky, fine coat is glossy blue-gray and tan, with a silver-gray or tan topknot. Developed as a companion dog, the silky is generally friendly and responsive, with the terrier-like alertness prescribed in the breed standard of perfection.

sill, also called SHEET, tabular igneous intrusion emplaced parallel to the bedding of the enclosing rock. Although they may have vertical to horizontal orientations, nearly horizontal sills are the most common. Sills may be a fraction of an inch to hundreds of feet thick and up to hundreds of miles long. Rock compositions of all types are found in sills; the famous basic sills have received much attention because of the knowledge they provide concerning the crystallization behaviour of such magmas. Sills can be subdivided on the basis of the number of intrusions that have formed them and the variability of the rock types involved: a simple sill results from a single intrusive; a multiple sill is formed by two or more intrusions; and a composite sill is composed of more than one rock type emplaced during more than one intrusive episode.

Silla, one of the three kingdoms of ancient Korea and the one that in 668 unified Korea under the Unified Silla dynasty (*q.v.*; 668–935). Silla is traditionally believed to have been founded by Hyŏkkŏse in 57 BC. By the 2nd century AD, a distinct confederation of local tribes was definitely in existence in the southeastern portion of the Korean peninsula. With the establishment of the hereditary monarchy of the Kim family during the reign of King Naemul (356–402), the promulgation of state laws and decrees, and the annexation of the eastern half of the Kaya state on the eastern tip of the peninsula in the reign of King Pŏphŭng (514–540), Silla emerged as a full-fledged kingdom.

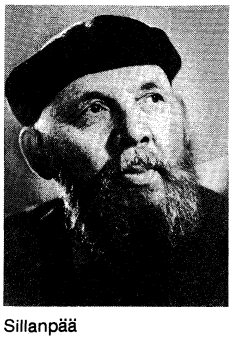
Its aristocracy was endowed with various privileges, and the aristocrats monopolized all important official posts. The excavations of extravagant ornaments, such as gold crowns and gold belts, indicate the luxury in which they lived. Sculpture and the decorative arts showed a tendency toward abstraction. A Silla crown, for example, is designed in simple, angular lines unlike the curvilinear floral designs characteristic of Paekche openwork. Granite was a frequent medium for both architecture and sculpture. Old Silla pottery is unglazed, grayish stoneware with a texture almost like that of slate. Vessel forms have clean-cut, functional lines, and decorations are incised geometric patterns.

Encouraged by the state, Buddhism flourished, and many temples were erected, the most prominent of which were the Hwangyong-sa, Pulguk-sa, and Sokkuram (a grotto shrine).

In the reign of King Chinhŭng (540–576) a unique military corps, called the Hwarangdo, was organized, and the military system was realigned. In the following century this powerful military machine allied itself with the Chinese T'ang dynasty (618–907) and subjugated the southeastern Korean state of Paekche in 660 and the northern Korean state of Koguryŏ in 668. This was followed by almost a decade of fighting, in which Silla expelled the T'ang forces and established a unified kingdom in the Korean peninsula.

Sillanpää, Frans Eemil (b. Sept. 16, 1888, Hämeenkyrö, Finland, Russian empire—d. June 3, 1964, Helsinki), first Finnish writer to win the Nobel Prize for Literature (1939).

The son of a peasant farmer, Sillanpää began studying natural science but in 1913 returned to the country, married, and began to write. His first short stories were published in journals in 1915. From 1924 to 1927 he worked for a publishing company in Porvoo. A new creative period followed in the early 1930s, when he wrote several of his best works.



Sillanpää
By courtesy of Kustannusosakeyhtio Otava

Sillanpää's first novel, *Elämä ja aurinko* (1916; "Life and the Sun"), the story of a young man who returns home in midsummer and falls in love, is characteristic. People are seen as essentially part of nature. Instinct, through which life's hidden purpose is revealed, rules human actions.

Shocked by the Finnish civil war of 1918, Sillanpää wrote his most substantial novel, *Hurskas kurjuus* (1919; *Meek Heritage*), describing how a humble cottager becomes involved with the Red Guards without clearly realizing the ideological implications. The novelette *Hiltu ja Ragnar* (1923) is the tragic love story of a city boy and a country servant-girl. After several collections of short stories in the late 1920s, Sillanpää published his best-known, though not his most perfect, work, *Nuorena nukkunut* (1931; *Fallen Asleep While Young,* or *The Maid Silja*), a story of an old peasant family. In *Miehen tie* (1932; *Way of a Man*), describing a young farmer's growth to maturity, realistic and lyric elements are blended. *Ihmiset suviyössä* (1934; *People in the Summer Night*) is stylistically his most finished and poetic novel. His reminiscences, *Poika eli elämäänsa* (1953; "Telling and Describing") and *Päivä korkeimmillaan* (1956; "The High Moment of the Day"), throw new light on him as a writer.

Sillein (Czechoslovakia): *see* Žilina.

Sillery, city, Québec region, southern Quebec province, Canada, on the north shore of the St. Lawrence River. Formerly an important lumber-shipping port, it is now a mainly residential suburb of Quebec city. It was named after Noël Brûlart de Sillery, of the Company of New France, who encouraged the establishment of a Jesuit mission on the site (1638) and a village for Abnaki Indians. The mission house is still used as a museum. Inc. city, 1947. Pop. (1986) 12,784.

Silliman, Benjamin (b. Aug. 8, 1779, North Stratford, Conn., U.S.—d. Nov. 24, 1864, New Haven, Conn.), geologist and chemist who founded the *American Journal of Science* and wielded a powerful influence in the development of science in the United States.

Silliman was appointed professor of chemistry and natural history at Yale, from which he had graduated in 1796. He was instrumental in expanding the college's educational resources through the acquisition of extensive mineralogical collections and the foundation of the Sheffield Scientific School, the Trumbull Gallery, and the medical school. Much in demand as a lecturer on science, Silliman was also a popular and well-known teacher.

In 1818 he started the *American Journal of Science and Arts* (later shortened to *American Journal of Science*), for many years known simply as *Silliman's Journal.* An important outlet for American scientific papers, it became one of the world's greatest scientific journals. It still exists but is devoted to geology alone.

Silliman retired in 1853 as professor emeritus. His works include *A Journal of Travels in England, Holland and Scotland* (1810) and *Elements of Chemistry* (1830). The mineral sillimanite was named in his honour.

Silliman, Benjamin (b. Dec. 4, 1816, New Haven, Conn., U.S.—d. Jan. 14, 1885, New Haven), American chemist whose report on the potential uses of crude-oil products gave impetus to plans for drilling the first producing oil well, near Titusville, Pa.

The son of the noted geologist and chemist Benjamin Silliman (1779–1864), he assisted his father in setting up a chemical laboratory in 1842, out of which grew the Sheffield Scientific School of Yale University. He taught medical chemistry and toxicology at the University of Louisville, Ky., from 1849 to 1854. He then succeeded his father in the chair of chemistry at Yale.

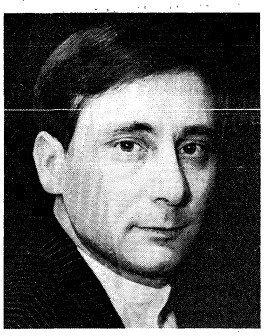
Silliman prepared numerous reports on mines and on technical manufacturing processes and conducted fundamental research on meteorites, photography, and gases. The "Silliman Report" (1855) set forth his analysis of crude oil and of the potentially valuable products that could be refined from it.

Silliman's works include *First Principles of Chemistry* (1847) and *First Principles of Physics* (1858). From 1838 to 1845 he assisted his father in editing the *American Journal of Science* and was then its coeditor in chief.

sillimanite, also called FIBROLITE, brown, pale green, or white glassy silicate mineral that often occurs in long, slender, needlelike crystals frequently found in fibrous aggregates. An aluminum silicate, Al_2OSiO_4, it occurs in high-temperature regionally metamorphosed clay-rich rocks (*e.g.,* schists and gneisses). Sillimanite is found at many points in France, Madagascar, and the eastern United States; a pale sapphire-blue gem variety occurs in the gravels of Sri Lanka. For detailed physical properties, *see* silicate mineral (table).

Sillitoe, Alan (b. March 4, 1928, Nottingham, Nottinghamshire, Eng.), writer whose brash and angry accounts of working-class life injected new vigour into post-World War II British fiction.

The son of a tannery worker, Sillitoe worked in factories from the age of 14. In 1946 he joined the air force and for two years served as a radio operator in Malaya. After his return to England, X rays revealed that he had contracted tuberculosis, and he spent several



Sillitoe, 1968
Horst Tappe from Camera Press

months in a hospital. Thereafter he lived in Nottingham (1950) and Kent (1951) and for the next six years in France and then Spain. After meeting Robert Graves, who suggested that he write about Nottingham, Sillitoe began work on his first published novel, *Saturday Night and Sunday Morning* (1958). An immediate success, it is the story of a rude and amoral young labourer for whom drink and sex on Saturday night provide the only relief from the oppression of the working life. Sillitoe worked on the screenplay of the film version (1960), which won international acclaim. From the short-story collection *The Loneliness of the Long Distance Runner* (1959), Sillitoe helped adapt the title story into a film (1962). Later novels, such as *The Death of William Posters* (1965) and *The Widower's Son* (1977), deal with more intellectual working-class characters. *The Storyteller* (1979) depicts in an intricately fragmented style a man's deterioration into madness. Notable short-story collections are *The Ragman's Daughter* (1963; filmed 1974), *Men, Women, and Children* (1974), and *The Second Chance* (1980).

Sillitoe has also written children's books, poetry, and plays while continuing as a novelist.

Sills, Beverly, original name BELLE SILVERMAN (b. May 25, 1929, New York City), American operatic soprano who won international fame many years before her Metropolitan Opera debut at age 46.

She was singing on commercial radio at the age of four and began vocal study with Estelle Liebling while still quite young. In 1945 she toured with a Gilbert and Sullivan opera company and in 1947 made her operatic debut with the Philadelphia Civic Opera. She spent several years traveling with touring opera companies and making guest appearances in various opera centres throughout the United States. In 1955 she became a member of the company of the New York City Opera, and in 1956 she created the role of Baby Doe in Douglas Moore's folk opera *The Ballad of Baby Doe.*

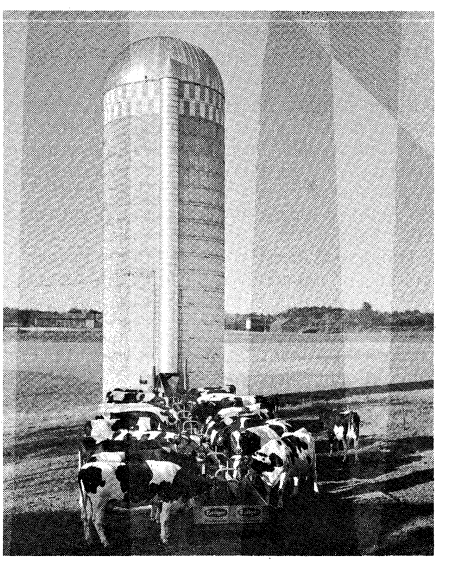
Sills married Peter Bulkeley Greenough in 1956. The tragic circumstances of their children—one born deaf, and the other mentally retarded—forced Sills to leave the stage in 1961. She returned in 1963 to sing in *Don Giovanni, The Abduction from the Seraglio,* and *Il Trittico.* Her performance as Cleopatra in the New York City Opera company's 1966 production of George Frideric Handel's *Giulio Cesare* brought her to international prominence as a performer of the florid repertoire.

Sills then made several appearances in European opera houses including La Scala, Milan (1969), and Covent Garden, London (1970). Her Metropolitan Opera debut, as Pamira in Gioacchino Rossini's *Le Siège de Corinthe* in 1975, was a phenomenal success. Her autobiography, *Bubbles: A Self-Portrait,* was published in 1976. From 1979 to 1989 she was director of the New York City Opera, which she restored to financial and administrative stability after years of disarray.

Sills, David L(awrence) (b. Aug. 24, 1920, New York City), American sociologist known for his studies of organizational goals in voluntary associations.

Sills received his Ph.D. from Columbia University (1956). He served as a research analyst in the public opinion and sociological research division during the Allied occupation of Japan (1947–50). He headed the United Nations Technical Assistance Organization in Bombay, the demographic division of the New York City Population Council, and the Columbia University Bureau of Applied Social Research. Employed by the publishing firm of Crowell Collier & Macmillan (1962–67), Sills was the editor of the 17-volume *International Encyclopedia of the Social Sciences* (1968, with a later supplement).

silo, in agriculture, airtight structure that encloses and protects silage (*q.v.;* partially fer-



Silo and auger feeding trough
Grant Heilman

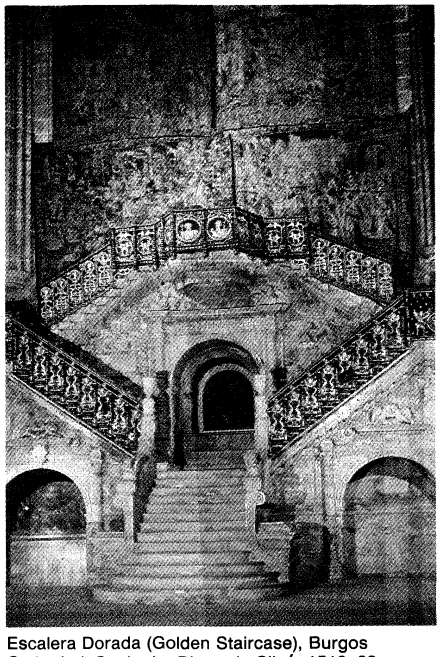
mented fodder, called haylage if made from grass), keeping it in the succulent and slightly sour condition edible for farm animals.

A common type silo is an upright cylindrical tower 10 to 18 feet (3 to 5 metres) in diameter and 30 to 50 feet in height, made of steel with a fused-glass or porcelain inner surface for corrosion resistance. Silos may also be constructed of other metals, masonry, or wood; they may also be horizontal pits, trenches (trench silo), or stacks above or below the ground. The structure may be sealed with earth, canvas, heavy paper, or plastic to keep air out. Silage may be unloaded from the bottom with a power-operated unloader and must be removed at a certain rate per day to prevent spoilage.

Siloé, Diego de (b. *c.* 1495, Burgos, Spain—d. Oct. 22, 1563, Granada), sculptor and architect whose achievements are recognized as among the finest of the Spanish Renaissance. His sculpture is considered the high point of the Burgos Plateresque; his Granada Cathedral is considered the finest of all Plateresque buildings and one of the most magnificent of all cathedrals.

The son of the sculptor Gil de Siloé, Diego probably studied sculpture in Florence. His first documented work is the "Caraccioli Altarpiece" (1514–15; S. Giovanni a Carbonara, Naples), a product of his collaboration with Bartolomé Ordóñez. Returning to Burgos in 1519, he executed many designs for altarpieces and also the tower of Santa Maria del Campo. In April 1528 he left for Granada, where he designed the cathedral (1528–43) and executed many designs for churches and their sculptural decoration. He travelled to Seville, Toledo, and Salamanca as a consultant and designer.

Diego's sculptural style is a mixture of the Italian Renaissance, Gothic, and Mudéjar (Spanish Muslim) and is properly called Plateresque. Influenced by both Michelangelo and Donatello, he was able to animate his figures and create forceful compositions. His



Escalera Dorada (Golden Staircase), Burgos Cathedral, Spain, by Diego de Siloé, 1519–23
A. Gutierrez—Ostman Agency

early masterpiece, the Escalera Dorada (Golden Staircase; 1519–23) in the Burgos Cathedral, combines both his sculptural and architectural gifts in a work of painted and gilded exuberance.

Diego's towering achievement is the Granada Cathedral. Wishing to build like the Romans, he adhered to the classical canon of the Italian Renaissance but created a work that combined the best features of the Renaissance, Gothic, and Mudéjar styles. His later churches, the Salvador church at Ubeda (1536), Guadix Cathedral (1549), and San Gabriel at Loja, all reflect elements of the design he perfected at Granada.

Siloé, Gil de, also called GIL SILOÉ, GIL DE URLIONES, or URLIENES, and GIL DE EMBERRES, or AMBERES (d. *c.* 1501), sculptor whose origins are still a matter of dispute but who is recognized as the greatest Spanish sculptor of the 15th century.

The many names by which Gil is known are evidence of the confusion surrounding his origin. Urliones, or Urlienes, probably refers to Orléans, and Emberres, or Amberes, to Antwerp. It is also possible that he was the Abraham de Nürnberg who was brought to Spain by Alonso de Cartagena. Aspects of Gil's art lend credence to the possibility of either a French or a Flemish-German background. The French influence can be detected in his iconography, while his figure sculpture resembles the art of Flanders and of the Lower Rhine.

Very few documented works by Gil have survived. Among the extant pieces are the funerary statues of King John II of Castile and his wife, Isabella of Portugal (1489–93; in La Cartuja de Burgos Miraflores), the altarpiece in the same monastery of Miraflores (1496–99), and the tombs of the infante Alfonso and Juan de Padilla. Gil was gifted with a fertile imagination, and all his work is marked by its wealth of elaborate detail and its exuberant variety. His figures have a heightened naturalism and are surrounded by rich ornamentation. As the central figure in the Burgos school of Gothic sculpture, he represented the high point of that style in Spain.

Silone, Ignazio, pseudonym of SECONDO TRANQUILLI (b. May 1, 1900, Pescina dei Marsi, Italy—d. Aug. 22, 1978, Geneva), Italian novelist, short-story writer, and political leader, world famous during World War II for his powerful anti-Fascist novels.

Born into a rural family, Silone was educated in the town of his birth until he was 15, when an earthquake killed his mother and two brothers and left the family in great poverty (his other brothers died later, one beaten to death in prison by Fascists). After drifting for a time, Silone managed to finish secondary school and in 1917 began to work with Socialist groups, becoming a leader of the antiwar movement and editor of the Roman Socialist organ *Avanguardia.* In 1921 he helped found the Italian Communist Party and in 1922 became the editor of the party's paper in Trieste, *Il Lavoratore* ("The Worker"). He devoted all his time to foreign missions and underground organization for the party until the Fascists drove him into exile. In 1930 he settled in Switzerland, became disillusioned with Communism, left the party, and began to write.

Writing under his pseudonym to protect his family from Fascist persecution, Silone produced his first novel, *Fontamara,* which was published in Zürich (1930; Eng. trans., 1934). It is a realistic and compassionate story of the exploitation of peasants in a southern Italian village, brutally suppressed as they attempt to obtain their rights. *Fontamara* became an international sensation and was translated into 14 languages. Later novels, *Pane e vino* (*Bread and Wine,* both 1937; revised as *Vino e pane,* 1955) and *Il seme sotto la neve* (1940; *The Seed Beneath the Snow,* 1942), portray socialist heroes who try to help the peasants by sharing their sufferings in a Christian spirit. *Pane e vino* was dramatized in 1944 as *Ed egli si nascose* (London, *And He Did Hide Himself,* New York, *And He Hid Himself,* both 1946). Silone also wrote a powerful anti-Fascist satire, *La scuola dei dittatori* (1938; *The School for Dictators,* 1939).

After World War II Silone returned to Italy, becoming active in Italian political life as a leader of the Democratic Socialist Party. In



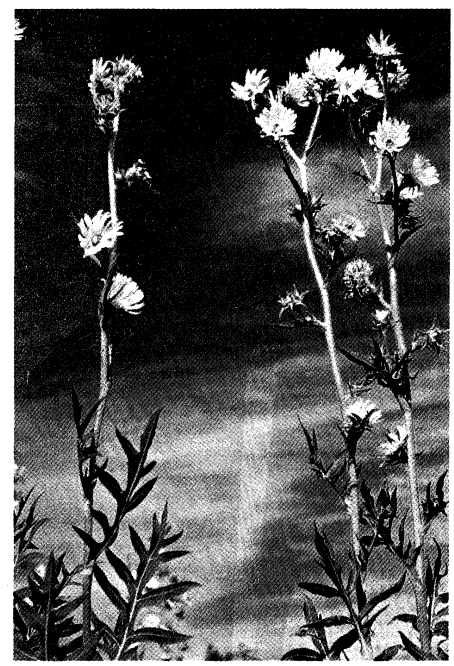
Silone, 1969
Horst Tappe—EB Inc.

1950 he retired to devote himself to writing. *Una manciata di more* (1952; *A Handful of Blackberries,* 1954) and *Il segreto di Luca* (1956; *The Secret of Luca,* 1958) show Silone's continued concern with the needs of southern Italy and the complexities of social reform. In *Uscita di sicurezza* (1965; *Emergency Exit,* 1968), Silone describes his shifts from Socialism to Communism to Christianity. A play, *L'avventura d'un povero cristiano* (published 1968; *The Story of a Humble Christian,* 1970), depicts the life of the 13th-century pope Celestine V, focussing on the conflict between the demands of the institutional church and his own spirituality.

Consult the INDEX *first*

Silphium, genus of tall perennial plants in the family Asteraceae, consisting of about 12 yellow-flowered species commonly called rosinweed, native to North America. Many species have rough leaves that may be opposite each other, alternate along the stem, or be grouped in whorls.

The base of each oval cup-plant (*S. perfoliatum*) leaf surrounds the square stem and may hold water. Compass plant, or pilotweed (*S. laciniatum*), is a prairie plant with large, deeply cut, lance-shaped leaves. It may grow



Compass plant (*Silphium laciniatum*)
Kitty Kohout from Root Resources—EB Inc.

to 3.5 m (about 12 feet) and has a tall flower stalk with solitary large flowers.

silt, sediment particles ranging from 0.004 to 0.06 mm (0.00016 to 0.0024 inch) in diameter irrespective of mineral type. Silt is easily transported by moving currents but settles in still water. It constitutes about 60 percent of the material in the Mississippi River delta. An unconsolidated aggregate of silt particles is also termed silt, whereas a consolidated aggregate is called siltstone. Silt deposits formed by wind are known as loess, a yellow, unconsolidated rock. Sediments are seldom composed entirely of silt but rather are a mixture of clay, silt, and sand. Clay-rich silt, upon consolidation, frequently develops parting along bedding surfaces and is called shale. If parting does not develop, the massive rock is called mudstone.

Consult the INDEX *first*

siltstone, hardened sedimentary rock that is composed primarily of angular silt-sized particles (0.0039 to 0.063 mm [0.00015 to 0.0025 inch] in diameter) and is not laminated or easily split into thin layers. Siltstones, which are hard and durable, occur in thin layers rarely thick enough to be classified as formations.

Siltstones are intermediate between sandstones and shales but are not so common as either. They contain less alumina, potash, and water than shales but more silica; in addition to mica, they may contain abundant chlorite and other micaceous clay minerals. Although many shales contain more than 50 percent silt, not all are siltstones; siltstones differ from these shales in that they commonly are chemically cemented and show evidence of cross-bedding (*i.e.,* lamination inclined to the main bedding plane), structures resulting from current flow, and flowage within a stratum. *See also* lutite; mudstone.

Silures, a powerful people of ancient Britain, occupying approximately the present counties of Gwent, southern Powys, and West, Mid, and South Glamorgan in central and southeastern Wales. Incited by the king of the Trinovantes tribe, Caratacus, they fiercely resisted the Roman conquest from about AD 48. A Roman legionary fortress was established first at Glevum (Gloucester) and later at Isca (Caerleon), and by AD 78 the Silures were overcome. Their capital had been a hill fort, Llanmelin, but the Romans forcibly transferred the inhabitants about 1 mile (1.6 km) south to a new town, built in the rectangular Roman pattern. This new town under the Romans was Venta Silurum (Caerwent, southwest of Chepstow, Gwent). Its massive Roman walls survive, and excavations have revealed a basilica, baths, and an amphitheatre.

Silurian Period, interval of geologic time from 438 to 408 million years ago. It is often divided into the Early Silurian Epoch (438 to 421 million years ago) and the Late Silurian Epoch (421 to 408 million years ago). As the third period of the Paleozoic Era, the Silurian Period follows the Ordovician Period and precedes the Devonian. The rocks that originated during the period make up the Silurian System.

A brief treatment of the Silurian Period follows. For full treatment, *see* MACROPAEDIA: Geochronology.

The Silurian System was named by Sir Roderick Impey Murchison in 1835 after the Silures, the ancient British tribe that occupied much of central and southeastern Wales, where rocks of the aforementioned age are well developed. Silurian rocks are found all over the world. The Silurian Period marks an important episode in Earth history at the end of early Paleozoic times, with the first appearance of land plants and jawed fish. Important, too, are the graptolites (especially the single-branched monograptids, whose fossils are useful for correlating Silurian rocks in widely separated areas) and many other marine invertebrate groups, such as the trilobites, brachiopods, conodonts, corals, stromatoporoids, crinoids, and mollusks.

The upper boundary of the Silurian System is defined, by international agreement, at a locality called Klonk in Czechoslovakia. The lower boundary has been fixed at a section of rocks in Dobb's Linn near Moffat in the Southern Uplands of Scotland.

In stratigraphy, the Silurian is divided (from oldest to youngest) into the Llandovery, Wenlock, Ludlow, and Pridoli (the equivalent of the British Downtonian) epochs. Though these are regarded as the standard divisions, there are many alternatives in various parts of the world.

In North America the Silurian System was formerly divided into the Alexandrian below the Niagaran, and the Cayugan above. Silurian rocks are extensively exposed in the Appalachians and across the Midwest, especially in the vicinity of the Great Lakes. Large coral-stromatoporoid-algal reef developments in the middle time interval of the system have often formed oil reservoirs. These roughly correspond, on a much grander scale, to the reef developments on the Swedish island of Gotland and on a smaller scale, to the reef developments on Wenlock Edge in Shropshire in the Welsh borderland of England.

Niagaran limestones are probably best known in the escarpment that forms Niagara Falls, between Lakes Erie and Ontario. These limestones are followed, notably in the Michigan Basin, by tremendous thicknesses of salt deposits, which are evidence of a widespread regression of the seas at the end of Silurian times. This regression also is seen in Europe in the form of transitional beds yielding fossils such as the large arthropods known as eurypterids. These salt deposits grade into continental facies known as Old Red Sandstone, which are of Devonian age and are found across northern Europe from Ireland to the Soviet Union, and in more distant places such as eastern Canada and Kashmir.

During the Silurian Period the continents were distributed in a totally different way than they are today. Such areas as Arctic Canada, Scandinavia, and Australia were probably in the tropics; Japan and the Philippines may have been inside the Arctic Circle; South America and Africa were most likely in the region of the South Pole, with either present-day Brazil or western Africa as the locus of the pole. In any case, the land surface was buried by an ice sheet that may have been about as large as that covering Antarctica today.

Volcanic activity was comparatively minor during the Silurian Period, but there were important earth movements, notably the Taconian orogeny (mountain-building event) of North America, which marks the boundary between the Ordovician and the Silurian, and the Caledonian orogeny in northwestern Europe, which probably reached its climax toward the end of Silurian time. The latter orogeny, the effects of which are particularly evident in Scandinavia and the northwestern part of the British Isles, probably resulted from the closing of an early Paleozoic precursor of the Atlantic Ocean.

Silva, Antônio José da, byname O JUDEU (Portuguese: "The Jew") (b. May 8, 1705, Rio de Janeiro, Braz.—d. Oct. 18, 1739, Lisbon, Port.), Portuguese writer whose comedies, farces, and operettas briefly revitalized the Portuguese theatre in a period of dramatic decadence.

Silva was born in Brazil, the son of parents who had been Jews. Though his parents professed Christianity, his mother was accused by the Inquisition of relapsing into Judaism, and in 1712, when Antônio was seven years old, the family was forced to leave Brazil for Portugal for her trial. Silva studied canon law at Coimbra, but at 21 he was imprisoned with his mother and brothers and forced under torture to abjure his Jewish faith. On his release, he completed his studies (1728), joined his father's legal practice in Lisbon, and married a cousin who had also suffered religious persecution.

During a brief period (1729–37) when he was unmolested by the authorities, he wrote eight plays, all for the *ópera dos bonecos* (puppet theatre), performed at the Bairro Alto Theatre in Lisbon. Prose dialogue is interspersed with arias, minuets, and *modinhas* (popular, light songs). The comic spirit of the plays is underlaid with sympathy and pity. His best plays are generally considered to be *A Vida do grande D. Quixote de la Mancha* (1733; "The Life of Don Quixote of La Mancha") and *As Guerras do Alecrim e da Mangerona* (1737; "The Wars of the Rosemary and the Marjoram"). Altogether they constitute a skilled and witty satire against the pretensions of a society based on caste and privilege.

In 1739 Silva and his wife were both charged by the Inquisition with the heresy of Judaizing and imprisoned on October 5. Thirteen days later, Silva was garrotted and burned at an auto-da-fé (public burning at the stake), witnessed by his wife, who died soon thereafter.

Silva, José Asunción (b. Nov. 27, 1865, Bogotá, Colom.—d. May 23, 1896, Bogotá), Colombian poet whose metrical experimentation and romantic reminiscences introduced a melancholy lyricism new to Spanish-American poetry. His highly personal poetry was widely imitated and greatly influenced Modernist poetry in Spanish America.

Silva's life was a tormented one, both because of his morbid sensibility and as a result of a series of misfortunes—the economic ruin of his prominent family; the death of his only confidante, his sister Elvira; and the loss of his best manuscripts in a shipwreck. Silva escaped from the misery of his life through a brief but brilliant poetic career and, at the age of 30, through suicide. His complete works, including *Crepúsculos* ("Twilights") and the *Nocturnos* ("Nocturnes"), for which he is best known, are collected in *Obra completa de José Asunción Silva* (1956).

Silva Guimarães, Bernardo da: *see* Guimarães, Bernardo.

Silva Porto (Angola): *see* Kuito.

Silva Xavier, Joaquim José da, byname TIRADENTES (Portuguese: "Tooth-puller") (b. 1748, Pombal, Minas Gerais, Braz.—d. April 21, 1792, Rio de Janeiro), patriot and martyr who organized and led the first major outbreak against Portuguese rule in Brazil. Unsuccessful, he was tried and executed. The nobleness of Silva Xavier's defense has made him a Brazilian national hero, and he is viewed as one of the precursors of independence in Latin America.

Educated by his priest brother, Silva Xavier early became a voracious reader. Working as a physician, a merchant, a soldier, and a dentist (hence his nickname Tiradentes), he read widely in the French Philosophes and carried with him copies of the constitutions of the 13 original states of the United States. Sharing his ideas with other intellectuals in the captaincy of Minas Gerais, he advocated the abolition of slavery and complete independence from Portugal. An attempt by Portuguese officials to collect back taxes touched off the call for the rebellion led by Tiradentes.

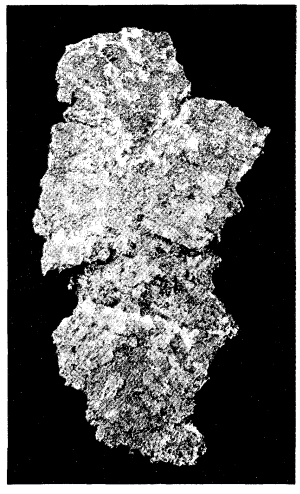
The uprising was a disaster, and Tiradentes was captured in Rio de Janeiro in April 1789. In a trial that lasted two years, he defended the republican cause with great dignity and force. He was the only conspirator to be sentenced to death and was publicly beheaded as an example to his fellow revolutionaries.

Silvanus, in Roman religion, the god of the countryside, similar in character to Faunus, the god of animals, with whom he is often identified; he is usually depicted in the guise of a countryman. Initially the spirit of the unreclaimed woodland fringing the settlement, he had some of the menace of the unknown. As clearings pushed back the forest, he evolved into a god of woodland pastures, of boundaries, and of villas, parks, and gardens. He never enjoyed a state cult or temple, but the simple ritual of his private worship at a sacred grove or tree had a universal appeal. In Latin literature his character tended to merge with that of the Greek god Silenus, a minor woodland deity, or Pan, a god of forests, pastures, and shepherds, and to be assimilated into the Greco-Roman mythological tradition.

Silvanus, SAINT: *see* Silas, Saint.

silver (Ag), chemical element of Group Ib in the periodic table.

Properties, uses, and occurrence. Together with gold, iridium, palladium, and platinum, silver is one of the so-called precious metals. Because of its comparative scarcity, brilliant white colour, malleability, and resistance to atmospheric oxidation, silver has long been used in the manufacture of articles of value, such as coins, ornaments, and jewelry. Silver has the highest known electrical and thermal conductivity of all metals and is used for making printed electrical circuits and as a coating for electronic conductors; it is also alloyed with such elements as copper or gold for use in electrical contacts.



Dendritic (branching) silver from Ontario

By courtesy of Joseph and Helen Guetterman Collection; photograph, John H. Gerard

Silver ornaments and decorations have been found in royal tombs dating back as far as 4000 BC. It is probable that both gold and silver were used as money by 800 BC in all countries between the Indus and the Nile.

Silver is widely distributed in nature, but the total amount is quite small when compared with other metals; the metal comprises 0.05 parts per million of the Earth's crust. Practically all sulfides of lead, copper, and zinc contain some silver. Argentiferous ores may contain amounts of silver from a trace to several thousand troy ounces per avoirdupois ton, or about 10 percent.

Unlike gold, silver is present in many naturally occurring minerals. Deposits of native (chemically free, or uncombined) silver are also commercially important. Sylvanite, a gold–silver telluride, $(Au,Ag)Te_2$, has been mined as an ore of both metals.

Because the majority of the ores that contain silver also contain the important metals lead, copper, or zinc or a combination of the three, the extractive metallurgy of silver is essentially that of the three metals, the silver being removed as a by-product. Pure silver is produced from the crude by-product either by electrolysis or by a chemical method.

Silver is treated in a number of MACROPAEDIA articles. For treatment of the recovery and refining of silver, *see* Industries, Extraction and Processing. For treatment of silver's use in ornamental and household objects, *see* Decorative Arts and Furnishings.

Historically, a major use of silver has been monetary, in the form of reserves of silver bullion and in coins. By the 1960s, however, the demand for silver for industrial purposes exceeded the total annual world production.

Use of the metal for sterling and plated silverware, ornaments, jewelry, and similar products has continued to be important. Alloys of silver with copper are harder, tougher, and more fusible than pure silver and are used for jewelry and coinage. The proportion of silver in these alloys is stated in terms of fineness, which means parts of silver per thousand of the alloy. Sterling silver contains 92.5 percent of silver and 7.5 percent of another metal, usually copper; *i.e.,* it has a fineness of 925. Jewelry silver is an alloy containing 80 percent silver and 20 percent copper (800 fine). Gold dental alloys contain about 75 percent gold and 10 percent silver. The yellow gold that is used in jewelry is composed of 53 percent gold, 25 percent silver, and 22 percent copper.

Natural silver consists of a mixture of two stable isotopes: silver-107 and silver-109. The chief radioactive isotopes are silver-108 (half-life, 2.42 minutes), silver-110 (half-life, 24 seconds), and silver-111 (half-life, 7.5 days). The metal does not react with moist air or dry oxygen but is oxidized superficially by moist ozone. It is quickly tarnished at room temperature by sulfur or hydrogen sulfide, which form a surface film of silver sulfide. In the molten state, silver dissolves oxygen; on solidification, most of the oxygen is expelled, a phenomenon known as the spitting of silver. The metal dissolves readily in nitric acid and in hot concentrated sulfuric acid.

Compounds. In the majority of silver compounds the element has a valence of one. These so-called argentuous compounds include such familiar substances as silver chloride (AgCl), silver bromide (AgBr), and silver iodide (AgI). Each of these salts is used extensively in photography. Silver chloride serves as the light-sensitive material in photographic printing papers and, together with silver bromide, in certain films and plates. The iodide is also used in the manufacture of photographic papers and films, as well as in cloud seeding for artificial rainmaking and in some antiseptics. All three halides are derived from silver nitrate ($AgNO_3$), which is the most important of the inorganic silver salts. In addition to providing the starting material for the production of the other salts, it is used in silver plating, silvering mirrors, cauterizing wounds, and treating various diseases of the skin and eyes.

Silver forms a relatively small variety of organic compounds. Among these, silver acetate (CH_3COOAg) is one of the most important, serving as an industrial oxidizing agent and laboratory reagent.

atomic number	47
atomic weight	107.868
melting point	960.8° C (1,861.4° F)
boiling point	2,212° C (4,014° F)
specific gravity	10.5 (20° C)
valence	1,2
electronic config.	2-8-18-18-1 or $(Kr)4d^{10}5s^1$

Silver, Horace (b. Sept. 2, 1928, Norwalk, Conn., U.S.), American jazz pianist, composer, and bandleader, exemplary performer of what came to be called the hard bop style of the 1950s and '60s. The style was an extension of bebop, with elements of rhythm and blues, gospel, and Latin-American music added. The style was marked by increased interest in composing original tunes with unusual structures, in place of the bebop practice of loosely basing improvisations on the chord progressions of a few favourite pop tunes such as "I Got Rhythm," "Indiana," and "What Is This Thing Called Love?"

During the mid-1950s Silver was heard on records with Stan Getz, Miles Davis, and Art Blakey, and he cofounded the most typical hard bop group of the 1950s—the Jazz Messengers—with the latter. Silver then formed his own series of excellent quintets. Instead of having ensemble statements only at the beginning and end of a piece, the middle being simply a container for improvised solos, Silver wrote ensemble passages positioned within and between improvised solos, and he further arranged his music by using repeating accompaniment patterns instead of conventional "comping" (sporadic, syncopated bursts of chording that flexibly respond to the directions indicated by the improvising soloist). He also wrote bass lines to fit his left-hand piano figures. The harmonies he wrote for saxophone and trumpet, often fourths and fifths, made the quintet sound much larger than most bebop quintets. Silver's piano solos were exceptionally clear and melodic, and he was not given to the standard practice, typified by his prime influence (Bud Powell), of improvising long, complex lines of eighth notes.

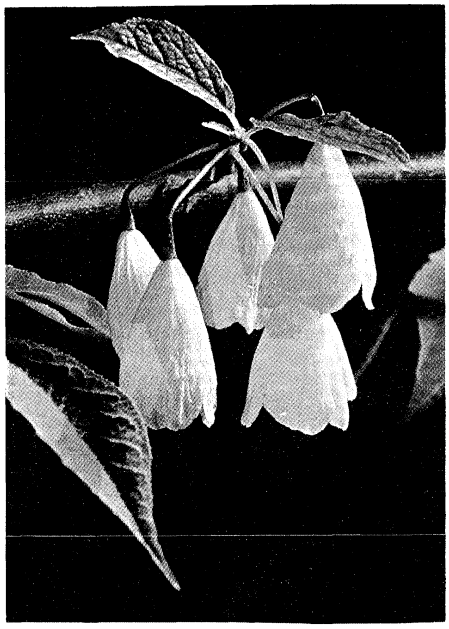
Silver's best known and longest lived quintet (1958–64) had trumpeter Blue Mitchell and tenor saxophonist Junior Cook, but, over the years, Silver also employed many other outstanding musicians, including saxophonists Joe Henderson and Michael Brecker, trumpeters Art Farmer and Randy Brecker, and drummers Roy Brooks and Al Foster. Silver's best known compositions include "The Preacher," "Señor Blues," "Song for My Father," "Sister Sadie," "Nica's Dream," and "Filthy McNasty." Silver exerted a wide influence, touching many pianists and jazz organists with the blues-derived aspects of his playing.

Silver Age, in Latin literature, the period from approximately AD 18 to AD 133 that is a time of marked literary achievement second only to the previous Golden Age (70 BC–AD 18). By the 1st century AD political patronage of the arts begun in the Augustan Age (43 BC–AD 18) and a stifling reverence for the literature of the Golden Age, particularly for the poetry of Virgil, had led to a general decline in original literary output. Under such tyrants as Caligula and Nero, speech making was a dangerous art, and rhetoricians turned to literature, influencing the development of the elaborate and poetical style characteristic of Silver Age prose. An increased provincial influence in Rome, while leading to an adulteration of the pure classical forms, contributed to the cosmopolitan outlook that was reflected in the psychologically perceptive and humanist tone of much of the best works of the period.

A great variety of literary forms is evident during the Silver Age. Of these, satire is the most vigorous, as exemplified by Juvenal in virulent satires of rich and powerful figures; by Martial in elegant epigrams on contemporary society; by Petronius in the picaresque novel *Satyricon* (1st century AD); and by Persius in poetic satires supporting the Stoic philosophy. History was the particular realm of Tac-

itus and Suetonius; Pliny the Elder and the Younger wrote letters on biography, science, natural history, grammar, history, and contemporary affairs. Quintilian excelled in literary criticism, Lucan in the epic form, Statius in poetry, Lucius Annaeus Seneca in rhetoric, and his son of the same name in tragedy.

silver bells, also called SNOWDROP TREE, or FRINGE TREE (*Halesia carolina*), deciduous plant, of the storax family (Styracaceae), native to southeastern and southern United States and cultivated as an ornamental. The tree grows from 12 to 24 metres (40 to 80 feet) tall and has alternate, stalked, toothed, bright-green leaves 5–10 centimetres (2–4 inches) long. The white, bell-shaped flowers,



Silver bells (*Halesia carolina*)
Louise K. Broman—Root Resources

about 2 cm long, are borne in clusters of two to five.

Silver City, ghost town, Owyhee County, southwestern Idaho, U.S., 37 mi (60 km) southwest of Boise. Founded March 10, 1863, it quickly displaced Ruby City as the centre of the Owyhee mines and was county seat (1866–1935). Rich silver lodes in the nearby War Eagle and Florida mountains were the subject of great excitement and bitter rivalry for control. A 500-lb (225-kg) silver crystal from the Poorman Mine won a gold medal at the Paris Exposition (1867). Silver City survived the collapse of the silver market accompanying the failure of the Bank of California in 1875 because of its mines' advanced technology, extensive British investments, and improved railway transportation. Mining activity, however, gradually declined, leading to a complete loss of population, which had reached a peak of 5,000.

Silver City, city, seat (1874) of Grant County, southwestern New Mexico, U.S. It lies just east of the Continental Divide, at an altitude of 5,931 ft (1,808 m) in the foothills of the Pinos Altos Range on the edge of the Gila National Forest (of which it is headquarters). It was founded in 1870 as a Spanish settlement called San Vincente de la Ciénaga (St. Vincent of the Marsh).

Located in a mining area noted for silver, gold, copper, lead, and zinc, it was incorporated (1876) as Silver City and was a boomtown during the 1880s. The Santa Rita open-pit copper mine has been in operation since Indian days. The nearby ghost town of Tyrone has been revitalized as a copper-mining centre by the Phelps Dodge Corporation. Silver City serves an irrigated farm and ranch area, with some lumbering and tourism. It is the seat of Western New Mexico University (1893). Fort Bayard State Hospital and Gila Cliff Dwellings National Monument are nearby. Pop. (1980) 9,887.

silver-eared mesia, also called SILVER-EAR (bird): *see* mesia.

silver fir (*Abies alba*), tree growing to a height of 150 feet; abundant in the mountainous regions of central and southern Europe.

silver fox (*Vulpes fulva*), red fox of North America in that colour phase when the fur is black with interspersed silver-tipped hairs. *See* fox.

silver king, the Atlantic tarpon. *See* tarpon.

silver maple, also called SOFT MAPLE, or WHITE MAPLE (*Acer saccharinum*), large, spreading tree, of the maple family (Aceraceae), popular as a rapid-growing shade tree. Native to eastern North America, it is widely cultivated elsewhere.

It grows to 18 metres (60 feet)—higher under favourable conditions—with a short, stout trunk and wide, irregular crown; slender drooping branches turn upward at the tips. Young bark is smooth and gray, becoming flaky with age. The deeply cut five-lobed leaf is light green above and silvery below. Inconspicuous greenish flowers appear along the shoots before the leaves unfurl in spring. The paired, winged fruit are the largest of any maple. The seeds are food for squirrels and birds; young twigs and foliage are eaten by deer. The soft wood has been used for crating and inexpensive furniture. Syrup can be obtained from the sap but in low yield.

Formerly a popular landscaping tree, the silver maple is now often excluded from public grounds because its brittle branches and twigs break easily, showering debris on the ground, and because it often sows numerous undesired seedlings in gardens and lawns. Among the varieties useful in landscaping are the cut-leaf silver maple (*A. saccharinum* 'Laciniatum'), with deeply indented, lacy leaves, and the pyramidal silver maple (*A. saccharinum* 'Pyramidale'), both of which are less liable to wind damage because they are shorter than the regular species.

silver nitrate, caustic chemical reagent and compound, important as an antiseptic, in the industrial preparation of other silver salts, and as a reagent in analytical chemistry. Its chemical formula is $AgNO_3$. Applied to the skin and mucous membranes, silver nitrate is used either in stick form as lunar caustic (or caustic pencil) or in solutions of 0.01 percent to 10 percent silver nitrate in water. The stick is used for removing warts and granulation tissue and for cauterizing wounds and ulcerations. Very dilute solutions are astringent and mildly antiseptic. A 1 percent or 2 percent solution is effective against gonococcal bacteria and may be applied to the eyes of newborn infants to ensure against blindness from gonorrhea.

Pure silver nitrate is an intermediate in the preparation of other silver salts, including the colloidal silver compounds used in medicine and the silver halides incorporated into photographic emulsions.

In analytical chemistry, aqueous solutions of silver nitrate are used in the volumetric determination of halides, cyanides, and thiocyanates, as well as for the detection of reducing agents and of the cations of various acids that form insoluble silver salts.

Silver nitrate is made in large quantities by dissolving silver in nitric acid. It crystallizes in transparent plates that melt at 212° C (414° F). The solubility at 20° C (68° F) is 222 grams per 100 grams of water. It is moderately soluble in methyl and ethyl alcohols and to a lesser extent in various other organic solvents. When heated to about 320° C (608° F), silver nitrate loses oxygen and forms silver nitrite. At a red heat, silver is formed.

Ingestion of silver nitrate causes violent abdominal pains, vomiting, and diarrhea, with the development of gastroenteritis. Treatment includes oral administration of common salt solutions, milk (or white of egg and water), and soap in water to protect the mucous membranes of the esophagus and stomach and precipitate the poisonous free silver ions as silver chloride.

Silver Springs, one of the largest limestone springs in the world and town, in Marion County, north central Florida, U.S., 6 mi (10 km) east of Ocala. The average flow is about 530,000,000 gal (2,000,000 cu m) per day, containing more than 480 tons of minerals. The water maintains a constant temperature of 72° F (22° C). The source of the main spring is a cavern 65 ft (20 m) long and 12 ft high. Most of the water discharged from the 100 or more springs in the group is from the abundant rainfall of north central Florida, which drains into the porous limestone subsurface and later gushes to the surface, filtered to unusual clarity. The springs sustain a large variety of aquatic life. Remains of mastodons, manatees, and extinct elephants have also been found, including some in the Silver River (formed by the springs). The clear water is often exploited for filming underwater movie scenes, and glass-bottomed boats take visitors over the spring pools. The explorer Hernando de Soto was probably the first European to see Silver Springs when he camped at Ocali, an Indian village nearby, in 1539. The Indian name for the springs is Sua-ille-oka, which means "sun-glinting water."

The town of Silver Springs is the focus of tourist activity, with a large motel and restaurant industry. Pop. (1980) town, 1,082.

Articles are alphabetized word by word, not letter by letter

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silver standard, monetary standard under which the basic unit of currency is defined as a stated quantity of silver and which is usually characterized by the coinage and circulation of silver, unrestricted convertibility of other money into silver, and the free import and export of silver for the settlement of international obligations.

No country presently operates under a silver standard. During the 1870s most European countries adopted the gold standard, and by the early 1900s only China and Mexico and a few small countries still used the silver standard. In 1873 the U.S. Treasury stopped coining silver. This led to the Free Silver Movement, whose supporters (miners, farmers, and debtors) advocated the return of silver coin. After the defeat of William Jennings Bryan, who ran for U.S. president on a platform advocating free and unlimited coinage of silver in 1896, agitation for free silver died in the United States. The U.S. Congress adopted the gold standard in 1900.

silverbill, any of several birds named for bill colour. Some finches of the genus *Lonchura* (*see* munia) are called silverbill.

Lichenops (*Hymenops*) *perspicillata,* the spectacled tyrant, or silverbill, of central South America, is a tyrant flycatcher.

silvering, process of making mirrors by coating glass with silver, discovered by the German chemist Justus von Liebig in 1835. In the process silver–ammonia compounds are reduced chemically to metallic silver, which is deposited on a suitably shaped glass surface. Modern processes may utilize silver solutions

and reducer solutions—consisting of invert sugar, Rochelle salt, or formaldehyde—that meet in a spray above clean glass traveling on a conveyor; as the spray falls on the glass surface, metallic silver is deposited.

Silvering of partial reflectors, for optical and physics research applications, must be done by a process slow enough so that the amount of reflectivity can be controlled. Partial reflectors transmit and reflect only portions of the incident light. Special mirrors for such instruments as reflecting telescopes are usually silvered by evaporation of silver onto a surface from an electrically heated filament in high vacuum.

Silverius, SAINT (b. Frosinone, Campania—d. Dec. 2, 537?, island of Palmaria, near Naples; feast day June 20), Italian pope from 536 to 537, a victim of the intrigues of the Byzantine empress Theodora.

Born the son of the future pope St. Hormisdas (before his father entered the priesthood), Silverius was a subdeacon when the Ostrogothic king Theodahad nominated him to the papacy. He was consecrated on June 8, 536, as successor to St. Agapetus I, who had angered Theodora by condemning Patriarch Anthimus of Constantinople and thus ruining her plans to restore Monophysitism, a doctrine that Christ has only one nature rather than two (*i.e.,* human and divine).

When Silverius refused to restore Anthimus, Theodora ordered the Byzantine general Belisarius to enter Rome (Dec. 9, 536) and depose Silverius; she replaced him with the deacon Vigilius, then nuncio to Constantinople. The Ostrogothic king Witigis then surrounded Rome and besieged Belisarius, who in March 537 falsely accused Silverius of treasonable collaboration with the Goths.

Silverius was degraded to the rank of monk and was driven from his see to Lycia, in Anatolia. He appealed to Theodora's husband, the emperor Justinian I the Great, who, apparently unaware of the situation, sent Silverius back to Rome for an inquiry. Vigilius, however, was ultimately able to banish his rival by force to the island of Palmaria, off Naples, where Silverius died by murder or starvation.

silversides, also called SAND SMELT, SMELT, or WHITEBAIT, any of many species of small, slim schooling fish of the family Atherinidae (order Atheriniformes), found in freshwater and along coasts around the world in warm and temperate regions.

Silversides are mullet-like fish named for the wide, silvery stripe usually present on each side. They have two dorsal fins and range in length to about 70 cm (28 inches). They are sometimes used as food.



Spawning grunions (*Leuresthes tenuis*)
Cy La Tour

The grunion (*Leuresthes tenuis*), a small species (15 cm long) found along California coasts, is noted for its spawning runs. It breeds along beaches at night, coming ashore at high tide. The eggs are buried in the sand, and, at the next high tide, they hatch and the new young make their way into the sea.

silvertip: *see* grizzly bear.

silverware, table knives, forks, and spoons that are made of silver. *See* cutlery; flatware.

silverwork, vessels, utensils, jewelry, coinage, and ornamentation made from silver. Silver sometimes occurs naturally in its metallic form but usually must be smelted from ores. The oldest silver artifacts date from ancient Sumer in about 4000 BC. The scarcity of silver, combined with its softness and malleability, precluded its use for making tools. These same characteristics, however, combined with its brilliant white colour and resistance to oxidation, ensured its prominence in ornamentation and as a major part of the monetary systems of most cultures. Silver is readily worked by nearly all metalworking techniques, including casting, chasing, embossing, engraving, forging, inlaying, and enameling.

In ancient times, especially in Rome, silver was highly prized for the making of plate ware, household utensils, and ornamental work. Silver later lost its position of prominence to gold, but, during the Middle Ages, it once again became the major material used for metal artwork. The similarity between solid gold and gilt silver assured that the less expensive silver would command a large market. Large quantities of silver from the New World also encouraged eager buyers in Europe. The art of silverwork flourished in the Renaissance, finding expression in virtually every imaginable form. Silver was often plated with gold and other decorative materials. Although silver sheets had been used to overlay wood and other metals since ancient Greece, an 18th-century technique of fusing thin silver sheets to copper brought silver goods called Sheffield plate within the reach of most people. *See also* metalwork.

Silvester (personal name and name of popes): *see under* Sylvester.

Silvestri, Filippo (b. June 22, 1873, Bevagna, Italy—d. June 10, 1949, Bevagna), Italian entomologist, best-remembered for his pioneering work in polyembryony, the development of more than one individual from a single fertilized egg cell.

During the late 1930s Silvestri discovered that this type of reproduction occurs in the species *Litomatix truncatellus* of the insect order Hymenoptera. His finding, resulting from a close analysis of the reproductive stages, cell division, and egg structure of these parasitic hymenopterans, attracted the attention of many biologists in general because of its implications for the nature of the egg and the causes of multiple generation.

Silvestri undertook various other important studies during his career. Notable among these activities was his investigation of the morphology and biology of the Termitidae, the most highly evolved family of termites. Equally significant was his comparative study of the form and structure of the millipede and the centipede.

Silvretta Group, German SILVRETTA GRUPPE, mountain range of the Rhaetian Alps along the Austrian–Swiss border, extending eastward from near Klosters to north of Schuls, both in Switzerland. The glacier-covered range rises to Linard Peak (11,191 feet [3,411 m]) in Switzerland and to Buin Peak (10,866 feet [3,312 m]) in Austria. Mountain climbing and winter sports are popular in the region.

Sima Guang (Chinese chronicler): *see* Ssu-ma Kuang.

Sima Qian (Chinese historian): *see* Ssu-ma Ch'ien.

Sima Xiangru (Chinese poet): *see* Ssu-ma Hsiang-ju.

Simancas, town, Valladolid province, in the Castile-León *comunidad autónoma* ("autonomous community"), north-central Spain. It lies on the east bank of the Pisuerga River, just southwest of Valladolid city. The town originated as the Roman Septimanca, and its most important landmark is a citadel dating from the Moorish occupation in the 9th century. This citadel is now the Archivo General del Reino, to which the national archives of Spain were removed by order of Philip II in 1563. It houses important private as well as state documents. Simancas is an agricultural trade centre. Pop. (1981) 1,378.

Simansky, Sergei Vladimirovich (Russian Orthodox leader): *see* Alexis.

Simao (China): *see* Ssu-mao.

Simaroubaceae, the quassia family of flowering plants, in the order Rutales, comprising 30 genera of tropical Asian trees, including the tree of heaven (*q.v.*). Members of the family have leaves that alternate along the stem and are composed of a number of leaflets arranged along an axis. Most species have small flowers, bitter bark, and fleshy fruits that are sometimes winged. The tree of heaven is often planted as an ornamental along city streets because it is smoke- and insect-resistant. Female plants are preferred because the male flowers release a disagreeable odour. Several varieties have colourful, twisted fruits and coloured leafstalks. Bark of species of the genera *Quassia* and *Picrasma* yields quassia, a bitter substance used in medicines. The crucifixion thorn (*Castela emoryi*) is native to the deserts of the southwestern United States.

Simbirsk (city, U.S.S.R.): *see* Ulyanovsk.

Simcoe, John Graves (b. Feb. 25, 1752, Cotterstock, Northamptonshire, Eng.—d. Oct. 26, 1806, Exeter, Devonshire), British soldier and statesman who became the first lieutenant governor of Upper Canada (now Ontario).

Simcoe entered the British army as an ensign in 1771. He served during the U.S. War of Independence (1775–83) and was promoted to captain in 1775. In 1777–81 he commanded the newly formed Queen's Rangers and was promoted to lieutenant colonel in 1778. Taken prisoner in 1779, he was subsequently released and, in 1781, invalided back to England, where he settled on his country estate.

Simcoe entered politics as member of Parliament for St. Mawes, Cornwall, in 1790. After passage of the Constitutional Act of 1791, which gave representative government to Canada, he was appointed lieutenant governor of Upper Canada. As lieutenant governor, he encouraged immigration and agriculture and worked on defense and road building. He was made a major general in 1794.

Simcoe left Canada in 1796. He served briefly as governor and commander in chief of Santo Domingo (Hispaniola; now the Dominican Republic) in 1797 and was promoted to lieutenant general. Back in England he took command at Plymouth in 1801, when a French invasion of England was expected. He was appointed commander in chief in India in 1806, but he fell ill on his way there; he returned to England, where he died.

Simcoe, Lake, lake, southeastern Ontario, Canada. It lies between Lake Huron's Georgian Bay and Lake Ontario, 40 miles (65 km)

north of Toronto. Fed by numerous small streams and joined by the Trent Canal, the lake, 287 square miles (743 square km) in area, drains northward through Couchiching Lake and the Severn River, also parts of the canal system, into the southeastern end of Georgian Bay. The lake is 30 miles (48 km) long and contains several islands, the largest, Georgina, being an Indian reserve. Encountered by Samuel de Champlain in 1650, it was originally known as Lac aux Claies before Governor John Simcoe renamed it for his father. Now a popular summer resort serving metropolitan Toronto, Lake Simcoe is situated in a rich farming region. Riparian settlements include Barrie and Orillia.

Simenon, Georges (Joseph Christian) (b. Feb. 13, 1903, Liège, Belg.—d. Sept. 4, 1989, Lausanne, Switz.), Belgian-French novelist whose prolific output surpassed that of any of his contemporaries, and who was perhaps the most widely published author of the 20th century.



Simenon
© Jerry Bauer

Simenon began working on a local newspaper at age 16, and at 19 he went to Paris determined to be successful. Typing some 80 pages each day, he wrote, between 1923 and 1933, more than 200 books of pulp fiction under 16 different pseudonyms, the sales of which soon made him a millionaire. The first novel to appear under his own name was *Pietr-le-Letton* (1931; *The Case of Peter the Lett*), in which he introduced the imperturbable, pipe-smoking Parisian police inspector Jules Maigret to fiction. Simenon went on to write about 80 more detective novels featuring Inspector Maigret, as well as about 130 psychological novels. His total literary output consisted of about 425 books that were translated into some 50 languages and which sold more than 600 million copies worldwide. In 1967 the publication of Simenon's complete works began in France and Italy.

Simenon's Inspector Maigret is one of the best-known characters in detective fiction. Unlike those fictional detectives who rely on their immense deductive powers, Maigret solved murders using mainly his psychological intuition and a patiently sought, compassionate understanding of the perpetrator's motives and emotional makeup. Besides psychological novels and detective stories, Simenon's other books include short-story collections and autobiographical works.

Simenon's central theme is the isolated existence of the neurotic, abnormal individual. Employing a style of rigorous simplicity, he evokes a prevailing atmosphere of neurotic tensions with sharp economy. Simenon lived in the United States for more than a decade from 1945, and later in France and Switzerland.

Simeon, one of the 12 tribes of Israel that in biblical times comprised the people of Israel who later became the Jewish people. The tribe was named after the second son born to Jacob and his first wife, Leah.

Following the Exodus out of Egypt and the death of Moses, Joshua led the Israelites into the Promised Land and divided the new territory among the 12 tribes. Though sources do not clearly indicate where the tribe of Simeon settled, it seems to have been in the south of Palestine beyond the powerful tribe of Judah. In time, part of the tribe of Simeon was apparently absorbed by Judah, while other members possibly relocated in the north. After the death of King Solomon (922 BC), Palestine split into the northern Kingdom of Israel and the southern Kingdom of Judah. If the tribe of Simeon is counted among the tribes that formed the northern kingdom, then it too was assimilated by other peoples after the Kingdom of Israel was conquered by the Assyrians in 721 BC. One way or another, the tribe of Simeon disappeared from history and is thus numbered among the Ten Lost Tribes of Israel (*q.v.*).

Simeon: *see* Peter the Apostle, Saint.

Simeon, also spelled SYMEON, name of Bulgarian rulers grouped below chronologically and indicated by the symbol •.

• **Simeon I,** byname SIMEON THE GREAT (b. 864/865—d. May 27, 927), tsar of the first Bulgarian empire (925–927), a warlike sovereign who nevertheless made his court a cultural centre.

Educated in Constantinople (now Istanbul), Simeon succeeded his father, Boris I, in 893 after the short intervening reign (889–893) of his dissolute elder brother, Vladimir.

His dominant ambition, which was to himself ascend the imperial throne of Byzantium—an aspiration afterward shared by many Bulgarian tsars—led Simeon to embark on many wars with the Byzantine Empire (894, 896, 913, 917, 923). He never took Constantinople, although it was more than once at his mercy; but he took for himself the title of "Tsar of All the Bulgarians" (925) and raised the archbishop of Bulgaria to the rank of a patriarch. In the Balkans he extended the power of Bulgaria over south Macedonia, south Albania, and Serbia, which became his vassal; but Bulgaria's dominion north of the Danube was probably lost during his reign. Simeon was twice married and left four sons, of whom the second, Peter I, succeeded him.

• **Simeon II** (b. June 16, 1937, Sofia, Bulg.), the last king of Bulgaria, reigning as a child from 1943 to 1946.

On Aug. 28, 1943, his father, Boris III, died under mysterious circumstances—his death being reported variously as due to a heart attack, to poisoning, and to shooting—and the six-year-old crown prince ascended the throne, overseen by a three-man regency comprising Boris' brother Prince Cyril, former war minister Lieutenant General Nikolai Michov, and former premier Bogdan Filov. After Bulgaria quit the Axis Powers and was overrun by the Soviet Red Army, the regents were arrested, and on Feb. 2, 1945, all three were executed as enemies of the state and as collaborators with the Germans. A second regency was established, but on Sept. 8, 1946, the monarchy was voted out of existence, and Simeon and his mother, Queen Ioanna, went into exile. Simeon eventually settled in Madrid, marrying a Spanish heiress.

Simeon OF DURHAM, also spelled SYMEON (d. *c.* Oct. 14, 1130/38), chronicler of medieval England.

Simeon entered the Benedictine abbey at Jarrow, in the county of Durham, in about 1071. This abbey was moved (1083) to the town of Durham, and there he made his religious vows in 1085/86 and later became choirmaster.

Between 1104 and 1108 Simeon wrote *Historia ecclesiae Dunelmensis,* a history of the see of Durham from its establishment in 635 at Lindisfarne (Holy Island) to 1096. The *Historia regum* ("History of the Kings"), consisting of two overlapping English histories covering the years 731–957 and 848–1129, was formerly attributed to him. It is now believed that he was the author only of the second history: a chronicle for the years 848–1118 (based on the *Life of King Alfred* by Asser and the *Chronicon* of Florence of Worcester) and a narrative of the years 1119–29 (part original, part based on Edmer's history of the church in Canterbury).

Simeon STYLITES, SAINT, also called SIMEON THE ELDER (b. *c.* 390, Sisan, Cilicia [near modern Aleppo, Syria]—d. 459, Telanissus, Syria), Syrian monk who was the first known stylite, or pillar hermit (from Greek *stylos,* "pillar"). He was called Simeon the Elder to distinguish him from a 6th-century stylite also named Simeon.

A shepherd, Simeon entered a monastic community, but, because of his excessive austerities, he was expelled and became a hermit. His reputed miracle-working generated popular veneration to such a degree that, about 420, to escape the importunities of the people, he began his pillar life northwest of Aleppo. His first column was 6 feet (2 m) high, later extended to about 50 feet (15 m). He remained atop the column until his death, permanently exposed to the elements, standing or sitting day and night in his restricted area, protected from falling by a railing, and provided with a ladder to communicate with those below or to receive meagre gifts of food from disciples. Eventually his pillar became a pilgrimage site. Visitors sought spiritual counsel, relief from sickness, intervention for the oppressed, and enlightenment in prayer and doctrine. Simeon apparently converted many people, and he influenced the Eastern Roman emperor Leo I to support the orthodox Chalcedonian party during the 5th-century controversy over the nature of Christ. Simeon's reputation inspired ascetics, both men and women, to emulate and surpass his austerities, some stylites appearing as late as the 19th century in Russia.

Simeon THE NEW THEOLOGIAN, SAINT: *see* Symeon the New Theologian, Saint.

Simeon, Charles (b. Sept. 24, 1759, Reading, Berkshire, Eng.—d. Nov. 13, 1836, Cambridge, Cambridgeshire), Anglican clergyman and biblical commentator who led the Evangelical (or Low Church) movement, in reaction to the liturgically and episcopally oriented High Church party.

Simeon was educated at King's College, Cambridge, where he became vice provost (1790–92). In 1782 he was presented to the living of Trinity Church, Cambridge, where he remained until his death. Renowned as a preacher, Simeon helped found the Church Missionary Society (1797) and assisted the newly founded (1804) British and Foreign Bible Society. In his *Horae Homileticae,* 17 vol. (1819–28; "Homiletic Offices"), he annotated the entire Bible for sermon material. In order to ensure the continuity of Evangelical teaching, he established (1816) the Simeon Trust to purchase the right to appoint clergymen to livings.

Simeon, Song of (hymn): *see* Nunc Dimittis.

Simeon ben Yoḥai (fl. 2nd century AD), Galilean tanna (*i.e.,* one of a select group of Palestinian rabbinic teachers), one of the most eminent disciples of the martyred Rabbi Akiba ben Joseph and, traditionally, author of the *Zohar* (*see* Sefer ha-zohar), the most

important work of Jewish mysticism. Little is known of Simeon's life, and what is recorded of it in the Talmud is enmeshed with legend.

Of the pupils at Akiba's academy, Simeon was second in esteem only to the saintly Rabbi Meïr. After Akiba was martyred by the Romans, Simeon also publicly opposed them and was forced to conceal himself. According to a number of legends, he and his son Eleazar hid in a cave for 13 years, subsisting on dates and the fruit of a carob tree. After they emerged, Simeon established an academy where his pupils included Judah ha-Nasi, later the redactor of the Mishna, in which many of Simeon's aphorisms are recorded. Simeon was sent by the Sanhedrin as an emissary to Rome, where he succeeded in having a number of restrictions upon Jewish observances removed.

Simeon advocated total devotion to the study of the Torah. In the development of Jewish law, in both its ritual and civil aspects, he stressed the importance of seeking the spirit in which laws were written, which could modify their application.

It was probably because of his reputation as a miracle worker and ascetic that the *Zohar* came to be attributed to him. Modern critical scholarship, however, ascribes the *Zohar* primarily to Moses de León (*q.v.*), a 13th-century mystic.

Simeon's grave at Meron, near Safed (Ẕefat) in Galilee, became a shrine for Oriental Jews and the mystical Ḥasidim; the traditional anniversary of Simeon's death (on Lag ba-Omer; *q.v.*) is observed with joyful ceremony at the site of his tomb.

Simeon Metaphrastes (b. *c.* 900, probably Constantinople—d. after 984), Byzantine hagiographer whose *Mēnologion,* a 10-volume collection of the lives of early Eastern saints, arranged according to their feast days, achieved wide popularity. Most of these texts had existed earlier, but they were not well written. Simeon gave them a stylistic revision (*metaphrasis*), and his version became so popular that the older collections ceased to be copied; hence many lives of saints were lost.

Of Simeon's life it is known only that he held an administrative post in the Byzantine civil service and that toward the end of his life he became a monk. Several commentaries on Eastern theologians and other works attributed to Simeon are probably not genuine.

Simeulue Island, Indonesian PULAU SIMEULUE, Simeulue also spelled SIMULUE, or SIMEULOEË, island in the Indian Ocean, Aceh *daerah istimewa* (special district), Indonesia. Simeulue lies off the northwestern coast of Sumatra, about 170 mi (274 km) southwest of Medan city. The island, 65 mi long and 20 mi wide, covers an area of 712 sq mi (1,844 sq km). Its hills rise to about 1,860 ft (567 m). Their slopes are covered with hardwood forests, and the coast is rocky, reef-bound, and intersected by short but rapidly flowing streams. Population settlements are along the hillsides, where terrace cultivation is practiced and rice, tea, and coffee are grown. Cattle, including water buffalo, are raised. There are coconut plantations, and copra and timber are the major exports. Crafts include weaving, wood carving, plaiting, and metalworking. The chief town and port is Sinabang, located on the southeastern coast and linked by road to Sebigo on the northeastern tip of the island. Communication with the mainland is mainly through Meulaboh, a nearby port on the northwestern coast of Sumatra.

Simferopol, also spelled SIMFEROPOL', city and administrative centre of the Crimean *oblast* (administrative region), Ukrainian Soviet Socialist Republic, on the Salgir River where it emerges from the Crimean Mountains. On the present outskirts of the town is the site of Neapolis, occupied by the Scythians from the 3rd century BC to the 4th century AD; but modern Simferopol was founded by the Russians in 1784, adjacent to the Tatar settlement of Ak-Mechet, after the annexation of the Crimea. Simferopol has a wide range of food-processing industries and makes wine, tobacco, and cigarettes. There are also light engineering and consumer-goods industries, producing machine tools, armatures, television sets, clothing, and footwear. The town has teacher-training, medical, and agricultural institutes and several research establishments. Pop. (1985 est.) 331,000.

Simhath Torah, Simhath also spelled SIMHAT, SIMCHAS, SIMCHATH, or SIMCHAT, Hebrew SIMḤAT TORAH ("Rejoicing of the Torah"), Jewish religious observance held on the last day of Sukkoth ("Festival of Booths"), when the yearly cycle of Torah reading is completed and the next cycle is begun. Torah scrolls are removed from the ark and carried through the synagogue seven times in a joyful procession, sometimes followed by children waving flags. There are singing and dancing and, for the children, sweets. The rejoicing characteristic of Simhath Torah is meant to express the joy that Jews feel in their possession and observance of the words of the Torah (the "Law").

simile, figure of speech involving a comparison between two unlike entities. In the simile, unlike the metaphor, the resemblance is explicitly indicated by the words "like" or "as." The common heritage of similes in everyday speech usually reflects simple comparisons based on the natural world or familiar domestic objects, as in "He eats like a bird," "He is as smart as a whip," or "He is as slow as molasses." In some cases the original aptness of the comparison is lost, as in the expression "dead as a doornail."

A simile in literature may be specific and direct or more lengthy and complex, as in the following lines of Othello:

> Never, Iago. Like to the Pontic Sea,
> Whose icy current and compulsive course
> Ne'er feels retiring ebb, but keeps due on
> To the Propontic and the Hellespont;
> Even so my bloody thoughts, with violent pace,
> Shall ne'er look back . . .
>
> (Shakespeare, *Othello*)

The simile does more than merely assert that Othello's urge for vengeance cannot now be turned aside; it suggests huge natural forces. The proper names also suggest an exotic, remote world, with mythological and historical associations, reminiscent of Othello's foreign culture and adventurous past.

The Homeric, or epic, simile is a descriptive comparison of greater length usually containing some digressive reflections, as in the following:

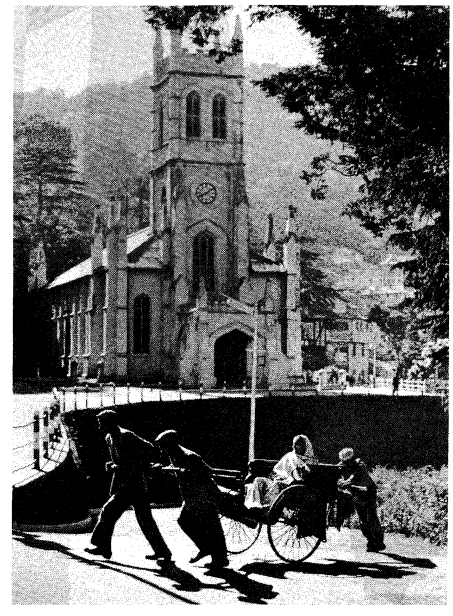
> As one who would water his garden leads a stream from some fountain over his plants, and all his ground—spade in hand he clears away the dams to free the channels, and the little stones run rolling round and round with the water as it goes merrily down the bank faster than the man can follow—even so did the river keep catching up with Achilles albeit he was a fleet runner, for the gods are stronger than men.
>
> (Iliad, Book XII)

Sīmjūrid DYNASTY (*c.* 940–1000), minor Iranian dynasty that ruled in Khorāsān. The Sīmjūrids, a family of Iranian notables, rose to prominence early in the 10th century under the Sāmānid rulers of Iran. The detailed history of the family is somewhat obscure, but its historical significance lies in the fact that in the last two decades of Sāmānid rule it held the balance of power in Khorāsān and western Afghanistan.

The founder of the family was a certain Aḥmad, originally a slave of the Sāmānid king Esmāʿīl. Aḥmad was appointed governor of Seistan by the Sāmānids in *c.* 912. His descendant Ebrāhīm Sīmjūrī became governor of Khorāsān during the reign of the Sāmānid Nūḥ I. Ebrāhīm's son Abū ol-Ḥasan Sīmjūrī created a virtually independent principality centred in Qohestān in southern Khorāsān. Abū ol-Ḥasan's son Abū ʿAlī added Herāt to the domains.

With the growing weakness of the Sāmānid dynasty and increasing power of the Ghaznavids, Abū ʿAlī entered into an alliance with the Qarakhanid Turks, hoping to strengthen his position. In ensuing tripartite hostilities between the Ghaznavids, the Qarakhanids, and the last of the Sāmānids, the Sīmjūrid territories were overrun and their power was extinguished.

Simla, city, administrative headquarters of Simla district and capital of Himāchal Pradesh state, northwestern India. The city lies northeast of Chandīgarh (Punjab state), on a ridge of the Himalayan foothills, at an elevation



Christ Church in Simla, against a background of wooded hills, in Himāchal Pradesh, India
Carl Purcell—Photo Researchers

of about 7,100 ft (2,200 m). Simla was built by the British on land they retained after the Gurkha War of 1814–16 and was used for resting troops. It gained popularity as a summer resort because of its cool climate and scenic setting, and from 1865 to 1939 it served as India's summer capital. From 1947 to 1953 it was headquarters of Punjab until the capital at Chandīgarh was completed.

Besides its administrative function, the city is one of India's most popular hill resorts. It is a rail terminus and lies on a main road, 175 mi (280 km) north of Delhi. Simla is also an agricultural trade centre and has some industry, including light manufacturing, brewing, and handloom weaving. Several sanatoriums and five colleges affiliated with Himāchal Pradesh University are located there.

Simla district, 1,930 sq mi (5,000 sq km) in area, was enlarged in a 1972–73 reorganization. It lies at the margin between the Himalayas and the northern Indian plain. Pop. (1981) town, 70,604; district, 510,932.

Simmel, Georg (b. March 1, 1858, Berlin—d. Sept. 26, 1918, Strassburg, Ger.), German sociologist and Neo-Kantian philosopher whose fame rests chiefly on works concerning sociological methodology. He did much to establish sociology as a basic social science in Germany. He taught philosophy at the uni-

versities of Berlin (1885–1914) and Strassburg (1914–18).

Simmel sought to isolate the general forms or recurrent regularities of social interaction from the specific content of definite kinds of activity, such as political, economic, and aesthetic. He gave special attention to the problem of authority and obedience. In *Philosophie des Geldes* (1900; 6th ed., 1958; "The Philosophy of Money") he applied his general principles to a particular subject, economics; he stressed the role of a money economy in specializing social activity and depersonalizing individual and social relationships. In the last decade of his life he devoted himself to metaphysics and aesthetics.

Simmel's sociology first became influential in the U.S. through translations and commentaries by Albion W. Small (1854–1926), one of the first important U.S. sociologists. *The Sociology of Georg Simmel* (ed. Kurt H. Wolff, 1950) comprises translations from *Soziologie* (1908) and other works. His ideas are also presented by Nicholas J. Spykman, *The Social Theory of Georg Simmel* (1925), and Rudolph H. Weingartner, *Experience and Culture: The Philosophy of Georg Simmel* (1962).

Simmonds' disease, pituitary disorder characterized by panhypopituitarism, a form of hypopituitarism in which all pituitary secretions are deficient. Effects include dwarfism, atrophy of the sex glands, shrinkage of the breasts and suppression of milk secretion, atrophy of the thyroid and the adrenal cortex, lowering of the metabolic rate, tendency toward lowered blood sugar, and lessened resistance to infection and shock. Some effects of panhypopituitarism have been simulated among emotionally deprived young children. Such children have shown remarkable recovery when removed from the injurious environment. The German doctor Morris Simmonds (1855–1925) first described this disease in 1914.

Simms, William Gilmore (b. April 17, 1806, Charleston, S.C., U.S.—d. June 11, 1870, Charleston), outstanding Southern novelist.

Motherless at two, Simms was reared by his grandmother while his father fought in the



Simms, detail of an engraving published by Johnson, Fry and Company, 1861

By courtesy of the Library of Congress, Washington, D.C.

Creek wars and under Jackson at New Orleans in 1814. Simms lived a vicariously adventurous childhood through his father, while absorbing history through his storytelling grandmother who had lived through the Revolution. After attending public schools for four years, when he entered the College of Charleston at 10, he knew enough French, Latin, German, and Spanish to dabble in translations. At 12 he completed the study of materia medica, and left college to become a druggist's apprentice. He began publishing poetry in Charleston papers at 16. Soon thereafter he joined his itinerant father in the Mississippi frontier country, meeting the people and seeing the life of which he later wrote. He edited a magazine and published a volume of poetry at 19, married at 20, and was admitted to the bar at 21.

Simms was a prodigious worker, whether at Woodlands Plantation in winter, Charleston in summer, or on yearly publishing trips north. As state legislator and magazine and newspaper editor, he became embroiled in political and literary quarrels. From Charleston and the South he nevertheless received lifelong praise approaching adulation; from the North, wide audience and eminent literary friendships despite his strong defense of slavery. Though his life was shadowed by defeat of the Confederacy, the death of his second wife, poverty, and the destruction of his home and library during the passage of Sherman's army, his letters attest a figure long underestimated by literary historians. Although not born into the social and literary circles of Charleston, he was eventually made a member of the city's most select group, the St. Cecilia Society.

Simms has been criticized for writing too much, too carelessly, and with too frequent use of stock devices; he was at his best the master of a racy and masculine English prose style and in dealing humorously with rowdy frontier characters. His gift as a teller of tales in the oral tradition and the antiquarian care he took in preparing historical materials are dominant features of such works as *Pelayo* (1838), in an 8th-century setting; *Vasconselos* (1853), 16th century; *The Yemassee* (1835; his most successful work in audience appeal), colonial; the revolutionary series—*The Partisan* (1835), *Mellichampe* (1836), *The Kinsmen* (1841), *Katherine Walton* (1851), *Woodcraft* (1854), *The Forayers* (1855), *Eutaw* (1856), *Joscelyn* (1867); his best border romances—*Richard Hurdis* (1838) and *Border Beagles* (1840); his short-story collection *The Wigwam and the Cabin* (1845); and his *History of South Carolina* (1840). Of 19 volumes of poetry, the collected *Poems* (1853) deserve mention. Most popular of his biographies were *The Life of Francis Marion* (1844) and *The Life of Chevalier Bayard* (1847). His literary criticism is represented in *Views and Reviews of American Literature* (1845).

Simnel, Lambert, Simnel also spelled SYMNELL (b. *c.* 1475—d. 1535?), impostor and claimant to the English crown, the son of an Oxford joiner, who was a pawn in the conspiracies to restore the Yorkist line after the victory of Henry VII (1485).

A young Oxford priest, Richard Symonds, seeing in the handsome boy some alleged resemblance to Edward IV, determined to exploit him. In 1486, the rumour that the "princes in the Tower," Edward's children, were still alive, suggested that Simnel might be passed off as one of them. A year later, the false report of the death in the Tower of another young Yorkist, Edward, earl of Warwick, changed the impersonation. Symonds took his charge to Ireland where the Yorkist interest was strong and where Simnel was crowned at Dublin as King Edward VI. Despite Henry VII's efforts (which included parading the real earl through the streets of London), the conspiracy spread.

In June 1487, Simnel landed in Lancashire, supported by 2,000 German mercenaries provided by Edward IV's sister Margaret, duchess of Burgundy, and in company with a genuine Yorkist claimant, John de la Pole, earl of Lincoln, who had abandoned his temporary loyalty to the Tudors. The issue was settled in the Battle of Stoke (June 1487); Lincoln was killed, Simnel and Symonds were taken, the other Yorkist leaders disappeared. Symonds was kept in prison, but Henry VII displayed only sardonic contempt for Simnel, whom he recognized to have been a harmless dupe. Employed in the royal kitchens, the pretender made a modest career for himself, dying soon after 1534.

Simōn: *see* Peter the Apostle, Saint.

Simon LE COUSTELLIER (the Cutler): *see* Caboche, Simon.

Simon MAGUS (Latin), English SIMON THE MAGICIAN, or THE SORCERER (fl. 1st century AD), practitioner of magical arts who probably came from Gitta, a village in biblical Samaria. Simon, according to the New Testament account in Acts of the Apostles 8:9–24, after becoming a Christian, offered to purchase from the Apostles Peter and John the supernatural power of transmitting the Holy Spirit, thus giving rise to the term simony (*q.v.*) as the buying or selling of sacred things or ecclesiastical office. Later references in certain early Christian writings identify him as the founder of post-Christian Gnosticism, a dualist religious sect advocating salvation through secret knowledge, and as the archetypal heretic of the Christian Church.

Having been revered by the people of northern Palestine as possessing vast preternatural powers, Simon Magus manifested his own admiration for the power of Christian evangelization when, in the New Testament story, he requested Baptism from Philip the Deacon. The biblical account concludes with Simon's repentance and apparent reconciliation with Christianity after his condemnation by St. Peter.

The 2nd-century theologian Justin Martyr relates that Simon visited Rome at the time of the emperor Claudius (41–54) and was there deified by followers fascinated with his miracle working. Archaeological finds reputed to have confirmed Simon's divinization have not proved genuine.

Other Christian documents of the 3rd century state that Simon Magus, in the role of false Messiah, had further confrontations with St. Peter at Rome. According to legend, on challenging the Apostle before the emperor Nero (54–68), Simon fell to his destruction from atop the Roman Forum in an attempt to demonstrate his occult ability to fly. Still other sources portray him as the individual responsible for the eclectic fusion of Stoicism and Gnosticism, known as "The Great Pronouncement."

Simon's quasi-Trinitarian Gnostic teaching, wherein he, with the title "the Great Power of God," appeared to the Jews as a mediating, suffering "Son of God," to the Samaritans as "Father," and to the pagan world as "Holy Spirit," is contained in the early Christian writings known as the Clementine literature. The mythic form of these documents raises doubts as to whether the biblical Simon Magus and the Simon of later apocryphal sources are the same.

In the 2nd century a Simonian sect arose that viewed Simon Magus as the first God, or Father, and he was sometimes worshipped as the incarnation of the Greek god Zeus. His consort Helen was regarded by his followers as the earthly manifestation of Athena.

In the Simonian creation myth, the first thought (Ennoia) was produced from the Father's mind in order to create the angels, who in turn created the visible universe. These angels, however, imprisoned the first thought out of jealousy, placing her in a human body so that she could not return to the Father. She was thus doomed to pass from body to body, the most recent being that of Helen. In order to redeem his first thought, the Father descended in human shape as Simon and offered salvation to human beings if they would recognize him as the first God.

The Simonian doctrine of salvation differed from that of the other Gnostic groups, for it promised redemption within the temporal order, whereas other Gnostics could conceive of

salvation as attainable only by escaping their earthly prison.

Simon OF SAINT-QUENTIN (fl. mid-13th century), French Dominican friar, who accompanied a diplomatic and proselytizing mission sent by Pope Innocent IV to the Mongols of Persia and Armenia in 1247. Much of his account of the mission is preserved in the *Speculum historiale* ("Mirror of History") of the French medieval encyclopaedist Vincent of Beauvais. From Acre, Palestine, the mission traveled 59 days to the camp of Baiju (Bachu), situated between the Aras River and Lake Gotchka (now Lake Sevan) in Armenia. Although the group was three times ordered to be executed for conduct that was deemed offensive (*e.g.*, offering no gifts, proselytizing, refusing to visit Güyük, the great khan of the Mongols), the party was dismissed after nine weeks with a letter from Baiju ordering the Pope to visit and submit to the Master of all the Earth (Güyük Khan).

Simon OF SUDBURY, original name SIMON TYBALD, or THEBAUD, or THEOBALD (b. Sudbury, Suffolk, Eng.—d. June 14, 1381, London), archbishop of Canterbury from 1375 and chancellor of England from 1380 who lost his life in the Peasants' Revolt of 1381.

Simon served for 12 years as an auditor (judge) of the Rota at the papal Curia, and in 1359 Pope Innocent VI employed him in an attempt to persuade King Edward III of England to open peace negotiations with France. As a reward for his services, Simon was appointed bishop of London by Innocent VI in 1361. Sent to Canterbury in May 1375, Simon, in his role as primate, avoided conflict with the state but dealt firmly with his suffragans. John Wycliffe appeared before him in February 1378 to answer charges of heresy. Simon crowned King Richard II on July 16, 1377.

In January 1380 he was appointed chancellor. In the spring of 1381 Kentish rebels under Wat Tyler marched on London; they held Simon and the lord treasurer, Sir Robert Hales, responsible for the oppressive poll tax. When the Tower of London was surrendered to Tyler's insurgents, Simon, Hales, and two other men were beheaded on Tower Hill.

Simon THE APOSTLE, SAINT, also called SIMON THE ZEALOT (fl. 1st century AD; d. Persia or Edessa, Greece?; Western feast day October 28, Eastern feast day June 19), one of the Twelve Apostles. In the Gospels of Mark and Matthew, he bears the surname



St. Simon, detail from a mural, 12th century; in the monastery of Eski Gümüs, Turkey

Sonia Halliday

Kananaios, or the Cananaean, often wrongly interpreted to mean "from Cana" or "from Canaan." *Kananaios* is the Greek transliteration of an Aramaic word, *qan' anaya,* meaning "the Zealot," the title given him by Luke in his Gospel and in Acts. It is uncertain whether he was one of the group of Zealots, the Jewish nationalistic party before AD 70. Apparently the titles may have been an attempt to distinguish him from the Apostle St. Simon Peter.

Nothing further is known about him from the New Testament. He supposedly preached the Gospel in Egypt and then joined the Apostle St. Judas (Thaddaeus) in Persia, where, according to the apocryphal Acts of Simon and Judas, he was martyred by being cut in half with a saw, one of his chief iconographic symbols (another being a book). According to St. Basil the Great, the 4th-century Cappadocian Father, Simon died peacefully at Edessa.

Simon, Claude(-Eugène-Henri) (b. Oct. 10, 1913, Tananarive, Madagascar), writer whose works are among the most authentic representatives of the French *nouveau roman* ("new novel") that emerged in the 1950s. He was awarded the Nobel Prize for Literature in 1985.

Simon was the son of a cavalry officer who was killed in World War I. He was raised by his mother in Perpignan, Fr. After studies at Paris, Oxford, and Cambridge, he traveled extensively and then fought in World War II. He was captured by the Germans in May 1940, escaped, and joined the French Resistance, managing to complete his first novel, *Le Tricheur* (1945; "The Trickster") during the war years. Later he settled in his hometown in southern France, where he cultivated vineyards.

In *Le Vent* (1957; *The Wind*) Simon defined his goals: to challenge the fragmentation of his time and to rediscover the permanence of objects and people evidenced by their survival through the upheavals of contemporary history. He treated the turmoil of the Spanish Civil War in *La Corde raide* (1947; "The Taut Rope") and *Le Sacre du printemps* (1954; "The Crowning of Spring") and the 1940 collapse of France in *Le Tricheur.* Four novels—*L'Herbe* (1958; *The Grass*), *La Route des Flandres* (1960; *The Flanders Road*), *La Palace* (1962; *The Palace*), and *Histoire* (1967)—constitute a cycle containing recurring characters and events. Many critics consider these novels, especially *La Route des Flandres,* to be his most important work. Later novels include *La Bataille de Pharsale* (1969; *The Battle of Pharsalus*) and *Triptyque* (1973; *Triptych*).

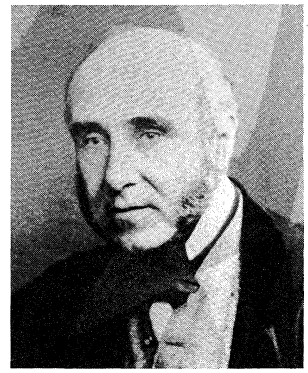
His style is a mixture of narration and stream of consciousness, lacking all punctuation and heavy with 1,000-word sentences. Through such masses of words, Simon attempts to capture the very progression of life; his novels remain readable despite their seeming chaos.

Simon, Herbert Alexander (b. June 15, 1916, Milwaukee), American social scientist known for his contributions in a large number of fields including psychology, mathematics, statistics, and operations research, all of which he synthesized in a key theory which led to his winning the 1978 Nobel Prize for economics.

Simon graduated from the University of Chicago in 1936, obtaining his Ph.D. in 1943. After holding various posts in political science he became, in 1949, professor of administration and psychology at Carnegie-Mellon University, Pittsburgh, later becoming professor of computer science and psychology there.

He is best known for his work on the theory of corporate decision-taking known as "behaviourism." In his influential book *Administrative Behavior* (1947), Simon sought to replace the highly simplified classical approach to economic modeling and its concept of the single decision-taking profit-maximizing entrepreneur with an approach to decision-taking that recognizes a multiplicity of factors. According to Simon, this framework provides a more satisfactory theoretical approach for a world in which decision-taking units are large enough for each one to have significant effects on prices and outputs. Crucial to this theory is the concept of satisfying behaviour—the achievement of acceptable levels of economic variables while keeping complications and risks at a minimum—as contrasted with the traditional emphasis on the achievement of maximum profits as the primary motivating factor. Simon's theory thus attempts to consider the psychological factors involved in decision-making that classical economists tend not to take into account. Later in his career, Simon became increasingly involved in the attempt to create artificial intelligence by computer technology. He is the author of several books on computers, economics, and management.

Simon, Sir John (b. Oct. 10, 1816, London—d. July 23, 1904, London), English physician whose efforts to improve the hygienic quality of urban life led to the establishment of modern standards of public health service.

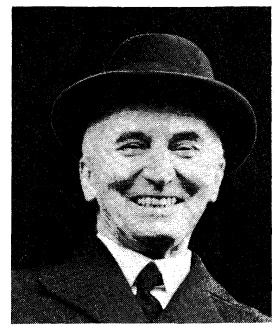


Sir John Simon

BBC Hulton Picture Library

A surgeon at King's College Hospital, London (1840–47), Simon was appointed first medical officer of health to the City of London (1848–55) and to the central government (1855–76). In this capacity he gradually created a state medical department to administer public health, establish state scientific research, perfect the vaccination system, and supervise the medical profession. His advocacy of public health legislation resulted in the Sanitary Act of 1866, which for the first time rendered a public health law universal, scientific, and compulsory while constituting the beginnings of industrial hygiene, and in the Public Health Act of 1875, which provided a complete sanitary code that, with consolidation and adjustments, remained in force for the next 100 years. He was knighted in 1887.

Simon (of Stackpole Elidor), John Allsebrook Simon, 1st Viscount (b. Feb. 28, 1873, Manchester—d. Jan. 11, 1954, London), British home secretary (1915–16, 1935–37), foreign secretary (1931–35), chancellor of the exchequer (1937–40), and lord chancellor (1940–45) who was identified with the appeasement policy of Prime Minister Neville



1st Viscount Simon

Keystone

Chamberlain's government toward Nazi Germany prior to World War II.

Called to the bar in 1899, Simon built a large practice, entered the House of Commons as a Liberal in 1906, and was successively appointed solicitor general (October 1910), attorney general (October 1913), and home secretary (May 1915) by Prime Minister Herbert H. Asquith. In January 1916 he resigned as home secretary in protest against the introduction of military conscription for World War I, but he remained in Parliament until November 1918. Reelected to the House in November 1922, he became foreign secretary in Ramsay MacDonald's National coalition government in November 1931. In 1927–30 he headed a commission to investigate the government of India and recommended moderate reforms there. Throughout the 1930s he also led the Liberal National Party, a group of former Liberals who opposed Socialism and had accepted the Conservatives' view favouring protective tariffs. He favoured a rapprochement between Britain and Nazi Germany and from 1936 was considered among the appeasement-minded politicians.

Appointed home secretary once more (by Stanley Baldwin) in June 1935 and chancellor of the exchequer (by Chamberlain) in May 1937, Simon remained a leading Cabinet authority on foreign affairs. He supported the futile Anglo-French agreement with Hitler in Munich (Sept. 30, 1938). In May 1940 Simon was appointed lord chancellor in Winston Churchill's wartime coalition ministry and was created a viscount. His autobiography, *Retrospect,* appeared in 1952.

Simon, Jules (-François) (b. Dec. 31, 1814, Lorient, Fr.—d. June 8, 1896, Paris), French political leader, philosopher, and theorist of the French Radical Party who as premier in 1876–77 became a central figure in the formative crisis of the Third Republic.

He was elected to the National Assembly of 1848 as a liberal and was philosophically devoted to the cause of freedom of speech, worship, and thought. He opposed the coup d'état of Louis-Napoléon in December 1851 and was suspended from his academic post at



Jules Simon
H. Roger-Viollet

the Sorbonne. After devoting himself to historical and philosophical research, he took the necessary oath of allegiance to the empire and in 1863 secured election to the legislature.

In 1868 Simon published *La Politique radicale,* which later became, along with Léon Gambetta's Belleville manifesto of 1869, the basis of the Radical Party's political program. Reelected in 1869, he became a member of the Government of National Defense set up in Paris after the defeat of Napoleon III's army by the Germans at Sedan had destroyed the Second Empire. On Feb. 18, 1871, Adolphe Thiers made him minister of education, religion, and fine arts in his emergency government.

Simon fell from office with Thiers on May 18, 1873. When the election of 1876 returned a strong republican majority to the Chamber of Deputies, Marshal Patrice de Mac-Mahon, who succeeded Thiers as president, was committed to a monarchical and paternalistic policy, but the republican gains obliged him, on Dec. 12, 1876, to invite Simon to form a ministry. Although relatively moderate, the ministry soon became involved in violent conflict with the clerical movements, and on May 16, 1877, Mac-Mahon wrote Simon a letter tantamount to dismissal. Simon, although opposed to the more rabidly anticlerical measures of Gambetta or Jules Grévy, was undefeated in the Chamber and could have defied the president. Instead he resigned, however, thereby precipitating the constitutional crisis of *le seize mai* (May 16), centring on the question of whether ministerial responsibility was owed to the president or to the Chamber. Because events determined that it should be owed to the Chamber, Mac-Mahon himself resigned on Jan. 30, 1879, and the Third Republic became essentially a parliamentary system.

Simon, (Marvin) Neil (b. July 4, 1927, New York City), playwright, screenwriter, television writer, and librettist who was one of the most popular playwrights in the history of the American theatre.

Simon was raised in the Bronx and studied at New York University before working as a comedy writer for various television shows in the late 1940s and throughout the '50s. His autobiographical play *Come Blow Your Horn* became a smash success on Broadway and ran for two years after opening in 1961. The plays that followed proved extremely popular with audiences and usually had very long runs on Broadway. They include *Barefoot in the Park* (1963; filmed 1967), *The Odd Couple* (1965; filmed 1968), *The Star-Spangled Girl* (1966), *Plaza Suite* (1968; filmed 1971), *Last of the Red Hot Lovers* (1969; filmed 1972), *The Prisoner of Second Avenue* (1971; filmed 1975), *The Sunshine Boys* (1972; filmed 1975), *California Suite* (1976; filmed 1978), *Chapter Two* (1977), *I Ought to Be in Pictures* (1980), and a trilogy of autobiographical plays consisting of *Brighton Beach Memoirs* (1983), *Biloxi Blues* (1985), and *Broadway Bound* (1986). Simon wrote the screenplays for the motion-picture adaptations of his plays as well as screenplays for a number of original motion pictures. He also wrote the books for the musicals *Little Me* (1962), *Sweet Charity* (1966), *Promises, Promises* (1968), and *They're Playing Our Song* (1979).

Simon's plays deal with the everyday lives and domestic problems of ordinary middle-class people. He examines his characters' marital and other dilemmas and, for comic effect, plays up the incongruity of their situations.

Simonde de Sismondi, J(ean-)C(harles-) L(éonard) (b. May 9, 1773, Geneva—d. June 25, 1842, Chêne, near Geneva), Swiss economist and historian who aroused men's consciences to what he saw as the perils and pitfalls of runaway industrialism. A pioneer theorist on the nature of economic crises and the risks of limitless competition, overproduction, and underconsumption, he was warmly regarded by such later economists as Karl Marx and John Maynard Keynes.

Son of a Protestant clergyman and a woman of means, Sismondi became a clerk at the age of 16 in a Lyon bank and saw the French Revolution unfold. To escape the Revolution's spreading effects he and his family went in 1794 to Tuscany, where they engaged in farming. Sismondi's experiences and observations there resulted in *Tableau de l'agriculture toscane* (1801; "Picture of Tuscan Agriculture"). Living in his native Geneva from 1800 on, he became so successful as an author of books and essays that he could decline offers of professorships.

Sismondi's monumental *Histoire des républiques italiennes du moyen âge,* 16 vol. (1809–18; *History of the Italian Republics in the Middle Ages*), which regarded the free cities of medieval Italy as the origin of modern Europe, inspired the leaders of that country's Risorgimento (unification movement).

As an economist, Sismondi was at first a loyal follower of Adam Smith, the proponent of laissez-faire economics. His *Nouveaux Principes d'economie politique* (1819; "New Principles of Political Economy"), however, represents a break with Smith's ideas. Sismondi argued for governmental regulation of economic competition and for a balance between production and consumption. He foresaw a growing rift between the bourgeoisie and the working class and called for social reforms to ameliorate the living conditions of the latter, but he stopped short of condemning private property.

Simonianism, the doctrine professed by followers of Simon Magus (*q.v.*).

Simonides OF CEOS (b. *c.* 556 BC, Iulis, Ceos—d. *c.* 468? BC, Syracuse, Sicily), lyric poet and epigrammatist from the Aegean island of Ceos. He appears to have originated the epinician ode in honour of victors in the Olympic Games, his epinicion of 520 being the earliest recorded.

Simonides studied music and poetical composition on Ceos but left as a young man and lived mostly in Athens. Allusions by later writers associate him with tyrant rulers of Athens, or Crannon and Larissa in Thessaly, and of Syracuse, but he did not depend entirely on patronage.

His lines on the Spartan rear guard that held the pass of Thermopylae against the Persians in 480 BC are a memorable epitaph, and such was his fame that many epigrams were later wrongfully ascribed to him. He was also the first Greek poet known to have written on commission for fees. The fragments of his dithyrambic (impassioned, chanted) poetry, which are known to have been successful in many Athenian competitions, the remains of his choral lyrics, and his epigrams indicate that he was well-suited to express the Panhellenic ideals of the new age that developed after the Greek victories over Persia.

Simonin, Albert-Charles (b. April 18, 1905—d. Feb. 15, 1980, Paris), French writer who brilliantly exploited the language of the Parisian underworld in tough, fast-talking thrillers that rivaled those of the leading American practitioners in the genre.

The authenticity of Simonin's work was guaranteed by his upbringing in La Chapelle district of Paris, where he left school at 12 years of age to do a variety of jobs, including stints as a chimneysweep, jeweler, and taxi driver. The last of these inspired *Voilà Taxi* (1935; "Taxi!"), his first book, written in the slang that was to become his hallmark.

Simonin took up journalism and wrote popular fiction under various pseudonyms before achieving popular and critical success in 1953 with *Touchez pas au grisbi!* ("Don't Touch the Grisbi"), which gained the Prix des Deux-Magots and was filmed with Jean Gabin in the leading role. Its sequel, *Le Cave se rebiffe* (1954; "The Angry Cave"), was equally successful and was followed by a dictionary of Parisian argot, *Le petit Simonin illustré par l'exemple* (1957; "The Little Simonin Illustrated by Example"). He wrote film scripts and in 1977 published a first volume of autobiography, *Confessions d'un enfant de la Chapelle* ("Confessions of a Child of La Chapelle"), which won the Prix Saint-Simon.

Simons, Menno (Dutch Anabaptist): *see* Menno Simons.

Simons, Walter (b. Sept. 24, 1861, Elberfeld, Westphalia—d. July 14, 1937, Babelsberg, Ger.), German jurist who served as interim

president of the Weimar Republic, March to May 1925. After serving in the German foreign ministry from 1911 to 1921, he became president of the German Supreme Court (1922–29). When Pres. Friedrich Ebert died, Simons became temporary president until the election and installation of Paul von Hindenburg. Simons also taught at the University of Leipzig from 1927.

Simonson, Lee (b. June 26, 1888, New York City—d. Jan. 23, 1967, Yonkers, N.Y., U.S.), designer influential in freeing U.S. stage design from constraints imposed by traditional realism.

In 1915, after studying at Harvard University and in Paris, Simonson began designing sets for the Washington Square Players in New York. Four years later, he helped found the Theatre Guild and became a member of the board of directors (1919–40). During the next 30 years he designed sets for more than 75 productions, including many sponsored by the guild.

He forsook the elaborate illusions of the "realistic" stage for the frank use of conventions suited to the meaning and action of particular plays. For John Masefield's *Faithful* (1919) he used Japanese screens, and for George Bernard Shaw's *Back to Methuselah* (1922) he projected lantern slides. Simonson was also active as an art critic, painter, magazine editor, and theatre consultant. His published works include *The Stage Is Set* (1932), an important essay on the theatre; an autobiography, *Part of a Lifetime* (1943); and *The Art of Scenic Design* (1950).

Simonstown, Afrikaans SIMONSTAD, town and naval base, southwestern Cape Province, South Africa. It is located on the eastern side of the Cape Peninsula, on False Bay of the Atlantic Ocean, 25 mi (40 km) south of Cape Town. Named for Gov. Simon van der Stel, it was a Dutch naval anchorage from 1741, and its harbour served as a refuge for merchant ships and whalers. In 1814 it became headquarters of the British South Atlantic Naval Squadron, and in 1957 the jurisdiction of the naval facilities were transferred to South Africa. The port, whose operations were considerably expanded in the 1970s, is South Africa's principal naval base. An adjacent surveillance and communications centre (opened in 1973) tracks much of the South Atlantic and South Indian oceans.

The town of Simonstown is compressed between mountains and the sea. Its historical landmarks include the original naval cemetery, the Residency (1776), Admiralty House (1814), and St. Francis of Assisi Church (1814, rebuilt 1834), the first English church in South Africa. The town's harbour is also a haven for deep-sea pleasure craft. Pop. (1983 est.) mun., 6,340.

simony, buying or selling of something spiritual or closely connected with the spiritual. More widely, it is any contract of this kind forbidden by divine or ecclesiastical law. The name is taken from Simon Magus (Acts 8:18), who endeavoured to buy from the Apostles the power of conferring the gifts of the Holy Spirit.

Simony, in the form of buying holy orders, or church offices, was virtually unknown in the first three centuries of the Christian Church, but it became familiar when the church had positions of wealth and influence to bestow. The first legislation on the point was the second canon of the Council of Chalcedon (451). From that time prohibitions and penalties were reiterated against buying or selling promotions to the episcopate, priesthood, and diaconate. Later, the offense of simony was extended to include all traffic in benefices and all pecuniary transactions on masses (apart from the authorized offering), blessed oils, and other consecrated objects.

From an occasional scandal, simony became widespread in Europe in the 9th and 10th centuries. Pope Gregory VII (1073–85) rigorously attacked the problem, and the practice again became occasional rather than normal. After the 16th century, it gradually disappeared in its most flagrant forms with the disendowment and secularization of church property.

simoom (whirlwind): *see* samūm.

simple harmonic motion, in physics, repetitive movement back and forth through an equilibrium, or central, position, so that the maximum displacement on one side of this position is equal to the maximum displacement on the other side, the time interval of each complete vibration is the same, and the force responsible for the motion is always directed toward the equilibrium position and is directly proportional to the distance from it. Many physical systems exhibit simple harmonic motion (assuming no energy loss): a vibrating mass attached to a spring, an oscillating pendulum, the electrons in a wire carrying alternating current, the vibrating particles of the medium in a sound wave, and other assemblages involving relatively small oscillations about a position of stable equilibrium.

In a simple harmonic oscillator, the energy of motion, or kinetic energy, is continuously being interchanged with stored energy, or potential energy. A specific example, the vibration of a mass attached to a vertical spring, the other end of which is fixed in a ceiling, illustrates the main features of simple harmonic motion. At the lowest position of the mass, the spring is under its greatest tension, which forces the mass upward and which diminishes to zero at the equilibrium position. At the highest position of the mass, the spring reaches its greatest compression, which forces the mass downward. Thus, at the extreme positions, the force is greatest and directed toward the equilibrium position. Near these positions of maximum displacement, though the speed is minimum, it is very rapidly changing, for it quickly decreases, reverses direction, and increases. This rapid change in speed implies great acceleration. Near the equilibrium position, however, even though the speed is maximum, it is undergoing almost no change in magnitude and no change at all in direction. At the equilibrium position, the acceleration has fallen to zero. Simple harmonic motion is characterized by this changing acceleration that always is directed toward the equilibrium position and is proportional to the displacement from the equilibrium position. Furthermore, the interval of time for each complete vibration is constant and does not depend on the size of the maximum displacement. In some form, therefore, simple harmonic motion is at the heart of timekeeping.

The motion is called harmonic because musical instruments make such vibrations that in turn cause corresponding sound waves in air. Musical sounds are actually a combination of many simple harmonic waves corresponding to the many ways in which the vibrating parts of a musical instrument oscillate in sets of superimposed simple harmonic motions, the frequencies of which are multiples of a lowest fundamental frequency. In fact, any regularly repetitive motion and any wave, no matter how complicated its form, can be treated as the sum of a series of simple harmonic motions or waves, a discovery first published in 1822 by the French mathematician Baron Jean-Baptiste-Joseph Fourier.

Simplicius OF CILICIA (fl. *c.* 530), Greek philosopher whose learned commentaries on Aristotle's *De caelo* ("On the Heavens"), *Physics, De anima* ("On the Soul"), and *Categories* are considered important, both for their original content and for the fact that they contain many valuable fragments of pre-Socratic philosophers. He studied at Athens and at Alexandria and spent most of his life in Athens, except for a short period after the closing of the school of philosophy in 529. A commentary on the *Encheiridion* of Epictetus and a work on quadratures are extant.

Simplicius, SAINT (b. Tivoli, near Rome—d. March 10, 483, Rome; feast day March 10), pope from 468 to 483. He became Pope St. Hilary's successor on March 3, 468, during a period that was turbulent ecclesiastically and politically.

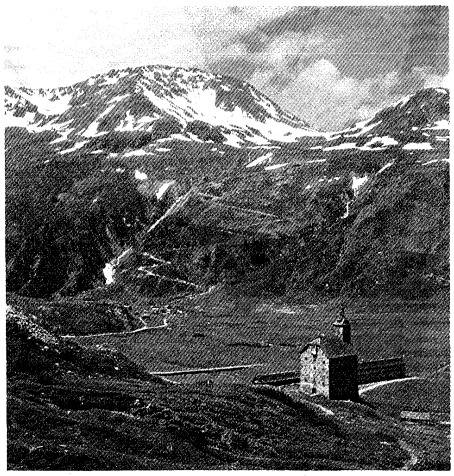
The Eastern Church was torn between orthodoxy and Monophysitism, a doctrine teaching that Christ has only one nature rather than two—*i.e.,* human and divine. The patriarchate of Antioch was being disputed by partisans and opponents of the orthodox Council (451) of Chalcedon. When Timothy Aelurus was restored as patriarch of Alexandria, the Monophysites had succeeded in gaining control of the key sees of Alexandria, Antioch, and Jerusalem. Simplicius appealed against Timothy to Patriarch Acacius of Constantinople and to the pro-Monophysite Basiliscus (who had usurped power from the Eastern Roman emperor Zeno in January 475). It was assumed that orthodoxy would be restored after Zeno regained power in August 476, and Simplicius succeeded in securing an imperial decree against Timothy. He failed, however, to obtain a similar decree against the Monophysite Peter Mongus, Timothy's successor, despite his appeal to Zeno and to Acacius, who then pursued a conciliar approach to the Monophysite controversy.

Meanwhile, Simplicius witnessed the end of the Western Roman Empire when no successor was nominated after the boy emperor Romulus Augustulus was deposed in 476 by the barbarian Odoacer, who then, by grant of Zeno, became patrician and in effect the first king of Italy. Zeno, in turn, seemingly became the sole rightful sovereign of the Roman world, and the elimination of Western imperial power served to enhance papal prestige in the West, where the pope had already begun to emerge as the focus of authority. Simplicius pursued the coordinating policy of his predecessors by extending the regime of the vicariate to the Iberian Peninsula, proclaiming the bishop of Seville papal vicar.

In 482 Zeno promulgated his *Henotikon,* a conciliatory document drafted by Acacius and Peter, reaffirming the doctrines of the Council of Nicaea (325) and making a disparaging reference to Chalcedon. The *Henotikon* was acceptable to the Monophysites and attained some religious peace for the East, but it involved a schism (the Acacian Schism) with Rome. Simplicius remained steadfast in upholding Chalcedonian orthodoxy and opposing Zeno's pro-Monophysitic policy. In doing so, he zealously defended papal supremacy against Byzantine caesaropapism (*i.e.,* a secular ruler's exercise of supreme authority over ecclesiastical matters).

Simplon Pass, mountain pass in southern Switzerland between the Pennine and Lepontine Alps at 6,581 ft (2,006 m) on the watershed between a north-flowing tributary of the Rhône and a south-flowing tributary of the Toce. It was not until the mid-13th century that the pass attained any importance as a route, and it was only when Napoleon built (1800–07) a carriage road through the Gorge of Gondo that the pass began to compete with the other Alpine passes as a major link between central and southern Europe. Near the summit of the pass is a hospice, first mentioned in 1235 as in the charge of the Order of St. John; it is now occupied by the Augustinians. Bellevue Simplon-Kulm Hotel stands near the hospice. A railway tunnel 12½ mi (20 km) long (opened 1906) cuts through 4,285

ft beneath the pass and connects Brig, Switz., with Iselle, Italy. When the pass is closed to



Simplon Pass in the Lepontine Alps, Switzerland
Keystone

road traffic, usually from mid-October to early April, cars are transported through the tunnel by train.

Simplon Tunnel, longest transportation (rail) tunnel in the world, about 12½ miles (20 kilometres) from Iselle, Italy, to Brig, Switz., and one of history's great engineering feats. The Simplon Pass was an important trade route between northern and southern Europe from the 13th century. It was improved in the beginning of the 19th century by a road constructed by Napoleon I. Following the successful completion of shorter Alpine passes, the Simplon was undertaken in the 1890s by Alfred Brandt, head of the German engineering firm of Brandt, Brandau & Company, and inventor of an efficient rock drill. Because of the great depth of the tunnel—more than a mile at its deepest point under Monte Leone—and consequent high temperature, Brandt developed a new tunnelling technique. He divided the tunnel into two separate galleries 55 feet (17 metres) apart. Thus, two pilot headings could be driven simultaneously, with crosshatches providing ventilation and a circuit for work trains. Many serious problems were overcome in the construction, beginning with the deflection of surveying instruments by the gravitational fields of the mountains and including water inrushes of up to 13,000 gallons (49,270 litres) a minute. At one point a stretch of fault rock riddled with springs was overcome only by the radical expedient of lining the pilot heading with 74 steel frames, each 20 inches (50 centimetres) thick, instead of conventional timbering. Temperatures of more than 120° F (49° C) were encountered.

Brandt died long before completion of the first gallery, which was holed through in January 1905. Various problems, including the outbreak of World War I, postponed completion of the second gallery until 1921.

Simpson, Christopher (b. *c.* 1605, Westonby, Yorkshire, Eng.—d. between May 5 and July 29, 1669, London), English composer, teacher, theorist, and one of the great virtuoso players in the history of the viol.

A Roman Catholic, he fought on the Royalist side in the English Civil War (1643–44) and subsequently became tutor to the son of a prominent Catholic, Sir Robert Bolles. During his life Simpson was highly regarded both as a person and as a musician. As a composer, chiefly of solo and ensemble works for viol, he is noteworthy for his exploitation of the instrument's resources and his development of variation form. His influential theoretical works were *The Division-violist* (1659, modern ed., 1958), discussing viol technique and the improvisation of descants and divisions (variations on a ground); and *The Principles of Practical Musick* (1665, modern ed., 1970), praised for its excellence by Henry Purcell and other contemporary composers.

Simpson, George Gaylord (b. June 16, 1902, Chicago—d. Oct. 6, 1984, Tucson, Ariz.), U.S. paleontologist known for his contributions to evolutionary theory and to the understanding of intercontinental migrations of animal species in past geological times.

Simpson received his doctorate from Yale University in 1926. He chose for his thesis the mammals of the Mesozoic Era, which are important for the understanding of mammalian evolution, although evidence of their existence consists mainly of tantalizing fragments of jaws and teeth. The materials were located chiefly in the Peabody Museum at Yale and the British Museum in London. Simpson produced substantial quarto monographs on the two collections, making his reputation as an able worker in mammalian paleontology.

In 1927 he joined the staff of the American Museum of Natural History, New York City, where he was to continue research in paleontology for three decades. The first 15 years were highly productive; he published about 150 scientific papers, many of considerable importance. A few dealt with lower vertebrates, but nearly all were on mammalian paleontology. In his first years in New York City he was interested in the fauna of Florida of the later Tertiary and Pleistocene (the Pleistocene Epoch, which followed the Tertiary Period, began about 2,500,000 years ago and ended about 10,000 years ago). He published a number of works on this topic. For the most part, however, his interests were in the early history of mammals, and most of his publications in the 1930s were concerned with this field. He studied the Cretaceous mammals of Mongolia and North America, especially the Paleocene fauna of the latter continent (the Paleocene Epoch began about 65,000,000 years ago and lasted about 11,000,000 years). This resulted in a major work on the Paleocene fauna of the Fort Union Formation of Montana, in which about 50 mammals of a variety of primitive types were found. The breadth of his studies of mammalian evolution led to the writing of a detailed classification of mammals that is standard in the field.

In the Tertiary a series of mammalian fauna lived in South America that were quite unlike those of any other continent. Those of the late Tertiary and Pleistocene forms were fairly well known, but little was known of the earlier history of the peculiar South American groups. Hence, in the early 1930s, he made three expeditions to Patagonia to collect new material and re-study specimens already described; as a result of these efforts, the early history of the Tertiary mammals of South America became vastly better known. He published several dozen papers on these forms in the late 1930s and afterward two volumes summarizing their early history.

During World War II Simpson did staff work for the U.S. Army, principally in North Africa. On his return to the American Museum, he became curator in charge of the active department of paleontology, as well as a professor at Columbia University. This restricted the time available for research, but his scientific productivity remained undiminished. While his descriptive work in paleontology continued, his interests spread to other fields. The possibility of applying mathematical methods to paleontology had already led to his co-authorship of a work on quantitative zoology. A consideration of the successive faunas of the various continental areas led to studies of the problems of the intercontinental migrations of animal species. Problems of taxonomy and classification are intimately connected with evolutionary studies, and, in addition to giving a thorough consideration of principles of classification in his work on mammalian classification, he published in 1961 a volume on *The Principles of Animal Taxonomy.* In a series of lectures which appeared in book form as *The Meaning of Evolution* in 1949, he discussed the philosophical implications of the acceptance of evolutionary theory, which attracted worldwide attention. In the postwar period there was a renewed study of evolutionary theory by geneticists, systematists, and paleontologists. Simpson took a major part in such studies; his principal publications in the area were his volumes *Tempo and Mode in Evolution* (1944; reissued 1984) and *Major Features of Evolution* (1953).

In 1958 Simpson left New York City to spend a decade as an Alexander Agassiz Professor of Vertebrate Paleontology at the Harvard Museum of Comparative Zoology. After that he moved to Tucson, Ariz., where he became professor of geosciences at the University of Arizona, a post from which he retired in 1982. He continued to publish widely. Later works include *Splendid Isolation: The Curious History of South American Mammals* (1980), *Why and How: Some Problems and Methods in Historical Biology* (1980), and *Fossils and the History of Life* (1983). (A.S.R.)

BIBLIOGRAPHY. George Gaylord Simpson, *Concession to the Improbable; an Unconventional Autobiography* (1978), a candid self-portrait that abounds with lively descriptions of his field expeditions.

Simpson, Sir James Young, 1ST BARONET (b. June 7, 1811, Bathgate, Linlithgowshire, Scot.—d. May 6, 1870, London), Scottish obstetrician who was the first to use chloroform in obstetrics and the first in Britain to use ether.

Simpson was professor of obstetrics at the University of Edinburgh, where he obtained



Sir James Simpson, 1870
BBC Hulton Picture Library

his M.D. in 1832. After news of the use of ether in surgery reached Scotland in 1846, Simpson tried it in obstetrics the following January. Later that year he substituted chloroform for ether and published his classic *Account of a New Anaesthetic Agent.*

Simpson persisted in the use of chloroform for relief of labour pains, against opposition of obstetricians and the clergy. He was appointed one of the queen's physicians for Scotland in 1847 and in 1866 was created a baronet.

Simpson introduced iron wire sutures and acupressure, a method of arresting hemorrhage, and developed the long obstetrics forceps that are named for him. He is also known for his writings on medical history (especially on leprosy in Scotland) and on fetal pathology and hermaphroditism.

Simpson, Sir John Hope (b. July 23, 1868, Liverpool—d. April 10, 1961), British civil administrator in India and author of two of the earliest modern studies on refugees.

Simpson held numerous governmental posts before his retirement in 1916, rising to the post of acting chief commander of the Andaman and Nicobar Islands. He then worked with refugee and relief services in China and Greece, for which he received high honours, including that of Knight Commander of the Order of the British Empire in 1937. Simpson's books *The Refugee Problem: Report of a Survey* (1939) and *Refugees: A Review of the Situation Since September 1938* (1939) remain prime sources of information on most aspects of the refugee situation during the early 20th century.

Simpson, Louis (Aston Marantz) (b. March 27, 1923, Jamaica), Jamaican-born U.S. poet and critic, notable for his marked development in poetic style. In 1964 he won the Pulitzer Prize in poetry for his volume *At The End of the Open Road, Poems* (1963).

Simpson moved from Jamaica to New York City at age 17. His education at Columbia University in New York City was interrupted by service in the U.S. Army (1943–45), and he was graduated from Columbia in 1948 (Ph.D., 1959). During the 1950s he worked as a book editor and taught at Columbia and at the University of California at Berkeley. From 1967 he taught at the State University of New York in Stony Brook.

Simpson's early poetry—that of *The Arrivistes: Poems 1940–1949* (1949) and *Good News of Death and Other Poems* (1955)—follows traditional forms and conventional rhyme and metrical patterns, though it treats such contemporary themes as war and the quality of life in the 20th century. In *A Dream of Governors* (1959), however, Simpson began to reflect the influence of Walt Whitman's poetry and to experiment with free verse. Simpson came to believe that poetry springs from the inner life of the poet and that its expression should be original and natural. By the publication of his next book of poetry, *At the End of the Open Road, Poems*, the development of his poetic style was clear: the use of poetic conventions had been abandoned. Simpson's later collections of poetry include *Adventures of the Letter I* (1971), *Searching for the Ox* (1976), *Caviare at the Funeral* (1980), and *The Best Hour of the Night* (1983). In addition to writing poetry, Simpson produced several critical studies of other poets and an autobiography, *North of Jamaica* (1972; U.K. title *Air with Armed Men*). A collection of his essays and lectures, *A Company of Poets*, was published in 1981.

To make the best use of the Britannica, consult the INDEX *first*

Simpson, Matthew (b. June 21, 1811, Cadiz, Ohio, U.S.—d. June 18, 1884, Philadelphia), best known and most influential Methodist leader in the United States during the second half of the 19th century.

Simpson had little formal education but taught himself basic school subjects, foreign languages, printing, and law. For three years he studied medicine under a local physician and then started his own practice. He had always been active in religious work, however, and in the 1830s decided to devote himself to the Methodist ministry. Within a few years he was recognized as an extraordinary preacher. In 1839 he became president of Indiana Asbury University (now DePauw) in Greencastle, where he spent nine years developing the school into a leading Midwestern educational institution.

In 1848 the Methodist General Conference elected Simpson editor of its magazine *Western Christian Advocate*. An ardent opponent of slavery, Simpson wrote powerful editorials and delivered persuasive speeches on the subject. In 1852 he was elected bishop of the Methodist Episcopal Church, and he used his position and his oratorical abilities to galvanize Northern patriotism before and during the Civil War. A close associate of top Republican Party officials, Simpson was chosen to deliver the eulogy at Lincoln's burial in Springfield, Ill.

During the last two decades of his life, Simpson travelled throughout the country and the world. His fame spread well beyond the boundaries of the United States and the Methodist Church. He also found time to write and edit several books, including *A Hundred Years of Methodism* (1876) and *Cyclopaedia of Methodism* (1878).

Simpson, N(orman) F(rederick) (b. Jan. 29, 1919, London), English playwright who achieves spectacular verbal effects by his cunning manipulation of phrasing, his frequent use of outrageous double entendre and, especially, of non sequitur.

Simpson was educated at the University of London, and during World War II he served in the Intelligence Corps. After the war he taught and worked in adult education as an assistant lecturer in English until 1962. His first play, *A Resounding Tinkle* (1957), illustrates Simpson's style of humour. *One Way Pendulum* (performed 1959), Simpson's most successful work, revolves about a man who builds a model in his living room of London's famous criminal court, the Old Bailey, and finds himself in its dock.

Simpson's other work includes *The Hole* (performed 1964), *The Cresta Run* (performed 1966), and *Was He Anyone?* (1973). He also wrote for television.

Simpson, O(renthal) J(ames) (b. July 9, 1947, San Francisco), U.S. collegiate and professional football player, who was a premier running back, known for his speed and evasiveness.

Simpson played football at Galileo High School (San Francisco), first as tackle and then as a fullback. He attended San Francisco City College (1965–66) to achieve a scholastic record that allowed him to play at the University of Southern California (USC; Los Angeles, 1967–68), where he set yards gained by rushing records: 1967, 1,415 yd; 1968, 1,709. He was named All-American (1967–68), played in two Rose Bowl games, and won the Heisman trophy as the best collegiate player of the season (1968). At USC he was also a member of a world-record setting 440-yd relay team.

Simpson, often called Orange Juice because of his initials, was the number one draft choice of the American Football League (AFL) Buffalo Bills in 1969. He set a season record for yards gained rushing (2,003) in 1973. The Bills were never a contending team during his stay, but he was a great box office draw. Injuries to his knees prompted the Bills to trade him in 1978 to the National League (NFL) San Francisco 49ers, but he retired after the 1979 season. His 1975 record of most touchdowns scored in a season (23) survived into the 1980s, as did his 1973 season rushing record for most yards gained. He led the AFL in rushing yardage (1972–73, 1975–76). His career total yards gained (11,236) was third in the all-time rankings. His salary in his last three years exceeded $700,000 annually.

After his retirement from football, Simpson became a film and television actor and sports commentator.

Simpson Desert, uninhabited arid region (about 56,000 sq mi [145,000 sq km]) in central Australia. Situated mainly in the Northern Territory, it overlaps into Queensland and South Australia and the Finke River (west), the Mulligan and Diamantina rivers (east), and the MacDonnell Ranges and Plenty River (north), projecting southward to the large saline Lake Eyre. Sand dunes, 70–120 ft (20–37 m) high and 1,500 ft apart, run parallel from northwest to southeast for distances up to 100 mi; *Triodia* grass (*Spinifex*) vegetation grows between the dune crests. The desert was noted by the explorer Charles Sturt in 1845 and was called (together with Sturt's Stony Desert) the Arunta Desert on a chart prepared by T. Griffith Taylor in 1926. The first complete crossing by a European was not accomplished until 1939, when Cecil Thomas Madigan studied the region and named it for A.A. Simpson, former president of the South Australian Branch of the Royal Geographical Society of Australasia. The Simpson Desert is the last refuge of some rare Australian desert animals, including the fat-tailed marsupial mouse.

Simrock, Karl Joseph (b. Aug. 28, 1802, Bonn—d. July 18, 1876, Bonn), German literary scholar and poet who preserved and made accessible much early German literature, either by translation into modern German (as with *Nibelungenlied,* 1827), by rewriting and paraphrasing (as with *Das Amelungenlied,* 1843–49), or by editing (as with *Die deutsche Volksbücher,* 18 vol. [1839–67]).



Karl Simrock, engraving after a photograph, 1862
Bavaria-Verlag

In his youth he studied law at Bonn and Berlin and attended lectures on literary theory by August Wilhelm von Schlegel and Karl Lachmann. He was removed from his judicial post in 1830 for a poem he had written praising the July Revolution of that year, but, following his father's death shortly afterward, he retired to Bonn and devoted himself to the study of literature. He was made an honorary professor at Bonn in 1850.

Simsbury, town (township), Hartford County, northern Connecticut, U.S., on the Farmington River. The area, originally called Massacoe, was settled in 1660 as part of Windsor. The community was separately incorporated in 1670 and was named either for Simondsbury, Eng., or for Simon Wolcott, an early pioneer. The settlers fled during King Philip's War (1675–76) and the village was burned. It was rebuilt and thrived after copper was discovered at East Granby (then part of Simsbury) in 1705. The first colonial copper coins were minted there in 1737 by John Higley; a collection is displayed in the Simsbury Historic Center. The town's area was reduced with the separate incorporation of Granby (1786), Canton (1806), and Bloomfield (1835). Simsbury is mainly residential with some light manufactures including safety fuses (since 1836). Tariffville village, near Talcott Mountain State Park, is in the northeastern part of the town. Pop. (1980) 21,161.

simulation, in industry, science, and education, a research or teaching technique that reproduces actual events and processes under test conditions. Developing a simulation is often a highly complex mathematical process. Initially a set of rules, relationships, and operating procedures are specified, along with other variables. The interaction of these phenomena create new situations, even new rules, which further evolve as the simulation proceeds. Simulation implements range from paper-and-pencil and board-game reproductions of situations to complex computer-aided interactive systems.

Simulation techniques for experimentation permit researchers to perform exotic "dry lab" experiments or demonstrations without using rare materials or expensive equipment. In the automotive industry, proposed automobile designs undergo simulated wind-tunnel tests in computer simulations, thus saving hundreds of hours formerly devoted to prototype building and testing. Time compression is another cost-saving feature of simulation technology. Events that can take anywhere from hours to eons in real time can be simulated in a few minutes. Medical researchers, for example, often must isolate organs and keep them alive by artificial means, grow cultures, inject chemicals, and wait for results. When the normal functions of a selected organ can be simulated accurately, however, researchers can observe in a few minutes the effects of a broad range of events on that functioning. Likewise, astronomers using computer simulations of galactic movements can demonstrate events that take millions of years to complete—such as the collision of two galaxies—to test the validity of theoretical descriptions.

As a technique for instruction, simulation allows students to deal in a realistic way with matters of vital concern but without dire consequences should they make wrong choices. The technique has proven especially useful in medical training, as, for example, in the University of Alberta Medical School, where the computer simulates patients in critical condition who will die without proper care. Aspiring doctors are asked to make swift diagnoses and prescribe treatments in an effort to keep the patient alive. Aircraft-pilot trainees also are exposed to realistic emergency situations by means of such sophisticated simulation devices as the Link trainer (*see* flight simulator).

Simulations enable students to understand complex interactions of physical or social environment factors. Dartmouth College students, for example, play a simulation game in which they strive to grow a good rice crop under the constant threat of pests, fire, and flooding. The Graduate School of Management at Northwestern University has programmed its computer to simulate a micro-model of the American economy. Using portable terminals and television monitors, students propose solutions to economic problems and compare the predictions they yield with data taken from the model.

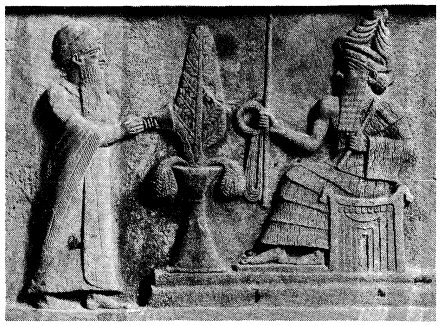
simulator, flight: *see* flight simulator.

simultaneous setting (theatre): *see* multiple setting.

Simulue (Indonesia): *see* Simeulue Island.

Sin (Akkadian), Sumerian NANNA, in Mesopotamian religion, the god of the moon. Sin was the father of the sun god, Shamash (Sumerian: Utu), and, in some myths, of Ishtar (Sumerian: Inanna), goddess of Venus, and with them formed an astral triad of deities.

Nanna, the Sumerian name for the moon god, may have originally meant only the full moon, whereas Su-en, later contracted to Sin, designated the crescent moon. At any rate, Nanna was intimately connected with the cattle herds that were the livelihood of the people in the marshes of the lower Euphrates River, where the cult developed. (The city of Ur, of the same region, was the chief centre of the worship of Nanna.) The crescent, Nanna's emblem, was sometimes represented by the horns of a great bull. Nanna bestowed fertility and prosperity on the cowherds, governing the rise of the waters, the growth of reeds, the increase of the herd, and therefore the quantity of dairy products produced. His consort, Ningal, was a reed goddess. Each spring, Nanna's worshipers reenacted his mythological visit to his father, Enlil, at Nippur with a ritual journey, carrying with them the first dairy products of the year. Gradually Nanna became more human: from being depicted as a bull or boat, because of his crescent emblem, he came to be represented as a cowherd or boatman.



The king pouring libations to Sin, Ur-Nammu stele, *c.* 2050 BC; in the University Museum of the University of Pennsylvania, Philadelphia

By courtesy of the University Museum of the University of Pennsylvania, Philadelphia

Sin was represented as an old man with a flowing beard—a wise and unfathomable god—wearing a headdress of four horns surmounted by a crescent moon. The last king of Babylon, Nabonidus (reigned *c.* 556–539 BC), attempted to elevate Sin to a supreme position within the pantheon.

sin, moral evil as considered from a religious standpoint. Sin is regarded in Judaism and Christianity as the deliberate and purposeful violation of the will of God. *See also* deadly sin.

The concept of sin has been present in many cultures throughout history, where it was usually equated with an individual's failure to live up to external standards of conduct or with his violation of taboos, laws, or moral codes. Some ancient societies also had concepts of corporate, or collective, sin (*see* original sin) affecting all human beings and dating from a mythical "fall of man" out of a state of primitive and blissful innocence. In ancient Greek thought, sin was looked upon as, in essence, a failure on the part of a person to achieve his true self-expression and to preserve his due relation to the rest of the universe; it was attributed mainly to ignorance.

In the Old Testament, sin is directly linked to the monotheistic beliefs of the Hebrews. Sinful acts are viewed as a defiance of God's commandments, and sin itself is regarded as an attitude of defiance or hatred of God. The New Testament accepts the Judaic concept of sin but regards humanity's state of collective and individual sinfulness as a condition that Jesus came into the world to heal. Redemption through Christ could enable men to overcome sin and thus to become whole. Both Christianity and Judaism see sin as a deliberate violation of the will of God and as being attributable to human pride, self-centredness, and disobedience. While insisting more strongly than most religions upon the gravity of sin, both in its essence and in its consequences, both Christianity and Judaism have emphatically rejected the Manichaean doctrine that either the created world as a whole or the material part of it is inherently evil. Christianity holds rather that evil is the result of the misuse of their free will by created beings and that the body, with its passions and impulses, is to be neither ignored nor despised but sanctified; in the Bible, the "flesh" that is spoken of disparagingly is not the human body but human nature in rebellion against God.

Theologians divide sin into "actual" and "original." Actual sin is sin in the ordinary sense of the word and consists of evil acts, whether of thought, word, or deed. Original sin (the term can be misleading) is the morally vitiated condition in which one finds oneself at birth as a member of a sinful race. In Genesis 3, this is depicted as an inherited consequence of the first human sin, *i.e.,* that of Adam. Theologians differ as to the interpretation of this narrative, but it is agreed that original sin, however mysterious its origin and nature may be, arises from the fact that human beings come into the world not as isolated individuals but as members of a corporate race inheriting both good and evil features from its past history.

Actual sin is subdivided, on the basis of its gravity, into mortal and venial. This distinction is often difficult to apply but can hardly be avoided. A mortal sin is a deliberate turning away from God; it is a sin in a grave matter that is committed in full knowledge and with the full consent of the sinner's will, and until it is repented it cuts the sinner off from God's sanctifying grace. A venial sin usually involves a less important matter and is committed with less self-awareness of wrongdoing. While a venial sin weakens the sinner's union with God, it is not a deliberate turning from him and so does not wholly block the inflow of sanctifying grace.

Actual sin is also subdivided into material and formal. Formal sin is both wrong in itself and known by the sinner to be wrong; it therefore involves him in personal guilt. Material sin consists of an act that is wrong in itself (because contrary to God's law and human moral nature) but which the sinner does not know to be wrong and for which he is therefore not personally culpable.

Sin-akhkheeriba (Assyrian king): *see* Sennacherib.

Sīnā' al-Janūbīyah (Arabic: "Southern Sinai"), *muḥāfaẓah* (governorate), southern part of Sinai Peninsula, Egypt. The governorate was created out of Sīnā' *muḥāfaẓah* in late 1978, after the first stages of the Israeli withdrawal from the peninsula were initiated. (Israel had occupied the area following the 1967 war with Egypt and other Middle Eastern states.) The northern boundary of the governorate roughly follows the old pilgrim track (Darb al-Ḥājj) from Suez city to Elat in Israel. The topography of the governorate is rugged, consisting in the south of granite and sandstone mountains cut by steep-walled wadis (seasonal watercourses). The highest peak is the historic Mount Katrīnah (Catherine), 8,668 feet (2,642 m). Scattered over the governorate is a modest Bedouin population that lives mainly by growing dates, barley, and some fruits and by raising livestock (camels, goats, donkeys, and sheep). They are compelled by the arid climate to migrate seasonally in search of pasture for their animals. Some have found employment in the governorate's developing oil and tourist industries. The city of aṭ-Ṭūr, capital of the *muḥāfaẓah,* is their principal settlement. In the mountainous interior a few Christian monastic communities raise dates, olives, apricots, and vegetables, as well as camels and goats in the wadis and oases watered by springs and wells.

Fishing is of some importance along the Gulf of Suez, with the main catching and storage centre at at-Ṭūr. The governorate's main resource is mineral wealth, of which petroleum is the most important. First discovered at

Mount Tanakah in 1910, new oil fields have multiplied, especially since the return of the western Sinai to Egypt. The Gulf of Suez fields are the richest oil-producing deposits in Egypt. At-Ṭūr is the centre for the Sinai oil industry. At Abū Rudays there is also a natural-gas field. Manganese is mined around Umm Bugmah, southeast of Abū Zanīmah, where there is a smelting plant.

Besides aṭ-Ṭūr, the governorate's main towns are all port towns: Mīnā' ash-Shaṭṭ, Abū Zanīmah, Abū Rudays, and Abū Darbah (all on the western coast); Dhahab and Nuwaybi' al-Muzayyinah (on the Gulf of Aqaba); and Ra's Naṣrānī (at the tip of the peninsula). Tourism has become an economically important activity since the late 1970s. St. Catherine's (*q.v.*), built by the Byzantine emperor Justinian (527–565) on the traditional site of the burning bush encountered by Moses near Mount Sinai, remains an active Greek Orthodox monastic community and is the seat of an autocephalous archbishop. It is also a pilgrimage and tourist site. The governorate contains several other monastic sites of historic interest, including the Monastery of the Forty Martyrs and the Monastery of SS. Cosmas and Damian. Along the Gulf of Aqaba coast and at Dhahab, a tourist industry centred on the landscape and the rich coral formations in the gulf was developed by the Israeli occupation administration and has been continued by Egypt. Minor ruins dating from ancient Egypt are also found in the governorate. The governorate is served by a highway network, and the Aḥmad Ḥamdī Tunnel (1980), passing under the Suez Canal, gives the governorate road communication with the Nile Valley. Pop. (1986 est.) 24,000.

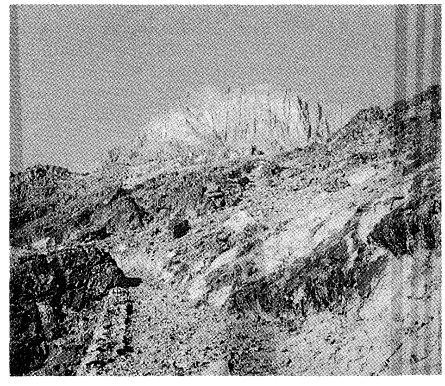
Sīnā' ash-Shamālīyah (Arabic: "Northern Sinai"), *muḥāfaẓah* (governorate), northern part of the Sinai Peninsula, Egypt. The governorate was created out of Sīnā' *muḥāfaẓah* in 1978 after the initial stages of Israeli withdrawal from the peninsula. Israel had occupied the Sinai in 1967 during the Six-Day War and held it until October 6, 1973, when Egypt reconquered a narrow strip along the Suez Canal in the Ramaḍān (Yom Kippur) War. Egypt and Israel agreed upon a disengagement of forces in 1975, and Israel began returning the Sinai in stages following the 1979 peace treaty. Al-'Arīsh, the capital of the *muḥāfaẓah,* was returned in May 1979, and the rest of the governorate was returned in April 1982.

The northern half of the Sinai Peninsula is dominated by the broad at-Tīh Plateau, which extends from the governorate's southern boundary downward to the north until it meets the Mediterranean coastal plain. At the northern edge of the *muḥāfaẓah,* the Mediterranean coastal plain widens out westward toward the Suez Canal, where it gives way to large expanses of sand dunes. Wadi al-'Arīsh, a seasonal stream 155 miles (250 km) long, lies in the northeastern section of the governorate and empties into the Mediterranean Sea near the town of al-'Arīsh. Mount Yu'alliq in the central area of the governorate at 3,589 feet (1,094 m) is the highest peak. Along the northern coast lies the large and brackish Bardawīl Lake (266 square miles [690 square km]). This lake is bounded on the north by a long, narrow sandbar that has been pierced since 1955 by two canals in order to link the lake with the sea. A large aquifer of groundwater, which is augmented by drainage from winter rainfall, underlies the *muḥāfaẓah,* and there are numerous wells and springs that tap this source.

Agriculture has become important on the plain of al-'Arīsh and along the coast. Reclamation efforts by both the Israeli occupation administration (1967–79) and the Egyptian government have brought much of the arable land under cultivation. Well water and a storage dam on the Wadi al-'Arīsh, which collects runoff from the winter rains, provide water for crops of barley, fruits, market vegetables, olives, and dates. Another large reclamation effort was started by the Egyptians in 1979 along the southwestern edge of Bardawīl Lake. Water piped from the Nile River provides irrigation for this scheme, which has opened much new land to cultivation. Vegetables, fruit trees, and wood trees have been planted. The majority of the settled population of the *muḥāfaẓah* lives in the coastal region or in the towns located there. The coastal Bedouin grow date palms and barley crops and also raise camels and goats, which they move into the hilly region to the south after the winter rains. Fishing is important around Bardawīl Lake and is a traditional occupation of the local Bedouin. The *muḥāfaẓah* has coal and uranium deposits and a few natural-gas fields, and a salt- and phosphate-extraction plant has been built near Bardawīl Lake.

The largest town of the governorate is al-'Arīsh, which also serves as a port. It is a market town for locally grown crops and has canning and freezing plants for fish. It is also the official transshipment point for products passing between Egypt and Israel and has a long-standing reputation as a centre for contraband traffic as well. Other towns are Būr Fu'ād, al-Qanṭarah (both Suez Canal towns), Rummānah (on the coast road), and Nakhl. Tourism, which started under the Israeli occupation, has been modified but continued by Egypt. Al-'Arīsh is the entry point from Israel and has air links to Cairo and the tourist sites in Sīnā' al-Janūbīyah (South Sinai) *muḥāfaẓah.* The Mediterranean coastal road in the governorate has been the main thoroughfare for military and commercial traffic between Egypt and Palestine since antiquity. Other roads farther south connect the governorate with the Nile valley via the Suez Canal ferry and via the Aḥmad Ḥamdī Tunnel, which runs under the Suez Canal. Pop. (1986 est.) 156,000.

Sinai, Mount, also called MOUNTAIN OF MOSES, or MOUNT HAREH, Hebrew HAR SINAI, Arabic JABAL MŪSĀ, granitic peak of the south-central Sinai Peninsula, Sīnā' al-Janūbīyah (South Sinai) *muḥāfaẓah* (governorate), Egypt. Mount Sinai is renowned as the principal site of divine revelation in Jewish history, where God is purported to have appeared to Moses and given him the Ten Commandments (Exodus 20; Deuteronomy 5). According to Jewish tradition, not only the decalogue but also the entire corpus of biblical text and interpretation was revealed to Moses on Sinai. The mountain is also sacred in both the Christian and Islāmic traditions. Because scholars differ as to the route of the Israelite exodus from Egypt and the place-names in the scriptural account cannot be identified in terms of present sites, a positive identification of the biblical Mount Sinai cannot be made. Mount Sinai itself, however, has long been accepted as the site in the traditions of Judaism, Christianity, and Islām.



The summit of Mount Sinai, Sinai Peninsula
W.P. Jacob, Greenwich, Conn.

In the early Christian era the area was frequented by hermits, and in AD 530 the monastery of St. Catherine was built at the northern foot of the mountain. Still inhabited by a few monks of the autonomous Orthodox Church of Mt. Sinai, it is probably the world's oldest continuously inhabited Christian monastery (*see* Saint Catherine's). Its library of ancient biblical manuscripts, including the famous 4th-century Greek Codex Sinaiticus (now in the British Museum), has been invaluable in reconstructing the text of the Bible.

The mountain, which rises to 7,497 feet (2,285 m) above sea level, was under Israeli administration from the Six-Day War of 1967 until 1979, when it was returned to Egypt. It has become an important pilgrim and tourist site.

Sinai Peninsula, Arabic SHIBH JAZĪRAT SĪNĀ', triangular peninsula linking Africa with Asia and occupying an area of 23,500 square miles (61,000 square km). It lies between the Gulf of Suez and the Suez Canal on the west and the Gulf of Aqaba and the Negev desert on the east, and it is bounded by the Mediterranean Sea on the north and the Red Sea to the south. Its greatest dimensions are about 130 miles (210 km) from east to west and about 240 miles (385 km) from north to south. The Sinai Desert, as the peninsula's arid expanse is called, is separated by the Gulf of Suez and the Suez Canal from the Eastern Desert of Egypt, but it continues eastward into the Negev without marked change of relief. Usually regarded as being geographically part of Asia, the Sinai Peninsula is the northeastern extremity of Egypt and adjoins Israel and the Gaza Strip on the east. The peninsula was occupied by Israeli forces during the Arab–Israeli War of 1967 but was returned to Egypt in 1982 under the terms of the 1979 peace treaty.

The Sinai has been inhabited since prehistoric times. The earliest written information about it dates from 3000 BC, when the ancient Egyptians recorded their explorations there in search of copper ores. The name Sinai, however, seems to have been known much earlier and may have been derived from the original name of one of the most ancient religious cults of the Middle East, that of the moon god Sin. The passage of the Israelites through Sinai is undoubted, but the route and the date of their exodus are still matters of debate. Sinai is likewise famous as the scene of the giving of the Law to Moses, but there is doubt as to which of the mountains of Sinai is the actual site. A road along the Sinai's northern coast served as the principal trade route between Egypt and Palestine for many centuries, and it is likely that Egypt erected a chain of fortresses to guard this route. After the decline of the Egyptian empire, Nabataeans from Petra controlled the trade routes of the Sinai for two centuries until they were defeated by the Romans in AD 106. The region then became part of the province of Arabia in the Roman Empire.

During the early Christian period, Sinai became the home of a large number of hermits and ascetics, particularly in the mountainous southern region. In AD 530 the Byzantine emperor Justinian I began the building of the monastery of St. Catherine on the lower slopes of Mount Sinai. This provided a centre for the scattered communities of Christians in the area, and the monastery served as a pilgrimage site throughout the Middle Ages. After 1517 Sinai formed part of the Ottoman Empire and was administered by an official sent from Constantinople (now Istanbul). Conditions in the Sinai deteriorated and traveling there became difficult after Egypt became in-

dependent of direct Turkish rule in the early 19th century. The al-ʿArīsh area was the scene of fighting between the Turks and the British during World War I, and at war's end the Sinai was turned over to Egypt and was administered by that country until the Israelis overran the peninsula in the Six-Day War of 1967. The Sinai has been the focus of Israeli-Egyptian combat in every military confrontation between the two nations since 1949, the Giddi and Mitla passes in the peninsula's northeastern portion being the scene of bitter fighting in 1956, 1967, and 1973.

Two principal regions may be recognized in Sinai. The first region is the southern complex of high mountains, including such peaks as Mount Katrīnah (Catherine), which is 8,668 feet (2,642 m) high; Umm Shawmar, 8,482 feet (2,585 m) high; ath-Thabt, 7,997 feet (2,437 m) high; and Mount Sinai, 7,497 feet (2,285 m) high. The southern region is essentially composed of igneous rocks and is sharply incised by deep, canyon-like wadis (seasonal watercourses) that drain toward the Gulf of Suez or the Gulf of Aqaba. This gaunt mountain mass is separated from the Gulf of Suez to the west by a narrow coastal plain, but on its eastern side it rises precipitately from the Gulf of Aqaba. The second region, flanking this mass on the north and forming two-thirds of Sinai, is a great plateau sloping from heights of more than 3,000 feet (900 m) downward to the Mediterranean. It is characterized by the extensive plain of Wadi al-ʿArīsh, by a number of islandlike massifs, and by broad western and northern coastal plains that have extensive sand dunes.

A conspicuous ridge runs along the southern rim of the Sinai in a great horseshoe curve, from which three main drainage basins have developed. The northern (or Mediterranean) drainage basin, in which Wadi al-ʿArīsh acts as a master stream, empties into the Mediterranean near the town of al-ʿArīsh. The eastern (Gulf of Aqaba and Dead Sea) basin and the western (Gulf of Suez) basin are both drained by a number of small streams. It is estimated that the Sinai Desert receives more than 1,600,000 acre-feet (2,000,000,000 cubic m) of water annually from local precipitation. About one-fourth of this water flows on the surface as runoff, and a similar amount percolates to groundwater reservoirs, thereby offering excellent opportunities for water conservation.

The Sinai falls within the great arid belt crossing northern Africa and southern Asia. Aridity is manifested in Sinai by a degraded soil surface, sand-dune expanses, salinization, and wadis. That less arid climatic conditions formerly prevailed is demonstrated by occasional terraces of thick alluvial and lacustrine deposits. In the Sinai's northern, or Mediterranean, region of low relief, the climate in winter has a relatively high amount of rainfall (5 inches [125 mm]); in summer it is dry and intensely hot, and in spring and autumn it has dry southern khamsin winds and occasional torrential rains. In the southern, or Red Sea, region, the climate differs because of the mountainous nature of the terrain. The prominent peaks are covered with clouds throughout the year and with ice in winter. Again, in winter there is some rainfall; in summer, rare monsoon winds from the southeast also account for occasional heavy rainfalls. The nights are cool, even though the daytime summer heat is intense. Prevailing light winds come mainly from the north. Relative humidity is generally high on the coasts, reaching 74 percent along the Mediterranean and 60 percent along the Red Sea.

Aside from newly irrigated areas on the northern coastal plain, the vegetation in the Sinai Desert is mostly ephemeral, but perennial scrub survives on the steep southern slopes and on the plateau to the north. Succulents and halophytes (salt-tolerant plants) are found on the subdesertic coastal plains, and medicinal and fodder plants are widely distributed. Animals are rare, but the species represented include ibex, gazelles, sand foxes, leopards, wildcats, jackals, hares, hedgehogs, and moles. Falcons and eagles are indigenous, and there are also seasonal migrants such as quail, partridge, and grouse.

The scanty population of Sinai is mostly concentrated in the northern fringe, where water supplies are adequate, as well as in the western fringe, where petroleum and manganese industries have been developed. The settled population is engaged in agriculture, land reclamation, and pastoralism and in the petroleum, mining, fishery, and tourism industries. The wandering Bedouin tribes migrate in search of water and pasturage but are increasingly attracted to industry and agriculture. In the mountainous south, a community of Eastern Orthodox Christian monks lives in the monastery of St. Catherine.

Petroleum, first discovered in 1910 at Mount Tanakah, in west Sinai, is the most important mineral exploited in the peninsula. Mineral ores considered feasible for exploitation include manganese and uranium. Various other minerals are also present, and building stones, dolomite, and sands and gravels are abundant.

Land reclamation and irrigation efforts using groundwater or water pumped from the Nile River have enabled several hundred thousand acres of land on the northern-coastal plain to be newly cultivated. Barley, fruits, market vegetables, dates, and olives are produced, and wood trees have been planted. Date-palm groves are scattered throughout the peninsula, and some of the area's original Bedouin inhabitants are still engaged in the nomadic grazing of livestock.

Sinaia, town, Prahova *judeţ* (county), east-central Romania. It lies about 65 miles (105 km) north-northwest of Bucharest in the Prahova River Valley, 2,770 feet (845 m) above sea level, at the foot of Mount Furnica in the Bucegi Massif of the Transylvanian Alps (Southern Carpathians). In 1695 a knight, Mihai Cantacuzino, built a monastery there and named it Sinaia after a monastery on Mount Sinai in the Sinai Peninsula. The name was passed on to the town, which developed rapidly after the arrival of a railway line in 1878. The 160-room Peleş Museum (with a German Renaissance exterior and various interior architectural styles) has a collection of paintings, furniture, and carpets. The Pelişor Palace has English-style landscaped gardens with exotic plants and conifers. A popular mountain and health resort, Sinaia has modern hotels and rest houses, campsites, and sports facilities. The town has a metallurgical works and factories producing building materials and processed foods. Pop. (1985 est.) 14,634.

Sinaitic inscriptions, also called PROTO-SINAITIC INSCRIPTIONS, archeological remains that are among the earliest examples of alphabetic writing; they were inscribed on stones in the Sinai Peninsula, where they were first discovered in 1904–05 by the British archaeologist Sir William Flinders Petrie. Apparently influenced both by Egyptian hieroglyphic writing and by the Canaanitic writing system (1900–1800 BC; probably ancestral to the North Semitic alphabet), the Sinaitic inscriptions date from approximately the beginning of the 16th century BC. As yet not satisfactorily deciphered, the small number of different Sinaitic symbols appear to indicate that the writing system was alphabetic rather than ideographic. In 1916 British Egyptologist Sir Alan Gardiner tentatively deciphered one group of symbols as the name of a Semitic female deity, Baʿalat; this conclusion was based on similarities in letter form between the Sinaitic symbols and Semitic counterparts and has been accepted by scholars as probably correct. Gardiner's research indicates a relationship between the Sinaitic writing system and the North Semitic alphabet; a relationship with the South Semitic alphabets of the Arabian Peninsula is also sometimes postulated.

Sinaloa, state, northwestern Mexico, on the Gulf of California and the Pacific Ocean. It is bounded on the north by Sonora, on the east by Chihuahua and Durango, and on the south by Nayarit. The 22,521-square-mile (58,328-square-kilometre) territory, which was made a state in 1830, consists of a barren, tropical coastal plain that rises inland to the Sierra Madre Occidental and is crossed by five main rivers. Sinaloa is primarily an agricultural area producing wheat, chick-peas, cotton, tobacco, sugarcane, and other crops on irrigated lands in the river valleys. Salt, graphite, manganese, gold, and other minerals are mined. Manufactures include beer, cigarettes, and cotton textiles. The major highway and railroad leading from Heroica Nogales to Mexico City pass through Culiacán, the state capital, and Mazatlán, the state's major Pacific Ocean port. A main highway also connects Mazatlán with Durango and other inland cities. Air connections are good. Pop. (1986 est.) 2,254,500.

Sinan, also called MIMAR SINAN ("Architect Sinan"), or MINAR KOCA SINAN ("Great Architect Sinan") (b. April 15, 1489, Ağırnaz, Turkey—d. July 17, 1588, Istanbul), most celebrated of all Ottoman architects, whose ideas, perfected in the construction of mosques and other buildings, served as the basic themes for virtually all later Turkish religious and civic architecture.

The son of Greek Orthodox Christian parents, he entered his father's trade as a stone mason and carpenter. In 1512, however, officials of the Ottoman government entered his village for the purpose of drafting Christian youths into the Janissary corps. Sinan, whose Christian name was Joseph, was chosen, and he began a lifelong service to the Ottoman royal house and to the great sultan Süleyman I (reigned 1520–66) in particular. Following a period of schooling and rigorous training, Sinan became a construction officer in the Ottoman army, eventually rising to chief of the artillery.

He first revealed his talents as an architect in the 1530s by designing and building military bridges and fortifications. In 1539 he completed his first nonmilitary building, and for the remaining 40 years of his life he was to work as the chief architect of the Ottoman Empire at a time when it was at the zenith of its political power and cultural brilliance. The number of projects Sinan undertook is massive—79 mosques, 34 palaces, 33 public baths, 19 tombs, 55 schools, 16 poorhouses, 7 madrasahs (religious schools), and 12 caravansaries, in addition to granaries, fountains, aqueducts, and hospitals. His three most famous works are the Şehzade Mosque and the Mosque of Süleyman I the Magnificent, both in Istanbul, and the Selim Mosque at Edirne.

Sinan's first truly important architectural commission was the Şehzade Mosque, which was completed in 1548 and which Sinan regarded as the best work of his apprenticeship. Like many of his mosque constructions, the Şehzade Mosque has a square base upon which rests a large central dome flanked by four half domes and numerous smaller, subsidiary domes. The Mosque of Süleyman in Istanbul was constructed in the years 1550–57 and is considered by many scholars to be his finest work. It was based on the design of the Hagia Sophia in Istanbul, a 6th-century masterpiece of Byzantine architecture that greatly influenced Sinan. The Mosque of Süleyman has a massive central dome that is pierced by 32 openings, thus giving the dome the effect



Mosque of Süleyman I the Magnificent, Istanbul, by Sinan, 1550–57
Owen Franken—Stock, Boston

of lightness while also copiously illuminating the mosque's interior. It is the largest mosque ever built in the Ottoman Empire. Besides the place of worship, it contains a vast social complex comprising four madrasahs, a large hospital and medical school, a kitchen-refectory, and baths, shops, and stables. Sinan himself considered the Mosque of Selim at Edirne, built in the years 1569–75, to be his masterwork. This mosque is the culmination of his centralized-domed plans, the great central dome rising on eight massive piers in between which are impressive recessed arcades. The dome is framed by the four loftiest minarets in Turkey.

Starting with the Byzantine church as a model, Sinan adapted the designs of his mosques to meet the needs of Muslim worship, which requires large open spaces for common prayer. As a result the huge central dome became the focal point around which the design of the rest of the structure was developed. Sinan pioneered the use of smaller domes, half domes, and buttresses to lead the eye up the mosque's exterior to the central dome at its apex, and he used tall, slender minarets at the corners to frame the entire structure. This plan could yield striking exterior effects, as in the dramatic facade of the Selim Mosque. Sinan was able to convey a sense of size and power in all of his larger buildings. Many scholars consider his tomb monuments to be the finest examples of his smaller works.

Sinanthropus, former genus name assigned to Peking man (*q.v.*) and Lantian man (*q.v.*), both now classified as *Homo erectus.*

Sinarquismo (from Spanish *sin,* "without," *anarquía,* "anarchy"), Fascist movement in Mexico, based on the Unión Nacional Sinarquista, a political party founded in 1937 at León, Guanajuato state, in opposition to policies established after the Revolution of 1911, especially in opposition to the anticlerical laws. It originated at the instigation of a German professor of languages in Guanajuato, Hellmuth Oskar Schleiter, who was a member of the Nazi Party and a German intelligence agent during World War I. The movement opposed Communism, liberalism, and the United States and supported the Fascist dictators Francisco Franco, Benito Mussolini, and Adolf Hitler.

The program of the Sinarquistas called for a return to Mexican traditions—Roman Catholicism, Spanish heritage, and a Christian social order centred on the home and village. The movement was also critical of abuses in local government. By 1941 Sinarquismo claimed 1,000,000 adherents, but it was subsequently weakened by splits and by a general improvement of the economy. In 1952 the Partido de Acción Nacional recruited Sinarquista agrarian reformers to broaden its popular appeal. In the 1950s and 1960s the remaining Sinarquista political activists continued to press for the restoration of the former powers of the Roman Catholic Church, but their influence was slight.

Şinasi, İbrahim, also called İBRAHIM ŞINASI EFENDI (b. 1826, Constantinople [now Istanbul]—d. Sept. 13, 1871, Constantinople), writer who founded and led a Western movement in 19th-century Turkish literature.

Şinasi became a clerk in the Ottoman general-artillery bureau. After learning French from a French officer who worked for the Ottoman army, Şinasi asked to be sent to study in France and spent five years (1849–53) there, meeting the leading French intellectuals and poets. On his return he held a number of government posts but turned to journalism and poetry. His *Divan-i Şinasi* ("The Collected Poems of Şinasi") appeared in 1853, and, about the same time, he published an anthology of poems translated from the French. In 1860 he worked for a newspaper, the *Tercüman-i ahval,* and in 1862 started his own paper, the *Tasvir-i efkâr* ("Picture of Ideas"), which soon became a vehicle for the expression of new political and literary ideas. Şinasi also wrote for the *Ceride-i askeriyye* ("The Military Gazette"). In 1865 he fled to Paris, probably for political reasons, and spent most of his time there studying and working on a massive Turkish dictionary, a task he never completed. Returning to Constantinople in 1870, he lived as a recluse.

Şinasi is considered the founder of the modern school of Ottoman literature and was probably the first Turkish writer to feel the need for directing literary expression to the masses. To accomplish this he advocated the reform of Turkish verse forms (based largely on imitation of French models, which he carefully studied and observed) and the adoption of a pure Turkish devoid of Arabic and Persian vocabulary and grammatical constructions.

Sinatra, Frank, byname of FRANCIS ALBERT SINATRA (b. Dec. 12, 1915, Hoboken, N.J., U.S.), popular American singer who also achieved wide success as a motion-picture actor.



Sinatra, 1963
By courtesy of *down beat* magazine

Sinatra began his singing career in about 1936, and in 1937 he and his group, the Hoboken Four, won an amateur talent contest. In 1939 he was discovered working in a roadside café by the bandleader Harry James, who immediately recruited him. His recording debut with the James band, singing "From the Bottom of My Heart," occurred in July 1939. In 1940–42 he sang with the Tommy Dorsey Orchestra and on Dec. 31, 1942, made his solo debut in New York City. He achieved sweeping national popularity through his performances as a soloist on the radio program "Your Hit Parade" from 1943 to 1945. Sinatra was excellent as a singer of popular love ballads owing to his distinctive phrasing and pauses and the subtle emotional overtones that his voice expressed.

Sinatra's first starring movie was *Higher and Higher* (1943), and he appeared in several other light film musicals during the 1940s. In 1953, when his career was in apparent decline, he played the nonsinging role of Angelo Maggio in *From Here to Eternity* and won an Academy Award for the serious acting abilities he displayed. This triumph gave his career a notable boost, and he subsequently became a versatile dramatic actor. His other films include *Guys and Dolls* (1955), *The Man with the Golden Arm* (1955), *Pal Joey* (1957), *Some Came Running* (1958), *The Manchurian Candidate* (1962), *Von Ryan's Express* (1965), *Tony Rome* (1967), *The Detective* (1968), and *The First Deadly Sin* (1981).

Except for a brief retirement in 1971–73, Sinatra remained a popular singing and recording star. He continued to perform in concerts and nightclubs and made frequent appearances on television.

Sinbirsk (city, Russian S.F.S.R.): *see* Ulyanovsk.

Sincelejo, city, capital of Sucre *departamento,* northern Colombia. It is located north of the Abibe Mountains, near the Gulf of Morrosquillo. The original Indian village of Cencelejo, consisting of scattered clearings in dense forest, was beyond Spanish control in the 16th century. The actual founding of the city dates from 1776, when Captain Antonio de La Torre y Miranda assumed leadership of Spanish and Indian settlers at the Sitio de San Francisco de Asís de Sincelejo ("Place of St. Francis of Assisi of Sincelejo"). Economic activities of the city and the surrounding agricultural area include cattle raising, sugar refining, clothing manufacture, and tobacco, rice, bean, corn (maize), and potato cultivation. The city is situated on the main highway linking Barranquilla and Medellín. Pop. (1985) 120,537.

Sinclair, Harry F(ord) (b. July 6, 1876, Wheeling, W.Va., U.S.—d. Nov. 10, 1956, Pasadena, Calif.), American oilman who founded Sinclair Oil Corporation, since merged into Atlantic Richfield Company. He also figured in the Teapot Dome scandal of the 1920s.

Sinclair grew up in Kansas during the early development of the oil fields there and in 1901 purchased his first oil property. Initially a lease broker, he later became an independent producer and finally entered refining and marketing. In 1916 he consolidated his interests into Sinclair Oil and Refining Corporation (later renamed Sinclair Oil Corporation), and within a few years he became a major independent producer with holdings worldwide.

In 1922 Albert B. Fall, then secretary of the interior in the Warren G. Harding administration, leased Sinclair the so-called Teapot Dome, a U.S. Navy oil reserve near Casper,

Wyo. The lease was given to Sinclair without competitive bidding, and it granted him exclusive rights to take and dispose of all oil and gas from the reserve. It was later disclosed that Fall had received large cash gifts and no-interest "loans" from Sinclair and Edward L. Doheny, another oil producer who had taken out a similar lease with Fall's approval. A Senate investigation subsequently brought the scandal to light, the leases were canceled, and Sinclair and others were indicted for bribery and conspiracy to defraud the government. Although acquitted of the major charge, Sinclair served 6½ months in prison for contempt of court and contempt of the U.S. Senate.

His oil business continued to prosper, however, and by the time of his retirement in 1949 Sinclair Oil had assets of $1,200,000,000, with earnings of $68,000,000. Sinclair was also interested in sports and was one of the organizers of the short-lived Federal League in baseball in 1914–15.

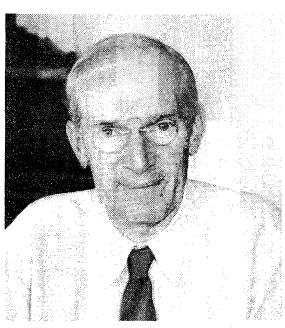
Sinclair, Sir Keith (b. Dec. 5, 1922, Auckland, N.Z.), poet, historian, and educator (subsequently emeritus) noted for his histories of New Zealand.

Sinclair's education at Auckland University College (until 1957 a college of the University of New Zealand; thereafter University of Auckland) was interrupted by army and navy service during World War II. He taught at his alma mater from 1947 to 1987, receiving a Ph.D. in 1954 and becoming professor of history in 1963. He was knighted in 1985.

His first volume of verse, *Songs for a Summer and Other Poems* (1952), was followed by *Strangers or Beasts: Poems* (1954), *A Time to Embrace* (1963), and *The Firewheel Tree* (1973). His best-known historical work is *The Origins of the Maori Wars* (1957; 2nd ed., 1961). He also wrote *A History of New Zealand* (1959; rev. and enl. ed., 1980), *The Liberal Government, 1891–1912: First Steps Towards a Welfare State* (1967), and *A Destiny Apart: New Zealand's Search For National Identity* (1986) and participated in many additional book projects.

Sinclair, Upton (Beall) (b. Sept. 20, 1878, Baltimore, Md., U.S.—d. Nov. 25, 1968, Bound Brook, N.J.), American novelist and polemicist for socialism and other causes; his *The Jungle* is a landmark among naturalistic, proletarian novels.

Sinclair graduated from the College of the City of New York in 1897 and did graduate work at Columbia University, supporting himself by journalistic writing. *The Jungle* (1906), his sixth novel and first popular success, was written when he was sent by the socialist weekly newspaper *Appeal to Reason* to Chicago to investigate conditions in the stockyards. Intended to create sympathy for the exploited and poorly treated immigrant workers in the meat-packing industry, *The Jungle* instead aroused widespread public indignation at the quality of and impurities in processed meats and thus helped bring about the passage of federal food-inspection laws; as Sinclair ironically commented at the time, "I aimed at the public's heart and by accident I hit it in the stomach." *The Jungle* is the most enduring of the works of the "muckrakers" (*see* muckracker). Published at Sinclair's own expense after several publishers rejected it, it became a best-seller, and Sinclair used the proceeds to open Helicon Hall, a cooperative-living venture in Englewood, N.J. The building was destroyed by fire in 1907 and the project abandoned.



Upton Sinclair
EB Inc.

A long series of other topical novels followed, none as popular as *The Jungle;* among them were *Oil!* (1927), based on the Teapot Dome Scandal, and *Boston* (1928), based on the Sacco-Vanzetti case. Sinclair's works were highly popular in Russia both before and immediately after the Revolution of 1917. Later his active opposition to the communist regime caused a decline in his reputation there, but it was revived temporarily in the late 1930s and 1940s by his antifascist writings. Sinclair again reached a wide audience with the Lanny Budd series, 11 contemporary historical novels beginning with *World's End* (1940) that were constructed around an implausible antifascist hero who happens to be on hand for all the momentous events of the day.

During the economic crisis of the 1930s, Sinclair organized the EPIC (End Poverty in California) socialist reform movement; in 1934 he was defeated as Democratic candidate for governor. Of his autobiographical writings, *American Outpost: A Book of Reminiscences* (1932; English title, *Candid Reminiscences: My First Thirty Years*) was reworked and extended in *The Autobiography of Upton Sinclair* (1962); *My Lifetime in Letters* (1960) is a collection of letters written to Sinclair.

Sindbad THE SAILOR, hero in *The Thousand and One Nights* who recounts his adventures on seven voyages. He is not to be confused with Sindbad the Wise, hero of the frame story of the Seven Wise Masters.

Sindbad's travails were based on the experiences of Basra (Iraq) merchants trading under great risk with the East Indies and China, probably in the early ʿAbbāsid period (750–*c.* 850). A strong infusion of the miraculous in the stories has, of course, exaggerated the dangers encountered.

In the frame story Sindbad is marooned or shipwrecked after he sets sail from Basra with merchandise. He is able to survive the terrible dangers he encounters by a combination of resourcefulness and luck and returns home with a fortune.

The finer details of the stories of the voyages shed considerable light on seafaring and trade in the East. For instance, though Sindbad does not specify the goods that he takes from Basra, it is stated that he obtains diamonds and other precious stones, sandalwood, camphor, coconuts, cloves, cinnamon, pepper, aloes, ambergris, and ivory during his voyages. Possible references to pirates are hidden in the tales of shipwrecks, which in the third and fifth voyages are caused by the fabulous roc, a bird that drops huge rocks on the ship, and by hairy apes that swarm over the ship and leave the crew on an island. The savages in canoes who torture Sindbad and his shipmates on the seventh voyage may have been from the Andaman Islands.

The miraculous experiences of Sindbad's travels suggest parallels in the literatures of several nations. For example, the giant roc, whose egg resembles a huge white dome, also appears in Marco Polo's descriptions of Madagascar and other islands off the eastern coast of Africa. The whale that is mistaken for an island on the first voyage has parallels with the great whales described by Pliny and Solinus. Al-Qazvīnī (13th-century Persian geographer), Marco Polo, and St. Epiphanius (bishop of Salamis in Cyprus; d. 403) mention areas similar to the valley of diamonds discovered by Sindbad on his second voyage. One can further relate the cannibal giants of the third voyage to the Cyclops of the *Odyssey,* while the incident of Sindbad's companions being fattened by cannibals with food that causes them to lose their reason suggests the lotus eating of the *Odyssey.* A Scythian custom of burying alive with the dead those who have been dear to them, referred to by St. Jerome, parallels Sindbad's burial in the cavern of the dead, while the "old man of the sea" who, on the fifth voyage, compels Sindbad to carry him, has been identified with the huge apes of Borneo and Sumatra.

Some scholars suggest that the tales of Sindbad's adventures in turn influenced Daniel Defoe's *Robinson Crusoe* and Jonathan Swift's *Gulliver's Travels.*

Sindh, also spelled SIND, province of southeastern Pakistan. It is bordered by the provinces of Balochistān on the west and north, Punjab on the northeast, the Indian states of Rājasthān and Gujarāt to the east, and the Arabian Sea to the south. Sindh is essentially part of the Indus River delta, and the area was the centre of the Indus valley civilization in the 3rd and 2nd millennia BC as represented by the sites of Mohenjo-daro, Amre, and Kot Diji. Its name was derived from the Indus River, which has been known as the Sindhu. The region was conquered successively by Persians, Greeks, Parthians, Sāsanians, Brahmans, Arabs, and British. The province was established in 1970, and its capital, Karāchi, is situated on the southwestern coast.

Sindh consists of three parallel belts extending north to south: a central alluvial plain, bisected by the Indus River; the Kīrthar Range on the west; and an eastern desert belt. The fertile central plain, 360 miles (580 km) long and about 20,000 square miles (51,800 square km) in area, gradually slopes downward from north to south. The Kīrthar Range is composed of three parallel tiers of ridges, has little soil, and is mostly dry and barren. The eastern desert region includes the low dunes and flats in the north, the Achhrro Thar ("White Sand Desert") to the south, and the Thar Desert in the southeast. The province has a subtropical climate and experiences hot summers and cold winters.

Except for the irrigated Indus valley, the province is arid and has scant vegetation. The dwarf palm, *kher* (*Acacia rupestris*), and *lohirro* (*Tecoma undulata*) trees are typical of the western hill region. In the central valley, the babul tree is the most dominant and occurs in thick forests along the banks of the Indus. The coastal strip and the creeks abound in semiaquatic and aquatic plants.

Sizable and ongoing migration to the province has resulted in an ethnically mixed population. Indigenous groups are the Mehs, or Muhannas, descendants of the ancient Mēds; Sammas and the related Lakhas, Lohānās, Nigamaras, Kahahs, and Channas; Sahtas, Bhattīs, and Thakurs of Rājput origin; Jāṭs and Lorras, both admixtures of the ancient Scythian and the later Balochi peoples; and Jokhia and Burfat. The major indigenous languages are Sindhi, Seraiki, and Balochi.

Agriculture is the basis of the economy. Waterlogging and salinity of the soil have been countered by the construction of surface drains. Sindh's largest water project, the Gudu Barrage, provides water for irrigation. Cotton, wheat, rice, sugarcane, corn (maize), millet, and oilseeds are the major crops. Livestock raising is also important. Sindh's coastal waters contain prawns and shrimp, pomfrets, shad, and catfish in abundance. Sindh is one of Pakistan's most industrialized regions. Large-scale manufacturing is centred in Karāchi. Major industries include cotton textiles, ce-

ment, sugar refining, and petroleum products. Karāchi is connected by road and railway to Lahore in Punjab province and to Quetta in Balochistān province. The Indus and some of its channels serve as waterways for the transport of agricultural products, and Karāchi is Pakistan's major port.

Karāchi is the stronghold of the national press. The major universities are Sindh University, centred in Hyderābād, and Karāchi University. The Sindhi Adabi (literary) board, which publishes works on Sindhi culture, and the Sindh-Provincial Museum and Library are located in Hyderābād. Area 54,407 square miles (140,913 square km). Pop. (1983 est.) 20,312,000.

Sindhi language, northwestern Indo-Aryan language spoken in the province of Sind, Pakistan, and in the neighbouring Rann of Kutch and Kāthiāwār Peninsula in India. The standard Sindhi dialect is Vicholi. Kacchi, spoken in Kutch, is classified by some as a Sindhi dialect strongly influenced by the Gujarati language and considered by others to be a transitional dialect between Sindhi and Gujarati. Sindhi is closely related to the Lahnda language spoken to the north. It has a large number of Persian and Arabic loanwords (because of centuries of Muslim influence) and is written in a variety of the Persian form of the Arabic alphabet. Hindus use a form of Devanāgarī writing. Little Sindhi literature was printed before 1920.

Sindhia FAMILY, Marāthā ruling family of Gwalior, which for a time in the 18th century dominated the politics of northern India. The dynasty was founded by Ranoji Sindhia, who in 1726 was put in charge of the Mālwa district by the peshwa (chief minister of the Marāthā state). At his death in 1750, Ranoji had established his capital at Ujjain; only later was the Sindhia capital moved to the rock-fortress of Gwalior.

Probably the greatest of Ranoji's successors was Sindhia Mahādāji (reigned 1761–94), who created a North Indian empire virtually independent of the peshwa. He emerged from war with the British East India Company (1775–82) as the recognized ruler of northwest India. With the aid of French officers he defeated the rajputs, took the Mughal emperor Shāh 'Alām under his protection, and finally won control of the peshwa by defeating the Marāthā Holkar, the peshwa's chief general, in 1793. His grandnephew, Daulat Rāo, however, suffered serious reverses. He came into conflict with the British in 1803. After being defeated in four battles by General Gerard Lake, he was obliged to disband his French-trained army and sign a treaty; he gave up control of Delhi but retained Rājputāna until 1817. The Sindhia became clients of the British in 1818 and survived as a princely house until 1947.

Sindona, Michele (b. May 8, 1920, Patti, Sicily, Italy—d. March 22, 1986, Voghera, Italy), Italian financier whose financial empire collapsed amid charges of fraud, bribery, and murder. The scandal also involved the Vatican.

Educated at the University of Messina, Sindona practiced law in Sicily from 1940 to 1946 and then, from 1946, lived in Milan. Over the next decades, using his talents as a tax and corporate lawyer, he built holdings estimated to total as much as $450,000,000, scattered about in a maze of banks and industries. One of his master companies was Fasco AG, incorporated in Liechtenstein, through which, by the mid-1960s, he headed companies in nine countries dealing in real estate, steel, paper, food processing, and banking. (He was also thought to have developed links to the Sicilian Mafia.) In 1972 he bought a controlling interest in Franklin New York Corporation, parent company of Franklin National Bank. Two years later the bank collapsed amid revelations of diversions of funds and the bribery of officials in the world of high finance. (A Vatican banker, Archbishop Paul Marcinkus, was accused of sharing in the illegal dealings but fought extradition from Vatican City. In any event, the Vatican lost millions of dollars in its dealings with Sindona.) In March 1980 a U.S. court convicted Sindona of 65 counts of conspiracy, fraud, and perjury, charging among other things that he had siphoned $45,000,000 in Franklin funds into other companies, mostly in Italy. Meanwhile, Italian authorities were pressing their accusations, holding him responsible for the crash of the giant Banca Privata Finanziaria and other institutions while diverting their capital into other banks and industries abroad. In 1985 he was convicted of fraud, along with 23 other defendants, in a Milanese court.

Meantime, a lawyer, Giorgio Ambrosoli, had been officially appointed liquidator of the Sindona empire and, in the course of his work, discovered evidence of Sindona's criminal manipulations; he compiled a report of more than 2,000 pages. On July 12, 1979, Ambrosoli was shot dead in front of his Milan home. In 1986 Sindona and an accomplice were convicted of ordering the killing, and Sindona was sentenced to life imprisonment. Two days after sentencing, Sindona was found collapsed in his jail cell, the victim of cyanide poisoning. Whether he committed suicide or was murdered was unknown, but shortly before dying he was quoted as saying, "They are afraid that I could reveal some very delicate information that they don't want divulged."

BIBLIOGRAPHY. Nick Tosches, *Power on Earth* (1986); and Luigi DiFonzo, *St. Peter's Banker* (1983), explore the spectacular career and the history of greed and corruption in these life stories of Sindona.

Sindone, Santa: *see* Turin, Shroud of.

Sines, town, port, and *concelho* (township), Setúbal *distrito* ("district"), southwestern Portugal, south of Lisbon, on the Atlantic coast. Sines was the birthplace of the navigator Vasco da Gama (*c.* 1460–1524). In 1978 the state-owned Petroleos de Portugal (Petrogal) opened a refinery with a capacity of 200,000 barrels per day of crude oil. Associated petrochemical and fertilizer industries were built around the refinery, and a railroad-car plant and various light industries also began operation there. The port was developed into a deepwater port to handle tankers and cargo carriers primarily for export activities. Pop. (1981) town, 7,752; *concelho,* 12,206.

sinfonia, plural SINFONIE, in music, any of several instrumental forms, primarily of Italian origin. In the 17th and 18th centuries, the name referred particularly to orchestral introductions to operas and cantatas.

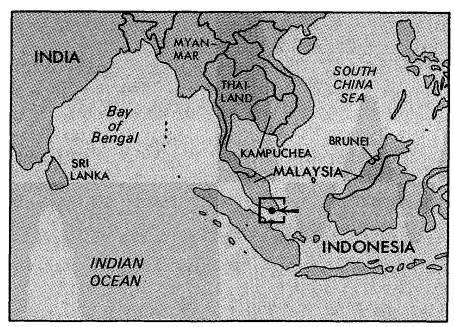
The Italian opera overture, or sinfonia, evolved into the autonomous orchestral symphony by way of a three-part form (fast-slow-fast) that became standard in the late 17th century. Once these contrasting sections had been expanded into relatively self-sufficient movements, little stood in the way of the three-movement symphonies composed in the 1740s by Italians (*e.g.,* Giovanni Battista Sammartini), Austrians (*e.g.,* Matthias Georg Monn), and Germans (*e.g.,* Johann Stamitz) alike. Occasionally the word sinfonia was transferred to nonorchestral media. Thus, Johann Sebastian Bach called his three-part keyboard inventions sinfonie.

sinfonia concertante, also called SYMPHONY CONCERTANTE, in music of the Classical period (*c.* 1750–*c.* 1820), symphony employing two or more solo instruments. Akin to the concerto grosso of the preceding Baroque era in its contrasting of a group of soloists with the full orchestra, it rather resembles the Classical solo concerto in musical form and is the ancestor of the double and triple concerti of the 19th century. Examples include the *Sinfonia Concertante in E Flat Major for Violin, Viola, and Orchestra,* K. 364, by W.A. Mozart and one for oboe, violin, bassoon, cello, and orchestra by Joseph Haydn.

The term occasionally refers to a symphony utilizing the principles of contrast and melodic interplay between instrumental groups that characterizes the concerto grosso.

Singanhoe, united national independence front formed by the Korean nationalists and the Korean communists that was organized in 1927 to seek more concerted efforts toward winning Korea's independence from Japan. The group attempted to encourage a national consciousness and promote anti-Japanese feeling. It sponsored studies of the Korean language, demanded freedom of thought, and supported scientific research in Korean universities. At its height the Singanhoe claimed 138 branches and 37,000 members, but, owing to Japanese oppression and internal dissension between nationalists and communists, the organization was dissolved in 1931.

Singapore, officially REPUBLIC OF SINGAPORE, Malay REPUBLIK SINGAPURA, Mandarin Chinese HSIN-CHIA-P'O KUNG-HO-KUO, Tamil SINGAPORE KUDIYARASU, island city-state situated at the southern tip of the Malay Peninsula, about 85 miles (137 km) north of the equator, covering an area of 240 square miles



Singapore

(622 square km). The capital city, Singapore, is administratively equivalent to the Republic of Singapore, which comprises Singapore Island, with an area of 210 square miles (544 square km) and 50 other islets. A road and rail causeway across the Johor Strait to the north connects it with West Malaysia; the Strait of Malacca to the southwest separates Singapore from the Indonesian island of Sumatra. The population in 1990 was estimated to be 2,718,000.

A brief treatment of Singapore follows. For full treatment, *see* MACROPAEDIA: Southeast Asia, Mainland.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. The topography of Singapore Island is undramatic; nearly two-thirds of its low, undulating landscape lies at less than 50 feet (15 m) above sea level. Its highest peak, Timah Hill, situated among the main island's rugged, granitic central uplands, rises to only 581 feet (177 m). The eastern part of the island, a low plateau generally consisting of uncompacted sands and gravel, is characterized by an intricate pattern of hills and eroded valleys. South and west of the central uplands are highly folded sedimentary scarplands forming a series of short cliffs and shallow valleys along the coast. Lying in a relatively quiescent seismic region, Singapore (with the Malay Peninsula) is bounded to the southwest by the extremely active volcanic belt that includes Sumatra and Java.

A dense network of short streams drains the

island; the longest, the Seletar River, is less than 10 miles (16 km) long. Although Singapore has an average annual rainfall of about 100 inches (2,500 mm), with rain falling somewhere on the island every day of the year, it is still dependent on neighbouring Malaysia for more than two-thirds of its water supply.

Singapore's average monthly temperatures, uniformly high throughout the year, vary from 77° F (25° C) in January to 81° F (27° C) in June. Annual rainfall, though fairly evenly distributed during the year, averages more than 10 inches (250 mm) per month during the December to March northeastern monsoon and about 7 inches (178 mm) during the May to September southern monsoon.

About 10 percent of its land area is considered arable, although its soils are generally poor. Nearly half of the arable land, through the use of modern intensive agricultural techniques, is among the most productive fruit and vegetable cropland in the world. About 5 percent of Singapore's landscape is forested, managed by the country's Nature Reserves Board; the greatest density of rain forest is in the Timah Hill Nature Reserve in the central uplands. Many streams, especially those draining northwards, have broad, mangrove-fringed estuaries that extend far inland. Most of the country's original rain forest vegetation has been replaced by tracts of scrubland. Among Singapore's mammals are the long-tailed macaque (an Asian species of monkey) and the scaly anteater. Birds are numerous and cobras and lizards abound.

The people. The population consists predominantly of Chinese (three-fourths of the total) who came mostly from Fukien and Kwangtung provinces and speak mutually incomprehensible dialects. Malays and Indians, including Tamils, Malayalis, and Sikhs, comprise most of the remaining population. The official languages are English, Mandarin (Chinese), Malay, and Tamil. More than 70 percent of all Chinese profess some degree of attachment to Confucianism, Buddhism, or Taoism. Malays and some Indians practice Islām; the remaining population is either Christian or Hindu.

The growth rate of Singapore's population declined by more than half between the 1960s and 1980 following the introduction of birth control measures. As a result, less than one-fourth of the population is under 15 years of age. The birth rate has slowly declined as well. The mortality rate has also declined with the reduction in communicable diseases.

Singapore's population is virtually all urban; some 85 percent of the total lives on 28 square miles (72 square km), mostly in multistoried apartments covering only a few square miles. Public housing projects and low immigration levels have alleviated overcrowding somewhat.

The economy. Singapore has a predominantly market economy based largely on international trade and finance. The gross national product (GNP) per capita, which is growing more rapidly than the population, is the highest in Southeast Asia.

Agriculture accounts for less than 1 percent of the GNP and employs a comparable percentage of the work force. Mixed farming predominates and specializes in raising vegetables, poultry, and pigs. Production of chicken and pork meets all but a small fraction of domestic demand; most other foodstuffs must be imported. Orchids and tropical fish are among the agricultural exports.

Other than granite quarrying, Singapore has no mining projects. Mineral raw materials must be imported. Singapore manufactures drilling equipment and rigs for offshore oil exploration throughout Asia and is one of the world's leading refiners of petroleum. Quantities of tin concentrates are smelted.

Manufacturing industries account for approximately one-fourth of the GNP and employ up to one-fourth of the work force. The industrial complex at Jurong, the largest in Southeast Asia, has more than 1,600 factories and manufactures textiles, plywood and veneer, bricks, cement, various chemicals and plastics, steel rods and pipes, and ships. Most manufactures are exported. Electricity is generated entirely from imported fuels; per capita consumption of electricity is by far the highest in Southeast Asia.

Singapore has more than 100 commercial banks, most of which are foreign. The Asian dollar market, which was established with assistance from the Bank of America in 1968, is headquartered in Singapore and channels foreign investments into primarily Asian ventures. Singapore is a member of the Commonwealth of Nations and the Association of Southeast Asian Nations (ASEAN). Chief trading partners include the United States, Malaysia, and Japan; trade with Communist countries is negligible. Crude petroleum, capital goods, and raw materials for industry dominate Singapore's imports; petroleum products, locally manufactured goods (including electrical machinery and finished textiles), and crude rubber are the main exports. Although the rapid growth of the manufacturing sector has reduced Singapore's dependence on entrepôt trade, Singapore remains one of the largest ports in the world in terms of annual tonnage.

Government and social conditions. Singapore is a parliamentary republic governed by a single political organization, the People's Action Party (PAP). Legislative authority rests with a 79-member unicameral Parliament, whose members are elected to five-year terms by compulsory adult suffrage. The leader of the Parliament's majority party, or coalition, assumes the country's executive leadership as prime minister. The president, who is head of state, is elected by Parliament to a four-year term. Although several political organizations compete for parliamentary seats, since 1959 the PAP has consistently dominated all elections. This politically pragmatic, anti-Communist organization has often wielded power in an authoritarian fashion; in 1982, for example, it created a constitution that designated the party as a "national movement," a move viewed by government critics as a step toward the establishment of a de jure one-party state.

Singapore's well-developed social welfare system provides benefits to employed persons for work injury, old age, disability, and widowhood. In addition, all residents are eligible to receive low-cost medical care.

Health conditions in Singapore are good, comparing favourably with those found in the most well-developed nations. Life expectancy for all races and sexes is more than 70 years; infectious diseases are of negligible significance. Cardiovascular diseases and malignant neoplasms (cancers) account for a large proportion of deaths.

Free primary education is available in the Malay, Mandarin, Tamil, and English languages. Although education is not compulsory, some 70 percent of all primary school age children are enrolled in classes. Graduates wishing to attend secondary school must pass examinations given in English and Chinese. Institutes of higher learning include the National University of Singapore (founded in 1980).

The government expects the nation's press to act as its partner rather than as its adversary. Radio and Television broadcasting is licensed by the Singapore Broadcasting Corporation.

Cultural life. Cultural activities in Singapore are largely derivative, springing from one or another of the major civilizations of China, India, Indonesia, or the West. Traditional Chinese and Indian music, painting, and drama are actively practiced by numerous cultural societies and professional groups. Malay music, which has adopted the rhythms of Western orchestras, also has wide appeal.

One of the country's most important cultural institutions is the Singapore Science Centre, the only science museum in Southeast Asia. In addition to its many exhibits, the centre has research facilities and lecture and conference halls.

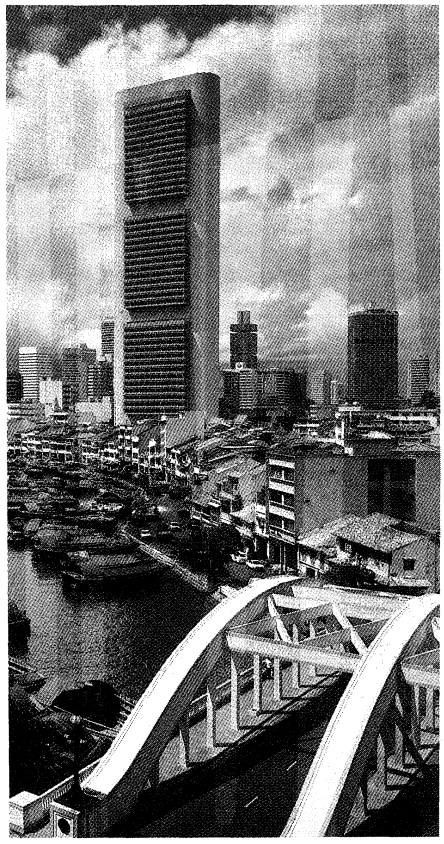
History. The island, once known as Tumasik (or Temasek), was long inhabited by fishermen and pirates and was an outpost of the Sumatran Empire of Śrivijaya. It remained under Śrivijaya suzerainty until the 14th century, when control passed to the Javanese Majapahit Empire, followed by the Siamese Ayutthaya kingdom. During the early 15th century, Tumasik became part of the Malacca Empire. In the 16th century the Portuguese established their hegemony over the area, followed by the Dutch in the 17th century. In 1819 Sir Stamford Raffles, the British East Indian administrator, established by treaty with the sultan of Johore the port settlement of Singapore, which became the centre of British colonial activity in Southeast Asia.

The growth of the port was steady, though slowed by the British acquisition of Hong Kong (1842), the development of Saigon (now Ho Chi Minh City) and Haiphong in Indochina, and the establishment of ports in the Dutch East Indies (now Indonesia). With the opening of the Suez Canal in 1869 and the advent of steamships, an era of prosperity began for Singapore. Its growth continued with the demand for the tin and rubber of the Malay Peninsula, for which the port was a natural shipping outlet. In 1867 Singapore became the administrative seat for the Straits Settlements, a British crown colony comprising Singapore, Penang, Malacca, and Labuan. During World War II the Japanese occupied Singapore until 1945, when it was restored to Britain. In 1946 the Straits Settlements dissolved and Singapore became a separate crown colony. Singapore achieved full internal self-government in 1959, became a part of Malaysia 1963, and became independent in 1965. The British withdrew militarily from Singapore in 1971. Singapore is influential in the affairs of the Association of Southeast Asian Nations. In domestic as in international politics the country's dominant voice after independence was that of its first prime minister, Lee Kuan Yew.

Singapore, city, capital of the Republic of Singapore. Its strategic position on the strait between the Indian Ocean and South China Sea, complemented by its deepwater harbour, has made it the largest port in Southeast Asia and one of the world's greatest commercial centres. The city, a free port, so dominates Singapore Island that the Republic of Singapore is often referred to as a city-state.

Singapore (known variously as the "Lion City," or "Garden City," the latter for its many parks and tree-lined streets) has been called "instant Asia" because it offers the tourist an expeditious glimpse into the cultures brought to it by immigrants from all parts of Asia. While predominantly Chinese, it has substantial minorities of Malays and Indians.

According to Malay tradition the island was visited by a prince from the Sumatran Empire of Śrivijaya, who founded and named the city of Singapura. Portuguese records also have it that the city was founded by a Śrivijayan prince from Palembang. Sacked by the Majapahit Javanese during the 14th century, it was supplanted by Malacca (Melaka) but remained a port of call. Its modern history begins with the arrival of Sir Stamford Raffles of the British East India Company, who, in searching for a trading site, landed there on Jan. 29, 1819. The growth of the port was steady, though slowed by the British acquisition of Hong Kong (1842), the develop-



Headquarters of the Oversea-Chinese Banking Corporation overlooking the Singapore River, Singapore city

E. Streichan—Shostal Associates

ment of Saigon (now Ho Chi Minh City) and Haiphong in Indochina and by the establishment of ports in the Netherlands East Indies (now Indonesia). The opening of the Suez Canal in 1869 and the advent of steamships increased Singapore's importance as a bunkering station. Its growth was assured by the demand for the tin and rubber of the Malay Peninsula, for which the port was a natural shipping outlet.

Created a city by royal charter in 1951, Singapore was administered as a municipality by an elected mayor–council government from 1957 until 1959, when the colony became self-governing. After 1963 the administration of the city and rural areas was handled by the central government.

The port area, one of the world's largest, covers 36 square miles (93 square km). The Port of Singapore Authority operates six gateways (Jurong port, Container Terminal, Keppel, Telok Ayer, Sembawang, and Pasir Panjang wharves) providing facilities for vessels ranging from oceangoing liners to lighters. Keppel wharves, protected between the islands of Brani and Sentosa, are deepwater and contain major docks and warehouses. Keppel is Southeast Asia's major transshipment point for oil, rubber, plywood, lumber, and spices. The main imports include machinery, textiles, and rice. The Malayan rail system from Bangkok and Kuala Lumpur terminates at Jurong port, with an additional spur to Sembawang.

The city proper, stretching north and east of the port area, is characterized by low (140–150-foot [40–50-metre]) hills topped by reservoirs. It spans the Singapore and Rochor rivers, tidal inlets crowded with native craft. The original settlement on the left bank of the Singapore River remains the heart of the city; it is the locale of the principal commercial, government, and public buildings and the Anglican St. Andrew's Cathedral (1862).

The modern Queenstown, Kallang, and Toa Payoh housing estates have cut into the cultural enclaves, particularly the Chinese quarter. Skyscraper hotels and office buildings now blend with the British colonial architecture, Chinese shophouses, and Malay kampongs (villages once thatch-roofed, now tin-roofed).

In addition to the port activities, there are tin-smelting works, pineapple canneries, rubber factories, oil refineries, and sawmills. The east lagoon is the regional centre for container transshipments. Jurong is a large industrial estate and port west of the city. The city-state's post-World War II economic activities have been so successful that Singapore is now virtually a developed country.

Notable buildings include the Victoria Theatre and Memorial Hall, the Raffles Hotel, the High Court, the City Hall, the House of Jade, the Sri Mariamman Temple, and the Singapore Polytechnic. The government maintains a national museum, library, and theatre and the Van Kleef Aquarium. The international airport at Changi (opened in 1981) was developed on reclaimed land to the northeast. The Singapore Botanic Gardens are to the northwest. The National University of Singapore was founded in 1980 by the merger of the University of Singapore and Nanyang University. The Nanyang Technological Institute was established in the former Nanyang University in 1981. Tiger Balm Gardens is a collection of statuary depicting Chinese myths and legends. Other attractions include the Jurong Bird Park (opened 1971), some 50 acres (20 hectares) in area, perhaps the largest of its kind in the world. Sentosa Island in Singapore Harbour has been developed as a major recreational area; it is connected by cable car with Mount Faber and is also accessible by ferry, providing visitors with beaches, a golf course, and an amusement park. Pop. (1985 est.) central city, 157,000; (1986 est.) metropolitan area, 2,587,000.

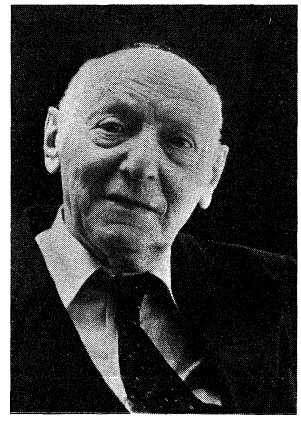
Singapore Botanic Gardens, officially BOTANIC GARDENS, one of the world's finest gardens both in terms of its aesthetic appeal and the quality of its botanical collection, located in Singapore. It has approximately 3,000 species of tropical and subtropical plants and a herbarium of about 500,000 preserved specimens. Founded by the British in the mid-19th century, much of the 31-hectare (80-acre) garden was hewn out of the Malay jungle. More than 4 hectares (11 acres) of original jungle land have been preserved in their natural state. During its early years the garden served primarily as an experimental station for plants—both native and imported—with potential commercial value. Under the direction of Henry N. Ridley, who took over as superintendent in 1888, the garden became a centre for research on *Hevea brasiliensis,* the Brazilian rubber tree. Ridley developed an improved method of tapping rubber trees that resulted in a better yield of latex. His innovation revolutionized the region's economy.

Singapore Strait, channel extending for 65 miles (105 km) between the Strait of Malacca (west) and the South China Sea (east). The strait is 10 miles (16 km) wide and lies between Singapore Island (north) and the Riau Islands (south), part of Indonesia. It includes Johore Strait (*q.v.*), Keppel Harbour, and many small islands. As the deepwater approach to the port of Singapore, the strait is one of the world's busiest commercial routes.

Singaraja, also spelled SINGARADJA, city, Bali *propinsi* (province), north-central Bali, Indonesia, located near the north coast and linked by road with other cities on the island, including Denpasar, the provincial capital. Buleleng to the north is its port on the Java Sea. Under Dutch colonial rule, Singaraja was the capital of Nusa Tenggara (Lesser Sunda Islands). The population includes Muslims, Buddhists, and Christians; there are also Arab and Indian settlers who are mostly merchants and traders. It is a centre of trade in rice and coffee, primarily for export to nearby Java. Crafts include sandstone carving; weaving; basket, hat, bag, and fan making; and leather working. Pink-sandstone quarries are nearby. The city has a historical library, the Gedong Kirtya, containing about 3,000 Balinese manuscripts. Sangsit (4 miles [7 km] east of Singaraja), Sarvan (to the southeast), and Yeh Sanih (to the east) are sites of old Hindu temples. About 7 miles (11 km) west of the city is the Lovina beach. Pop. (1980) 94,914.

Singen, in full SINGEN AM HOHENTWIEL, city, Baden-Württemberg *Land* (state), southwestern Germany, on the Aach River in the Hegau (a region of extinct volcanic mountains), at the eastern foot of the Hohentwiel (2,251 feet [686 m]). First mentioned in 787 as Sisinga, the village grew up near a mighty fortress on the Hohentwiel, the setting of Viktor von Scheffel's famous novel *Ekkehard* (1855?). The Hohentwiel, with Singen, became an enclave of Württemberg in 1538, and the fortress was often besieged until it was destroyed by the French in 1800. Singen, chartered in 1899, is an industrial city with an aluminum rolling mill and some light manufactures. Pop. (1989 est.) 42,605.

Singer, Isaac Bashevis, Yiddish YITSKHEK BASHYEVIS ZINGER (b. July 14, 1904, Radzymin, Pol., Russian Empire), Polish-born American writer of novels, short stories, and essays in Yiddish and recipient, in 1978, of the Nobel Prize for Literature. His fiction, depicting Jewish life in Poland and the United States, is remarkable for its rich blending of irony, wit, and wisdom, flavoured distinctively with the occult and the grotesque.



Isaac Bashevis Singer, 1980

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Coming from a family of Hasidic rabbis, Singer received a traditional Jewish education at the Warsaw Rabbinical Seminary. However, like his elder brother Israel Joshua Singer (best known for *The Brothers Ashkenazi* [1936]), he preferred being a writer to being a rabbi. His first novel, *Der Sotn in Gorey* (*Satan in Goray*), was published in installments in Poland shortly before he immigrated to the United States in 1935. Settling in New York City, as his brother had done a year earlier, he initially worked for the Yiddish newspaper *Jewish Daily Forward,* and as a journalist he signed his articles with the pseudonym Warshofsky. In 1943 he became a U.S. citizen.

Although Singer's works became most widely known in their English versions, he continued to write almost exclusively in Yiddish, personally supervising the translations. Among his major novels are *The Family Moskat* (1950), *The Magician of Lublin* (1960), *The Slave* (1962), *The Manor* (1967), *The Estate* (1969),

Enemies, a Love Story (1972), *Shosha* (1978), and *The Penitent* (1983). His increasingly popular collections of short stories include *Gimpel the Fool* (1957), *The Spinoza of Market Street* (1961), *Short Friday* (1964), *The Seance* (1968), *A Crown of Feathers* (1973; National Book Award), and *Old Love* (1979). *The Collected Stories of Isaac Bashevis Singer* was published in 1982.

Singer evoked in his writings the vanished world of Polish Jewry as it existed before the Holocaust. His two most ambitious novels, *The Family Moskat* and the continuous narrative spun out in *The Manor* and *The Estate,* have large casts of characters and extend over several generations in time. These books chronicle the changes in and the eventual breakup of large Jewish families during the later 19th and earlier 20th centuries as their members are differently affected by the secularism and assimilationist opportunities of the modern era. Singer's shorter novels examine characters who are tempted by evil in various forms, as in the brilliant circus magician of *The Magician of Lublin,* the crazed messianism of the 17th-century Jewish villagers in *Satan in Goray,* and the sufferings of the enslaved Jewish scholar in *The Slave.* His short stories are saturated with Jewish folklore, legends, and mysticism and display his incisive understanding of the weaknesses inherent in human nature.

Schlemiel Went to Warsaw, and Other Stories (1968) is one of his best-known books for children. In 1966 he published *In My Father's Court,* an autobiographical account of his childhood in Warsaw.

Singer, Isaac Merrit (b. Oct. 27, 1811, Pittstown, N.Y., U.S.—d. July 23, 1875, Torquay, Devon, Eng.), American inventor who developed and brought into general use the first practical domestic sewing machine.

At the age of 19 Singer became an apprentice machinist, and in 1839 he patented a rock-drilling machine. Ten years later he patented a metal- and wood-carving machine. While working in a Boston machine shop in 1851,



Isaac Merrit Singer, detail of a portrait by an unknown artist
By courtesy of the Singer Co.

Singer was asked to repair a Lerow and Blodgett sewing machine; 11 days later he had designed and built an improved model, which he patented and sold through I.M. Singer & Company. The first to embody features allowing continuous and curved stitching, his machine employed an overhanging arm holding the needle bar over a horizontal table, thus making it possible to sew on any part of the work. His basic design features have been followed in almost all subsequent machines.

Because Singer had embodied in his machine the basic eye-pointed needle and the lock stitch developed by Elias Howe of the United States, Howe won a patent-infringement suit against him in 1854. The suit did not prevent Singer from manufacturing his machine, however, and in June 1851 he formed a partnership with Edward Clark. By 1860 their company had become the largest producer of sewing machines in the world. Singer secured 12 additional patents for improvements to his machine.

Singer pioneered the use of installment credit plans, which have had a profound effect on consumer sales in modern society. In 1863 Singer and Clark formed the Singer Manufacturing Company, and Singer retired to England.

Singer, Israel Joshua (b. Nov. 30, 1893, Biłgoraj, Pol.—d. Feb. 10, 1944, New York City), Polish-born writer in Yiddish, noted for his realistic and solidly constructed historical novels.

I.J. Singer was the son of a Ḥasidic rabbi and was the older brother of the writer Isaac Bashevis Singer. He began writing tales of Ḥasidic life in 1915 and then worked as a newspaper correspondent in Warsaw during the 1920s and early '30s, publishing several collections of short stories during this time, including the short story "Perl" ("The Pearl"), which was his first international success. His novel *Yoshe Kalb,* a description of Ḥasidic life in Galicia, appeared in 1932, and the next year he immigrated to the United States. His subsequent writings appeared in serialized form in the *Jewish Daily Forward* newspaper in New York City. The novel *Die Brider Ashkenazi* (*The Brothers Ashkenazi*) was published in 1936 and was followed in 1943 by *Die Mishpoche Karnovsky* (*The Family Carnovsky*).

Like his brother, I.J. Singer wrote multigenerational family novels; but, unlike his brother, he firmly links his vivid characters with a larger historical and socioeconomic setting, which receives considerable attention throughout the book. Singer's masterpiece, *The Brothers Ashkenazi,* examines the rivalry of two very different brothers whose fortunes parallel that of their birthplace, the Polish industrial city of Łódź. *The Family Carnovsky* traces an assimilated German-Jewish family for several decades until its members must immigrate to the United States after the Nazi takeover. Singer also wrote short stories and plays that were successsfully produced by Yiddish theatre groups both in Europe and in the United States.

Singer Company, major American corporation, which grew out of the sewing-machine business founded by Isaac M. Singer.

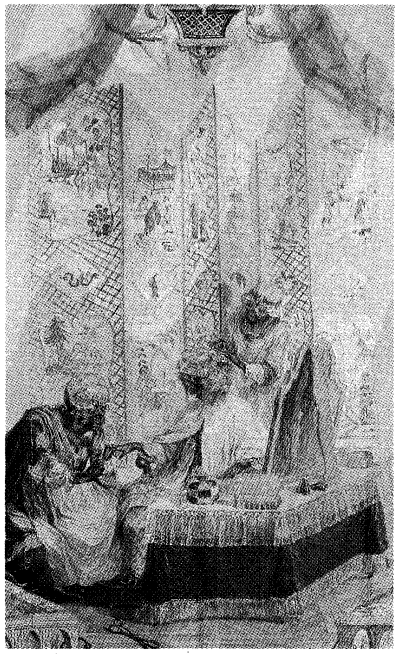
The company was incorporated in 1863 as the Singer Manufacturing Company, taking over the business of I.M. Singer Company, which had been formed to market the sewing machine patented by Singer in 1851. The company assumed the name Singer Company in 1963.

Singer's original design, which was the first practical sewing machine for general domestic use, incorporated the basic eye-pointed needle and lock stitch developed by Elias B. Howe, who won a patent-infringement suit against Singer in 1854. Singer, however, consolidated enough patents in the field to enable him to engage in mass production, and by 1860 his company was the largest manufacturer of sewing machines in the world.

Singer began to market its machines internationally in 1855 and won first prize at the Paris World's Fair. The company demonstrated the first workable electric sewing machine at the Philadelphia electric exhibition in 1885 and began mass-producing domestic electric machines in 1910. Singer was also a marketing innovator and was a pioneer in promoting the use of installment payment plans.

Besides sewing machines, the company also manufactured power tools, floor-care products, furniture, and electronics controls. In the late 1970s and '80s Singer began to diversify into the production of aerospace electronics and other high-technology items. In 1986 the company spun off its sewing-machine and furniture-manufacturing operations into a separate new company called SSMC Inc., which continued to use the Singer brand name. In 1988 financiers seized control of the Singer Company and proceeded to dismantle the company for personal profit.

singerie (French: "monkey trick"), type of humorous picture of monkeys fashionably attired and aping human behaviour, painted by



"La Toilette," detail of a singerie by Christophe Huet, first half of the 18th century; in the Musée Condé, Chantilly, Fr.
Giraudon—Art Resource/EB Inc.

a number of French artists in the early 18th century. It originated with the French decorator and designer Jean Berain, who included dressed figures of monkeys in many of his arabesque wall decorations. The emergence of singerie as a distinct genre, however, is usually attributed to the decorator Claude III Audran, who in 1709 painted a large picture of monkeys seated at table for the Château de Marly. Antoine Watteau experimented with the genre, as did a number of his contemporaries. Reflecting a vogue for Chinese decor, or chinoiserie, singeries executed in the third decade of the 18th century depicted monkeys attired not in Parisian but in mandarin dress and imitating Chinese manners.

Singh, (Chaudhuri) Charan (b. Dec. 23, 1902, Noorpur, Uttar Pradesh, India—d. May 29, 1987, New Delhi), Indian politician who served for a brief period as prime minister (1979–80).

Singh became a lawyer and in 1929 joined the Indian National Congress movement. He was jailed several times in the struggle for Indian independence. He served in the United Provinces (now Uttar Pradesh) state assembly from 1937 on and was chief minister of that state in 1967–68 and 1970. In 1977 he allied his peasant- and agricultural-based Indian Revolutionary Party with the Janata Party of Morarji Desai and served as minister of home affairs (1977–78) and deputy prime minister (1979) in Desai's coalition government. Factional quarreling broke apart the Janata coalition in 1979, and in July of that year Singh became prime minister with the support of his former political enemy, Indira Gandhi, who had imprisoned him during the state of emergency (1975–77). Within a month Gandhi withdrew her support from Singh, who thenceforth headed a caretaker government until Gandhi was returned to power in the elections

of January 1980. Singh never again held high office.

Singh, Vishwanath Pratap (b. June 25, 1931, Allahabad, India), politician and government official who became prime minister of India in 1989.

Singh was adopted by the raja (ruler) of the small principality of Manda, near Allahabad, and studied at Allahabad and Pune (Poona) universities, earning bachelor's and law degrees. Singh became a member of the Legislative Assembly of his home state of Uttar Pradesh in 1969 as a member of the Congress Party. He won election to the Lok Sabha (lower house of Parliament) in 1971 and was appointed a deputy minister of commerce by Prime Minister Indira Gandhi in 1974. He was minister of commerce in 1976–77, and, when Indira Gandhi returned to power in 1980, he served as chief minister (governor) of Uttar Pradesh until 1982, and he resumed his post as commerce minister in 1983.

Upon the death of Indira Gandhi in 1984, her son and successor as prime minister, Rajiv Gandhi, appointed Singh minister of finance. In this post, Singh's efforts to reduce governmental regulation of business and to prosecute tax fraud attracted widespread praise. Transferred to the post of minister of defense in January 1987, Singh resigned from Gandhi's Cabinet later that year after his investigations of arms-procurement fraud were squelched.

Soon afterward, Singh resigned from the government altogether and left Gandhi's Congress (I) Party. He soon built a nationwide coalition of centrist opposition parties called the National Front, which contested the general elections of December 1989. With the parliamentary representation of Rajiv Gandhi's Congress (I) Party much reduced after that election, Singh as the leader of the National Front was able to form a coalition government in alliance with two other major opposition parties. He was sworn in as India's prime minister on Dec. 2, 1989. After state legislative elections in March 1990, Singh's governing coalition achieved control of both houses of India's Parliament.

Singh Sabhā, educational and literary movement among the Sikhs, a religious group of northern India, during the late 19th and early 20th centuries. It began as a defense against the proselytizing activities of Christians and Arya Samajists (Hindu reformists) and sought the reconversion of many Sikhs back to Hinduism. Its chief aims were the revival of the teachings of the Sikh Gurūs (traditional religious leaders and teachers), the production of religious literature in the Punjabi language, and a campaign against illiteracy. The Singh Sabhā actively cultivated loyalty to the British, who then governed the Punjab, and in return enjoyed the patronage of the administrators. In collaboration with the British, Sikh schools and colleges were founded in various parts of the Punjab. Among the Sikh scholars associated with the movement was the poet-philosopher Vir Singh (1872–1957).

Singhasāri, kingdom based in eastern Java that emerged in the first half of the 13th century after the decline of the kingdom of Kaḍiri. Singhasāri's first king, Ken Angrok (or Ken Arok), defeated the king of Kaḍiri, Kertajaya, in 1222.

The last king of Singhasāri, Kertanagara (*q.v.;* 1268–92), was able to unite eastern Java temporarily. Toward the end of Kertanagara's reign, Kublai Khan, the great khan of the Mongols and the emperor of China, sent an envoy to Singhasāri demanding homage, but Kertanagara refused and even insulted Kublai's ambassador. Soon thereafter the ruler of Kaḍiri, Jayakatwang, rebelled against Singhasāri and killed Kertanagara, thus ending the period of Singhasāri dominion. The temples built during Singhasāri's rule are considered great examples of Hindu-Javanese arts; they mark the gradual transformation of Hindu architectural models into Javanese forms and also reflect the increasing syncretism of Hinduism and Buddhism, which culminated in Kertanagara's Śiva-Buddha cult.

singing, the production of musical tones by means of the human voice. It is the oldest form of music making and is an art with many associations, social, religious, and literary, as well as musical. In its physical aspect, singing has a well-defined technique that depends on the use of the lungs, which act as an air supply, or bellows; on the larynx, which acts as a reed or vibrator; on the chest and head cavities, which have the function of an amplifier, as the tube in a wind instrument; and on the tongue, which together with the palate, teeth, and lips articulate and impose consonants and vowels on the amplified sound. Though these four mechanisms function independently, they are nevertheless coordinated in the establishment of a vocal technique and are made to interact upon one another. From a musical viewpoint, the sounds produced by a singer are required to have tone quality, to be in tune, to be maintained in their tone quality, and to be capable of dynamic gradations. The technique of singing depends ultimately on the coordination of the various anatomical mechanisms in order to produce a propulsion of sound in a steady flow.

Modern Western styles of singing largely derive from the Italian bel canto, which had its origin in a style associated with the polyphonic music of the 16th century. Because this music expressed the significance or the moods of the text, a great range of expression was required from the singers, who, in these polyphonic works, assumed something of the function of a vocal orchestra. The art of singing accordingly evolved to allow the singers the maximum power and variety of expression.

Bel canto singing was built primarily on the recognition that the intensity of vocal tone on a single note may be increased or diminished. The varying of this intensity was known as the messa di voce. There is, however, a difference between variation in intensity and variation in volume of vocal tone. The style depended on the technique of intensity; that is, tone was varied by increasing or decreasing the air pressure on the glottal lips and not by enlarging the oral chamber, which merely resulted in a larger tonal volume. The style was also based on the principle that the voice has two "tones," a diapason tone produced when the larynx is in a relatively low position, and a flute tone when the larynx assumes a higher position. Both singers and composers were aware of these distinctions, which, however, were largely obliterated when a broader style of singing was introduced by Richard Wagner and later composers.

Physical aspects of the technique of bel canto singing demanded a stance in which the chest was raised and the stomach drawn in; the raising of the soft palate together with a corresponding lowering of the larynx; and the drawing back of the chin with the effect of opening the throat. Correct breathing was above all essential, and the Italians went so far as to declare that "he who knows how to breathe can sing." By a contraction of the upper abdominal muscles, control is achieved over the diaphragm, which thus enables the flow of air pressure from the lungs to be kept steady. This principle, which was the basis of singing in the 18th century, was later adopted by the Spanish tenor Manuel García, who declared that "the lungs are for tone emission, the glottis is for pitch, the oral cavity is for vowel and timbre, and the front of the mouth is for consonants." The function of the diaphragm is to regulate the pressure of air, while the larynx, as a nozzle in a water spray, determines the nature of the flow.

With the muscles in appropriate position and the reserve of air under proper control, accented notes in singing are given their full value not as startling percussive notes but in the manner of an accented note produced by a violinist who prepares his effect by the proper placing of his bow. An exercise known as *vibrazione* enables the singer to control the voice at the larynx and, by attacking a note softly, to increase the volume by pressure of the larynx. These methods of tone production and control, used by García and later singers, originated from a practice known as *coupe de glotte.*

Later schools of singing paid much attention to the resonation of the voice in the "mask," that is, the cavities of the head, though this resonation did not affect the radiative power of the voice but only its volume. These singers, and also the still-later parlando singers, who effected a union of speech and singing, made a conscious use of resonation in this way and differed from the bel canto singers in that they exercised less control over physical mechanisms.

The development of the orchestra by Hector Berlioz, Giuseppe Verdi, and Wagner encouraged singers to seek means of amplifying their voices by methods of resonation unknown in the bel canto style, and a new method was established of "singing on resonance." Jean de Reszke, who emphasized the function of the nose in resonation, was the main exponent of this school. Apart from the facial mask and the nose, other resonators were held to be the hard palate and the teeth. Followers of this school maintained that the voice should be "placed" in a particular area of resonation, according to the physique of the singer.

Demands made on the voice by Wagner and later composers transformed the principles of the style, largely because the human voice would have been submerged by the vast orchestral resources drawn upon by these composers. Even so, the robust Wagnerian singers often had great difficulty in projecting their voices through the heavy orchestral texture. The technique of the parlando singer eventually enabled the *Sprechstimme* ("speaking voice") of Arnold Schoenberg and his followers to become established, while the use of the microphone in popular music led to an even closer approximation to the speaking voice. In other developments of Western vocal music about the mid-20th century, the tendency, particularly when the singer was required to place emphasis upon an isolated word or a dramatic effect, was to associate the parlando and resonation styles with the remaining traditions of bel canto singing.

Singitic Gulf, Modern Greek SINGITIKÓS KÓLPOS, also called KÓLPOS AYION ÓROUS, gulf, the larger and deeper of two extending into the southeastern Chalcidice peninsula of Greek Macedonia. It is formed on the west by the Sithonía prong and on the east by the Áyion Mountain (Aktí) prong. Toward the head of the gulf is the islet of Ammoulianí, opposite which on the isthmus of the Áyion Mountain prong of the peninsula are the silted-up remains of a canal completed by Xerxes in 480 BC, linking Ierisoú Gulf with the Singitic Gulf. Few villages and ports lie on the Singitic Gulf. Dhafní is the main port along the gulf and serves the monastic community of Mount Athos. Ouranópolis grew from a small fishing village to a major tourist centre with many hotels for travelers exploring Mount Athos.

single crystal, any solid object in which an orderly three-dimensional arrangement of the atoms, ions, or molecules is repeated throughout the entire volume. Certain minerals, such as quartz and the gemstones, often occur as

single crystals; synthetic single crystals of elements, especially silicon and germanium, are used in solid-state electronic devices such as transistors, rectifiers, and integrated circuits.

In the preparation of synthetic single crystals, special techniques are employed to control the deposition of material upon one nucleus (*see* nucleation), which often is a small single crystal of the substance obtained from a previous preparation.

single tax, originally a tax upon land values proposed as the sole source of government revenues, intended to replace all existing taxes.

The term itself and the modern single-tax movement originated with the publication of the American economist Henry George's *Progress and Poverty* in 1879. The proposal gained substantial support in subsequent decades and then gradually declined in popular appeal.

Advocates argued that since land is a fixed resource, the economic rent is a product of the growth of the economy and not of individual effort; therefore society would be justified in recovering it to support the costs of government. They accepted the view of the economist David Ricardo that a tax on economic rent could not be shifted forward. A second argument was that acceptance of the single tax would make other forms of taxes unnecessary, and eliminating taxes on buildings would stimulate construction and economic growth. A third advantage cited was the simplicity of administration of a single tax.

Critics found the tax contrary to the usual standard of ability to pay, since there is no correlation between land ownership and total wealth and income. Moreover, portions of other incomes may be considered just as much "unearned" as land rent. Practically, separation of the value of land and the value of buildings would be very difficult.

While no attempt has been made to use the land tax as a single tax, several jurisdictions have applied their property taxes to land only, instead of to land and buildings, or have taxed land more heavily than buildings. Examples include Australia, New Zealand, the western provinces of Canada, and a few municipalities in the United States.

singlestick, a slender, round stick of wood about 34 inches (slightly less than 1 m) long, thicker at one end than at the other, and used for attack and defense with the thicker end thrust through a cup-shaped hilt of basketwork to protect the hand. It originated as a practice sword in the 16th century and became popular in its own right for cudgel play and singlesticking in British cities and towns during the 18th century.

Toward the end of the 18th century, play became very restricted. The players were placed near together and could not move their feet. Strokes were delivered with wrist action from a high, hanging guard position, the stick hand being held above the head. Blows on any part of the body above the waist were allowed, but all except those aimed at the head were employed only to gain openings, as each bout was decided only by a broken head—*i.e.,* a cut on the head that drew blood.

The sport declined in the late 19th century and, though briefly revived as practice for the sabre, was seldom practiced after the beginning of the 20th century.

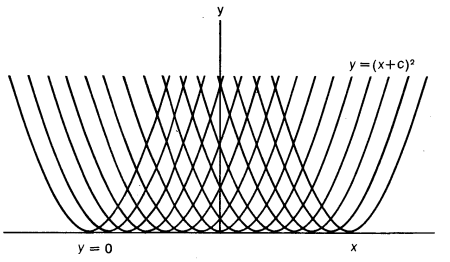
Singleton, town, east-central New South Wales, Australia, on the Hunter River. Founded in 1820, it was first known as St. Patrick's Plain and then renamed in 1822 after an early settler, Benjamin Singleton. Proclaimed a town in 1836, it became a municipality in 1866 and a shire in 1976. Located on a highway and major rail lines, the town is the centre for a large cooperative dairy association that supplies Sydney (94 miles [151 km] southwest) with dairy produce. Cattle, sheep, wine grapes, and vegetables are also raised in the district, and high-grade coal is mined and hardwoods are cut. The town's industry includes food processing, sawmilling, joinery, engineering, and leatherworking. The area in which Singleton is situated is liable to floods. Singleton is the site of St. Catherine's College. Pop. (1986) 10,990.

Singora (Thailand): *see* Songkhla.

Singspiel (German: "song-play"), 18th-century opera in the German language, containing spoken dialogue and usually comic in tone. The earliest Singspiels were light plays whose dialogue was interspersed with popular songs. Resembling the contemporary English ballad opera and the French opéra-comique (both of which stimulated its development), the Singspiel rose to great popularity in the late 18th century. Its success was partly caused by a reaction by composers and audiences against the artificial conventions of the then dominant Italian opera.

The leading composers of Singspiel included Johann Adam Hiller, Jiří Antonín Benda, and Karl Ditters von Dittersdorf. In the hands of Wolfgang Amadeus Mozart the Singspiel evolved into a serious and more complete art form in such works as *Die Entführung aus dem Serail* (1782; *The Abduction from the Seraglio*). From there the Singspiel ultimately gave rise both to German Romantic opera of the 19th century and to popular Viennese operetta.

singular solution, in mathematics, solution of a differential equation that cannot be obtained from the general solution gotten by the usual method of solving the differential equation. When a differential equation is solved, a general solution consisting of a family of curves is obtained. For example, $(y')^2 = 4y$ has the general solution $y = (x + c)^2$, which is a family of parabolas (*see* Graph). The line $y = 0$ is also a solution of the differential equation, but it is not a member of the family constituting the general solution. The singular solution is related to the general solution by its being what is called the envelope of that family of curves representing the general solution. An envelope is defined as the curve that is tangent to a given family of curves. If the singular solution is an envelope, it can be found from the general solution by solving the maximum (or minimum) problem of finding the value of the parameter c for which y has a maximum (or minimum) value for a fixed x, and then substituting this value for c back into the general solution. In the example given, y has its minimum value for each x when $c = -x$, giving the singular solution as indicated.



Family of solutions and singular solution of $(y')^2 = 4y$

singularity, also called SINGULAR POINT, in mathematical analysis, point of the complex plane (that is, a complex number of the form $z_0 = x_0 + iy_0$) at which some function of the complex variable z is not analytic (that is, the function cannot be expressed as an infinite series in powers of z). At points arbitrarily close to the singularity, the function is analytic.

For example, the function $f(z) = e^z/z$ is analytic throughout the complex plane—for all values of z—except at the point $z = 0$, where the series expansion is not defined because it contains the term $1/z$. The series is $1/z + 1 + z/2 + z^2/6 + \ldots + z^n/(n+1)! + \ldots$.

Sinha, Satyendra Prassano, 1ST BARON SINHA OF RAIPUR (b. June 1864, Raipur, India—d. March 6, 1928, Berhampur), Indian lawyer and statesman who had an extremely successful legal career, won high esteem in Indian nationalist circles, and was appointed to high office under the British government.

Sinha was educated at the Presidency College, Calcutta, and was called to the bar from Lincoln's Inn in London. He was the first Indian to be appointed advocate general of Bengal (1907) and the first to be appointed to the governor-general's Executive Council, in which he served as law member during 1909–10. He was knighted in 1914, presided over the Indian National Congress Party's session at Bombay in 1915, and subsequently served in the Imperial War Cabinet of Britain. In 1919 he joined the Lloyd George ministry as undersecretary for India, being raised to the peerage as Baron Sinha of Raipur, and steered through the House of Lords the Government of India Act of 1919, based on the Montagu-Chelmsford proposals for the reform of the Indian constitution. In 1920 he was appointed governor of the province of Bihar and Orissa, becoming the first Indian to hold such office under the British. Ill health forced his resignation the following year. He was appointed a member of the Judicial Committee of the Privy Council in 1926.

Sinhala Maha Sabha, political group in Ceylon (now Sri Lanka) that was founded in 1937 by S.W.R.D. Bandaranaike. It was a communally oriented group and promoted the interests of the Sinhalese sector of the population and of Buddhism. In 1945 Bandaranaike threw the support of the Sabha behind the newly created United National Party (UNP) of D.S. Senanayake, which was to dominate politics for the first 10 years of Ceylonese independence.

Although forming a part of the UNP, the Sabha continued as a separate political organization, often publicly supporting linguistic or religious policies that were inconsistent with the policies of the UNP. Differing with Senanayake both on political policy and on leadership succession within the UNP, Bandaranaike left the UNP in 1951. Simultaneously, he dissolved the Sabha, establishing in its place the Sri Lanka Freedom Party, which in 1956 defeated the UNP and thrust Bandaranaike into the prime ministership.

Sinhala Only Bill (1956), act passed by the government of Ceylon (now Sri Lanka) making Sinhalese the official language of the country. The bill was the first step taken by the new government of S.W.R.D. Bandaranaike to realize one of the main campaign promises that had brought about his landslide victory in the 1956 general election. Violently opposed by the Tamil-speaking minority in Ceylon, the passage of the bill was followed by rioting.

The Tamil Federal Party, led by S.J.V. Chelvanayakam, pressed demands that Ceylon be made a federal state. To conciliate the Tamils, Bandaranaike made a pact with Chelvanayakam, allowing for the official use of Tamil in Tamil-speaking provinces; in April 1958, however, under pressure of Sinhalese extremists, Bandaranaike nullified this pact. Such severe rioting and communal violence ensued that mass internal migrations of Tamils and Sinhalese occurred, and a state of emergency was declared. In August 1958 The Tamil Language (Special Provisions) Act was passed, providing for the use of Tamil for certain administrative purposes and as a medium of instruction in secondary and higher educa-

tion, a measure that temporarily mollified but did not satisfy either the Tamils or the more extremist Sinhalese.

Sinhalese, also spelled SINGHALESE, or CINGALESE, member of a people of Sri Lanka (formerly Ceylon) that constitutes the largest ethnic group of that island. In the late 20th century they were estimated to number about 12.3 million, or 74 percent of the population. Their ancestors are believed to have come from northern India, traditionally in the 5th century BC. Their language belongs to the Indo-European family.

Most Sinhalese are agriculturalists. The low-country Sinhalese of the southern and western coastal regions have been heavily influenced by European culture, while the Kandyan Sinhalese of the highlands are more traditional. The Sinhalese are Theravāda Buddhists except for a Christian minority.

Like other peoples of Sri Lanka, the Sinhalese have a caste society with a complex structure based largely on occupation. Marriage partners are usually taken from persons of the same caste, preferably from the children of the mother's brother or father's sister. Monogamy is the rule, although among the Kandyans a man may occasionally have more than one wife or a woman more than one husband.

Sinhalese language, also spelled SINGHALESE, or CINGALESE, Indo-Aryan language spoken in Sri Lanka (formerly Ceylon). It was brought there by colonists from northern India about the 5th century BC. Because of its isolation from the other Indo-Aryan tongues of mainland India, Sinhalese developed along independent lines. It was influenced by Pāli, the sacred language of the Ceylonese Buddhists, and to a lesser degree by Sanskrit. It has borrowed a considerable number of words from the Dravidian languages, mostly from Tamil, which is also spoken in Sri Lanka.

Earliest inscriptions in Sinhalese, written on rock in Brāhmī characters, date from about 200 BC. By around 1250 the literary language had attained a form from which it has varied little since, although the modern spoken language differs considerably from it. Much literature was produced, nearly all of Buddhist inspiration, from 1000 on; modern secular literature began in the 20th century. Modern Sinhalese has its own syllabic script. Dialects of Sinhalese are spoken in the Lakshadweep and Maldive islands.

Siniavski, Andrey Donatovich: *see* Sinyavsky, Andrey Donatovich.

Sinigaglia (Italy): *see* Senigallia.

Sinitic languages: *see* Chinese languages.

sinkhole, also called SINK, or DOLINE, topographic depression formed as underlying limestone bedrock is dissolved by groundwater. It is considered the most fundamental structure of karst topography. Sinkholes vary greatly in area and depth and may be very large. There are two main varieties, one caused by the collapse of the roof of a cavern, the other by the gradual dissolving of rock under a soil mantle. Collapsed sinkholes generally have steep rock sides and may receive streams that then flow underground. The soil-mantled sinkhole is generally shallower than the collapsed sinkhole and receives local drainage; it may become clogged with clay and hold a small lake. Some sinkholes, formed at low sea-level stages during the Pleistocene epoch, are now half-drowned and are known as cenotes.

Sinkiang, Uygur Autonomous Region of, Uygur also spelled UIGHUR, Wade-Giles romanization HSIN-CHIANG WEI-WU-ERH TZU-CHIH-CH'Ü, Pinyin XINJIANG UYGUR ZIZHIQU, autonomous region occupying the northwestern corner of the People's Republic of China. The huge region of mountains and deserts is bordered by Mongolia to the northeast, the Soviet Union to the northwest, Afghanistan and the disputed territory of Jammu and Kashmir to the southwest, the Tibet Autonomous Region to the southeast, and the Chinese provinces of Tsinghai and Kansu to the east.

A brief treatment of the Uygur Autonomous Region of Sinkiang follows. For full treatment, *see* MACROPAEDIA: China.

Southern Sinkiang came under the loose control of China's Western Han dynasty around 100 BC. Local Uighur (Uygur) leaders retained their autonomy after the decline of the Han. The area became part of the T'ang dynasty's empire in the 7th century AD, and in the 13th century it was conquered by the Mongol leader Genghis Khan. The Ch'ing dynasty took control of the area in the 18th century, and it was made a province of China in 1884. Because of the region's remote location, it was governed by semi-independent warlords rather than the central government. It came under the rule of the Chinese communist government in 1949. It became the Uygur Autonomous Region of Sinkiang in 1955. The capital city is Wu-lu-mu-ch'i (Urumchi).

China's largest political unit, Sinkiang is an area of lonely rugged mountains and vast desert basins. It can be divided into five physiographic regions from north to south: the Northern Highlands, the Dzungarian Basin, the Tien Shan ("Celestial Mountains"), the Tarim Basin, and the Kunlun Mountains. The Northern Highlands extend in a semicircle along the Mongolian border. The Dzungarian Basin is surrounded by mountains on the northeast, south, and northwest, and is open on the east and west. South of this, the Tien Shan, occupying nearly one-fourth of the region, is perpetually covered by snow with numerous long glaciers descending its slopes. Still further south, the Tarim Basin is surrounded by mountains on three sides and consists of a central desert and isolated oases. The desert covers more than 270,000 square miles (700,000 square km) and is absolutely barren. The Kunlun Mountains, with elevations up to 24,000 feet (7,300 m), form an almost impenetrable barrier at their central part. Remote from the ocean and enclosed by high mountains, Sinkiang has a continental dry climate; rainfall is very slight.

There are more than 40 different ethnic groups living in Sinkiang. The largest are the Uighurs and the Han (Chinese). The Uighurs are a Muslim Turkic-speaking people who constitute almost 50 percent of Sinkiang's population. Other groups include the Mongolians and Khalka Mongols, Hui (Chinese Muslims), Kazakhs, Uzbeks, Tungusic-speaking Manchus and Sibos, Tadzhiks, Tatars, Russians, and Tahurs. The population is evenly divided between the Dzungarian and Tarim basins. About 40 percent of the people in the north practice farming, while about the same proportion in the south are pastoralists. The region has four major cities: Wu-lu-mu-ch'i, K'o-la-ma-i (Karamai), I-ning (Kuldja), and Kashgar.

Because of its dry climate, Sinkiang depends almost entirely on irrigation for cultivation of the land. The main crops grown are wheat (spring and winter), corn (maize), rice, *kaoliang* (sorghum), and millet. Sinkiang is one of China's main fruit-producing regions; its sweet Ha-mi melons, seedless Tufan grapes, and Ili apples are well known. Sheep and horses are the principal livestock.

Mineral resources include deposits of lead, zinc, copper, molybdenum, and tungsten. High yield oilfields are located between Wu-lu-mu-ch'i and K'o-la-ma-i and in the Tarim Basin. Heavy industry includes an iron and steel works and a cement factory at Wu-lu-mu-ch'i and a farm-tool plant at Kashgar. Industries processing agricultural products have been established within the region near the source of raw materials.

Sinkiang has a good road system. There is a railway which crosses the region from Kansu province to Wu-lu-mu-ch'i; a southern branch line connects T'u-lu-p'an with K'u-erh-lo. Air service is centred in Wu-lu-mu-ch'i. Area 635,900 square miles (1,646,900 square km). Pop. (1988 est.) 14,063,000.

sinking fund, fund accumulated and set aside by a corporation or government agency for the purpose of periodically redeeming bonds, debentures, and preferred stocks. The fund is accumulated from earnings, and payments into the fund may be based on either a fixed percentage of the outstanding debt or a fixed percentage of profits. Sinking funds are administered separately from the corporation's working funds by a trust company or a sinking-fund trustee.

The funds may be used immediately to retire the bonds for which the fund was established; however, in most cases sinking-fund administrators opt to save money by investing the fund in conservative bonds purchased on the open market. Revenues from these investments are then added to the fund; for example, $1,000,000 can be added to the sinking fund at a cost of only $500,000 if bonds can be purchased at a 50 percent discount to the face value. The purpose of a sinking fund is to assure investors that provision has been made for repayment of bonds at maturity.

Sinn Féin (Irish: "We Ourselves," or "We Alone"), in full SINN FÉIN THE WORKERS' PARTY, Irish SINN FÉIN PAIRTI NA NOIBRI, nationalist political party in Ireland professing a socialist, anticapitalist ideology. Although the party has been electorally insignificant since the 1920s, it plays a role of some importance in Irish political life because of its left-wing opposition to the conservatism of the two main parties, Fianna Fáil and Fine Gael, because of its relationship with the Irish Republican Army (*q.v.;* IRA), of which it is sometimes described as the political wing, and because of its militancy over the question of a united Ireland.

The party's early history is closely associated with Arthur Griffith, who in 1901 became editor of a nationalist newspaper, *The United Irishman,* and who was active in a body known as Cumann na nGaedheal ("Society of Gaels"), which first met in October 1902 and which espoused a policy its members called Sinn Féin. The main elements of the Sinn Féin program were passive resistance to the British, withholding of taxes, and the establishment of an Irish ruling council and independent local courts.

The party was of little significance until the period following the Easter Rising in Dublin (1916), when it became the rallying point for extreme nationalist and republican opposition to the prospective settlement with Great Britain that was to result in 1921 in a divided Ireland owing allegiance to the crown.

The unequivocal demand of Sinn Féin's leader, Eamon De Valera, for a united, republican Ireland won the party 73 out of 105 seats in a general election of December 1918. Sinn Féin members met in Dublin in January 1919 and declared themselves the parliament of an Irish republic, setting up a provisional government in rivalry to Ireland's British administration, which was still negotiating with the central British government.

Following the creation of the Irish Free State in 1921, the uncompromising hostility of many of Sinn Féin's members to the terms of the agreement with Britain put the party outside constitutional politics because it refused to recognize the legitimacy of the Dáil Éireann, the Irish assembly. This resulted in the resignation (March 1926) of De Valera

and his founding of Fianna Fáil, which absorbed most of Sinn Féin's membership.

In the election of June 1927, Sinn Féin candidates gained only 2.7 percent of the seats and did not campaign again until 1957, when they gained 2.6 percent and won four seats. In the late 20th century, it has won few seats and, in some elections, none at all.

The party's main significance since the 1920s has been its activism over the question of Irish unification and its links with the IRA. Many IRA members belong to Sinn Féin, but the latter has little real control, especially in times of crisis. At a "secret" meeting held in Dublin in December 1969, both Sinn Féin and the IRA split into "Official" and "Provisional" wings over the tactics to be used in pursuit of unification.

Sinnott, Michael: *see* Sennett, Mack.

Sino-French War (1883–85), conflict between China and France over Vietnam, which disclosed the inadequacy of China's modernization efforts and aroused nationalistic sentiment in South China.

The French had already begun to encroach on Vietnam, China's major protectorate in the south, and by 1880 controlled the three southern provinces, known as Cochinchina. In the 1880s they began to expand northward in Vietnam, stationing troops in Hanoi and Haiphong. The Chinese responded by building up their forces in the area and engaging the French in a series of limited battles.

In 1882 the great Chinese viceroy Li Hung-chang negotiated an agreement with France in which the two countries agreed to make the area a joint protectorate. This agreement was, however, rejected by Paris, which dispatched additional troops to North Vietnam. Meanwhile, a war party emerged within the Chinese government and began to pressure the court to take a harder line. But Chinese reinforcements were quickly defeated by the French (1883), and the wavering court attempted to seek a new settlement.

The subsequent Li–Fournier Convention called for the admittance of French trade through the Tongking area of North Vietnam, the withdrawal of Chinese troops from the area, and the recognition of French rights in North Vietnam. In return, China was not required to pay any indemnity. Meanwhile, the war party again became dominant in China, and it refused to accept any loss of sovereignty over Vietnam. Hostilities were therefore resumed. Chang Chih-tung, one of the leading hawks, was appointed to take command of the land forces. He was successful against French forces that had attempted to advance north into South China, but at sea the new Chinese fleet of 11 steamers was destroyed. The great Foochow shipyard, which China had built with French aid, was also demolished. A peace treaty was finally signed at Paris in 1885 in which China agreed to recognize the Li–Fournier agreement.

Sino-Japanese War (1894–95), conflict between Japan and China that marked the emergence of Japan as a major world power and demonstrated the weakness of the Chinese Empire. The war grew out of conflict between the two countries for supremacy in Korea. Korea had long been China's most important client state, but its strategic location opposite the Japanese islands and its natural resources of coal and iron attracted Japan's interest. In 1875 Japan, which had begun to adopt Western technology, forced Korea to open itself to foreign, especially Japanese, trade and to declare itself independent from China in its foreign relations.

Japan soon became identified with the more radical modernizing forces within the Korean government, while China continued to sponsor the conservative officials gathered around the royal family. In 1884 a group of pro-Japanese reformers attempted to overthrow the Korean government, but Chinese troops under Gen. Yüan Shih-k'ai rescued the King, killing several Japanese legation guards in the process. War was avoided between Japan and China by the signing of the Li–Itō Convention, in which both nations agreed to withdraw troops from Korea.

In 1894, however, Japan, flushed with national pride in the wake of its successful modernization program and its growing influence upon young Koreans, was not so ready to compromise. In that year, Kim Ok-kyun, the pro-Japanese Korean leader of the 1884 coup, was lured to Shanghai and assassinated, probably by agents of Yüan Shih-k'ai. His body was then put aboard a Chinese warship and sent back to Korea, where it was quartered and displayed as a warning to other rebels. The Japanese government took this as a direct affront, and the Japanese public was outraged. The situation was made more tense later in the year when the Tonghak rebellion broke out in Korea, and the Chinese government, at the request of the Korean king, sent troops to aid in dispersing the rebels. The Japanese considered this a violation of the Li–Itō Convention, and they sent 8,000 troops to Korea. When the Chinese tried to reinforce their own forces, the Japanese sank the British steamer "Kowshing," which was carrying the reinforcements, further inflaming the situation.

War was finally declared on Aug. 1, 1894. Although foreign observers had predicted an easy victory for the more massive Chinese forces, the Japanese had done a more successful job of modernizing, and they were better equipped and prepared. Japanese troops scored quick and overwhelming victories on both land and sea. By March 1895 the Japanese had successfully invaded Shantung and Manchuria and had fortified posts that commanded the sea approaches to Peking. The Chinese sued for peace.

In the Treaty of Shimonoseki, which ended the conflict, China recognized the independence of Korea and ceded Taiwan, the adjoining Pescadores, and the Liaotung Peninsula in Manchuria.

China also agreed to pay a large indemnity and to give Japan trading privileges on Chinese territory. This treaty was later somewhat modified by Russian fears of Japanese expansion, and the combined intercession of Russia, France, and Germany forced Japan to return the Liaotung Peninsula to China.

China's defeat encouraged the Western powers to make further demands of the Chinese government. In China itself, the war triggered a reform movement that attempted to renovate the government; it also resulted in the beginnings of revolutionary activity against the Manchu rulers of China.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Sino-Japanese War (1937–45), conflict that broke out when China began full-scale resistance to the expansion of Japanese influence in its territory (begun in 1931). In an effort to unseat the Nationalist government of Chiang Kai-shek, the Japanese occupied large areas of eastern China in 1937–38. A stalemate then ensued, and Japanese forces were diverted to Southeast Asia and to the Pacific War against the Western Powers and their allies beginning in 1941. Japan's World War II defeat by the Allies ended its occupation of China (1945).

Sino-Tibetan Chain (China): *see* Ta-hsüeh Mountains.

Sino-Tibetan languages, group of more than 300 languages and major dialects, chief among them being Chinese, Tibetan, and Burmese.

A brief treatment of the Sino-Tibetan languages follows. For full treatment, *see* MACROPAEDIA: Languages of the World.

In numbers of speakers, Sino-Tibetan languages constitute the world's second largest language family (after Indo-European). Various Chinese languages (or dialects), grouped as Sinitic languages, are spoken in China and Taiwan and by Chinese immigrants in many nations. Tibeto-Burman languages are spoken in Tibet, Burma, and throughout the Himalayan Mountain region.

Sino-Tibetan languages have in common a number of features, many of which are typological in nature: monosyllabicity, tonality, affixation, initial consonant alternation, vowel alternation, indistinct word classes, use of noun classifiers, and strict word order. Phonological correspondences in shared vocabulary have been important pieces of evidence in the argument that all Sino-Tibetan languages are related and derive from a common source.

Sinitic (Chinese) languages. The term Chinese has been applied to numerous dialects and languages from the middle of the second millennium BC. Linguists now use the term Sinitic for the Chinese languages.

The history of the Chinese languages can be divided into three periods: pre-Classical (*c.* 1500 BC–*c.* AD 200), Classical (*c.* 200–1920), and post-Classical. The earliest pre-Classical Chinese extant is in the form of oracle inscriptions on bones and tortoise shells. Archaic Chinese (Chou and Ch'in dynasties, 1122–206 BC) includes the copious writings of Confucian, Taoist, and other philosophers. Chinese of the Han period (206 BC–AD 220) laid the basis for Classical Chinese, which underwent very few changes during the centuries in which it was used. An artificial construct, Classical Chinese was soon unintelligible when read aloud since the spoken language continued to change, as did the conventions for pronouncing the written characters. Consequently, it has at times been unfairly denied the status of a real language; in fact, Classical Chinese has been a lingua franca into the 20th century. Post-Classical Chinese has its roots in the vernacular used since the T'ang dynasty (618–907). The written Post-Classical language, spoken Mandarin, and the vernacular of the Peking area have recently been combined to form a practical national language known as Modern Standard Chinese. This new written idiom has gained great popularity and has largely replaced Classical Chinese. The People's Republic of China has effectively undertaken the task of making Modern Standard Chinese understood all over China.

The Chinese writing system is nonalphabetic. Each meaningful syllable, or each nonmeaningful syllable that is part of a polysyllabic word, is represented by a specific character. Although many of the characters depict some object, they are not recognizable in most cases. Thus, it would be misleading to describe the Chinese script as pictographic or ideographic. Nor is it syllabic, since syllables that sound alike but have different meanings are written differently. The Chinese writing system is logographic; *i.e.,* each symbol represents a word.

During the Ch'in dynasty (221–206 BC) the first governmental standardization of characters was instituted and involved some 3,000 characters. The Ch'in characters have to a large degree remained the standard to the present day. Although dictionaries of over 40,000 characters have been compiled, the number of absolutely necessary characters is today estimated at fewer than 4,000. The divergence of modern spoken Chinese from the written language and the problem of its unwieldiness have led to several attempts to introduce a new system of writing Chinese. Political instability

thwarted this effort until the 1950s. China's Communist government has simplified many characters and introduced a new phonetic system (*pinyin zimu*) for transliterating Chinese into the Latin alphabet. *Pinyin* is conceived as a script that may gradually replace characters altogether.

Tibeto-Burman languages. The Tibeto-Burman languages have evolved from a common source in very different ways owing, at least in part, to the movements of peoples throughout central and southern Asia.

The Tibetan writing system was developed by early Buddhist missionaries from India in the 7th to 9th century. It is an alphabetic system very similar to Indo-Aryan systems. Present-day Tibetan pronunciation differs greatly from the written language. Western Tibetan dialects have most faithfully preserved such features as initial consonant clusters and final stops, which Central dialects have lost. Central dialects have developed a system of tones, probably owing to Chinese influence. Increasing influence on Tibetan from Chinese is likely as a result of political control.

The Burmese writing system is alphabetic and Indic in origin. Written Burmese in its present form dates back at least to the 15th century. Grammatical categories have remained fairly conservative, but great changes have occurred in Burmese phonetics.

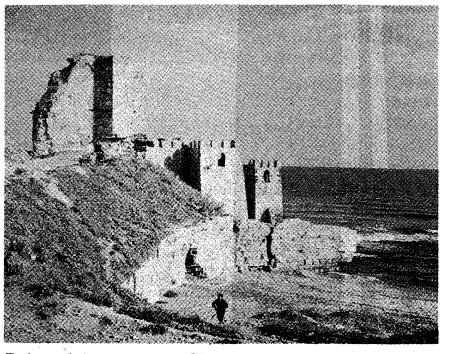
Sinoia (town, Zimbabwe): *see* Chinhoyi.

Sinop, historically SINOPE, seaport on the southern coast of the Black Sea, northern Turkey. It lies on an isthmus linking the Boztepe Peninsula to the mainland and is shut off from the Anatolian Plateau by high, forest-clad mountains. Having the only safe natural roadstead on the north coast of Asia Minor, Sinope was in antiquity the foremost port on the coast, with its land approaches barred by a huge citadel (now in ruins) and its sea side defended by a strong wall. Its decline was associated with its lack of easy access to the interior and its rivalry with İnebolu on the west and with Samsun on the east; the latter has emerged as the largest Turkish port on the Black Sea.

According to legend, Sinope was founded by the Amazons, who named it after their queen, Sinova. The city's ancient inhabitants ascribed its foundation to Autolycus, a companion of Hercules. Destroyed by the wandering Cimmerians, it was refounded toward the end of the 7th century BC by a colony of Milesians. It ultimately became the most flourishing Greek settlement on the Euxine (Black) Sea. A terminus of the trade routes from Upper Mesopotamia, it commanded much of the maritime trade of the Pontic region and by the 5th century BC had established many colonies on the coast and enjoyed naval supremacy in the Black Sea. In 183 BC it was taken by Pharnaces I and became the capital of the Pontic kings. Under Mithridates VI the Great, who was born there (as was the 4th-century-BC founder of the Cynic sect, Diogenes), it enjoyed a high degree of prosperity and was embellished with fine buildings, naval arsenals, and well-built harbours. The Roman Lucius Licinius Lucullus captured the seaport in 70 BC, and the city was nearly destroyed by fire.

Taken by the Seljuq Turks from the Comneni of Trebizond (modern Trabzon) in AD 1214, it was incorporated into the Ottoman Empire in 1458. In November 1854, shortly after the outbreak of the Crimean War, the Russian navy dramatically attacked Sinop, destroying the Ottoman fleet and reducing large parts of the city to ashes.

Extant monuments include a ruined ancient citadel rebuilt during Byzantine and Seljuq periods, some isolated columns and inscribed stones built into the old walls and dating from the early Greek and Roman periods, and Alâeddin Cami (a mosque), built in 1214. A 13th-century Alâiye religious school now houses the local museum. Sinop is linked by road with Samsun and by sea with Istanbul.

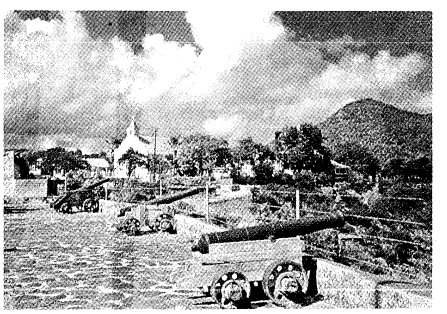


Ruins of the citadel at Sinop, Tur.
R.V. Johnson—Shostal/EB Inc.

The hinterland around Sinop is drained by the Gök River and is mountainous and partly forested. Agriculture employs most of the labour force. Corn (maize), flax, and tobacco are grown in the valleys and on the fertile coastal strip. Pop. (1985 prelim.) city, 25,025.

Sint Anna Bay, English SANTA ANNA BAY, Dutch SINT ANNA BAAI, deep channel separating the two parts of Willemstad, capital of Curaçao, in the Netherlands Antilles. The bay is a narrow waterway about 1 mile (1.6 km) long and from 300 to 1,000 feet (90 to 300 m) wide. The south end opens into the Caribbean Sea; the north end opens up into the Schottegat, a giant, deep lagoon that serves as a harbour and seaplane anchorage. Spanning Sint Anna Bay is the pontoon Koningin Emma ("Queen Emma") Bridge, linking the two parts of the city. A newer fixed bridge vaults 160 feet (50 m) high over the bay and contains a four-lane highway.

Sint Eustatius, English SAINT EUSTATIUS, also called STATIA, island in the Bovenwindse Eilanden (Dutch: "Windward Islands") of the Netherlands Antilles, in the Caribbean Sea. It lies 7 miles (11 km) southeast of Saba and south of Sint Maarten. Sint Eustatius, measuring 6 by 3 miles (10 by 5 km) and having a total land area of 8 square miles (21 square km), is dominated by two extinct volcanoes. A flat central plain divides the two. Sint Eustatius, in the trade wind belt, receives an average 44 inches (1,125 mm) of rainfall annually, mainly between May and November; but climatic conditions vary considerably over the island. On the east (Atlantic) side the wind is strong and the vegetation low. On the calm west (Caribbean) side grow tall palms and breadfruit trees and thick banana groves. At Whitewall, on the southern slope of one of the volcanoes, The Quill, arid conditions prevail and xerophytic plants (adapted to growth with limited water) predominate. The remainder of the island is covered with tough, thorny bushes and trees, many of which lose their leaves during the dry season.



Fort Oranje at Oranjestad, capital of Sint Eustatius, Netherlands Antilles
Arthur Griffin—EB Inc.

The island, first colonized by the French and English in 1625, was taken by the Dutch in 1632 and named Nieuw Zeeland. Control was not absolute, the island changing hands 10 times in the period 1664–74, yet Sint Eustatius began to grow as a commercial centre. Despite the absence of a good natural harbour and a severe shortage of fresh water, it became the main focus of the slave trade and of mercantile exchange in the eastern Caribbean by 1780. The island was probably the most important source of supplies for the rebellious North American colonies, arousing the antagonism of Britain. This condition was aggravated when, on Nov. 16, 1776, Sint Eustatius became the first foreign government officially to recognize the fledgling United States, firing a salute to the brig *Andrew Dorea,* which was flying the new Stars and Stripes. Britain could no longer ignore the situation; seizing on the opportunity presented by an impending American–Dutch commercial treaty, Admiral George Rodney was ordered to capture the island and did so in February 1781. After sacking storehouses and homes, the British continued to fly the Dutch flag, luring many American and other enemy ships to their capture. This marked the end of Sint Eustatius' prosperity, which was never regained.

Sint Eustatius is a poor island, and many of its young people leave to find jobs elsewhere. Although rainfall is meagre, with every home having its cistern to catch runoff, there is some cultivation of onions, yams, and sweet potatoes. Lobsters are caught for export to Puerto Rico. Along the rim and within the crater of The Quill is a dark forest filled with orchids and other tropical vegetation.

The island is governed locally by an elected council headed by a lieutenant governor and also elects one member to the Netherlands Antilles legislature (Staten). The government provides medical and dental care and maintains radio-phone service to the off-island world. The spoken language is English. The entire population is concentrated in Oranjestad, and it includes an increasing number of American retirees. Islanders often return home after living in the United States long enough to earn Social Security incomes. Pop. (1983 est.) 1,483.

Sint-Jans-Molenbeek (Belgium): *see* Molenbeek-Saint-Jean.

Sint Maarten (Caribbean island): *see* Saint-Martin.

Sint Nicolaas, town, southeastern end of Aruba Island, in the southern Caribbean Sea. Its deepwater port, with facilities for cargo handling and fuel bunkering serves the nearby Lago Oil and Transport Company refinery, established by Standard Oil of New Jersey (now Exxon) in 1929. Nearby is the coastal village of Savaneta, which, under the name of Commandeursbaai, was the capital of Aruba until 1797. Pop. (1965 est.) 16,714.

Sint-Niklaas (Flemish), French SAINT-NICOLAS, municipality, East Flanders province, northern Belgium, southwest of Antwerp. The former capital of the Waasland region, it was granted independence by the counts of Flanders (1241) and chartered in 1513. A rail junction and the industrial and trade centre for the fertile Waasland (Pays de Waes), its marketplace is the largest in Belgium (7½ acres [3 hectares]). It has textile industries and several specialized schools. Notable buildings are the town hall (1876) with a 35-bell carillon, the old town hall (1663; now law courts), the Church of Sint-Niklaas (15th–16th century; restored 1900), Notre Dame Church (1844), and the Walburg Château (16th century). The town museum contains mementos of the geographer Gerardus Mercator, who was born nearby. Pop. (1983 est.) mun., 68,157.

Sinte-galeshka (Sioux Indian): *see* Spotted Tail.

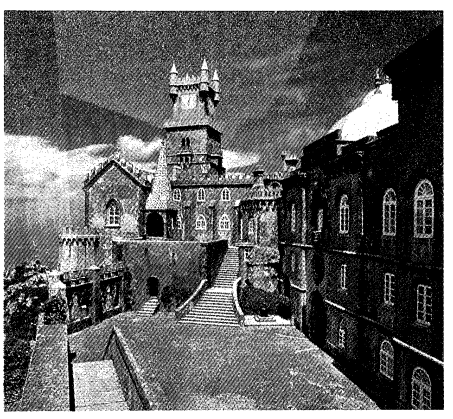
sinter, mineral deposit with a porous or vesicular texture (having small cavities). At least two kinds are recognized: siliceous and calcareous. Siliceous sinter (geyserite; fiorite) is a deposit of opaline or amorphous silica that occurs as an incrustation around hot springs and geysers and sometimes forms conical mounds (geyser cones) or terraces. The deposition of siliceous sinter is largely due to the action of algae and other forms of vegetation in the thermal waters; near fumaroles and in the deeper channels of hot springs, it may be formed by alteration of wall rocks. Locations include Iceland; New Zealand; Yellowstone National Park, Wyo., U.S.; and Steamboat Springs, Colo., U.S.

Calcareous sinter, sometimes called tufa, calcareous tufa, or calc-tufa, is a deposit of calcium carbonate, exemplified by travertine. So-called petrifying springs, not uncommon in limestone districts, yield calcareous waters that deposit a sintery incrustation on objects exposed to their action. The cavities in calcareous sinter are partly due to the decay of mosses and other vegetable structures that have assisted in its precipitation. Even in thermal waters, such as the hot springs of Karlovy Vary, Czech., which deposit sisolite, the origin of the deposits is mainly due to organic agencies.

sintering, the welding together of small particles of metal by applying heat below the melting point. The process may be used in steel manufacturing—to form complex shapes, to produce alloys, or to work in metals with very high melting points. In a steel-sintering plant a bed of powdered iron ore, mixed with coke or anthracite, is ignited by a gas burner and then moved along a traveling grate. Air is drawn down through the grate to produce downdraft combustion. As the bed moves forward, a very high heat (1,325°–1,500° C [2,400°–2,700° F]) is generated that converts the tiny particles into lumps about 2.5 cm (1 inch) in diameter suitable for burning in the blast furnace to convert them to steel. Sintering is also used in the preliminary molding of ceramic or glass powders into forms that can then be permanently fixed by firing.

The driving force in sintering is decreasing surface energy; as the sintering proceeds, adjacent particles partially coalesce owing to viscous flow (as in glass) or to diffusion processes (as in crystalline materials), and consequently the total surface area decreases. The result is improved mechanical and physical properties of the material. *See also* powder metallurgy.

Sintra, formerly CINTRA, three *freguesias* (parishes) and a *concelho* (township) of Lisboa *distrito* ("district"), Portugal. The towns and villages of the *freguesias* are picturesquely situated on the northern slope of the rugged Sintra Mountains about 15 miles (24 km) west-northwest of Lisbon. An area of former royal summer residence, Sintra possesses a beauty that was celebrated by Lord Byron in his poem *Childe Harold's Pilgrimage* and by other literary figures. On one of the mountain peaks is the Pena Palace (Palácio da Pena), a 19th-century building, partly an adaptation of a 16th-century monastery and partly an imitation of a medieval fortress, which was built for Queen Maria II by her young German consort. On another peak is a Moorish castle, Castle dos Mouros, and in a section called the old town is a 12th–15th-century royal palace, a mixture of Moorish and debased Gothic. These buildings and the nearby Monserrate Palace and its park, one of the best examples of landscape gardening in the Iberian Peninsula, attract large numbers of visitors. Tourism is important. Sintra is an agricultural trade centre. Granite, basalt, limestone, marble, and alabaster are quarried in the area.



Pena Palace, Sintra, Port.

George Holton—Photo Researchers/EB Inc.

Sintra has given its name to two conventions, one in 1509 between Portugal and Castile settling differences concerning voyages of exploration, and one in 1808 by which the British and Portuguese allowed the defeated French army to return home during the Peninsular War. Pop. (1981) the *freguesias* of Santa Maria e São Miguel, São Martinho, and São Pedro de Penaferrim, 20,574; *concelho,* 225,398.

Sintra Mountains, Portuguese SERRA DE SINTRA, mountain range, Lisboa *distrito* ("district"), western Portugal. It extends about 10 miles (16 km) from the resort of Sintra to the Cape da Roca on the Atlantic Ocean, reaching its highest point (1,736 feet [529 m]) just south of Sintra. The lush vegetation (both Mediterranean and northern European flora) on the mountainsides and a mild climate have made the area famous as a tourist retreat for Lisbon's population.

Sinuhe (fl. 20th century BC), Middle Kingdom Egyptian official of the 12th dynasty (1938–1756 BC) who fled Egypt to settle in Syria. His biography yields information about political and social conditions of the time.

Sinuhe was an official of the harem maintained for Amenemhet I by his queen. While on an expedition to Libya he learned of the king's assassination (1908 BC) and fled, either from fright or because of his complicity. He intended to travel southward but was blown to the north while crossing the Nile, and he passed into Palestine. After much wandering in Palestine and Lebanon, he was invited to settle with a chieftain of southern Syria, who adopted him and married him to his eldest daughter. In that land Sinuhe raised a family and became a veritable patriarch. He defended his father-in-law's territory and entertained emissaries traveling to and from Egypt.

The pharaoh Sesostris I invited Sinuhe to return to Egypt, and Sinuhe eagerly accepted. The king forgave him his real or imagined crimes and welcomed him with rich gifts; thereafter Sinuhe remarried in his homeland, while the pharaoh ordered a fine tomb built for him. Sinuhe's biography survived as a popular epic; internal evidence suggests that it is based on actual events. The story of Sinuhe was adapted by a modern Finnish writer, Mika Waltari, for a popular novel, *The Egyptian* (1949).

Sinŭiju, city, northwestern North Korea. It was developed during the Japanese occupation (1910–45) at the Korean terminus of a railway bridge across the Yalu (Amnok) River, 7 miles (11 km) west of the old city of Ŭiju (Sinŭiju meaning "New Ŭiju"). An open port, 25 miles (40 km) from the mouth of the Yalu River, it grew commercially with the lumber industry, which uses the river to transport the logs from inland forests. The chemical industry developed with the construction of the Sup'ung Dam (a hydroelectric complex) on the upper course of the river. During the Korean War, Sinŭiju sustained heavy damages from bombing, but it has been rebuilt. Sinŭiju has a plant manufacturing enameled ironware. It is connected with P'yŏng-yang by air, electric railway, and road and with the Chinese city of An-tung, across the Yalu, by a railway bridge 3,097 feet (944 m) long. It is linked with the Trans-Siberian Railway through the Manchuria Railway. North Korean trade with China is funneled through the city. Pop. (1981 est.) 200,000.

sinus, in anatomy, a hollow, cavity, recess, or pocket; a large channel containing blood; a suppurating tract; or a cavity within a bone. Two types of sinus, the blood-filled and the air-filled sinuses, are discussed in this article.

Blood-filled sinuses. The cranial venous sinuses are spaces between the layers of dura mater, which covers the brain, and are lined with endothelium similar to that lining veins. These sinuses receive blood from the veins of the brain, and all eventually drain into the principal vein of the neck—the internal jugular. Communications between these intracranial venous sinuses and veins outside the skull such as those in the nose, are important because they offer a direct path by which infection in the nose may reach the brain.

Among these sinuses the cavernous sinus is of particular interest, because it lies on each side of the pituitary gland and contains not only venous blood but also the internal carotid artery and several cranial nerves.

Paranasal air sinuses. The air sinuses, four on each side, are cavities in the bones that adjoin the nose. They are outgrowths from the nasal cavity and retain their communications with it by means of drainage openings, or ostia. Consequently, their lining is mucous membrane similar to that found in the nose. The mucus secretion formed is propelled by small, hairlike processes called cilia through the ostia of the sinuses to the nasal cavity. From there it is eventually swallowed or expelled. All sinuses are absent or small at birth; they gradually enlarge until puberty, when they usually grow rapidly.

The two frontal sinuses are situated in the frontal bone immediately above and between the eye sockets, or orbits. They are usually unequal in size and have the shape of an irregular pyramid with its apex directed upward. The thin bony wall separating the two cavities sometimes is absent.

It is rare to recognize the frontal sinuses until the age of seven years, and their maximum growth occurs after puberty. They vary considerably in size and are usually larger in the male than in the female, averaging, when fully developed, approximately 3 cm (1.2 inches) in height, 2.5 cm (1 inch) in width, and 2 cm (0.8 inch) in depth. The front, or anterior, wall is thick skull bone; behind the sinuses lies bone covering the brain, and the floor of the sinuses slopes toward their openings into the nose.

The maxillary sinuses are not only the largest of the air sinuses but also the first to appear, being present in the fourth month of intrauterine life. Each is a pyramidal space, its roof formed by the floor of the eye socket, and its floor by the palate and teeth-bearing bone. The roots of the upper-jaw teeth may project through the floor into the sinus cavity or may be so closely related to the floor that extraction leads to the formation of an opening between mouth and sinus (oro-antral fistula). The maxillary sinuses reach their maximum size by about age 12, when all the permanent teeth except the third molars have erupted. The nerves supplying the upper teeth run through the front wall of the sinus and may be irritated during acute antral infections with resultant toothache.

The ethmoidal sinuses, from 3 to 18 thin-walled cavities between the nasal cavities and the eye sockets, make up the ethmoidal labyrinths. Their walls form most of the inner walls of the eye sockets and are joined together by a thin perforated plate of bone at the roof of the nose. This bone, the cribriform plate, transmits the olfactory nerves that carry the sense of smell.

The sinuses contained within each labyrinth are arranged in three noncommunicating groups, all of which open into the nasal cavity. All produce mucus whose function is to lubricate the cilia lining the nasal passages.

The sphenoidal sinuses are situated back of the nose in the sphenoidal bone, which forms a forward part of the base of the skull and contains the depression, or fossa, for the pituitary gland. The sinuses are separated from each other by a bony wall, or septum, that is rarely in the midline, and they discharge their mucus through an opening in the front wall of the sinus into the nose.

These sinuses appear before birth but remain small until the age of 10, when they grow rapidly; rapid growth also occurs at about puberty. Sphenoidal sinuses are important in the surgical approach to the pituitary gland for patients with breast cancer or pituitary tumours.

Functions of the paranasal sinuses. Comprehensive studies on the comparative anatomy and physiology of the nose and paranasal sinuses have been made in humans and in lower animals. The presence of the sphenoidal and frontal sinuses in carnivores such as the dog, hyena, and tiger is related to an increased area of olfaction and consequent improvement in the sense of smell. Ethmoidal air cells are found only in higher apes and humans and are probably the result of restriction of the olfactory area.

The maxillary sinuses are largest in humans, in the higher apes, and in capuchin and howler monkeys; they are absent in baboons, lorises, and tapirs. It has been suggested that these sinuses play a part in phonation, that they aid in conservation of heat from the nasal fossae, and that they serve to lighten the skull, but evidence for these theories is lacking.

Diseases of the sinuses. The most common disorder affecting the paranasal sinuses is infection, a condition that is known as sinusitis (*q.v.*).

Polyps, consisting of swollen nasal lining, may grow from both the maxillary and ethmoidal sinuses and cause nasal obstruction. They occur most commonly as a result of nasal allergy and require surgical removal.

Cancers affecting the paranasal sinuses are rare, especially in the sphenoidal and frontal area. They occur most commonly among the Bantu of South Africa, where they are related to the long-term use of homemade carcinogenic snuff. Recently, however, it has been shown that certain woodworkers in the furniture industry have a greatly increased incidence of nasal sinus cancer.

sinusitis, acute or chronic infection of the paranasal sinuses (*i.e.,* the cavities in the bones that adjoin the nose).

Acute sinusitis usually results from infections of the upper respiratory tract such as the common cold. Acute sinusitis may occur at any time after six months of age. By the age of four years the maxillary sinus is the one most commonly affected. General diseases, such as measles, also frequently precipitate acute sinusitis, as may the penetration of infected water from swimming. The symptoms of acute sinusitis are pain and headache, tenderness over the affected area, nasal obstruction and discharge, and malaise. Treatment of the disorder is directed primarily at overcoming the infecting organism by the use of systemic antibiotics such as penicillin and at encouraging drainage of the sinuses by the use of vasoconstricting nose drops and inhalations. If the infection persists, the pus localized in any individual sinus may need to be removed by means of a minor surgical procedure known as lavage, in which the maxillary or sphenoidal sinuses are irrigated with water or a saline solution.

Chronic sinusitis may follow repeated or neglected attacks of acute sinusitis, particularly if there is impaired nasal breathing or drainage from intranasal obstruction. The symptoms of chronic sinusitis are a tendency to colds, purulent nasal discharge, obstructed breathing, loss of smell, and sometimes headache. Pain is not a feature of chronic sinusitis. If antibiotic therapy or repeated lavage do not alleviate the condition, surgery may be necessary.

sinusoid, irregular tubular space for the passage of blood, taking the place of capillaries and venules in the liver, spleen, and bone marrow. The sinusoids form from branches of the portal vein in the liver and from arterioles (minute arteries) in other organs. The walls of the sinusoids are lined with phagocytic cells, called Kupffer cells, that digest old red blood cells and clear the bloodstream of toxins.

In the liver, blood enters the hepatic sinusoids from both the portal vein (*q.v.*) and the hepatic artery; the venous blood is cleansed in the sinusoids, while the arterial blood provides oxygen to the surrounding liver cells. Blood then passes from the sinusoids into the hepatic vein for return to the heart.

Sinyavsky, Andrey Donatovich, Sinyavsky also spelled SINIAVSKI, pseudonym ABRAM TERTS, or TERTZ (b. Oct. 8, 1925, Russian S.F.S.R.), Russian critic and author of novels and short stories who was convicted of subversion by the Soviet government in 1966.

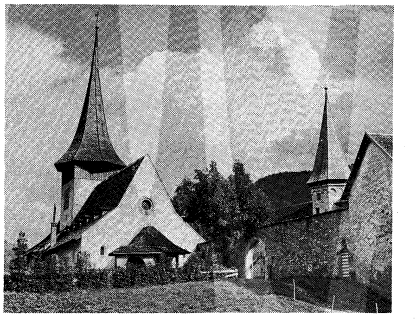
Sinyavsky graduated from Moscow University in 1952 and later joined the faculty of the Gorky Institute of World Literature. He contributed to the literary journal *Novy Mir* and produced an incisive introduction to a volume of poems by Boris Pasternak. His works of fiction, none of which were published in the Soviet Union, were smuggled to the West and published under the name of Abram Tertz.

The English translations of Sinyavsky's fiction began with the novel *The Trial Begins* (1960), which deals with the Doctors' Plot of 1953, during which nine Soviet doctors were unjustly accused of treason. An anthology of short stories, *Fantastic Stories* (1963), explores the themes of tyranny, dissipation, and spiritual loneliness. In the novel *The Makepeace Experiment* (1965), a village boss hoodwinks his constituents with myths and magic. Also smuggled to the West was the essay *On Socialist Realism* (1960), which called for a new inventiveness in Soviet literature.

Sinyavsky and another writer, Yuly Daniel, were arrested on September 13, 1965, and the following February were convicted of producing anti-Soviet propaganda through their writings. Daniel was sentenced to five years of hard labour and Sinyavsky to seven. The trial, a record of which was published in *On Trial* (1966), prompted domestic and international protest. Sinyavsky was released from prison in 1971 and two years later moved to Paris, where he taught Russian literature at the Sorbonne.

Under extreme conditions, Sinyavsky continued to write during his imprisonment. English translations of his works during this period include *For Freedom of Imagination* (1971), *Unguarded Thoughts* (1972), and *A Voice from the Chorus* (1976).

Sion (French), German SITTEN, capital of Valais *canton,* southwestern Switzerland. It lies along the Rhône River, at the mouth of La Sionne River, southeast of Lake Geneva (Lac Léman). It originated as a Celtic and Roman settlement called Sedunum. Sion became the seat of a bishop in the late 6th century, and from 999 the bishops of Sion held the spiritual and temporal power in Valais, which they retained, at least in part, until 1798. The two hillocks that dominate the



A 15th-century church in Sion, Switz.
Davis Pratt from Rapho/Photo Researchers—EB Inc.

town are crowned by the remains of the 13th-century Château de Tourbillon and those of the Château de Valère (Valeria), now containing a historical museum and a mainly 13th-century church. Other notable buildings are the Cathedral of Notre-Dame-du-Glarier, the Church of Saint-Théodule (1516), the Maison Supersaxo (1505), the town hall (1660), and the remains of the Château de la Majorie, now housing an art gallery. The town is on the road and rail routes from Lausanne to Milan via the Simplon Pass. It is an important market for vegetables, fruit, and wine. The population is predominantly French speaking. Pop. (1987 est.) 23,504.

Siôn Cent, also called SIÔN GWENT, SIÔN Y CENT, SIÔN KEMP, or SIÔN KEMPT (b. *c.* 1367—d. *c.* 1430), Welsh poet whose name became a symbol of contention between the bards who celebrated the heroic deeds of the nobles in an elevated tone and those who wrote more personal poetry praising the simple and noble qualities possessed by their imperfect and human heroes. According to Siôn Cent, the traditional praise of the nobles was hollow flattery and lies. His writings (poems in *cywydd* metre) reflect the influence of the moralists of the European Middle Ages, treating of religious or moral subjects and dwelling upon the uncertainty of life and the inevitability of death. Very little is known of him, although his poem in praise of Brecknockshire may indicate his origin.

Siouan languages, North American Indian family of languages that, with the Iroquoian and Caddoan language families, constitutes the Macro-Siouan language phylum. This phylum is, after the Algonquian, the largest native American linguistic phylum north of Mexico. Siouan includes at least five language groups: those of the Gulf Coast region (including Biloxi, Ofo, Tutelo), the upper Missouri River region (including Hidatsa, Crow), the northern plains (including Dakota, or Sioux proper), the central plains (Omaha, Osage, Ponca, Kansa, Quapaw), and the Great Lakes (including Winnebago). The extinct Catawba language of the Carolinas is sometimes classified as a Siouan language.

Siouan languages, Macro: *see* Macro-Siouan languages.

Sioux, also called DAKOTA, North American Plains Indian people, or confederation of peoples, of Siouan linguistic stock. The name Dakota means "allies"; their more proper designation is Sioux, an abbreviation of Nadouessioux ("Adders," *i.e.,* "enemies"), a name originally applied to them by the Ojibwa. There were three main divisions of the Sioux: Santee, Yankton, and Teton, calling themselves, respectively, Dakota, Nakota,

and Lakota. The Santee, or Eastern Sioux, comprised the Mdewkanton, Wahpeton, Wahpekute, and Sisseton; the Yankton included the Yankton and Yanktonai; and the Teton, or Western Sioux, had seven main divisions—the Sihasapa, or Blackfoot; Brulé (Upper and Lower); Hunkpapa; Miniconjou; Oglala; Sans Arcs; and Oohenonpa, or Two-Kettle.

Before the middle of the 17th century, the Santee Sioux lived in the area around Lake Superior, where they gathered wild rice and beans, hunted deer and buffalo, and speared fish from canoes. Prolonged and continual warfare with the Ojibwa drove the Santee into southern and western Minnesota; the Teton and Yankton divisions were forced permanently from Minnesota onto the Great Plains (in present North and South Dakota), where they ceased to carry on their traditional agricultural activity and adopted the Plains way of life, which centred on the nomadic hunting of buffalo and other big game.

The Sioux shared many cultural characteristics with other Plains Indian societies. They lived in tepees (a Sioux word). Men acquired status by performing brave deeds in warfare; horses and scalps obtained in a raid were evidence of valour. Warfare and supernaturalism were closely connected, to the extent that designs suggested in mystical visions were painted on war shields to protect the bearers from their enemies. The Sioux practiced an elaborate form of the sun dance, their chief tribal festival.

Their religious system recognized four powers as presiding over the universe, and each power in turn was divided into hierarchies of four. The buffalo figure also had a prominent place in their religion. Among the Teton Sioux the bear was important; bear power obtained in a vision was regarded as curative. The Santee Sioux engaged in a ceremonial bear hunt to protect their warriors before their departure on a raid.

Sioux women were skilled at porcupine-quill and bead embroidery bearing geometric designs. Police functions were performed by military societies, the most significant duty of which was overseeing the buffalo hunts. Other societies included dance, shamanistic, and women's societies.

Of all the Plains tribes, the Sioux were the most resolute in resisting white men's incursions upon their land. With the advance of the white frontier west of the Mississippi River in the mid-19th century, the United States sought to forestall Indian trouble by negotiating the First Treaty of Fort Laramie (1851) with the Sioux, Shoshoni, Cheyenne, Arapaho, and other Western tribes. The treaty assigned boundaries to each tribe throughout the northern Great Plains and arranged for forts and roads within Indian territory. In 1851 and 1859 the Santee Sioux gave up most of their land in Minnesota and were assigned a reservation on which they were encouraged to practice settled agriculture. White violations of the treaties, however, together with the pressure of the advancing white frontier, led the Santee Sioux to mount a bloody uprising in 1862 under the leadership of Little Crow. After their defeat, the Santee Sioux were forced to move westward to reservations in Dakota and Nebraska.

The territory of the nomadic Teton and Yankton Sioux, which included the area between the Missouri River and the Teton Mountains and between the Platte River on the south and the Yellowstone River on the north, was invaded increasingly by whites after the Gold Rush of 1849. These Sioux tribes were particularly incensed by the government's attempt to build a road to Bozeman, Mont. (the Powder River Road), across their favourite hunting grounds in the Bighorn Mountains. In 1865–67 Red Cloud (*q.v.*), an Oglala chief, led thousands of Sioux warriors in a campaign to halt the road's construction. On Dec. 21, 1866, a band under Chief High Backbone was responsible for the Fetterman Massacre, a battle in which more than 80 U.S. soldiers were trapped and killed near Fort Phil Kearny. The United States eventually acknowledged defeat in the Second Treaty of Fort Laramie (1868), in which the government agreed to abandon the Bozeman Trail and guaranteed the Sioux exclusive possession of the area in South Dakota west of the Missouri River.

When gold was discovered in the Black Hills of South Dakota in the mid-1870s, however, thousands of miners chose to disregard the Second Treaty of Fort Laramie and swarmed onto the Sioux reservation, thus precipitating another round of hostilities in 1876. At the Battle of the Little Bighorn (*q.v.*) in June 1876, a large contingent of Sioux and Cheyenne were able to overwhelm Lieutenant Colonel George A. Custer and wipe out his entire band of 266 men, but this spectacular Indian victory did not affect the course of the larger war. Later that summer 3,000 Sioux were trapped at the Tongue River valley by the main army of General Alfred H. Terry, and the Sioux surrendered on October 31, after which the majority returned to their reservations.

The chiefs Sitting Bull, Crazy Horse (*qq.v.*), and Gall refused, however, to take their bands into the reservations. Crazy Horse was killed following his surrender in 1877, while Sitting Bull escaped to Canada, returning to the United States in 1881. In 1890–91 the Ghost Dance religion, which preached the coming of a messiah, a return to the old nomadic hunting life, and reunion with the dead, began to take a strong hold among the Sioux people, who had suffered harsh privations while confined to their reservations. Believing that the movement was disturbing an uneasy peace, government agents moved to arrest its ringleaders. Sitting Bull was killed in 1890 by Indian police taking him into custody. Finally, the U.S. troops' massacre of many Sioux men, women, and children at Wounded Knee (*q.v.*) in December 1890 marked the end of all Sioux resistance to white domination.

In the late 20th century the Sioux numbered about 40,000; more than 75 percent of them lived on reservations in North and South Dakota, Montana, and Nebraska. A few thousand more lived in Canada. *See also* Plains Indian.

Sioux City, city, seat (1853) of Woodbury county, northwestern Iowa, U.S. It lies on the Missouri River (bridged to South Sioux City, Neb.) at the influx of the Big Sioux and the Floyd rivers, where Iowa, South Dakota, and Nebraska meet. The site was visited in 1804 by the explorers Meriwether Lewis and William Clark, who buried Sergeant Charles Floyd there (commemorated by a monument erected in 1960, the first U.S. national historic landmark). Laid out in 1848 by William Thompson of Illinois and known as Thompsonville, it was settled by Theophile Bruguier, a French-Canadian trader, who arrived in 1849 with his Sioux Indian wives and their father, Chief War Eagle, who aided the European pioneers in the area. War Eagle's grave is in a park on a bluff overlooking the river with a view of the three states. Incorporated in 1857, the community was renamed for the chief's tribe. It grew with the steamboat trade and became a supply and land-office depot for the northern plains. With the advent of the railroad (1868) and the meat-packing industry (1872), its population increased rapidly from about 1,000 to 19,060 in 1885, reaching more than 70,000 by 1920.

Transportation, stockyard activity, and extensive wholesale trade and grain interests are the chief economic activities. Sioux City is the seat of Morningside College (founded in 1889 as the University of the Northwest), Briar Cliff College (1930), and Western Iowa Tech Community College (1966). Pop. (1987 est.) city, 79,121; metropolitan area (MSA), 114,700.

Sioux Falls, city, seat (1862) of Minnehaha county, southeastern South Dakota, U.S., on the Big Sioux River. Founded in 1857, it was named for the falls of the river. The settlement was harried by Minnesota Sioux (Dakota) Indians, who caused it to be abandoned in 1862. With the establishment of Fort Dakota on the site in 1865, the settlers gradually returned. The falls were controlled for waterpower in 1873, and the shipment of Sioux Falls granite, a hard quartzite used in construction, began in 1878 after the arrival of the railroad. Because of the laxity of South Dakota divorce laws, Sioux Falls was famous (*c.* 1890–1910) as a "divorce mill."

The city, by far the largest in the state, is a trade and distributing centre for a large farming area. Its stockyards form one of the largest livestock markets in the United States. Industries include meat packing, wood and metal fabrication, and the manufacture of farm machinery and electronic components. One of the world's first commercial nuclear-power plants is on the city's eastern outskirts. Educational facilities include Augustana (1860) and Sioux Falls (1883) colleges and the North American Baptist Seminary. The state penitentiary, a school for the deaf, Pettigrew Museum (with pioneer exhibits), and the Earth Resource Observation Systems (EROS) Data Center for the application of space technology to life on Earth are also in the city. Inc. village, 1877; city, 1883. Pop. (1987 est.) city, 97,608; metropolitan area (MSA), 123,700.

sipahi, feudal cavalryman of the Ottoman Empire whose status resembled that of the medieval European knight. The *sipahi* (from Persian for "cavalryman") was holder of a fief (timar; Turkish: *tımar*) granted directly by the Ottoman sultan and was entitled to all of the income from it in return for military service. The peasants on the land were subsequently attached to the land and became serfs. The *sipahi*s provided the bulk of the Ottoman army until about the mid-16th century. From then on they were gradually supplanted by the Janissaries, an elite corps comprised of infantrymen paid regular salaries by the sultanate. In part, this change resulted from the increased use of firearms, which made cavalry less important, and from the need to maintain a regular standing army. The *sipahi*s were completely discredited during the War of Greek independence (1821–32), and the timar system was officially abolished in 1831 by Sultan Mahmud II as part of his program to create a modern Western-style army.

Siphnus, Modern Greek SÍFNOS, Greek island of the Cyclades (*q.v.*) group, consisting of a limestone ridge whose principal peaks, Profítis Ilías (2,277 feet [694 m]) and Áyios Simeón (1,624 feet [495 m]), are crowned by Byzantine churches; the island is 28 square miles (73 square km) in area. In antiquity Siphnus was colonized by Athens. Its gold and silver mines financed a treasury at Delphi in about 525 BC, but by the 1st century AD they were flooded. A refuge from iconoclastic persecutions at Byzantium during the early Christian era, the island has many Byzantine and post-Byzantine churches and monasteries, some in ruins. Part of the Venetian duchy of Naxos after 1207, it was recovered by the Byzantines in the 1270s and then ruled by Venetian families from 1307 to 1617, after which the Turks held sway. The main town, Apollonía, lies just southeast of the west-coast port of Kamáres. On the east coast, the village of Kástro is on the site of the ancient capital. Chief industries are pottery making and fishing. Pop. (1981) 2,087.

siphon, also spelled SYPHON, instrument, usually in the form of a tube bent to form two legs of unequal length, for conveying liquid over the edge of a vessel and delivering it at a lower level. Siphons may be of any size; they are used in civil engineering to transfer water or other fluids over elevations. The action depends upon the influence of gravity (not, as sometimes thought, on the difference in atmospheric pressure—a siphon will work in a vacuum) and upon the cohesive forces that prevent the columns of liquid in the legs of the siphon from breaking under their own weight. Water has been lifted more than 35 feet (11 m) by a siphon.

Siping (China): *see* Ssu-p'ing.

Sippar, modern ABŪ ḤABBAH, ancient city of Babylonia, located southwest of present Baghdad, central Iraq. Sippar was subject to the 1st dynasty of Babylon, but little is known about the city before 1174 BC, when it was sacked by the Elamite king Kutir-Nahhunte. It recovered and was later captured by the Assyrian king Tiglath-pileser I. Under the 8th dynasty of Babylon, however, King Nabu-apla-iddina (*c.* 880) rebuilt Sippar's great Temple of Shamash and recorded that while digging in the ruins he found the ancient image of the god, and he depicted himself and Shamash on a stone memorial tablet. This same tablet was later found by King Nabopolassar when he restored the temple in the late 7th century BC. The tablet is now in the British Museum.

Sipri (India): *see* Shivpuri.

sipunculid: *see* peanutworm.

Sipyagin, Dmitry Sergeyevich, Sipyagin also spelled SIPIAGIN (b. March 20 [March 28, Old Style], 1853, Kiev, Ukraine, Russian Empire [now in Ukrainian S.S.R.]—d. April 28 [April 15], 1902, St. Petersburg [now Leningrad], Russia), conservative Russian minister of the interior (1900–02), known for his absolute allegiance to autocracy.

Sipyagin was born into a family of the old nobility and graduated from the University of St. Petersburg in 1876, after which he entered government service in the Ministry of the Interior. He served as governor of Courland province (1888–91) and of Moscow (1891–93) before returning to St. Petersburg as assistant minister of state domains (1893–94). Sipyagin was appointed minister of the interior in October 1899. Characterized by historians as "a flamboyant reactionary," Sipyagin was a man of narrow views who had unquestioning faith in autocracy as the proper form of government for Russia. Indifferent to national problems, Sipyagin concentrated on administrative details and the management of local affairs while simultaneously trying to expand both his influence with Tsar Nicholas II and the authority of his department at the expense of his fellow ministers. He took an active role in suppressing student and labour political organizations and in obstructing the powers of the zemstvos (local rural assemblies).

Sipyagin was assassinated by a 20-year-old Socialist Revolutionary student who entered the ministry disguised as an aide-de-camp of the tsar.

Siqueiros, David Alfaro (b. Dec. 29, 1896, Chihuahua, Mex.—d. Jan. 6, 1974, Cuernavaca), Mexican painter and muralist whose art reflected his Marxist political ideology. He was one of the three founders of the modern school of Mexican mural painting (along with Diego Rivera and José Clemente Orozco).

A political activist from his youth, Siqueiros studied at the San Carlos Academy of Fine Arts, Mexico City, before leaving in 1913 to fight in the army of Venustiano Carranza during the Mexican Revolution. Later he continued his art studies in Europe.

In 1922, after returning to Mexico, Siqueiros helped paint the frescoes on the walls of the National Preparatory School and also began organizing and leading unions of artists and workingmen. During the Spanish Civil War (1936–39), he commanded several brigades for the Republicans. Over four decades, his labour-union work and his communist political activities led to numerous jailings and periods of exile. He visited the United States, the Soviet Union, and many Latin American countries as a lecturer and guest artist.

Most of Siqueiros' large murals are in government buildings in Mexico. His murals are distinguished by great dynamism and compositional movement, monumental size and vigour, a sculptural treatment of forms, and a limited colour range that is subordinated to dramatic effects of light and shadow. Siqueiros and his followers produced thousands of square metres of vivid wall paintings in which numerous social, political, and industrial changes were portrayed from a left-wing perspective. He commonly used synthetic lacquer colours sprayed from paint guns in order to speed up the process of decorating large public buildings. He also did many easel paintings, the best known of which is perhaps "Echo of a Cry" (1937).

Siquijor, island of the Philippines, located in the Bohol (Mindanao) Sea 19 miles (30 km) southeast of Negros island. Siquijor has an area of 113 square miles (292 square km). It was called Isla de Fuegos ("Island of Fires") by the early Spanish explorers because of the myriad fireflies that they found there. Made up of sedimentary rock and fringed coral reefs, the island has flatlands of narrow floodplains and deltas. The ports of Larena and Lazi are used for shipping; fishing is the main industry. Pop. (1980) 70,360.

Sir Edward Pellew Group, cluster of barren sandstone islands in the Gulf of Carpentaria, near the mouth of the McArthur River, in northeastern Northern Territory, Australia. The islands have a total area of 800 square miles (2,100 square km). Vanderlin, the largest, is 20 miles (32 km) long by 8 miles (13 km) wide. Reached in 1644 by the Dutch navigator Abel Tasman, the island was thought to be part of the mainland and was named Cape Vanderlin. The explorer Matthew Flinders in 1802 proved Vanderlin an island, and he named the group after Captain Edward Pellew (later Admiral Viscount Exmouth) of the Royal Navy. Other islands are North, South West, Centre, and West.

Sir Gawayne and the Grene Knight, also spelled SIR GAWAIN AND THE GREEN KNIGHT, Middle English alliterative poem of unknown authorship, dating from the second half of the 14th century (perhaps 1375). It is a chivalric romance that tells a tale of enchantment in an Arthurian setting. Its hero, Sir Gawayne (Gawain), is presented as a devout but humanly imperfect Christian who wins a test of arms, resists temptation by a lord's wife, but succumbs to an offer of invulnerability.

The poem is technically brilliant. Its alliterative lines (some 2,500) are broken up into irregular stanzas by short rhyming passages; they are tautly constructed, and the vocabulary is astonishingly rich—influenced by French in the scenes at court but strengthened by many dialect words, often of Scandinavian origin, that belonged to northwest England. The blend of sophisticated atmosphere, psychological depth, and vivid language produces an effect superior to that found in any other work of the time.

Preserved in the same manuscript with *Sir Gawayne* were three other poems, now generally accepted as the work of its author. These are two alliterative poems of moral teaching, *Patience* and *Purity,* and an intricate elegiac poem, *Pearl.* The author of *Sir Gawayne* and the other poems is frequently referred to as "the Pearl Poet." *See also* Gawain.

Sirāj-ud-Dawlah, original name MĪRZĀ MUḤAMMAD (b. *c.* 1729—d. July 2/3, 1757), ruler, or nawab, of Bengal, India, under the nominal suzerainty of the Mughal emperor. His reign marked the entry of Great Britain into India's internal affairs. The nawab's attack on Calcutta resulted in the "Black Hole" incident, in which a number of English captives suffocated in a jail cell (*see* Black Hole of Calcutta).

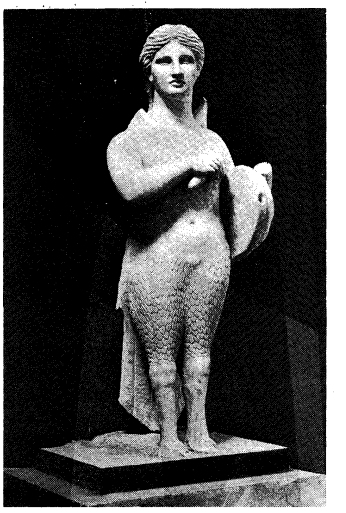
Sirāj-ud-Dawlah became nawab of Bengal on the death of his granduncle, 'Alī Vardī Khān, in 1756. Faced with opposition to his succession from other family members, he was also troubled by the fortification of Calcutta, undertaken without his permission by the British East India Company, which supported his primary opponent, Rajballabh. Although Sirāj-ud-Dawlah succeeded in removing threats from rival claimants, the British governor of Calcutta continued to defy his requests to cease fortifying the city.

Convinced that the British would not comply, Sirāj-ud-Dawlah marched on the city, taking the English post at Cossimbāzār along the way. Shortly after he arrived, on June 16, 1756, the governor, the majority of his staff, and a number of British inhabitants fled Fort William for the safety of English ships in the harbour. After putting up a weak resistance, the fort surrendered on June 20, and on that night there occurred the "Black Hole" incident.

Calcutta was retaken by Robert Clive and Admiral Charles Watson on Jan. 2, 1757. The British reinforced their position of power by plotting with Mīr Ja'far, Sirāj-ud-Dawlah's general, to overthrow the nawab. After alienating the Hindu bankers and his army, Sirāj-ud-Dawlah fell victim to their treachery at Plassey, where on June 23, 1757, Clive, with an army of 3,000, defeated the nawab and his army of 50,000. He fled to Murshidābād but was captured and executed.

Sirājganj, city in central Bangladesh, just west of the Brahmaputra (Jamuna) River. It is an important jute collection, processing, and trade centre, with road, rail, and river steamer connections. Its jute mills were the first to be established in the Bengal area. It was constituted a municipality in 1869. It has several colleges affiliated with the University of Rājshāhi (1953). Pop. (1981) 106,774.

Siren, in Greek mythology, a creature half bird and half woman who lured sailors to



Siren, tomb statue from the Dipylon cemetery in Athens, 4th century BC; in the National Archaeological Museum, Athens

Alinari—Art Resource/EB Inc.

destruction by the sweetness of her song. According to Homer there were two Sirens on an island in the western sea between Aeaea and the rocks of Scylla. Later the number was usually increased to three, and they were located on the west coast of Italy, near Naples. They were variously said to be the daughters of the sea god Phorcys or of the river god Achelous.

The Greek hero Odysseus, advised by the sorceress Circe, escaped the danger of their song by stopping the ears of his crew with wax so that they were deaf to the Sirens; yet he was able to hear the music and had himself tied to the mast so that he could not steer the ship out of course. Another story relates that when the Argonauts sailed that way, Orpheus sang so divinely that none of them listened to the Sirens. In later legend, after one or other of these failures the Sirens committed suicide. In art they appeared first as birds with the heads of women, later as women, sometimes winged, with bird legs.

The Sirens seem to have evolved from two elements: a primitive tale of the perils of early exploration combined with an Oriental image of a bird-woman. Anthropologists explain the Oriental image as a soul-bird—*i.e.,* a winged ghost that stole the living to share its fate. In that respect the Sirens had affinities with the Harpies.

siren, any member of the family Sirenidae (order Urodela), a group of three species of aquatic salamanders that resemble eels. The long, slender body is usually brown, dark gray, or greenish. The forelegs are tiny, and the hind legs and pelvis are absent. Young and adults have feathery gills.

Sirens usually burrow in mud in the bottom of marshes or streams or hide among water plants or stones but sometimes venture onto dry land for brief periods. Out of the water they can make a soft yelping or squeaking sound. The principal diet is insects and small fish, which they catch at night. They mate in the water and lay eggs singly or in batches on the leaves of water plants. It is not known whether fertilization is internal or external. The young develop into adults without metamorphosis, or radical physical change. Some live at least 25 years.

The greater siren (*Siren lacertina*) is 50–90 centimetres (about 20–35 inches) long and occurs in the Atlantic coastal states of the United States from Delaware southward to Florida and westward to northern Mexico. The lesser siren (*Siren intermedia*) is about 17–60 cm (about 7–24 in.) long and is found from South Carolina to Texas and in the Mississippi Valley northward to Illinois and Indiana. The dwarf siren (*Pseudobranchus striatus*), of which at least five races have been identified, is about 12–21 cm (about 5–8 in.) long. Its range is throughout Florida and into southern South Carolina.

siren, noisemaking device producing a piercing sound of definite pitch. Used as a warning signal, it was invented in the late 18th century by the Scottish natural philosopher John Robison. The name was given it by the French engineer Charles Cagniard de La Tour, who devised an acoustical instrument of the type in 1819. A disk with evenly spaced holes around its edge is rotated at high speed, interrupting at regular intervals a jet of air directed at the holes. The resulting regular pulsations cause a sound wave in the surrounding air. The siren is thus classified as a free aerophone. The sound-wave frequency of its pitch equals the number of air puffs (or holes times number of revolutions) per second. The strident sound results from the high number of overtones (harmonics) present.

sirenian, a member of the mammalian order Sirenia, which consists of 2 living and more than 20 extinct genera of large aquatic animals. The four surviving species have become rare owing to their exploitation for meat and oil by man. The largest sirenian, Steller's sea cow (*Hydrodamalis gigas*), grew to a length of 8 metres (24 feet) but was hunted out of existence within decades of its discovery in 1741. The two remaining genera, both occasionally also called sea cows, are the dugong (*Dugong dugon*) and the manatee (three species of *Trichechus*). Both usually attain lengths of up to 4 m, but there have been sightings of animals nearly twice that size.

A brief treatment of sirenians follows. For full treatment, *see* MACROPAEDIA: Mammals.

Sirenians are completely herbivorous and are confined to the shallow waters of coastal areas where higher aquatic plant life is abundant. Dugongs are strictly marine mammals and are found mainly in the Indo-Pacific area. Manatees also live in the sea but can thrive in estuarine or riverine waters as well, and if put on nearby land they can often wriggle their way back into their native element. They are found in both the tropical and subtropical Atlantic as well as the Amazon Basin and the Caribbean.

Fossil records show that the order Sirenia of the superorder Subungulata, which also includes elephants, dates to the Eocene Period (about 50,000,000 years ago). With bodies shaped like torpedoes and no hind limbs, sirenians propel themselves through the water with their flat tails. The dugong has a downturned snout and a forked tail, while the manatee has a straight snout and a rounded tail. The skin of both animals is very thick and tough with little hair. There is not much blubber under the skin, but a great deal of fat is found in the body. The eyes are lidless, small, and round; ear openings exist, but they are tiny and hard to detect. The bones of these mammals are very dense, making them heavy for their size. They feed through the use of powerful muscular lip action, stripping vegetation from plants and crushing it with the aid of horny pads at the front of each jaw. The dugong's teeth consist of six cusped molars, four of which gradually fall out as the animal matures, leaving the adult with two. In the male a modified incisor grows to become a tusk. Manatees have 20 to 30 molars in each jaw that gradually move forward with age. Manatees are also unusual in that they have six neck vertebrae instead of the seven found in all other mammals.

Sirenians live in groups for the most part. Because of their natural habitat and their extreme shyness, little is known of their breeding, growth, or other physiological processes. Gestation is thought to be about five months, with single births usual; occasionally twins are born to dugongs. Both males and females are the same size at any age. Mammary glands are in the pectoral area, and it is thought that the suckling of a young sirenian held upright by a flipper may have been the inspiration for the myth of the mermaid.

Sirenians breathe by making frequent trips to the water's surface and have been known to spend up to 16 $^1/_2$ minutes underwater between breaths. Manatees may be seen, usually lying with their backs up, basking in the sunshine. They are very sensitive to sound, wary and suspicious by nature, and will instantly submerge if the slightest unfamiliar noise disturbs them.

Siret River, river, rising on the eastern slopes of the Carpathian Mountains in the Ukrainian S.S.R. and flowing generally southward about 360 mi (575 km) across eastern Romania to enter the Danube west of Galaţi. Its upper course cuts longitudinally through Moldavia in a wide valley with a sinuous course; its lower course, like that of the Danube, is low and marshy. Of the seven major rivers that drain from the Eastern Carpathians into the Siret, the Bistriţa provides the greatest volume and has hydroelectric stations. The Siret's basin is 17,000 sq mi (44,000 sq km) in area. The river is navigable only by small craft.

Sirhind Canal, canal in Punjab state, northwestern India. Opened in 1882, it consists of an extensive canal system that irrigates more than 2,000 sq mi (5,200 sq km) of farmland. The system's headworks, where it draws its water, are on the Sutlej River at Ropar, near the border of Himāchal Pradesh state. From there the canal runs west-southwest to Dorāha, where it splits into three branches. One flows west and then northwest to rejoin the Sutlej near the Pakistan border; one runs southwest past Bhatinda to the border of Rājasthān state; and the third flows southeast to Patiāla. There are many distributaries, in addition to the three principal branches.

Sirhindī, Shaykh Aḥmad (b. 1564, Sirhind, Patiala, India—d. 1624, Sirhind), mystic and theologian largely responsible for the reassertion and revival in India of orthodox Sunnī Islām as a reaction against the syncretistic religious tendencies prevalent during the reign of the emperor Akbar.

Shaykh Aḥmad, who through his paternal line traced his descent from the caliph ʿUmar I (the second caliph of Islām), received a traditional Islāmic education at home and later at Siālkot (now in Pakistan). He reached maturity when Akbar, the renowned Mughal emperor, attempted to unify his empire by forming a new syncretistic faith (Dīn-e-Ilāhī), which sought to combine the various mystical forms of belief and religious practices of the many communities making up his empire.

Shaykh Aḥmad joined the mystical order Naqshbandīyah, the most important of the Indian Ṣūfī orders, in 1593–94. He spent his life preaching against the inclination of Akbar and his successor, Jahāngīr (1605–1627), toward pantheism and Shīʿī Islām (one of that religion's two major branches). Of his several written works, the most famous is *Maktūbāt,* a compilation of his letters written in Persian to his friends in India and the region north of the Oxus River. Through these letters Shaykh Aḥmad's major contribution to Islāmic thought can be traced. In refuting the extreme monistic position of *waḥdat al-wujūd* (the concept of divine existential unity of God and the world, and hence man), he advanced the notion of *waḥdat ash-shuhūd* (the concept of unity of vision). According to this doctrine, there exists only a subjective experience of unity, which occurs only in the mind of the believer; it has no objective counterpart in the real world. The former position, he felt, led to pantheism, which was contrary to the tenets of Sunnī Islām.

A measure of his importance in the development of Islāmic orthodoxy in India is the title that was bestowed posthumously on him, Mujaddid-e Alf-e Sānī (Renovator of the Second Millennium), a reference to the fact that he lived at the beginning of the second millennium of the Muslim calendar. His teachings were not always popular in official circles. In 1619, by the orders of the emperor Jahāngīr who was offended by his aggressive opposition to Shīʿī views, Shaykh Aḥmad was temporarily imprisoned in the fortress at Gwalior. His burial place at Sirhind is still a site of pilgrimage.

Siribunyasan, also called ONG BUN (b. *c.* 1730—d. 1781, Vientiane, Laos), king of the Lao principality of Vientiane during whose reign Laos came to be dominated by Siam (Thailand).

When Siribunyasan succeeded his father, Ong Rong, on the throne in about 1760, Laos was divided into rival states, Vientiane itself was split in factions, and Burmese armies were

sweeping across Siam and northern Southeast Asia. Siribunyasan soon attached himself to the Burmese. Provincial officials who helped bring Siribunyasan to the throne subsequently rebelled against him and tried to set up a new state, and he called in Burmese assistance against them (*c.* 1763). In 1764, when the Burmese attacked his rival Luang Prabang, Vientiane troops assisted the Burmese.

Through the next decade, faced with a hostile Luang Prabang to the north and Champassak to the south, and with Siam itself still occupied with invading Burmese armies, Siribunyasan had no choice but to continue an alliance with the Burmese. Once King Taksin had effected Siam's recovery, however, he began to move to subdue Vientiane and end Burmese influence in the Lao states. At the end of 1778, moving simultaneously across the Khorat Plateau and up the Mekong River from Cambodia, Siamese troops captured Vientiane (early 1779), with the aid of an army from Luang Prabang, and seized the prized Prabang and Emerald Buddha images from the city. Siribunyasan escaped eastward to the Vietnam border region. Though his sons were held hostage in Siam, Siribunyasan was allowed to return to reign in Vientiane, as a vassal of the Thai kings.

Siricius, SAINT (b. *c.* 334, Rome—d. Nov. 26, 399, Rome; feast day November 26), pope from 384 to 399.

Ordained a deacon by Pope Liberius, he was elected as Pope St. Damasus I's successor in December 384. His famous letters—the earliest surviving texts of papal decretals—focus particularly on religious discipline and include Baptism, consecration, ordination, penance, and continence. Siricius' important decretal of 386 (written to Bishop Himerius of Tarragona), commanding celibacy for priests, was the first decree on this subject and has remained in force ever since the pontificate (440–461) of Pope St. Leo I the Great. Significantly, Siricius asserted papal authority by accompanying his decretals with threats of sanctions against those who contravened them; his letters designate the pope as a sovereign of the whole Western Church, for which he makes laws.

Likewise, Siricius believed he was entitled to intervene in the affairs of the Eastern Church. At the request of Bishop St. Ambrose of Milan, he became involved with settling the Meletian Schism, a complex situation involving the disputed bishopric of Antioch. His instructions to the Council of Caesarea (393) for recognizing Flavian I as the legitimate Antiochene bishop terminated the long-standing schism. He arbitrated in 394 in a dispute within the Arabian Church on the bishopric of Bosra (Bostra).

A column still surviving in the Basilica of St. Paul Outside the Walls, Rome, commemorates Siricius' dedication (390) of that church.

Sirionó, South American Indian people of eastern Bolivia. They live in the dense tropical forests of the eastern and northern parts of the department of Beni. Unlike other Indians of the Chiquitos-Moxos region, the Sirionó are linguistically Tupians (*q.v.*) who long ago became separated from the main stock through migration; they have a simple semi-nomadic culture in sharp contrast to their neighbours' more developed cultures. Earlier efforts by missionaries and government agents to settle them on the land proved disastrous, and their numbers have been reduced by disease. A few of the remaining Sirionó, a non-warlike people, have withdrawn into the deep forest, while others provide forced labour on farms and cattle ranches.

Sirionó subsistence needs were traditionally met through a combination of farming, hunting, and gathering. In the dry season they planted corn (maize), sweet potatoes, and sweet cassava; then they left their fields for a nomadic period of hunting and gathering, returning only for short intervals to care for their crops. The harvest season brought them back to clear their fields and store the crop, after which they resumed their migratory life.

Their material culture and social organization were simple. They carried fire from camp to camp, saying that they had lost the art of making it. Their temporary huts, built of poles covered with palm leaves, were sometimes large enough to shelter 120 people. They traced their descent through the maternal line, and the married couple lived in the wife's village or band. They believed in spirits but lacked shamans to intercede with them. They made beer out of maize and wild honey; among their pastimes were dancing and singing. They wore no clothes but painted their bodies.

Siris (Greece): *see* Sérrai.

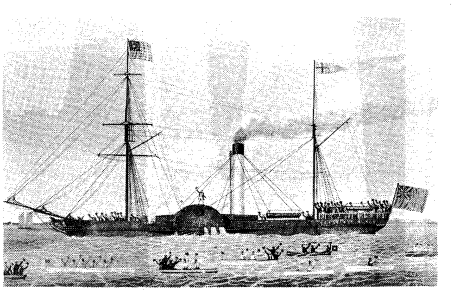
Sirius, also called ALPHA CANIS MAJORIS, or DOG STAR, brightest star in the night sky, with apparent visual magnitude −1.5. It is a binary star in the constellation Canis Major. The bright component of the binary is a blue-white star 23 times as luminous as the Sun, somewhat larger and considerably hotter than the Sun. Its distance from the solar system is about 8.6 light-years. Its name probably comes from a Greek word meaning "sparkling" or "scorching."

Sirius was known as Sothis to the ancient Egyptians, who were aware that it rose just before sunrise at about the time the annual floods were beginning in the Nile delta. Among the ancient Romans, the hottest part of the year was associated with the heliacal rising of the Dog Star, a connection that survives in the expression "dog days."

That Sirius is a binary star was reported by the German astronomer Friedrich Wilhelm Bessel in 1844. He had observed that the bright star was pursuing a slightly wavy course among its neighbours in the sky and concluded that it had a companion star, with which it revolved in a period of about 50 years. The companion was first seen in 1862 by Alvan Clark, a U.S. astronomer and telescope maker.

Sirius and its companion revolve together in orbits of considerable eccentricity and with average separation of the stars of about 20 times the Earth's distance from the Sun. Despite the glare of the bright star, the seventh-magnitude companion is readily seen with a large telescope. This companion star, known as Sirius B, is about as massive as the Sun, though much more condensed, and was the first white dwarf star to be discovered.

Sirius, first ship to cross the Atlantic entirely under steam. Built originally for service in the Irish Sea, the 703-ton "Sirius," a side-wheeler, was chartered by the British & American Steam Navigation Company and sailed from London to New York by way of Cork in 1838 with 40 passengers. Her fuel ran out just short of her destination, but her captain, determined to complete the passage under steam, refused to hoist the ship's sails and, instead, fed spars into the furnace. Sandy Hook, New Jersey, was sighted in time to avert a potential mutiny, and the "Sirius" beat the much larger "Great Western" to New York by a few hours. In addition to establishing a crossing record, the "Sirius" introduced an important technical innovation, a condenser to recover the fresh water used in the boiler.



The "Sirius," lithograph, 1838

By courtesy of the Mariners' Museum, Newport News, Va.

Sirkari disease: *see* kala-azar.

Sirmaur, also spelled SIRMOOR, or SIRMŪR, district, Himāchal Pradesh state, northwestern India. Located at the southern margin of the Himalayas, the district is 1,080 sq mi (2,800 sq km) in area and is drained by the Giri River. The topography is mostly hilly; Chaur Peak, on the district's northern boundary, reaches nearly 12,000 ft (3,660 m) above sea level. Sirmaur was formerly a princely state in the Punjab Hill States, and was merged with Himāchal Pradesh in 1948, following Indian independence. The district headquarters are at Nāhan (*q.v.*). Pop. (1981) 306,952.

Sirohi, town, administrative headquarters of Sirohi district, Rājasthān state, northwestern India. Founded in the early 15th century, it stands on the western slopes of Sarawan Hill, after which it is said to be named. Sirohi was the capital of the former princely state of Sirohi. The town is an agricultural market and a handicraft–metalwork centre known for its manufacture of knives, daggers, and sword blades. A hospital and a government college affiliated with the University of Rājasthān are located there.

Sirohi district (1,983 sq mi [5,135 sq km]) comprises a tract broken by hills and rocky ranges. The Arāvalli Range crosses it from northeast to southwest; Mt. Abu is the highest peak. The district is drained by the western Banās and tributaries of the Lūni and Sukri rivers. Corn (maize), pulses, wheat, and oilseeds are among the chief crops; limestone, granite, and marble deposits are worked. Sirohi, a former princely state established in the early 15th century, was merged with Bombay state in 1949 and became part of Rājasthān state in 1950. Pop. (1981) town, 23,903; district, 542,049.

Síros (Greece): *see* Syros.

Sirsa, town, Sirsa district, Haryāna state, northwestern India, on the edge of the Great Indian (Thar) Desert. Sirsa town and fort, known in antiquity as Sarsuti, are said to have been built by a Raja Saras (*c.* AD 250); it was one of the most important 14th-century towns of North India. Deserted after the famine of 1783, it was refounded in 1838 and incorporated as a municipality in 1867. It is a rail and road junction linking the district with Rājasthān, and its industries include handloom weaving and various manufactures. Sirsa has three colleges affiliated with Kurukshetra University. A large cattle fair is held in the town in summer.

Sirsa district has an area of 1,652 sq mi (4,279 sq km). It lies at the northern edge of the Great Indian (Thar) Desert, with outlying hills of the Arāvalli Range in the southwest. Agriculture in the district is supported by extensive canal irrigation systems. Pop. (1981) town, 89,068; district, 707,068.

Sirte, Golfo della (Mediterranean Sea): *see* Sidra, Gulf of.

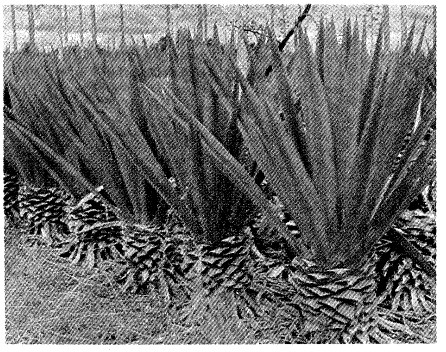
Sirtica, sandy desert region, essentially a northward extension of the Sahara (desert), north central Libya; it is the site of one of the world's largest oil fields. The region fronts the Mediterranean Sea for about 300 mi (480 km) along the southern part of the Gulf of Sidra and extends generally southeastward through the Sirte (Surt) Basin; it is bordered on the west by the northwest–southeast running volcanic massif of al-Harūj al-Aswad (rising to

3,937 ft [1,200 m]). The bulk of Libya's oil deposits are scattered throughout the Sirtica region and in the Sirte Basin in particular; the Sarīr oil field is located southeast of the region. Sirtica was isolated from the ancient Greek (eastern) and Punic (western) cultural trends, and as a result it was a refuge for outcasts. In about 500 BC an altar was erected to mark the boundary between the Greek and Punic realms. Sirtica also formed the dividing line between the Muslim west (*maghrib*) and the Muslim east (*mashriq*) from the 7th century AD.

The petroleum reservoirs in the Sirtica are estimated to lie at depths of between 500 and 13,000 ft below the surface. Commercial exploitation began in 1959 at Dahra field; Zaltan, the largest field in Libya, was discovered the same year and lies about 105 mi (169 km) south of the Mediterranean port of Marsá al-Burayqah. The crude extracted in the Sirtica region is light and has a low sulfur content. The oil is transported northwestward by pipeline to terminals at as-Sidrah, Ra's al-Unūf, Marsá al-Burayqah, and az-Zuwaytīnah on the Gulf of Sidra. Besides petroleum extraction, salt is also produced in large quantities.

Sisaket, also spelled SI SA KET, or SRISAKET, town and *changwat* (province) in the Northeastern region of Thailand. Sisaket town, the provincial capital, lies on the railway between Nakhon Ratchasima and Udon Thani. The province (area 3,413 sq mi [8,840 sq km]) is drained by the Samran, Raet, and Khayung rivers. It is one of Thailand's poorest regions; rice and tobacco are the main products. It borders Kampuchea (Cambodia) and has a substantial Khmer-speaking population. Pop. (1980) town, 20,014; (1983 est.) province, 1,130,685.

sisal (*Agave sisalana*), plant of the agave family (Agavaceae) and its fibre, the most important of the leaf fibre (*q.v.*) group. The plant is native to Central America, where its fibre has been used since pre-Columbian times. Interest



Sisal (*Agave sisalana*)
Harrison Forman

in sisal was stimulated by the development of the machine grain binder in the 1880s, bringing a demand for low-cost twine, and plantings were soon established in the Bahamas and Tanganyika (now Tanzania). By the late 1930s sisal was being cultivated in Mozambique, Angola, Madagascar, and elsewhere in Africa, and in the Philippines, Taiwan, Brazil, Venezuela, Indonesia, and Haiti.

The plant stalk grows to about 3 feet (0.9 metre) in height, with a diameter of approximately 15 inches (38 centimetres). The lance-shaped leaves, growing out from the stalk in a dense rosette, are fleshy and rigid, with gray to dark green colour. Each is 2 to 6 feet (0.6 to 1.8 metres) long, 3 inches (7.6 centimetres) wide at the base, and 4 to 7 inches (10 to 18 centimetres) across the widest portion, terminating in a sharp spine. Within four to eight years after planting, the mature plant sends up a central flower stalk reaching about 20 feet (6 metres) in height. Yellow flowers, about 2.5 inches (6 centimetres) long and with an unpleasant odour, form dense clusters at the ends of branches growing from the flower stalk. As the flowers begin to wither, buds growing in the upper angle between the stem and flower stalk develop into small plants, or bulbils, that fall to the ground and take root. The old plant dies when flowering is completed.

Plants grow best in moderately rich soil with good drainage and in warm, moist climates. Young plants, propagated from bulbils or rhizomes (underground stems) of mature plants, are usually kept in nurseries for the first 12 to 18 months. At the beginning of the rainy season the plants are transferred to the field where they are spaced 4 to 8 feet (1.2 to 2.4 metres) apart. Sisal matures about three to five years after planting, depending upon the climate, yielding satisfactory fibre for seven or eight years thereafter and producing about 300 leaves throughout the productive period. Outer leaves are cut off close to the stalk as they reach their full length. The initial harvest is about 70 leaves; subsequent annual production averages about 25.

Sisal fibre is usually obtained by machine decortication in which the leaf is crushed between rollers. The resulting pulp is scraped from the fibre, and the fibre is washed and then dried by mechanical or natural means. The lustrous fibre strands, usually creamy white, average 40 to 50 inches (100 to 125 centimetres) in length and 0.08 to 0.15 inch (0.2 to 0.4 centimetre) in diameter.

Sisal fibre, sometimes referred to as sisal hemp but not related to true hemp, is fairly coarse and inflexible. It is valued for cordage use because of its strength, durability, ability to stretch, affinity for certain dyestuffs, and resistance to deterioration in saltwater. Sisal ropes and twines are widely employed for marine, agricultural, shipping, and general industrial use. The fibre is also made into matting, rugs, millinery, and brushes. Tanzania and Brazil are the largest producers.

siserskite, osmium-rich variety of the mineral iridosmine (*q.v.*).

Sisimiut (Greenland): *see* Holsteinsborg.

Sisines, Archelaus: *see* Archelaus.

Sisinnius (b. Syria—d. Feb. 4, 708, Rome), pope from Jan. 15 to Feb. 4, 708. He was consecrated *c.* Jan. 15, 708. Threatened by the Exarch of Ravenna (*see* Ravenna, Exarchate of), the Lombards, and the Muslims, Sisinnius ordered the walls of Rome reinforced. He was buried in St. Peter's.

Sisk, Mildred E. (propagandist): *see* Gillars, Mildred.

siskin, any of about 20 small, brown-streaked birds, marked with yellow, that belong chiefly to the genus *Carduelis* (including *Spinus*) of the family Carduelidae (*q.v.*). Siskins occur

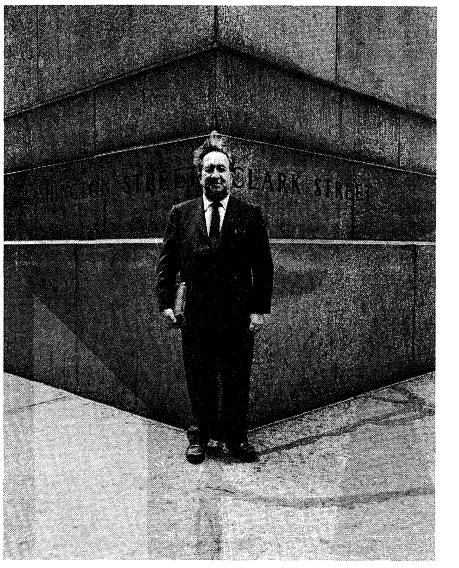


Common siskin (*Carduelis spinus*)
Frank V. Blackburn from the Natural History Photographic Agency—EB Inc.

from cold northern regions, worldwide, to the Cape of Good Hope and to Cape Horn. All have conical bills and short forked tails. They flock in fields to feed on weeds, and they make wheezy sounds, often in flight. The 11-centimetre (4½-inch) pine siskin (*C. pinus*) of North America has yellow wing and tail bars. The common siskin (*C. spinus*) of Europe has a black cap and yellow-tinged breast.

Siskind, Aaron (b. 1903, New York City), U.S. teacher, editor, and one of the most influential photographers of the mid-20th century, known primarily for his innovations in abstract photography.

Siskind began to photograph in 1932, while he was an English teacher in the New York



Siskind, 1971
Doug Prince

City public school system. His first notable work was a series of photographic documentaries of the effects of the Depression on various New York communities. Unlike other documentary series of the period, Siskind's "Dead End: The Bowery" and "Harlem Document" show as much concern for pure design as for the plight of his subjects. After the late 1930s, he no longer photographed people, concentrating instead on architectural photography, as in his series "Old Houses of Bucks County."

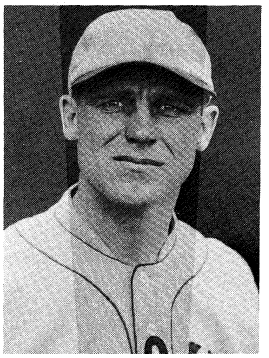
The abstract work for which Siskind became best known developed from his attempt to express his own states of mind in photography rather than merely to record subject matter. In the early 1940s he began photographing patterns and textures of such mundane subjects as coiled ropes, footprints in sand, and seaweed. Within a few years he became preoccupied with the abstract qualities of two-dimensional surfaces such as pavement, billboards, and walls, especially those transformed by weathering and decay. This theme was perhaps most poignantly emphasized in his 1967 series of photographs of the ruins of the Arch of Constantine and the Appia Antica in Rome.

Siskind's early abstract work was not immediately accepted by photographers, but it was widely admired by painters such as Willem de Kooning and Franz Kline, who were associated with the movement of Abstract Expressionism (*q.v.*). Siskind, in fact, exhibited his abstract photographs with their paintings. Much of Siskind's influence resulted from his activities as a founder-member of the Society for Photographic Education and as coeditor of *Choice,* a literary and photography magazine. But, aside from the direct impact of his photographs, his greatest influence was as professor of photography at the Institute of Design of the Illinois Institute of Technol-

ogy in Chicago, a post he held from 1951 to 1971, when he became professor of photography at the Rhode Island School of Design. His publications include *Aaron Siskind, Photographer* (1965), a 30-year anthology of his photographs; *Bucks County: Photographs of Early Architecture* (1974); and another anthology *Places, 1966–1975* (1976).

Sisler, George (Harold) (b. March 24, 1893, Manchester, Ohio, U.S.—d. March 26, 1973, Richmond Heights, Mo.), U.S. professional baseball player, considered by some the greatest of all first basemen.

As a student at the University of Michigan, Sisler excelled in baseball, football, and basketball. He entered the major leagues directly



Sisler
UPI—EB Inc.

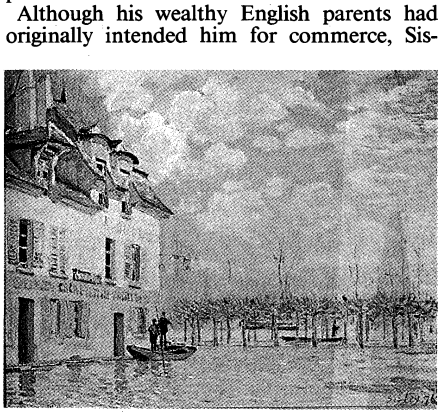
with the St. Louis Browns of the American League in 1915 and remained with them through 1927. He later played for Washington (1928) and the Boston Braves of the National League (1928–30).

Before settling at first base, the left-handed Sisler pitched and played the outfield. He twice hit over .400 (.407 in 1920 and .420 in 1922) and attained a career average of .340. He set a major league record with 257 hits in 1920. In 1922, he batted safely in 41 consecutive games, an American League record until 1941. He led the American League in stolen bases four years, stealing 51 in 1922.

Ill health prevented Sisler from playing in 1923, when he was at his peak. Impaired vision, caused by sinus trouble, reduced his effectiveness thereafter, as did the burden of managing the Browns (1924–26). Nonetheless, he hit over .300 in all but one of his remaining seasons. He was elected to the Baseball Hall of Fame in 1939.

Sisley, Alfred (b. Oct. 30, 1839, Paris—d. Jan. 29, 1899, Moret-sur-Loing, Fr.), painter who was one of the creators of French Impressionism.

Although his wealthy English parents had originally intended him for commerce, Sisley began painting as an amateur, and in Charles Gleyre's studio in 1862 he began his association with Claude Monet, Pierre-Auguste Renoir, and Jean-Frédéric Bazille. The Franco-Prussian War of 1870 brought financial ruin to the Sisley family and caused Sisley to flee temporarily to London. At this period of crisis he decided to make painting his full-time career. The rest of his life was a constant struggle against poverty. Shortly after his death his talent began to be widely recognized, and the price of his work rose sharply.



"The Boat During the Flood," oil on canvas by Alfred Sisley, 1876; in the Louvre, Paris
By courtesy of the Musee du Louvre, Paris; photograph, Marc Garanger

Sisley was essentially a landscape painter. His works can be distinguished from those of his colleagues by their softly harmonious values. His early style was much influenced by Corot, and his restricted and delicate palette continued to reflect something of Corot's silvery tonalities. His snowscapes are particularly effective. Much of his best and most spontaneous work was done in the period 1872–80 in the neighbourhood of Paris, at Marly, Louveciennes, Bougival, Sèvres, Saint-Cloud, and Meudon, at a time when he was in close touch with Monet.

Sismondi, Jean-Charles-Léonard Simonde de: *see* Simonde de Sismondi, J(ean-) C(harles-) L(éonard).

sismondine, magnesium-rich variety of the silicate mineral chloritoid (*q.v.*).

Sisowath, also spelled SISOVAT, or SI SUVATA (b. Sept. 7, 1840, Bătdâmbâng Province, Cambodia—d. 1927, Cambodia), king of Cambodia from 1904 until his death, a figurehead for the French colonial administration, which had secured the protectorate over Cambodia (now Kampuchea) in a treaty signed by Sisowath's half brother Norodom in 1863.

With Norodom, Sisowath received his education under the surveillance of the Thai sovereign at Bangkok because Siam (Thailand), with Vietnam, had long held Cambodia in vassalage and chosen Cambodian sovereigns. Sisowath remained at Bangkok until his father, King Duong, died in 1860; he then went to Oudong, the old Cambodian capital just north of Phnom Penh, to prevent his younger half brother Si Votha from seizing the throne. He forced Si Votha out of Oudong, but the Thais recalled him to Bangkok and hastily installed the more compliant Norodom on the throne.

When the French won partial control of Vietnam in 1862, they claimed a protectorate over Cambodia as well. Norodom was crowned with French consent, and Sisowath withdrew to Saigon, where he was subsidized by the French, who could threaten Norodom with the prospect of installing Sisowath in his place.

Sisowath remained in Saigon until 1867, when he was called to quell anti-French uprisings in Cambodia. He thereafter remained in Phnom Penh and gave his support to the French colonial regime. Norodom died in 1904, and Sisowath succeeded to the throne. In 1906 he visited the Colonial Exhibition at Marseille and toured France. Upon his death, he was succeeded by his son Monivong.

Sīstān, also spelled SEISTAN, extensive border region, eastern Iran and southwestern Afghanistan. Forty percent of its area (roughly 7,000 sq mi [18,000 sq km]) is in Iran; about half the population reside in Zābol district of Iran. The region comprises a large depression some 1,500–1,700 ft (450–520 m) in elevation; numerous rivers fill a series of lagoons (*hāmūn*) and in high flood form a shallow lake that spills into another depression to the south. Three large deltas form the main regions of settlement: Lash-Juwain on the Farāh Rūd, Chakhānsūr on the Khash Rūd (both in Afghanistan), and Sīstān proper on the Helmand. Sīstān has a true desert climate, with highly irregular rainfall averaging less than 4 in. (100 mm) annually, extreme heat in summer, and frosts in winter. A "wind of 120 days" blows unceasingly from the north during summer, causing considerable erosion.

The population is chiefly Tadzhik (Tajik; the original Iranian population of Afghanistan and Turkistan), though of mixed descent. There is a strong nomadic element of Baluchi and Brahui, in addition to groups of Jāṭ and Gujars, and of Gavdars, who breed humped cattle.

Since 1959 Iranian Sīstān has formed an *ostān* (province) with Balūchestān. Zābol is joined to the Meshed–Zāhedān highway by road; Zāhedān, with its railhead to Quetta (Pakistan), is the international outlet. Chakhānsūr is the chief town of Afghan Sīstān.

Strife, corruption, and isolation hampered Sīstān's economy, which depended on a makeshift dam that annually was swept away by flood. Today two barrages irrigate approximately 320,000 ac (130,000 ha); the chief crops are wheat and barley, with a little cotton and corn (maize).

Sīstān is the reputed land of origin of the legendary Kayānian dynasty of Persia. From AD 226 the Sāsānian monarchs ruled Sīstān by constructing dams and irrigation canals. In the mid-7th century the Muslim Arabs invaded Sīstān and introduced Islām, though less effectively than elsewhere. The region was controlled by a series of local and outside dynasties in following centuries, including the harsh rule of Timur (Tamerlane), a Turkic conqueror, in the 14th century. Sīstān subsequently was independent under its own *malik*s (kings). Though Shāh Ismāʿīl I (1502–24) of Persia conquered Sīstān, he and his successors left the *malik*s largely in control. In 1747 Sīstān came under the control of an Afghan, after whose death it was for long a bone of contention between Iran and Afghanistan. This dispute led to British arbitration and the delimitation of the Irano-Afghan frontier in 1872, a work brought to a close only in 1903–05. In the early 1970s the Iranian government sponsored extensive irrigation work in Sīstān.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

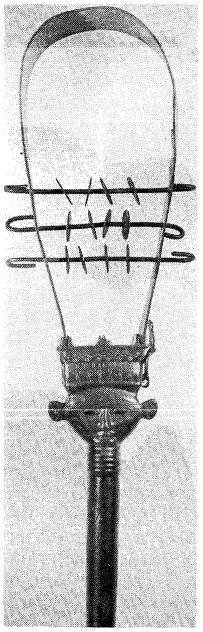
Sīstān-e Balūchestān, *ostān* (province), southeastern Iran, bounded by the Gulf of Oman on the south, by Kermān *ostān* on the west, and by Khorāsān *ostān* on the north. It borders Pakistan and Afghanistan on the east and covers an area of 70,108 sq mi (181,578 sq km). The province formed part of the Parthian Empire (250 BC–AD 226) and was included in the Sāsānid, Ṣafavid, and Qājār dynasties that successively ruled Iran. It was through that area that Alexander the Great in 323 BC, and later Nāder Shāh in AD 1737, invaded India. The region consists of a number of upland snowcapped massifs; the intervening areas are plains at an altitude of about 3,000 ft (900 m) above sea level. Abrupt gorges, wide valleys, and drainage swamps mark the landscape. Tributaries of the Helmand River drain the region. The population consists mostly of Baluchi, who are related to the Pashto speakers of Afghanistan and Pakistan and are Sunnī Muslims. The economy of the province is dominated by agriculture; crops include rice, corn (maize), fruits, and vegetables. Sheep, goats, cattle, and poultry are raised. Industries produce processed food, rugs and carpets, leather goods, milled rice, embroidered goods, and bricks. Roads link Zāhedān (the provincial capital) with Zābol, Īrānshahr, Chāh Bahār, and Sarāvān. The Trans-Iranian Railway traverses the northern part of the province and connects Zāhedān with Kermān. Pop. (1983 est.) 829,000.

Sisters of ———: *see under* substantive word (*e.g.,* Charity, Sisters of; Mercy, Sisters of).

Sistine Chapel, papal chapel in the Vatican Palace that was erected in 1473–81 by Pope Sixtus IV and is famous for its Renaissance frescoes and as the meeting place of the Sacred College of Cardinals. The sidewall frescoes were painted from 1481 to 1483. On the north wall are six frescoes executed by Perugino, Pinturicchio, Botticelli, Domenico Ghirlandajo, and Cosimo Rosselli depicting events from the life of Christ, and on the south wall are six other frescoes by Perugino, Pinturicchio, Botticelli, Domenico and Benedetto Ghirlandajo, Cosimo Rosselli, Luca Signorelli, and Bartolomeo della Gatta. For great ceremonial occasions the lower portions of the side walls were covered with a series of tapestries depicting events from the Gospels and the Acts of the Apostles. These were designed by Raphael and woven in 1515–19 at Brussels. The greatest masterpieces in the chapel are Michelangelo's ceiling fresco (1508–12) and "The Last Judgement" fresco (1533–41) on the west wall behind the altar.

sistrum, Greek SEISTRON, percussion instrument, a rattle consisting of a wood, metal, or clay frame set loosely with crossbars (often hung with jingles) that sound when the instrument is shaken. A handle is attached to the frame.

In ancient Egypt, sistra were either temple shaped or had a closed-horseshoe shape. The sistrum was used in the cult of the goddess Hathor; later, as Hathor merged with the maternal and life-giving goddess Isis, use of the



Egyptian sistrum, bronze (crossbars and jingles are modern), dated after 850 BC; in the British Museum, London

By courtesy of the trustees of the British Museum, London

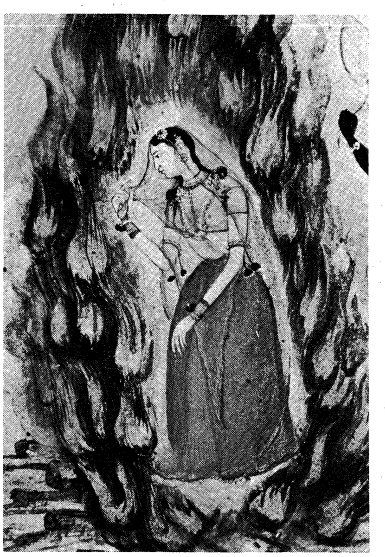
sistrum spread with the cult of Isis throughout the Roman Empire. Open-topped, U-shaped sistra existed by 2500 BC in Sumer and have been excavated near Tbilisi, Georgia, in the Soviet Union. Similar sistra are played today in the liturgy of the Coptic and Ethiopian churches. They also exist in West Africa, among two American Indian tribes, and as the bamboo shark rattle of Malaysia and Melanesia. "Sistrum" sometimes also refers to a bell glockenspiel.

Sisyphus, in Greek mythology, the cunning king of Corinth who was punished in Hades by having repeatedly to roll a huge stone up a hill only to have it roll down again as soon as he had brought it to the summit. In the *Iliad* Sisyphus, living at Ephyre (later Corinth), was the son of Aeolus (eponymous ancestor of the Aeolians) and the father of Glaucus (*q.v.*). In post-Homeric times he was called the father of Odysseus. Sisyphus was the reputed founder of the Isthmian Games. Later legend related that when Death came to fetch him, Sisyphus chained him up so that no one died until Ares came to aid Death, and Sisyphus had to submit. In the meantime, Sisyphus had told his wife, Merope, not to perform the usual sacrifices and to leave his body unburied. Thus, when he reached the underworld he was permitted to return to punish her for the omission. Once back at home, he continued to live to a ripe old age before dying a second time. Sisyphus was, in fact, like Autolycus and Prometheus (*qq.v.*), a widely popular figure of folklore—the trickster or master thief—everlastingly punished in Hades as the penalty for cheating Death.

sit-in, a tactic of nonviolent civil disobedience. The demonstrators enter a business or a public place and remain seated until forcedly evicted or until their grievances are answered. Attempts to terminate the essentially passive sit-in often appear brutal, thus arousing sympathy for the demonstrators among moderates and noninvolved individuals. Following Mahatma Gandhi's teaching, Indians employed the sit-in to great advantage during their struggle for independence from the British. Later, the sit-in was adopted as a major tactic in the civil rights struggle of American blacks; the first prominent sit-in occurred at a Greensboro (North Carolina) lunch counter in 1960. Student activists adopted the tactic later in the decade in anti-Vietnam War, curriculum reform, and other demonstrations.

A tactic similar to the sit-in, the sit-down, has been used by unions to occupy plants of companies that were being struck. The sit-down was first used on a large scale in the United States during the United Automobile Workers' strike against the General Motors Corporation in 1937. *See also* civil disobedience.

Sītā (Sanskrit: Furrow), also called JĀNAKĪ, in Hindu mythology, the consort of Rāma and the embodiment of wifely devotion and self-surrender. Her abduction by the demon king Rāvaṇa and subsequent rescue are the central incidents in the great Hindu epic the *Rāmāyaṇa* ("Romance of Rāma"). Sītā was raised by King Janaka; she was not his natural daughter, but sprang from a furrow when he was ploughing his field. Rāma won her as his bride by bending Śiva's bow, and she accompanied her husband when he went into exile. Though carried away to Laṅkā by Rāvaṇa she kept herself chaste by concentrating her heart on Rāma throughout her long imprisonment. On her return she asserted her purity and also proved it by voluntarily undergoing an ordeal by fire. Rāma, however, banished her to the forest in deference to public opinion. There she gave birth to their two children, Kuśa and Lava. After they reached maturity and were acknowledged by Rāma to be his sons, she called upon her mother, Earth, to swallow her up.



Sītā, Mughal painting, *c.* 1600; in the collection of Bharat Kala Bhavan, Vārānasi, India

Pramod Chandra

Sītā is worshipped as the incarnation of Lakṣmī, the consort of Vishnu. She is frequently depicted in Indian miniature paintings of the *Rāmāyaṇa*, and her images in bronze are among the finest achievements of South Indian art. These usually form a group, with images of Rāma, his brother Lakṣmaṇa, and his devotee, the monkey Hanumān; the iconographical texts instruct the artist to show Sītā looking at her husband with supreme happiness.

Sītāmarahi, town, administrative headquarters of Sītāmarahi district, Bihār state, northeastern India, on the western bank of the Lakhandai River. A station on the North Eastern Railway and connected by roads with the Nepal frontier, it is a commercial centre trading in rice, timber, oilseeds, and hides. A large Rāmanavami fair, celebrating the birth of Lord Rāma, is held in spring with considerable trade in pottery, spices, brassware, and cotton cloth. A cattle fair held in Sītāmarahi town is the largest in Bihār state. The town is sacred in Hindu mythology because Sītā (also called Jānaki), the wife of Rāma, was found nearby by her father, King Jānaka. It has a pond and a temple dedicated to Jānaki, as well as the Hanumān, Mahādeva, and Gaṇeśa temples.

Sītāmarahi district, with an area of 1,027 sq mi (2,659 sq km), is in the extreme northern part of the state in the fertile Middle Ganges Plain. It is bounded by the districts of Madhubani on the east, Darbhanga and Muzaffarpur on the south, and East Champāran on the west; it is bounded on the north by Nepal. The Bāghmati River and its tributaries flow through the western part of the district. Agriculture is the principal occupation; rice, wheat, bajra (pearl millet), pulse (legumes), corn (maize), sugarcane, and oilseeds are grown. Industries produce cotton textiles, tanned leather, milled rice, hydrogenated vegetable oil, wood carvings, and metalware. There is a network of roads, and the North Eastern Railway travels through the central part of the district. Pop. (1981) town, 31,610; metropolitan area, 47,032; district, 1,932,147.

Sītāpur, town, administrative headquarters of Sītāpur district, Uttar Pradesh state, northern India, north-northwest of Lucknow, on the Sarāyān River. Sītāpur was a military centre under the British and contains a military cantonment. Located at the junction of several roads and rail lines, it is a marketplace for grain and other crops. There are sugar and plywood industries and a hospital specializing in diseases of the eye.

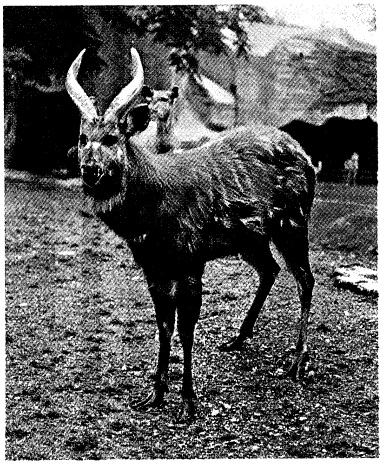
Sītāpur district, which totals 2,215 sq mi (5,738 sq km) in area, comprises a level plain between the Gomati and Ghāghara rivers. It is drained by the Sārda and tributaries of the Gomati. Most of the land is under cultivation or is forested; rice, wheat, and barley are grown. Much of the district is irrigated by the Sārda Canal system. There are sugar mills at Hargaon and Biswān. Pop. (1981) town, 101,210; district, 2,337,284.

sitar, northern Indian stringed musical instrument of the lute family, used as a solo instrument with tamboura (drone-lute) and tabla (drums) and in ensembles, as for northern Indian kathak dances. It is the dominant instrument in Hindustani music. It developed under medieval Muslim influence from the tanbur, a Middle Eastern long-necked lute, and from the vina, or *bīn,* a narrow, elaborate Indian zither. Like the tanbur, it has a deep, pear-shaped body; metal strings strung with the treble away from the player; and both front and side tuning pegs. Its neck, however, is wider than the tanbur's, and its frets are movable.

The sitar normally has five melody strings and five or six drone strings, which are also used to accentuate the rhythm or pulse; beneath the convex frets in the hollow neck are 9 to 13 sympathetic strings. The range extends upward from about the F below middle C. The convex frets facilitate pulling the string to the side to play ornaments. There is often a gourd under the pegbox end of the neck, reminiscent of the vina. The three-stringed sitar, in fact, is called the *tritantri vina.* The sitar is plucked with a wire plectrum worn on the right forefinger.

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sitatunga (species *Tragelaphus spekei*), aquatic antelope, family Bovidae (order Artiodactyla), found in swamps and marshes of central Africa. The sitatunga swims, dives,



Sitatunga (*Tragelaphus spekei*)
Tom McHugh—Photo Researchers/EB Inc.

and often feeds in the water and hides by submerging almost totally. Its long, spreading hooves and flexible foot joints enable it to walk with ease on soft ground. It attains a shoulder height of about 102 cm (40 inches) and has shaggy hair that is reddish brown in females, grayish brown in males. There is a white mark on the face, two white patches on the neck, and sometimes scattered white stripes on the body. The male has long, spiral horns.

sitella, also called TREERUNNER, any of about seven species of Australasian birds of the genus *Neositta,* usually placed in the nuthatch family, Sittidae, but sometimes in the family Neosittidae. They resemble nuthatches in build—short-tailed and large-footed—and in behaviour, but they are more or less streaked and make cup nests in forked twigs.

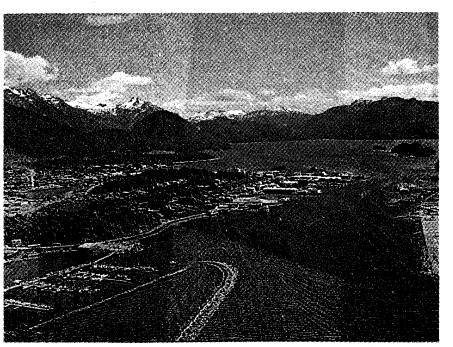
Sithole, Ndabaningi (b. July 31, 1920, Nyamandhlovu, Matabeleland, Rhodesia [now Zimbabwe]), teacher, clergyman, and an intellectual leader of the black nationalist movement in Rhodesia, later Zimbabwe.

Mission-educated, Sithole was a teacher before he studied theology in the United States (1955–58). On returning to Rhodesia he was a Congregationalist minister, school principal, and president of the African Teachers' Association (1959–60). His political career began in 1960, when he joined the new National Democratic Party and became its treasurer.

Sithole helped form the Zimbabwe African Peoples' Union (ZAPU) in December 1961 and, after it was banned, traveled widely in search of support, making broadcasts into Rhodesia from Tanzania. By July 1963 he returned to Rhodesia and formed a new party, the Zimbabwe African National Union (ZANU). Considered dangerous, Sithole and other nationalists were arrested a few days before Rhodesia unilaterally declared itself to be a sovereign state on Nov. 11, 1965.

Sithole was imprisoned until December 1974, when he was allowed to attend a meeting of black nationalist leaders with the Rhodesian prime minister, Ian Smith, in Lusaka, Zambia. Sithole returned to Rhodesia and again was arrested on March 4, 1975. He was released one month later and attended a meeting of the Organization of African Unity in Dar es Salaam, Tanz. He then went to Lusaka and continued to fight for the cause of black majority rule in Rhodesia. In 1978–79 he served on the Transitional Executive Council, preparing the transfer of power in Zimbabwe-Rhodesia. He was a member of Parliament in 1979. Though continuing as leader of ZANU, he was defeated in the elections of 1982, and his influence dimmed thereafter. Sithole published his influential *African Nationalism* in 1958 (2nd ed., 1968). In addition to numerous newspaper and journal articles, he also wrote a biography of Obed Mutezo (1970), the novel *The Polygamist* (1972), and an account of the Zimbabwe struggle, *Roots of a Revolution* (1977).

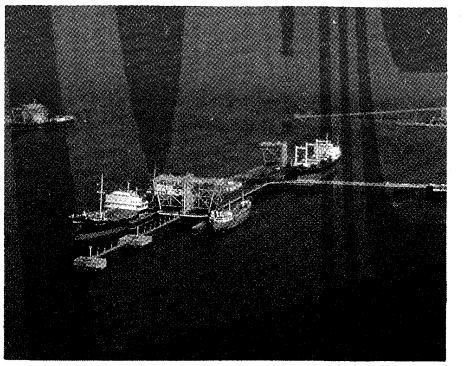
Sitka, city, historically the most notable Alaskan settlement, on the west coast of Baranof Island in the Alexander Archipelago, southeastern Alaska, U.S. Old Sitka, or Fort St. Michael, was established in July 1799 by Aleksandr Baranov (Baranof), the first Russian governor of Alaska. The fort was destroyed by the Tlingit Indians in 1802. The present city was founded as Novo Arkhangelsk (New Archangel) in 1804, when Baranov moved the headquarters of the Russian-American Company (a Russian trading company) there from Kodiak. After 1867 the settlement was commonly known as Sitka (probably derived from a Tlingit Indian word meaning "by the sea"). The formal transfer of Alaska from Russia to the United States took place there on Oct. 18, 1867, and Sitka was the territorial capital until replaced by Juneau in 1900. Sitka's principal economic activities are fishing, canning, lumbering, and tourism. St. Michael's Cathedral (Russian Orthodox, 1848) was rebuilt after



The harbour at Sitka, Alaska
Bob and Ira Spring—EB Inc.

destruction by fire in 1966. Sheldon Jackson (junior) College, founded there in 1895, has a museum housing native and Russian mementos. Sitka Community College was opened in 1962. Nearby is Sitka National Historical Park. Mount Edgecumbe (3,271 feet [997 m]), on Kruzof Island, is a conspicuous landmark in Sitka's island-studded, mountain-locked harbour. Inc. 1920. Pop. (1986 est.) 7,700.

Sitrah, town, in the state and emirate of Bahrain, on Sitrah island, in the Persian Gulf. An oil port, Sitrah handles not only the entire petroleum production of Bahrain but is also



Deepwater oil-loading wharf in the Persian Gulf off Sitrah, Bahrain
FPG—EB Inc.

an export centre for oil fields in northeast Saudi Arabia. A submarine and land pipeline runs northwest about 36 miles (58 km) across the Gulf of Bahrain and Bahrain island, from ad-Dammān on the Saudi mainland to Sitrah. The town has extensive tank farms; the country's oil refinery is 2.5 miles (4 km) southeast, on Bahrain island near ʿAwālī.

Laid out in the 1960s, Sitrah has a rectangular street pattern, with modern buildings. Because of shallow offshore waters, the pipeline runs along a marine causeway, extending almost 2.75 miles (4.5 km) into the gulf; at its end is a wharf at which oceangoing tankers dock. Aluminum from the smelter near ar-Rifāʿ on Bahrain island is also exported from Sitrah.

Sitrah island, elongate in shape, has an area of 3.8 square miles (10 square km) and is the fourth largest island of the Bahraini archipelago. Lying just east of Bahrain island, Sitrah island is separated from it by a narrow tidal channel. Before the discovery of oil on Bahrain (1932), Sitrah island's well-watered northern section had the principal settlements; it was known for its luxuriant date palms. Pop. (1981) 9,618.

Sittang River, river in east-central Myanmar (Burma), rising northeast of Yamethin on the edge of the Shan Plateau and flowing south for 260 miles (420 km) to empty into the Gulf of Martaban of the Andaman Sea. The broad Sittang River valley lies between the forested Pegu Mountains (west) and the steep Shan Plateau (east) and holds the main road and railway from Yangon (Rangoon) to Mandalay as well as the major towns of Pegu, Toungoo, Yamethin, and Pyinmana. The river is navigable for 25 miles (40 km) year-round and for 55 miles (90 km) during three months of the year. The Sittang is used to float timber (particularly teak) south for export. Its lower course is linked by canal to Pegu River. This canal, built to bypass the tidal bore that afflicted the mouth of the Sittang, once provided the only route from Yangon to Toungoo. Geomorphologists consider the Sittang a misfit, too small in volume for its large valley, and theorize that the lower course of the Irrawaddy River originally occupied the valley but was deflected westward by geologic movements in Pleistocene times.

Sittard, *gemeente* (commune), Limburg *provincie,* southeastern Netherlands. Chartered

in 1243, it was a domain of the dukes of Jülich from 1400 to 1794. It was then controlled by the French until 1814 and by the Belgians from 1830 to 1839. The commune's industries include quarrying and the manufacture of fertilizer, chemicals, electronic components, and textiles, and there are coal mines (now closed) in the area. Churches from the 14th, 15th, and 17th centuries remain, and there is a regional museum. Pop. (1988 est.) 44,251; Sittard-Geleen metropolitan area, 177,432.

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Sitte, Camillo (b. April 17, 1843, Vienna, Austria—d. Nov. 16, 1903, Vienna), Austrian architect and town planner who propagated many ideas similar to those that the so-called Garden City advocate, Sir Ebenezer Howard, was advancing at the same time in England. Sir Raymond Unwin in England and Daniel Hudson Burnham in the United States were among the later town planners influenced by German and Austrian theorists, of whom Sitte was the most articulate.

Sitte directed the Vienna State Polytechnic School, and, shortly before his death, he founded the periodical *Der Städtebau* ("City Building"; first issue 1904). His ideas are summarized and their influence is traced in *Camillo Sitte and the Birth of Modern City Planning* (1965), by George Roseborough Collins and Christiane Crasemann Collins, who also translated his major book, *Der Städtebau nach seinen künstlerischen Grundsätzen* (1889; 5th ed., 1922), as *City Planning According to Artistic Principles* (1965).

Sitten (Switzerland): *see* Sion.

Sitter, Willem de (b. May 6, 1872, Sneek, Neth.—d. Nov. 20, 1934, Leiden), Dutch mathematician, astronomer, and cosmologist who developed theoretical models of the universe based on Albert Einstein's general theory of relativity.

De Sitter studied mathematics at the State University of Groningen and then joined the astronomical laboratory there, where under J.C. Kapteyn's guidance he developed a liking for astronomy. He spent the years 1897–99 at the Cape Observatory in South Africa and devoted himself to astronomy thereafter. In 1908 de Sitter became professor of astronomy at the University of Leiden, and in 1919 he became director of the Leiden Observatory.

In his early career de Sitter analyzed the motions of Jupiter's four great Galilean satellites in order to determine their masses. His experience in celestial mechanics proved useful in 1916–17, when he published a series of papers in London in which he described the astronomical consequences of Einstein's general theory of relativity. His papers aroused British interest in the theory and led directly to Arthur Eddington's 1919 expedition to observe a solar eclipse in order to measure the gravitational deflection of light rays passing near the Sun.

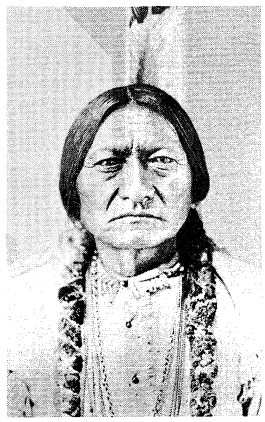
De Sitter's concept of the universe differed in some respects from that of Einstein. Einstein's relativistic conception of curved space led him to envision the universe as static and unchanging in size, but de Sitter maintained that relativity actually implied that the universe was constantly expanding. This view was later supported by Edwin Hubble's observations of distant galaxies and was eventually adopted by Einstein himself. De Sitter's calculations of the size of the universe and the number of galaxies contained in it subsequently proved to be too small.

Sittewald, Philander von: *see* Moscherosch, Johann Michael.

Sittidae (bird family): *see* nuthatch.

Sitting Bull, Indian name TATANKA IYOTAKE (b. *c.* 1831 near Grand River, Dakota Territory [now in South Dakota], U.S.—d. Dec. 15, 1890, on the Grand River in South Dakota), Teton Dakota Indian chief under whom the Sioux tribes united in their struggle for survival on the North American Great Plains. He is remembered for his lifelong distrust of white men and his stubborn determination to resist their domination.

Sitting Bull was born into the Hunkpapa division of the Teton Sioux. He joined his first war party at age 14 and soon gained a reputation for fearlessness in battle. He became a leader of the powerful Strong Heart warrior society and, later, was a participant in the Silent Eaters, a select group concerned with tribal welfare. As a tribal leader Sitting Bull helped extend the Sioux hunting grounds westward into what had been the territory of the Shoshone, Crow, Assiniboin, and other Indian tribes. His first skirmish with white soldiers occurred in June 1863 during the U.S. Army's retaliation against the Santee Sioux after the "Minnesota Massacre," in which the Teton Sioux had no part. For the next five



Sitting Bull, 1885

By courtesy of the Smithsonian Institution National Anthropological Archives, Washington, D.C.

years he was in frequent hostile contact with the army, which was invading the Sioux hunting grounds and bringing ruin to the Indian economy. In 1866 he became principal chief of the northern hunting Sioux, with Crazy Horse, leader of the Oglala Sioux, as his vice-chief. Respected for his courage and wisdom, Sitting Bull was made principal chief of the entire Sioux nation about 1867.

In 1868 the Sioux accepted peace with the U.S. government on the basis of the Second Treaty of Fort Laramie, which guaranteed the Sioux a reservation in what is now southwestern South Dakota. But when gold was discovered in the Black Hills in the mid-1870s, a rush of white prospectors invaded lands guaranteed to the Indians by the treaty. Late in 1875 those Sioux who had been resisting the whites' incursions were ordered to return to their reservations by Jan. 31, 1876, or be considered hostile to the United States. Even had Sitting Bull been willing to comply, he could not possibly have moved his village 240 miles (390 km) in the bitter cold by the specified time.

In March General George Crook took the field against the hostiles, and Sitting Bull responded by summoning the Sioux, Cheyenne, and certain Arapaho to his camp in Montana Territory. There on June 17 Crook's troops were forced to retreat in the Battle of the Rosebud. The Indian chiefs then moved their encampment into the valley of the Little Bighorn River. At this point Sitting Bull performed the Sun Dance, and when he emerged from a trance induced by self-torture, he reported that he had seen soldiers falling into his camp like grasshoppers from the sky. His prophecy was fulfilled on June 25, when Lieutenant Colonel George Armstrong Custer rode into the valley and he and all the men under his immediate command were annihilated in the Battle of the Little Bighorn.

Strong public reaction among whites to the Battle of the Little Bighorn resulted in stepped-up military action. The Sioux emerged the victors in their battles with U.S. troops, but though they might win battle after battle, they could never win the war. They depended on the buffalo for their livelihood, and the buffalo, under the steady encroachment of whites, were rapidly becoming extinct. Hunger led more and more Sioux to surrender, and in May 1877 Sitting Bull led his remaining followers across the border into Canada. But the Canadian government could not acknowledge responsibility for feeding a people whose reservation was south of the border, and after four years, during which his following dwindled steadily, famine forced Sitting Bull to surrender. After 1883 he lived at the Standing Rock Agency, where he vainly opposed the sale of tribal lands. In 1885, partly to get rid of him, the Indian agent allowed him to join Buffalo Bill's Wild West show, in which he gained international fame.

The year 1889 saw the spread of the Ghost Dance religious movement, which prophesied the advent of an Indian messiah who would sweep away the whites and restore the Indians' former traditions. The Ghost Dance movement augmented the unrest already stirred among the Sioux by hunger and disease. As a precaution, Indian police and soldiers were sent to arrest the chief. Seized on Grand River, Dec. 15, 1890, Sitting Bull was killed while his warriors were trying to rescue him. He was buried at Fort Yates, but his remains were moved in 1953 to Mobridge, S.D., where a granite shaft marks his resting place.

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Sittwe, also called AKYAB, town, western Myanmar (Burma). It is the chief settlement of the Arakan region. Situated on the Bay of Bengal at the mouth of the Kaladan River, Sittwe occupies the eastern side of a hilly ridge affording shelter from the southwest monsoon. After the cession of Arakan to the British in 1826, Sittwe replaced Myohaung as the region's seat of government and rapidly grew from a small fishing village into a leading port of Burma. Although heavily damaged during World War II, the port was rebuilt, and it handles both coastal and international trade. Rice is the chief export. Sittwe is the site of a dockyard, diesel electric plant, and several rice mills. It has air transportation service, and a regular ferry links it with Chittagong in Bangladesh. The town is at the confluence of the Mayu, Kaladan, and Lemro rivers, all navigable. Rice is grown on the alluvial plains. The wet, forested hill ridges of the interior to the east are sparsely populated. Muslims, who migrated there from Bangladesh after the Indo-Pakistani war of 1971, outnumber the Buddhist Arakanese in the Sittwe area. Pop. (1983) 107,607.

situation, comedy of: *see* intrigue, comedy of.

Sitwell, Dame Edith (b. Sept. 7, 1887, Scarborough, Yorkshire, Eng.—d. Dec. 9, 1964, London), English poet who first gained fame for her stylistic artifices but who emerged during World War II as a poet of emotional depth and profoundly human concerns. She was equally famed for her formidable personality, Elizabethan dress, and eccentric opinions.

A member of a distinguished literary family, she was the daughter of Sir George Sitwell and the sister of Sir Osbert and Sir Sacheverell Sitwell. Her first book, *The Mother and Other Poems,* appeared in 1915. She began to attract attention by editing in 1916 an annual anthology, *Wheels,* in which she and her brothers led a spirited revolt against the prevailing poetry of the Georgians. The notoriety sought by the Sitwells in their artistic battles may, at the time, have obscured the originality of her talent. The visual sensibility and verbal music of her early poetry, *Clowns' Houses* (1918), *Bucolic Comedies* (1923), and *The Sleeping Beauty* (1924), in which she created her own world of beautiful objects, nursery symbols, and unfamiliar images, revealed the influence of W.B. Yeats and T.S. Eliot. Her emphasis on the value of sound in poetry was shown especially in *Façade* (1923), for which Sir William Walton wrote the music. *Gold Coast Customs* (1929), with its harsher and more agonized imagery, marked the end of a period of experiment. In 1930 her *Collected Poems* appeared. In her later work, especially *Street Songs* (1942), *Green Song* (1944), and *Song of the Cold* (1945), written during World War II, a greater mastery of technique and a deeper



Edith Sitwell, 1959
BBC, London

sense of suffering and spirituality are apparent. Religious symbolism was further emphasized in *Gardeners and Astronomers* (1953) and *The Outcasts* (1962), works that brought her wide recognition as a poet of tragic grandeur and intensity. In 1955 she was received into the Roman Catholic church.

Her wide reading and scholarship and her predilection for the splendours of a lost aristocratic age are revealed in the prose works *Alexander Pope* (1930), *Bath* (1932), *The English Eccentrics* (1933), *I Live Under a Black Sun* (1937; a novel based on the life of Swift), *A Poet's Notebook* (1943), and *A Notebook on William Shakespeare* (1948). She made visits to the United States, where, in 1953 in Hollywood, she completed the film script of her book on the girlhood of Elizabeth I, *A Fanfare for Elizabeth* (first published 1946). Her *Selected Letters* (1970; U.S. title *Selected Letters, 1919–1964,* 1971) were edited by John Lehmann and Derek Parker. She was created Dame of the British Empire in 1954.

John Pearson's *The Sitwells: A Family Biography* was published in 1980.

Sitwell, Sir (Francis) Osbert (Sacheverell), 5TH BARONET (b. Dec. 6, 1892, London—d. May 4, 1969, near Florence), English man of letters, famous, with his sister Edith and brother Sacheverell, as a tilter at establishment windmills in literature and the arts. His best-known books are his prose memoirs.

Sitwell wrote satirical and serious poetry (*The Collected Satires and Poems,* 1931; *Mrs. Kimber,* 1937; *Selected Poems, Old and New,* 1943; *Wrack at Tidesend,* 1952; and other volumes); novels, of which the best is *Before the Bombardment* (1926), a satirical portrayal of the last phase of Victorian society in Scarborough, Yorkshire, just before World War I; short stories; and criticism. His reputation rests, however, on his autobiographical series *Left Hand! Right Hand!* (1944), *The Scarlet*



Osbert Sitwell, 1965
Camera Press

Tree (1946), *Great Morning!* (1947), *Laughter in the Next Room* (1948), and *Noble Essences* (1950). In these he created with conscious nostalgia the portrait of a vanished age—childhood at the family seat, Renishaw Hall, near Sheffield, and at Scarborough; school days at Eton College; and service in the Grenadier Guards (1912–19). Especially memorable is the account of his eccentric and dominating father, Sir George Sitwell, whom he succeeded as the 5th baronet in 1943. *Queen Mary and Others* (1974) was a collection of essays published posthumously.

John Pearson's *The Sitwells: A Family Biography* was published in 1980.

Sitwell, Sir Sacheverell, 6TH BARONET (b. Nov. 15, 1897, Scarborough, Yorkshire, Eng.—d. Oct. 1, 1988, Weston Hall, near Towcester, Northamptonshire), English poet and critic, younger brother of the poets and essayists Edith and Osbert. He is best known for his books on art, architecture, and travel.

Sitwell's poetry—*The People's Palace* (1918), *The Thirteenth Caesar* (1924), *The Rio Grande* (performed 1929, with music by Constant Lambert), *Selected Poems* (1948), and other volumes—mainly in traditional metres, reveals in its mannered style the effect of his interest in the arts and music. More original are his imaginative and interpretative books, of which the first, *Southern Baroque Art* (1924), was the forerunner of much academic research. His poetic prose is seen at its best in the "autobiographical fantasia" *All Summer in a Day* (1926) and the gloomily meditative *Splendours and Miseries* (1943). He succeeded



Sacheverell Sitwell, 1966
Universal Pictorial Press, London

his brother as the 6th baronet on Osbert's death in 1969. *For Want of the Golden City* (1973) is a series of essays on life and art containing a considerable amount of autobiographical material. A noted traveler, he said in 1982 that, among the most beautiful sites on earth, he judged Venice to be the best, with Angkor Wat in Kampuchea in second place.

John Pearson's *The Sitwells: A Family Biography* was published in 1980.

Śiva, also spelled ŚIWA, or SHIVA, one of the main deities of Hinduism, worshiped as the paramount lord by the Śaiva (Shaivite) sects of India (*see* Śaivism). Śiva (Sanskrit: "Auspicious One") is one of the most complex gods of India, embodying seemingly contradictory qualities. He is both the destroyer and the restorer, the great ascetic and the symbol of sensuality, the benevolent herdsman of souls and the wrathful avenger. Though some of the combinations of roles may be explained by Śiva's identification with earlier mythological figures, they also arise from a tendency in Hinduism to combine complementary qualities in a single ambiguous figure.

Śiva's female consort is known under various manifestations as Umā, Sātī, Pārvatī, Durgā, and Kālī (Śiva is also sometimes paired with the supreme goddess, Śakti). The divine couple, together with their sons—the six-headed Skanda and the elephant-headed Gaṇeśa—are said to dwell on Mount Kailāsa in the Himalayas. Śiva's mount and theriomorphic image is the bull Nandi; a sculpture of Nandi sits opposite the main sanctuary of every Śiva temple. In temples and in private shrines Śiva is worshiped in his fundamental form of the *liṅga* (*q.v.*), or phallus.

Śiva is usually depicted in painting and sculpture as white or ash-coloured, with a blue neck (from holding in his throat the poison thrown up at the churning of the cosmic ocean, which



Śiva, bronze statue, Madras, *c.* AD 900
By courtesy of the Government Museum, Madras; photograph, Royal Academy of Arts, London

threatened to destroy humankind), his hair arranged in a coil of matted locks (*jaṭāmakuṭa*) and adorned with the crescent moon and the Ganges (according to legend he brought the Ganges River to earth by allowing her to trickle through his hair, thus breaking her fall). He has three eyes, the third eye bestowing inward vision but capable of burning destruction when focused outward. He wears a garland of skulls and a serpent around his neck and carries in his two (sometimes four) hands a deerskin, a trident, a small hand drum, or a club with a skull at the end.

Śiva is represented in a variety of forms: in a pacific mood with his consort Pārvatī and son Skanda, as the cosmic dancer (Naṭarāja), as a naked ascetic, as a mendicant beggar, as a yogin, and as the androgynous union of Śiva and his consort in one body, half-male and half-female (Ardhanārīśvara). Among his common epithets are Śambhu ("Benignant"), Śaṅkara ("Beneficent"), Paśupati ("Lord of Beasts"), Maheśa ("Great Lord"), and Mahādeva ("Great God").

Siva Dayāl Sāheb, also called ŚIVDAYĀL, original name TULSĪ RĀM (b. 1818, Āgra, Āgra province, India—d. 1878, Āgra), founder of the esoteric Hindu sect Radha Soami Satsang.

He was born into a devout Vaiṣṇava family

of the Kṣatriya caśte and was established as a banker in Āgra. In 1861 he revealed himself as the *sant satguru* (true teacher of spirituality) and began instructing a group of followers. He wrote two books, one in prose and one in verse, both titled *Sār Bacan* ("Essential Utterances").

The sect founded by Siva Dayāl Sāheb believes that human capabilities are most fully developed by secret disciplines aimed at uniting the individual soul, the sound made by the worshipper in repeating the name of the lord, and the sound heard internally, which emanates from God. The usual Hindu divinities are not worshipped, but great veneration is accorded a guru, or spiritual leader, and the relics associated with past gurus.

Siva Dayāl Sāheb's ashes are entombed in a sacred garden (Dayāl Bāgh) near Āgra, still a principal headquarters of the sect.

Śivājī, also spelled SHIVĀJĪ (b. Feb. 19, 1630, or April 1627, Shivner, Poona, India—d. April 3, 1680, Rājgarh), Indian king (1674–80), founder of the Marāthā kingdom of India. Its security was based on religious toleration and on the functional integration of the Brahmans, Marāthās, and Prabhus.

Early life and exploits. Śivājī was descended from a line of prominent nobles. India at that time was under Muslim rule: the Mughals in the north and the Muslim sultans of Bijāpur and Golkundā in the south. All three ruled by right of conquest, with no pretense that they had any obligations toward the ruled. Śivājī, whose ancestral estates were situated in the Deccan, in the realm of the Bijāpur sultans, found the Muslim oppression and religious persecution of the Hindus so intolerable that, by the time he was 16, he had already convinced himself that he was the divinely appointed instrument of the cause of Hindu freedom—a conviction that was to sustain him throughout his life.

Collecting a band of followers, about 1655 he began to seize the weaker Bijāpur outposts. In the process, he destroyed a few of his influential co-religionists who had aligned themselves with the sultans. All the same, his daring and military skill, combined with his sternness toward the oppressors of the Hindus, won him the heart and mind of the common man. His depredations grew increasingly audacious, and several minor expeditions sent to chastise him proved ineffective.

When the Sultan of Bijāpur, in 1659, sent against him an army 20,000 strong under Afẓal Khān, Śivājī, pretending to be intimidated, enticed the force deep into difficult mountain terrain and then killed Afẓal Khān at a meeting to which he had lured him by submissive appeals. Meanwhile, picked troops that had been previously positioned swooped down on the unwary Bijāpur army and routed it. Overnight, Śivājī had become a formidable warlord, possessing the horses, the guns, and the ammunition of the Bijāpur army.

Alarmed by Śivājī's rising strength, the Mughal emperor Aurangzeb ordered his viceroy of the south to march against him. Śivājī countered by carrying out a daring midnight raid right within the Viceroy's encampment, in which the Viceroy lost the fingers of one hand and his son was killed. Discomfited by this reverse, the Viceroy withdrew his force. Śivājī, as though to provoke the Mughals further, attacked the rich coastal town of Surat and took immense booty.

Aurangzeb could hardly ignore so flaunting a challenge and sent out his most prominent general, Mīrza Raja Jai Singh, at the head of an army said to number 100,000 men. The pressure exerted by this vast force, combined with the drive and tenacity of Jai Singh, soon compelled Śivājī to sue for peace and to undertake that he, accompanied by his son, would attend Aurangzeb's court at Āgra to be formally accepted as Mughal vassals. In Āgra, hundreds of miles from their homeland, Śivājī and his son were placed under house arrest, where they lived under the threat of execution.

Escape from Āgra. Undaunted, Śivājī feigned illness and, as a form of penance, began to send out enormous baskets filled with sweets to be distributed among the poor. On Aug. 17, 1666, he and his son had themselves carried past their guards in these baskets. His escape, possibly the most thrilling episode in a life filled with high drama, was to change the course of Indian history. His followers welcomed him back as their leader, and within two years he not only had won back all the lost territory but had expanded his domain. He collected tribute from Mughal districts and plundered their rich mart; he reorganized the army and instituted reforms for the welfare of his subjects. Taking a lesson from the Portuguese and English traders who had already gained toeholds in India, he began the building of a naval force and was thus the first Indian ruler in modern times to appreciate that sea power was essential for trade as well as defense.

Almost as though prodded by Śivājī's meteoric rise, Aurangzeb intensified his persecution of Hindus; he imposed a poll tax on them, connived at forcible conversions, and demolished temples, erecting mosques in their places.

Independent sovereign. In the summer of 1674, Śivājī had himself enthroned with great fanfare as an independent sovereign. The suppressed Hindu majority rallied to him as their leader. He ruled his domain for six years, through a Cabinet of eight ministers. A devout Hindu who prided himself as the protector of his religion, he broke tradition by commanding that two of his relatives, who had been forcibly converted to Islām, should be taken back into the Hindu fold (Hinduism admits no converts); yet even though both Christians and Muslims often imposed their creeds on the populace by force, he respected the beliefs and protected the places of worship of both communities. Many Muslims were in his service. After his coronation, his most noteworthy campaign was in the south, during which he forged an alliance with the sultans and thereby blocked the grand design of the Mughals to spread their rule over the entire subcontinent.

Śivājī had several wives and two sons. His last years were shadowed by the apostasy of his elder son, who, at one stage, defected to the Mughals and was brought back only with the utmost difficulty. The strain of guarding his kingdom from its enemies in the face of bitter domestic strife and discord among his ministers hastened his end. The man Macaulay called "the Great Śivājī" died after an illness in April 1680, in the mountain stronghold of Rājgarh, which he had made his capital.

Śivājī breathed new life into a moribund race that for centuries had resigned itself to abject serfdom and led them against Aurangzeb, a powerful Mughal ruler. Above all, in a place and age stained by religious savagery, he stands almost alone as one who practiced true religious tolerance. (R.R.D.)

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Sivas, historically SEBASTEA, SEBASTEIA, or MEGALOPOLIS-SEBASTEIA, city, capital of Sivas *il* (province), central Turkey. It lies at an altitude of 4,183 ft (1,275 m) in the broad valley of the Kızıl river. Although excavations at a mound known as Topraktepe indicate Hittite settlements, nothing is known of Sivas' history prior to its emergence as the Roman city of Sebastea, which became the capital of Armenia Minor under the emperor Diocletian near the end of the 3rd century. Justinian I had the city walls rebuilt and fortified in the 6th century, and under the Byzantine emperors Sebastea was a large and wealthy Anatolian city. In 1021 Sennacherib-John, the Armenian king of Vaspurakan (Van), ceded his dominions to Basil II and became the Byzantine viceroy of Sebastea. His successors served in the same position until the Turks arrived in the area in the late 11th century. The Turkmen Dānishmend dynasty conquered Sebastea *c.* 1080–90, renamed it Sivas, and made it the capital of a principality until it fell to the Seljuq sultan of Rūm in 1172. Under the Seljuqs, Sivas reached its greatest prosperity, becoming one of the most important cities of Anatolia; it was said to have had more than 150,000 inhabitants when it was plundered by the Central Asian ruler Timur (Tamerlane) in 1400. Though it never regained its former prosperity, it was an important provincial capital under the Ottoman Empire, and in September 1919 it was the site of the second national congress called by Mustafa Kemal (Atatürk), later first president of Turkey. This congress eventually led to the expulsion of the European occupying forces, the end of the Ottoman Empire, and the establishment of the republic.

Sivas contains some of the finest remains of 13th-century Seljuq architecture. Of these, the *medreses* (religious schools) are particularly noteworthy: the Gök (Blue) Medrese (1271), which houses the local museum; the Şifaiye Medresesi (1217–18), originally a hospital, containing the *türbe* (tomb) of its founder, Sultan Kay-Kā'ūs I; and the Çifte Minare Medrese with its intricately carved facade and minarets. The oldest mosque is the Ulu Cami (Great Mosque), dating from the Turkmen era. Near the city is the Armenian monastery of the Holy Cross, which contains a royal throne and other relics.

In the past, Sivas owed much of its importance as a communications centre to the north–south and west–east trade routes to Iraq and Iran, respectively. With the development of railways, the city gradually recovered its economic importance. It stands at the junction of several railways and highways and is linked by air with Istanbul via Ankara. Its manufactures include cement and cotton and woollen textiles.

Sivas *il,* with an area of 11,396 sq mi (29,515 sq km), is drained by the Kızıl, Kelkit, Çaltı, and Tohma rivers. After Ankara and Konya, it is the third largest *il* in Turkey. It is an important cereal-producing area and contains large deposits of iron ore, which are worked at Divriği (*q.v.*). Pop. (1980) city, 172,864; *ilçe,* 239,817; (1983 est.) *il,* 754,800.

To make the best use of the Britannica, consult the INDEX *first*

Sivash, also spelled SIVAŠ, Russian GNILOYE MORE (Putrid Sea), system of shallow inlets, Sea of Azov, Ukrainian Soviet Socialist Republic. Sivash is an area of marshy inlets and coves on the western margin of the Sea of Azov, from which it is separated by the Arabat Spit (Russian *Arabatskaya Strelka*), a sandbar measuring from 890 ft to 5 mi (270 m to 8 km) in width. Sivash covers an area of approximately 990 sq mi (2,560 sq km) and is covered with mineral salts during the summer months. The salts are used in the local chem-

ical industries of Krasnoperekopsk, a city on the Perekop isthmus.

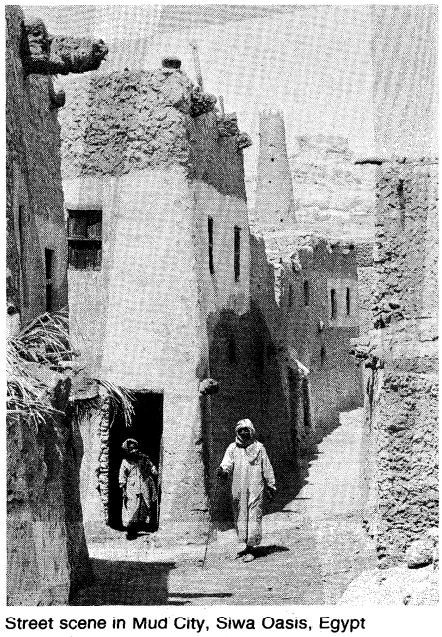
Sivash was the site of important military operations during the Russian Civil War and World War II.

Śivdayāl (Hindu religious leader): *see* Siva Dayāl Sāheb.

Sivertsen, Cort, Cort also spelled CURT (Norwegian seaman): *see* Adelaer.

Śiwa (Hindu deity): *see* Śiva.

Siwa Oasis, Arabic WĀḤAT SĪWAH, oasis in Marsā Maṭrūḥ *muḥāfaẓah* (governorate), Egypt, near the Libyan frontier, 350 mi (560 km) west of Cairo. Siwa (ancient Egyptian Sekht-am, meaning "palm land") was the seat of the oracle temple of Amon (Zeus Ammon), where Alexander the Great was welcomed



Street scene in Mud City, Siwa Oasis, Egypt
Hubertus Kanus—Rapho/Photo Researchers

(332/331 BC) as a son of Amon. Fragmentary remains of the temple dedicated to the god Amon, with 4th-century-BC inscriptions, lie in the ruins of Aghūrmī. Nearby is the ruined temple of Umm Beda (Um Ebeida) and many Roman remains. The first European to reach Siwa after Roman times was the British traveller William George Browne in 1792. The mud-brick houses are inhabited by Berber-speaking Sudanic peoples. The fertile oasis (6 mi long by 4–5 mi wide) has about 200 springs, with thousands of olive trees and date palms providing the chief source of income. The only developed industry is basketry. Pop. (1966) town, 3,569.

Siwālik Hills, also called SIWĀLIK RANGE, or OUTER HIMALAYAS, sub-Himalayan range, extending west-northwestward for more than 1,000 mi (1,600 km) from the Tista River, Sikkim (India), through Nepal, across northwestern India, and into northern Pakistan. Though only 10 mi wide in places, the hills have an average elevation of 3,000 to 4,000 ft (900 to 1,200 m). They rise abruptly from the plain of the Indus and Ganges rivers (south) and parallel the main range of the Himalayas (north), from which they are separated by valleys. The Siwāliks are sometimes considered to include the southern foothills of the Assam Himalayas, which extend eastward for 400 mi across southern Bhutan to the bend of the Brahmaputra River. The range proper, to which the name Siwālik (from Sanskrit, meaning Belonging to [the God] Śiva) was formerly restricted, is the 200 mi of foothills extending from Hardwār, India, on the Ganges River northwestward to the Beās River. Everywhere in this section the poor scrub forests have long since been removed, and the hills are subject to severe erosion. Periodic floods sweep masses of sand and silt down into the ever-changing great stream beds, called *cos*, that are dry except after rains. The Nepal portion of the hills is called the Churia Range.

Siwalik Series, division of geologic time and deposits in the Punjab region of Asia. The Siwalik Series, a thick sequence of sediments, overlaps the Pleistocene and preceding Pliocene epochs (the Pleistocene began about 2,500,000 years ago and ended about 10,000 years ago). The Siwalik Series was deposited by streams eroding material from the rising Himalayas. It has provided a rich array of fossil vertebrates, including the dryopithecines, also found in eastern Africa, which formed the basal stock that gave rise to both man and the modern apes. Remains of the first clearly hominid forms, creatures further along the line toward man, are known from the Siwalik as well.

Several divisions of the Siwalik Series are recognized. The earliest is the Dhok Pathan Zone, recognizable by a distinctive faunal assemblage of mammals and clearly of late Pliocene age (more than 2,500,000 years old). The Tatrot Zone, which follows the Dhok Pathan Zone, contains a fossil fauna that relates it to the Villafranchian Stage of southern Europe and elsewhere. The Tatrot Zone is clearly Early Pleistocene. The fauna is a cool, temperate assemblage as compared to the warm, tropical fauna of the Dhok Pathan Zone. The Pinjor Zone, which follows the Tatrot, is also Early Pleistocene in age. The fauna includes horse and buffalo, and the mammal assemblage as a whole indicates that a warm climate again was dominant. The Lower Boulder Conglomerate, which follows the Pinjor Zone and completes the series, is of late Early Pleistocene age and precedes deposits of the Middle Pleistocene.

Siwān, town, administrative headquarters of Siwān district, Bihār state, northeastern India, 40 mi (64 km) northwest of Chāpra town on the eastern bank of the Dāha River. The town's name is derived from *savayāna* (Sanskrit: "bier"); according to legend, Buddha's bier, during its journey to Kusinārā for cremation, was set on the ground in Siwān for a short time. The town is a junction on the North Eastern Railway and is connected by paved roads with nearby areas. It is a commercial and manufacturing centre, and pottery, brass ware, and articles made from *phūl* (a locally smelted alloy) are produced. There are also a sugar mill and a distillery.

Siwān district, with an area of about 850 sq mi (2,200 sq km), composes part of the Middle Ganges Plain in the northwestern part of Bihār state. It is bounded by Gopālganj district on the north, Saran on the east, and Uttar Pradesh state on the north and west. The economy of the region is primarily based on agriculture; crops include rice, wheat, corn (maize), pulse (legumes), sugarcane, cotton, and oilseeds. Pop. (1981) town, 51,284; district, 1,778,930.

Siwertz, Sigfrid (b. Jan. 24, 1882, Stockholm—d. Nov. 16, 1970, Stockholm), novelist, playwright, poet, and short-story writer and one of the most facile and prolific of the early-20th-century Swedish writers who consciously made use of a journalistic style and were often labelled "social reporters."

Siwertz studied at the University of Uppsala and the Collège de France in Paris. In his early works, Siwertz had not yet shaken off the prevalent turn-of-the-century mood, with which he later came to terms in *En flanör* (1914; "An Idler"). For a while, somewhat under the influence of Henri Bergson, he was convinced that the active will is always good. World War I brought such beliefs to an abrupt end. After the war he wrote what is considered his best novel, *Selambs* (1920; *Downstream,* 1922), in which he relentlessly exposes capitalistic mentality as reflected in the light of wartime profiteering.

Six, Les (French: The Six), group of early 20th-century French composers whose music represents a strong reaction against the heavy, Germanic Romanticism of Richard Wagner and Richard Strauss, as well as against the lush Impressionism of Claude Debussy. Les Six were Darius Milhaud, Francis Poulenc, Arthur Honegger, Georges Auric, Louis Durey, and Germaine Tailleferre. The French critic Henri Collet originated the label Les Six in his article "The Russian Five, the French Six, and M. Erik Satie" (*Comoedia,* January 1920). Collet wished to draw a parallel between the well-known, highly nationalistic group of five late 19th-century Russian composers (Nikolay Rimsky-Korsakov, Modest Mussorgsky, Aleksandr Borodin, Mily Balakirev, and César Cui) and the similar group of later French composers, who drew much of their inspiration from the music of Erik Satie and the poetry of Jean Cocteau.

The artificiality of Collet's assemblage has often been remarked on by critics, and certainly each of the six composers developed along lines best suited to his own tastes and abilities. Yet it is impossible to ignore such distinctive elements as dry sonorities, sophisticated moods, and jazz rhythms that tend to identify the music of these composers as forming a discrete school.

six-day race, form of indoor bicycle racing in which riders race continuously for six days with only brief stops for rest and refreshment. The contestant who covers the greatest distance in the allotted time is the winner.

This type of competition achieved early popularity in the United States, where the first such race, at Madison Square Garden in New York City, was held in 1891. Contestants used high-wheeled bicycles and competed as individuals. In later events low-wheeled bicycles became standard. In 1899 one-man races were prohibited, and two-man-team competition, in which partners took turns riding and resting, was introduced.

The sport spread to Chicago, Detroit, San Francisco, and other major U.S. and Canadian cities in the early 1900s, but its decline was almost as rapid as its growth. By 1938 weekly attendance at the New York races had dropped from a peak of more than 100,000 to about 50,000. Winning performances also declined, from a record 2,759 mi (4,439 km) in 1914 to 2,080 mi (3,347 km) in 1939. The New York race was discontinued after 1939, except for a few unsuccessful attempts at revival.

Six-day races continue to draw crowds in Europe, particularly in Germany. Modern racers cover fewer total miles than old-time cyclists because they race only 12 hours each day.

Six Dynasties (AD 220–589), in China, the period between the end of the Han dynasty (AD 220) and the foundation of the Sui (581; conquest of the South, 589). The name is derived from the six successive dynasties that had their capitals at the central Chinese city of Nanking during this time: the Wu (222–280), the Eastern Chin (317–420), the Liu-Sung (420–479), the Southern Ch'i (479–502), the Southern Liang (502–557), and the Southern Ch'en (557–589). At the same time, the North was ruled by a succession of kingdoms founded by invaders from Central Asia. Important among these were the Northern Wei, which ruled from 386 to 534/535 from Lo-yang; the Eastern Wei, between 534 and

550 at An-yang; the Western Wei, from 535 to 556/557 at Ch'ang-an; the Northern Ch'i, from 550 to 577 at An-yang; and the Northern Chou, from 557 to 581 at Ch'ang-an. That the age takes its name from the Nanking states reflects a gradual shift in Chinese civilization from its previous centre in the North to the relatively unpopulated southern area, whose capital was separated from the northern invaders by the Yangtze.

As a result of the disintegration of the society and constant foreign incursions and alien reign throughout the North, many fundamental changes occurred in China during this period. The Confucian system that had ordered society was in ruins, and the growing influence of Taoism and the importation of Buddhism worked profound changes everywhere. Buddhism became a great popular religion, embraced by the northern invaders because its conception of kingship helped consolidate their authority; its emphasis on faith and good works had an effect not unlike that of the church on Europe of the early Middle Ages. Taoism also grew, spreading from its status as the religion of the few and finally becoming a great popular religion.

Despite the general chaos, great advances were made in medicine, astronomy, botany, and chemistry. Wheelbarrows and kites were invented. Coal was first used as a fuel. It was also during the Six Dynasties that the great aristocratic families began to arise in Chinese society. By the end of the period, their control was so firmly established that they continued to dominate the society until the middle or end of the T'ang dynasty (618–907).

Inevitably, the changes and uncertainties of the age were reflected in the arts, which flowered abundantly, transcending the chaos that characterized its political record. Translation of Buddhist texts into Chinese focussed attention on literature and calligraphy. Poetry flourished, and love songs were popular everywhere; in the North, where war was always near, martial influences appeared in such poetry as the "Ballad of Mu Lan," in which a girl disguises herself as a boy and wins glory at war. Literary poetry—*e.g.*, that of the lyrical Ts'ao Chieh (3rd century) and the great T'ao Ch'ien (4th–5th century)—was widely popular. Taoism influenced major writers to exhibit individuality of expression, rather than merely to emulate ancient masters. Conversation and intellectual discourse became fashionable. The intonations of Buddhist chants sharpened ears and heightened Chinese appreciation of the tonal qualities of their own speech. Art invaded the mundane: Yang Hsien-chih wrote *Lo-yang Chia-lan chi* ("Record of Buddhist Temples in Lo-yang") as a record, but it was also a graceful and charming account of current affairs and folklore. Tensions between the Chinese and various northern invaders stimulated cultural rivalry and concern for the preservation of old literature and other artworks. In the North the trumpets, drums, and double-reed wind instruments used for signalling by the Tatar invaders were adapted to purely musical uses.

Also in the North the Wei were quick to build Buddhist temples, and this not only won popular support but also stimulated development of the visual arts. That impetus came more slowly in the South, accelerated during the 4th century by refugees from the North and missionaries from Indochina, but Nanking evolved into the real centre of Chinese culture, with an abundance of great painters and calligraphers, as well as poets—some of whom turned to art criticism. A painter turned critic, Hsieh Ho, set forth the "Six Principles" of Chinese painting. The early painters of the period turned naturally to Buddhist and Taoist subjects. Tai K'uei and Ku K'ai-chih were versatile poets, musicians, painters, and sculptors who helped inspire the tradition of scholarly amateur painters.

Architecture thrived with the erection of temples and monasteries, the great monuments of the 4th and 5th centuries. In the North the Wei dynasty moved its seat to Lo-yang in 495, and architects built a city of splendour for the new capital. Tiered pagodas of brick and stone were built both in the North and South, in the North with decorative touches reflecting Indian stupas, in the South with curved rooflines. Frescoes were painted and relief figures carved on temple walls and occasionally in caves; in the North some Buddhist frescoes from the period survive in caves. In sculpture, the massive bulk of figures from the Han tradition gave way to leaner winged lions and other monumental work. A new elegance of form pervaded all visual arts of the Six Dynasties, just as individuality and grace characterized the literature. Painting in the South in the early 6th century developed an ethereal style, modifying the courtly figure painting of the 5th century with flowing drapery and golden robes.

As population increased in the South, there was impetus for the creation of pottery for funerary and other purposes in the lower Yangtze Valley (*e.g.*, Yüeh-ware jars and ewers). In Hopei and Hunan, "northern celadon" originated, with its exotic echoes of art styles imported by conquerors from the north and west.

Ultimately, it was the cultural life of the period that paved the way for the eventual reunification of China under the Sui dynasty, for as successive conquerors of the North sought to consolidate their hold, they turned to Chinese idioms and imagery to validate their reign and, in the process, became absorbed and converted. In the case of the Northern Wei, the invaders were completely assimilated in less than a century, even to the point of outlawing their own original dress.

six-man football, variety of American football developed in 1934 by Stephen Epler, a high school athletic coach in Nebraska, for small secondary schools unable to produce or to equip enough players to build an 11-man squad plus an additional 11 for practice scrimmage and substitutions. The rules drawn up by Epler retained the essential factors of blocking, tackling, running, and passing while opening the way to new possibilities for skill and strategy and reducing the dangers of injury. During the 1930s, the game spread throughout the U.S. and to Canada, played by primary and secondary schools, boys' clubs, and college intramural teams.

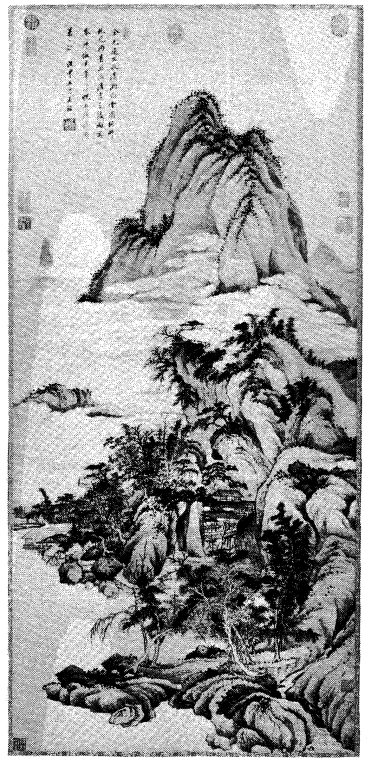
The game is played by two teams of six men each. A team consists of a centre, two ends, a quarterback, a halfback, and a fullback. The field of play is 100 yards long and 40 yards wide (about 90 by 35 metres). The goal lines are 80 yards apart, and there are two end zones 10 yards deep. Three officials (referee, umpire, and linesman) supervise the play.

The essential differences between the 6-man and 11-man games are as follows: After the ball is snapped, a clear (backward) pass or a forward pass must be thrown before the ball can cross the scrimmage line. A violation of this rule is penalized by moving the ball back five yards; a handoff is not considered a pass. Every player is eligible to receive a forward pass. During a series of four plays (downs), the team in possession of the ball must advance it 15 yards or give it up to the opposing team. A field goal scores four points. A try after touchdown starts at the three-yard line with a successful kick scoring two points and a run or pass scoring only one. If at the end of the first half, or during the second half, a team acquires 45 points more than its opponent, the game ends.

In nearly all other essentials the rules for 6-man football are the same as those for the 11-man game.

Local variations have been developed in scoring, eligibility for pass receiving, and the use of a one- or two-hand touch instead of a tackle to stop a ball carrier (*see also* touch football). In the 1950s many schools changed from 6-man to 8-man teams, which played on the smaller field but under 11-man rules. The team makeup was the same as that of the six-man team, with the addition of two linemen, who, with the centre, were ineligible to receive forward passes. In a few areas games are played by teams of five or nine players.

Six Masters of the early Ch'ing period, group of major Chinese artists who worked in the 17th and early 18th centuries (Ch'ing dynasty). Also known as orthodox masters,



"White Clouds over Hsiao and Hsiang," hanging scroll after Chao Meng-fu by Wang Chien, one of the Six Masters of the early Ch'ing period, ink and colour on paper, 1668; in the Freer Gallery of Art, Washington, D.C.

By courtesy of the Smithsonian Institution, Freer Gallery of Art, Washington, D.C.

they continued the tradition of the scholar-painter, following the injunctions of the artist-critic Tung Ch'i-ch'ang (*q.v.*) late in the Ming dynasty.

The Six Masters include the flower painter Yün Shou-p'ing (*q.v.*) and the landscapists Wu Li (*q.v.*) and the Four Wangs: Wang Shih-min, Wang Chien, Wang Yüan-ch'i, and Wang Hui (*q.v.*). The works of the Six Masters are generally conservative, cautious, subtle, and complex in contrast to the vigorous and vivid painting of their "individualist" contemporaries.

Six Principles (Chinese visual arts): *see* Hsieh Ho.

Six Schools (Hindu philosophy): *see* Mīmāṃsā; Nyāya; Sāṃkhya; Vaiseshika; Vedānta; and Yoga.

six-tone scale (music): *see* hexatonic scale.

1688, Revolution of, byname GLORIOUS REVOLUTION, or BLOODLESS REVOLUTION, in English history, the events of 1688–89 that

resulted in the deposition of James II and the accession of his daughter Mary II and her husband William III, prince of Orange and stadholder of the Netherlands.

After the accession of James II in 1685, his overt Roman Catholicism alienated the majority of the population. In 1687 he issued a Declaration of Indulgence, suspending the penal laws against dissenters and recusants, and in April 1688 ordered that a second Declaration of Indulgence be read from every pulpit on two successive Sundays. William Sancroft, the archbishop of Canterbury, and six other bishops petitioned him against this and were prosecuted for seditious libel. Their acquittal almost coincided with the birth of a son to James's Roman Catholic queen, Mary of Modena (June). This event promised an indefinite continuance of his policy and brought discontent to a head. Seven eminent Englishmen, among them the Tory Earl of Danby and Henry Compton, bishop of London, wrote inviting William of Orange to come over with an army to redress the nation's grievances.

William's chief concern was to check the overgrowth of French power in Europe, and he welcomed England's aid. Thus, having been in close touch with the leading English malcontents for more than a year, he accepted their invitation. Landing at Torbay (November 5), he advanced slowly on London, as support fell away from James II. James's daughter Anne and his best general, John Churchill, were among the deserters to William's camp; thereupon James fled to France.

William was now asked to carry on the government and summon a Parliament. When this Convention Parliament met (Jan. 22, 1689), it agreed, after some debate, to treat James's flight as an abdication and to offer the Crown, with an accompanying Declaration of Right, to William and Mary jointly. Both gift and conditions were accepted. Thereupon the convention turned itself into a proper Parliament and the Declaration into a Bill of Rights. This bill gave the succession to Mary's sister, Anne, in default of issue to William and Mary; barred Roman Catholics from the throne; abolished the power to suspend laws; condemned the power of dispensing with laws "as it hath been used of late"; declared a standing army illegal in time of peace; and required frequent parliaments and free elections.

The settlement marked a considerable triumph for Whig views. If no Roman Catholic could be king, then no kingship could be unconditional. The adoption of the exclusionist solution lent support to John Locke's contention that government was in the nature of a social contract between the king and his people represented in parliament.

Sixtus, also spelled XYSTUS (especially I to III), name of Roman Catholic popes, grouped below chronologically and indicated by the symbol •.

• **Sixtus I,** SAINT (b. Rome?—d. *c.* 125, Rome?; feast day April 3), pope from *c.* 115 to *c.* 125. He succeeded Pope St. Alexander I and ruled the church under the Roman emperor Hadrian. Although authoritative sources vary on the dates of his pontificate, they all agree that he reigned for nine or 10 years. Sixtus' martyrdom is unproved.

• **Sixtus II,** SAINT (b. Greece?—d. Aug. 6, 258, Rome; feast day August 6), pope from 257 to 258, one of the early Roman Church's most venerated martyrs.

He was elected in August 257 to succeed Pope St. Stephen I, during whose pontificate there arose a conflict with certain Eastern churches over the rebaptism of converted heretics. Although Stephen firmly upheld the Roman rule that made rebaptism unnecessary, Sixtus, supposedly influenced by Bishop St. Dionysius the Great of Alexandria, adopted a more conciliatory attitude by tolerating the Eastern policies of rebaptism. He thus restored relations with those churches that had been severed by Stephen because of the conflict and sent an envoy to Bishop St. Cyprian of Carthage, Stephen's opponent.

Shortly after Sixtus' election, the Roman emperor Valerian promulgated his first decree against the Christians, and a violent persecution ensued. For protection, Sixtus gathered (Aug. 6, 258) his congregation for services in the subterranean cemetery of Praetextatus on the Appian Way. There, he and four deacons, SS. Januarius, Vincent, Magnus, and Stephen, were seized and either beheaded immediately or brought to court and returned for execution. Sixtus was buried in the nearby cemetery of Callistus.

Subsequent legend wrongly claims his martyrdom by crucifixion. His alleged authorship of the *Sentences of Sextus* (a collection of maxims on spiritual perfection) is dubious.

• **Sixtus III,** SAINT (b. Rome—d. Aug. 19, 440; feast day March 28), pope from 432 to 440.

A chief Roman priest when he succeeded Pope St. Celestine I on July 31, 432, Sixtus had previously been suspected of favouring Pelagianism (heretical doctrine that minimized the role of divine grace in man's salvation), but on becoming pope he disappointed the Pelagians' expectations and repelled their attempts to rejoin with Rome.

Sixtus was a conciliator, and in 433 he witnessed the restoration of church peace after he helped settle a Christological dispute following the Council (431) of Ephesus between patriarchs St. Cyril of Alexandria and John of Antioch. He sustained calm relations with the East; the only notable incident of minor disturbance took place in 437, when a Constantinopolitan synod tried to encroach on the pope's rights in Illyria (the northwestern part of the Balkan Peninsula) and on those of the Antiochene patriarchate. When Proclus, the new patriarch of Constantinople, attempted to impose the synod's decisions on the Illyrian bishops, Sixtus reminded them of their obligation toward his vicar in Thessaloníki (modern Salonika, Greece).

Sixtus III sponsored important building projects in Rome, including a reconstruction of the Liberian Basilica (now St. Mary Major) and the erection of a second basilica adjoining the 4th-century church of St. Lawrence Outside the Walls.

• **Sixtus IV,** original name FRANCESCO DELLA ROVERE (b. July 21, 1414, Cella Ligure, near Savona, Republic of Genoa—d. Aug. 12, 1484, Rome), pope from 1471 to 1484 who effectively made the papacy an Italian principality.

Becoming a Franciscan, he subsequently taught and was chosen minister general of his order in 1464. He was made cardinal in 1467 by Pope Paul II, whom he succeeded on Aug. 9, 1471.

Neither a crusader nor curial politician, Sixtus aimed at the aggrandizement of his family and of the Papal States, subordinating his duties as the church's spiritual head in a manner characteristic of his era. Concurrently, the ideal of the crusade against the Turks was dying. In 1472, under Cardinal Oliviero Carafa, he sent a fleet that participated in the landing at the important Muslim stronghold of Smyrna, but a new expedition in 1473 failed. Sixtus IV's relations were strained with France, whose king Louis XI firmly upheld the Pragmatic Sanction of Bourges (1438), which had established the liberties of the French Church. His efforts in 1474 and 1476 to reunite the Russian Church with Rome and to gain Russian support against the Turks were unsuccessful.

Sixtus IV soon abandoned universal interests, concentrating on Italian politics and revealing his confirmed nepotism. His beneficiaries were members of his own family, whom he greatly enriched and who involved him in messy disputes, perhaps the worst of which was a conspiracy against Lorenzo (the Magnificent) de' Medici. On April 26, 1478, during mass at Florence cathedral, the agents of Girolamo Riario, Sixtus IV's nephew, wounded Lorenzo and killed his brother, Giuliano, in a plot to overthrow the Medici. Although Sixtus endorsed the plot, he did not approve of assassination. Out of this scandal and its counteraction, he justifiably managed to excommunicate Lorenzo, to put Florence under



Sixtus IV, commemorative medallion by Andrea Guacialoti

By courtesy of the National Gallery of Art, Washington, D.C., the Samuel H. Kress Collection

interdict, and to induce King Ferdinand I of Naples, the papacy's ally, to declare a fruitless and inglorious war that kept Italy confused for two years. In 1480 Lorenzo boldly made peace with Ferdinand, despite Sixtus, who maintained war between the papacy and Florence. He finally absolved Lorenzo and removed the interdict.

Apart from meddling in feuds between the great Roman families, Sixtus IV committed himself rather scandalously to Venice's aggression against the kingdom of Ferrara, which he incited the Venetians to attack (1482); their combined assault was intervened by Milan, Florence, and Naples. For refusing to desist from the hostilities that he had instigated and for appearing to be a dangerous rival to the Papal States, Sixtus placed Venice under interdict in 1483.

In ecclesiastical affairs, Sixtus IV instituted for the Roman Church the feast (December 8) of the Immaculate Conception of the Blessed Virgin Mary. He formally annulled (1478) the decrees of the Council of Constance and condemned (1482) abuses in the Spanish Inquisition. He granted many privileges to the mendicant orders, particularly to his own Franciscans.

Above all, he was a founder or restorer of important institutions and a patron of arts and letters. He established and richly endowed the first foundling hospital and repaired and built numerous Roman churches (including Sta. Maria del Popolo and Sta. Maria della Pace); the Sistine Chapel is his principal monument. He commissioned such great artists as Sandro Botticelli and Antonio del Pollaiuolo and pensioned such eminent men of learning as Bartolomeo Platina. From 1471 he was the second founder of the Vatican Library, which he opened for scholars. These outstanding achievements, however, were accomplished with heavy taxation and simony.

• **Sixtus V,** original name FELICE PERETTI (b. Dec. 13, 1520, Grottammare, Ancona, Papal States—d. Aug. 27, 1590, Rome), pope from 1585 to 1590, who reformed the Curia.

He entered the Franciscan order in 1533 and

was ordained at Siena, Republic of Florence, in 1547. He served twice (1557–60) as inquisitor general in Venice, his severity there causing his recall. Pope Pius V made him vicar general of the Franciscans and bishop (1566), later elevating him to the cardinalate on May



Sixtus V, commemorative medallion by Lorenzo Fragni

By courtesy of the National Gallery of Art, Washington, D.C., the Samuel H. Kress Collection

17, 1570. He retired during the pontificate (1572–85) of Pope Gregory XIII and edited the works of Bishop Ambrose of Milan (1st vol., 1580). On April 24, 1585, he was unanimously elected successor to Gregory, who had left the Papal States in chaos. The Papal States had been financially drained to satisfy the multifarious needs of the Counter-Reformation, and lawlessness, particularly banditry, was widespread.

Sixtus swiftly restored peace and safety, but his extreme measures in dealing with bandits created many enemies. His financial policies, intended to strengthen the church's reserves, included the sale of offices, creation of new *monti* (loans), new taxes, and regulation of prices. Immense sums were spent on his huge building program, including the completion of St. Peter's dome, the rebuilding of the Lateran Palace and the Vatican, revision of street plans, and the general embellishment of Rome that transformed it from a medieval to a Baroque city. Yet he was able to end his reign as one of Europe's richest princes.

Sixtus' greatness is founded on his achievements in reforming the central administration of the church. By a bull of 1586 he defined the Sacred College of Cardinals, limiting its number to 70. The secretariat of state was reorganized, and in January 1588 the Curia's entire administrative system was overhauled. He established 15 congregations (the principal departments), specifying the form and function that remained substantially unchanged until the reforms after the second Vatican Council (1962–65). He is considered one of the founders of the Counter-Reformation because it was through his new curial machinery that the decrees of the ecumenical Council of Trent (1545–63) were effectively enforced.

Sixtus V was faced with a dilemma in international relations. He desired to stop the spread of Protestantism, especially in France, which was being torn by the complex civil Wars of Religion (1562–98) between the Huguenots and the Catholics. During the War of the Three Henrys, in 1585, Sixtus excommunicated the Protestant Henry of Navarre (the future Henry IV of France) and promised subsidies for a Spanish invasion of England.

His attitude toward Henry changed, however, when Henry began considering conversion to Catholicism. Sixtus died while negotiating with Henry over the kingship of France. U. Balzani's *Sisto Quinto* ("Sixtus the Fifth") appeared in 1913, followed by L.M. Personne's *Sisto V: Il genio della potenza* ("Sixtus V: The Genius of Power") in 1935.

61 Cygni, first star whose distance from Earth (about 11 light-years) was measured (by Friedrich Wilhelm Bessel in 1838) and also the first star found (by Kaj Aage Strand, in 1943) to have a planet-like companion body.

The star is a visual binary the components of which revolve around each other in a period of about 650 years. They are of fifth and sixth magnitudes. Regular variations in the motion of the brighter component show the presence of an invisible companion with about 1 percent the mass of the Sun, or 10 times that of the planet Jupiter.

siyyum (Hebrew: "termination"), joyous celebration observed by Jews, either when a study group completes a tractate of the Talmud (rabbinic compendium of law, lore, and commentary) or when the writing of a Torah scroll (first five books of the Bible) is completed.

The study of the Talmud is frequently arranged so that a tractate can be finished on the eve of Passover (Pesaḥ). Because a special meal (*se'uddat mitzva*) follows a study of the final passage, the firstborn is exempt from his usual fast on that day. When a Torah scroll is near completion, males are generally allowed the privilege of writing one of the final letters on the sacred manuscript. This event is followed by a celebration.

sizing, coating with a gelatinous or other substance to add strength or stiffness or to reduce absorbency. In the visual arts, a canvas or panel is prepared for painting by applying size, a dilute mixture of glue or a resinous substance. In oil painting it is essential that the canvas be coated with size so that its absorbency is reduced and contact with the paint, which would lead ultimately to the decay of the canvas fibre, is avoided. Hide glue is most frequently used to treat canvas, having largely replaced parchment size, which was recommended by the 14th-century Italian artist and writer Cennino Cennini.

Sizing is done in interior decoration to prepare surfaces, especially bare and absorbent ones such as wallboard or gypsum board, for the application of wallpaper or to prepare wallpapered surfaces for painting.

In textiles and paper production, sizing is applied so as to form a solid, continuous surface film, imparting such characteristics as smoothness, stiffness, weight, and lustre. Yarn acquires strength and abrasion resistance from sizing. Common sizing substances are starch, wax, gelatin, oil, and certain polymers.

Sjælland, also spelled ZEALAND, largest and most populous island of Denmark, between the Kattegat strait and the Baltic Sea, separated from Sweden by The Sound (Øresund) and from Fyn (Funen) Island by the Great Belt (strait). Sjælland (sea–land) is divided into seven major administrative units: the municipalities of Copenhagen and Frederiksberg; and the *amtskommuner* (counties) of København, Frederiksborg, Vestsjællands, Roskilde, and the northern part of Storstrøms. The area of Sjælland is 2,713 sq mi (7,027 sq km).

Sjælland's basal rock platform is exposed in the chalk and limestone cliffs at Stevns Klint but is generally obscured by thick morainic deposits forming a gently undulating landscape. Its irregular coastline is broken by Isefjord and Roskilde Fjord. The northern part of the island is well wooded and lake strewn, with fine resort beaches on the coast. This area was once a royal hunting ground, and many fine castles survive. Fertile clay loams support agriculture (grains), dairy farming, and cattle breeding, especially in the south. Fishing and tourism are also economic factors. There are many Stone Age and Viking relics, particularly the Viking fortress of Trælleborg (*c.* AD 1000), as well as medieval churches, castles, and manor houses. Besides Copenhagen and its suburbs, urban settlements include Roskilde, Helsingør (Elsinore), Næstved, Korsør, Slagelse, Sorø, Holbæk, Ringsted, Vordingborg, Køge, Kalundborg, and Hillerød. Pop. (1976 est.) 1,987,549.

Sjahrir, Sutan (b. March 5, 1909, Padangpandjang, Sumatra—d. April 9, 1966, Zürich), influential Indonesian nationalist and prime minister who favoured the adoption of Western constitutional democracy for Indonesia.

Sjahrir, son of a public prosecutor, received a Dutch education in Sumatra and Java and attended the Law Faculty at the University of Leiden. In The Netherlands he was a member of a Socialist student group (Socialistische Studentenclub) and secretary of the student group Perhimpunan Indonesia (Indonesian Union), which numbered among its members many of Indonesia's future political leaders. He returned to the Dutch East Indies in 1931 and helped establish the Pendidikan Nasional Indonesia, a rival group to Partindo, the nationalist organization formed from remnants of the suppressed Partai Nasional Indonesia (Indonesian Nationalist Party), founded by Sukarno, the foremost Indonesian nationalist leader. The groups differed on the goals and means appropriate to nationalists, with Pendidikan opposed to Partindo's concept of a united front of left-wing parties, and were divided by personal antagonisms as well. Early in 1934 Sjahrir and Pendidikan's co-leader Mohammad Hatta were exiled by the Dutch authorities and remained isolated from Indonesian politics until the arrival of Japanese occupation forces in 1942. Sjahrir was opposed to the Japanese but chose to withdraw from public life rather than actively resist. He pressed for the country to declare independence before the Japanese surrender.

Sjahrir's pamphlet "Perdjuangan Kita" (1945; "Our Struggle") won for him the support of militant nationalists in the capital, as well as the office of prime minister in the postwar government at a time when executive power had been stripped from the president, then Sukarno, and given to the prime minister. That was done at Sjahrir's instigation as he feared Sukarno's cooperation with the Japanese would hurt the republic's image in international opinion, on which the success of negotiations with the Dutch largely depended. Sjahrir negotiated the Linggadjati Agreement, under which the Dutch acknowledged Indonesia's authority in Java and Sumatra. His conciliatory policies were not in keeping with the temper of the times, however, and in February 1946 he had to resign briefly, and in June 1947 he was forced to resign permanently. He then became a member of the Indonesian delegation to the United Nations. In 1948 he formed a Socialist party, Partai Sosialis Indonesia (PSI), which opposed the Communist Party, but it failed to win popular support and was banned by Sukarno in 1960. On Jan. 17, 1962, Sjahrir was arrested on charges of conspiracy. He was held without trial until 1965, when he was allowed to travel to Switzerland for medical treatment following a stroke.

Sjöberg, Alf (b. June 21, 1903, Stockholm—d. April 17, 1980, Stockholm), motion-picture director whose films were preeminent in the post-World War II Swedish film revival. He broke with the stage traditions that were inhibiting the artistic development of the Swedish cinema, and developed a lyrical style that was further developed by the filmmaker Ingmar Bergman.

Sjöberg was trained as an actor and stage producer and studied film production at Ufa, Germany's major film studio. His first motion picture, *Den starkaste* (1929; *The Strongest*), was a purely cinematic form of expression. He spent the next 10 years as a theatrical director. In 1940 his film *Den blomstertid* (*Blossom Time*) initiated a series of internationally successful motion pictures that combined techni-

cal expertise and visual freshness with sensitive character portrayal. *Himlaspelet* (1942; *The Road to Heaven*) examined the deeply rooted spirituality of the Swedish people; *Hets* (1944; Eng. trans. *Frenzy*, or *Torment*), written by Ingmar Bergman, brought worldwide critical acclaim; *Fröken Julie* (1950; *Miss Julie*) was a film version of Strindberg's play. Sjöberg's other films included *Karin Månsdotter* (1954), *Sista paret ut* (1956; *Last Pair Out*), *Domaren* (1960; *The Judge*), *Ön* (1964; *The Island*), and *Fadern* (1969; *The Father*).

Sjöberg, Birger (b. Dec. 6, 1885, Vänersborg, Swed.—d. April 30, 1929, Växjö), songwriter and poet known for his development of a strikingly original form in modern Swedish poetry.

After very little formal education and a number of occupations, Sjöberg became a journalist. In his spare time he wrote the lyrics and music of songs, which he sang occasionally to entertain friends. His first publication of songs, *Fridas bok* (1922; "Frida's Book"), was highly successful and brought him much acclaim. He was hailed a modern troubadour in the tradition of Sweden's Carl Bellman, and he soon found himself on a series of concert tours with his songs. He recoiled from this attention, however, and withdrew in disgust, apparently desiring his reputation to be based on work more significant than his songs. His only novel, *Kvartetten som sprängdes* (1924; "The Quartet Which Was Broken Up"), also became highly popular. He unleashed his full fury in *Kriser och Kransar* (1926; "Crises and Laurel Wreaths"), a relentless and explosive confrontation with post-World War I life and an artistic breakthrough to new forms and highly modern poetic devices.

After his death, two further volumes appeared, a second series of Frida songs (1929) and a selection from some 3,000 poems and fragments published under the title *Minnen från jorden* (1940; "Memories from Earth").

Sjögren's syndrome, also called SICCA SYNDROME, chronic inflammatory disorder characterized by severe dryness of the eyes and the mouth that results from a diminution in secretion of tears and saliva. Dryness may also involve the nose, pharynx, larynx, and tracheobronchial tree. Approximately half the persons affected also have rheumatoid arthritis or, less commonly, some other connective-tissue disease, such as scleroderma, polymyositis, or systemic lupus erythematosus. The great majority of the persons affected are women.

Infiltration (gradual assemblage) of lymphocytes and plasma cells leads to enlargement of the parotid or other salivary glands in half the patients. There may also be enlargement of the spleen, diminution in white blood cell numbers, Raynaud's phenomenon, vasculitis (inflammation of vessels) with chronic leg ulcers, a disease of the peripheral or trigeminal nerves, chronic (Hashimoto's) thyroiditis (inflammation of the thyroid), enlargement of the liver, and inflammation of the pancreas. A number of persons with sicca syndrome of long duration have developed neoplasms of the type called reticulum cell sarcoma, or primary macroglobulinemia (the presence in the blood of globulins of high molecular weight).

Treatment toward relief of symptoms includes the administration of artificial tears to lessen ocular dryness. Corticosteroids or immunosuppressive drugs have been employed with some success for the more serious manifestations.

Sjöström, Victor, Sjöström also spelled SEASTROM (b. Sept. 20, 1879, Silbodal, Swed.—d. Jan. 3, 1960, Stockholm), motion-picture actor and director who contributed significantly to the international preeminence of the Swedish silent film in the post-World War I era. Influenced by the novels of Selma Lagerlöf, whose art is rooted in sagas and folklore and imbued with a reverence for nature, Sjöström's films were lyrically beautiful expressions of man's relationship to nature and to society.

Trained as a stage actor, Sjöström directed and starred in his first film, *Trädgårdsmästaren* (*The Gardener*), in 1912. Other notable films were *Ingeborg Holm* (1913); *Terje vigen* (1916; *Third Way*), an experiment in the integration of setting and theme; and *Berg ejvind och hans hustru* (1917; *The Outlaw and His Wife*), in which he refined the technique of light diffusion and the use of significant details. With the release of *Körkarlen* (*The Phantom Carriage*, or *The Soul Shall Bear Witness*) in 1920, the artistic excellence of the Swedish film was recognized throughout the world.

Emigrating to Hollywood in 1923, Sjöström directed pictures in which he further refined his visual techniques—*e.g.*, *He Who Gets Slapped* (1924), *The Scarlet Letter* (1926), *The Divine Woman* (1927), and *The Wind* (1928). Their pictorial beauty and realism were reminiscent of his finest Swedish films. Although his American films were critically acclaimed, they were not outstanding box-office successes. In 1930 Sjöström returned to Sweden. Though he directed a few more films, it was primarily as an actor that he participated in the post-World War II Swedish film revival. One of his outstanding performances was that of the aged hero of Ingmar Bergman's film *Smultronstället* (1957; *Wild Strawberries*).

Sjöwall, Maj; and Wahlöö, Per (respectively b. Sept. 25, 1935, Stockholm; b. Aug. 5, 1926, Göteborg, Swed.—d. June 22, 1975, Malmö), Swedish journalists and innovative writers of detective fiction.

As a team Per Wahlöö and his wife Maj Sjöwall (married in 1962) wrote a series of detective stories in which Martin Beck and his colleagues at the Central Bureau of Investigation in Stockholm were the main characters. From *Roseanna* (1965) to *Terroristerna* (1975; "The Terrorists"), the series consists of 10 novels, all of which are translated into English and a number of other languages. In their psychological characterization and use of a police collective instead of a mastermind, the works bear similarities to the writings of both Georges Simenon and Ed McBain. What sets the series apart from other books in the same genre is the conscious use by Wahlöö and Sjöwall of the popular form of the detective story as a vehicle for social criticism. The crime itself, however intriguing, plays a subordinate role in each novel. Both the police force and the criminals mirror the shifting social forces within the Swedish welfare state. The authors criticized strongly the many abuses of power and the systematic use of propaganda in society. Many of these motifs recur in Per Wahlöö's novels of the late 1950s and early 1960s. Maj Sjöwall and Per Wahlöö received the Sherlock Prize in 1968.

Skadi, Old Norse SKAOI, in Norse mythology, the giant wife of the sea god Njörd. In order to avenge the death of her father, the giant Thiazi, Skadi took up arms and went to attack the rival tribe of the gods (the Aesir) in Asgard, home of the gods. The Aesir, wanting to appease her anger, offered her the choice of one of their number for a husband, with the stipulation that she choose a god by his legs (or feet) alone. She chose Njörd, thinking that he was the fair god Balder; their marriage failed because Njörd preferred to live by the sea, and Skadi was happier in her father's home in the mountains (Thrymheim). In some sources, Skadi was known as the goddess of snowshoes. Another tradition had her later marrying the god Odin and bearing sons.

Skagen, also called THE SKAW, city and port, Nordjyllands *amtskommune* (county commune), northern Jutland, Denmark, near the northern tip of the peninsula on the Kattegat strait. Chartered in 1413, it is one of the principal fishing centres in Denmark. It is also a summer resort and, from the 1870s, the site of an artists' and writers' colony. Notable are the Rå-bjerg Mile sand dunes to the south and the Old Church, which has been buried to the roof in sand since a storm in 1775. At the Grenen headland (also called the Prong), the most northerly point of Denmark (2 miles [3 km] north), the Skagerrak (an arm of the North Sea) and the Kattegat meet. Pop. (1985 est.) city, 11,653; (1986 est.) mun., 13,994.

Skagerrak, rectangular arm of the North Sea, trending southwest to northeast between Norway on the north and the Jutland peninsula of Denmark on the south. About 150 miles (240 km) long and 80–90 miles (130–145 km) wide, it narrows between Cape Skagen (the Skaw), Denmark, and the Swedish coast before turning south into the Kattegat toward the Danish sounds and the Baltic Sea. Shallow along the Danish shore, it deepens toward the Norwegian coast, reaching a depth of more than 2,000 feet (600 m). A busy shipping lane, its ports include Oslo and Kristiansand (Norway) and Uddevalla and Strömstad (Sweden).

Skagerrak, Battle of the (1916): *see* Jutland, Battle of.

Skagway, city, southeastern Alaska, U.S., at the north end of the Lynn Canal, the northernmost point on the Inside Passage (Alaska Marine Highway). Founded in the 1890s as the gateway to the Yukon and Klondike goldfields, it owed its importance to being the Pacific coastal terminus of the White Pass and Yukon Railway from Whitehorse, head of navigation on the Yukon River. The railway suspended service in 1982. Cruise ships and ferries call at the ice-free port, and Klondike Highway 2 links the town with the Alaska Highway. Nearby is Reid Falls (300 feet [90 m]). Inc. 1900. Pop. (1984 est.) 816.

skaldic poetry, skaldic also spelled SCALDIC, oral court poetry originating in Norway but developed chiefly by Icelandic poets (skalds) from the 9th to the 13th century. Skaldic poetry was contemporary with Eddaic poetry but differed from it in metre, diction, and style. Eddaic poetry is anonymous, simple, and terse, often taking the form of an objective dramatic dialogue. Skalds were identified by name; their poems were descriptive and subjective; their metres were strictly syllabic instead of free and variable; and their language was ornamented with *heiti* and *kennings*. *Heiti* ("names") are uncompounded poetic nouns, fanciful art words rather than everyday terms; *e.g.*, "brand" for "sword," or "steed" for "horse." *Kennings* are metaphorical circumlocutions such as "sword liquid" for "blood" or "wave-horse" for "ship." Sometimes *kennings* are extremely indirect; for example, "the blue land of Haki" (a sea king) refers not to land but to the sea and requires a knowledge of Norse mythology to be understood. Of the 100 skaldic verse forms, the *dróttkvætt* (court metre), which uses a syllable count and a regular pattern of alliteration, internal rhyme, and assonance, was most popular. The formal subjects of the skalds were shield poems (descriptions of the mythological engravings on shields), praise of kings, epitaphs, and genealogies. There were also less-formal occasional poems, dream songs, magic curses, lampoons, flytings (or poems of abuse), and (although forbidden by law) many love songs. Because they so often praised current feats of the kings, the poems have high historical value, limited only by their abstruse language. The greatest of the skalds was Egill Skallagrímsson (*q.v.*), whose life and works are preserved in the *Egils saga*.

Skalkottas, Nikos, in full NIKOLAOS SKALKOTTAS (b. March 21, 1904, Khalkis, Greece—d. Sept. 20, 1949, Athens), one of the leading Greek composers of the 20th century.

Skalkottas began violin studies at the age of five, continuing them later at the Athens conservatory and in Berlin, where he also studied composition. Influenced by Schoenberg, with whom he studied (1927–31), he began using the 12-tone method in his compositions but adhered to traditional forms. Returning to Athens in 1933 Skalkottas worked as an orchestral violinist but continued to compose.

Little of his music was performed during his lifetime, and almost none of it was published. His major works include symphonic suites, three piano concerti, four string quartets, and the overture *The Return of Ulysses.* His settings of Greek dances are based on Balkan folk music.

Skallagrímsson, Egill (Icelandic skald): *see* Egill Skallagrímsson.

Skamander, group of young Polish poets who were united in their desire to forge a new poetic language that would accurately reflect the experience of modern life. Founded in Warsaw *c.* 1918, the Skamander group took its name from the name of their monthly publication. It was co-founded by Jarosław Iwaszkiewicz, known primarily for his novels and short stories, and Julian Tuwim, a lyrical poet of emotional power and linguistic sensitivity, best remembered for the collections *Czychanie na Boga* (1918; "Lying in Wait for God"), and *Biblia cygańska* (1933; "The Gypsy Bible"), and the long autobiographical poem *Kwiaty polskie* (1949; "Polish Flowers"). Also associated with the group were Kazimierz Wierzyński, Jan Lechoń (pseudonym of Leszek Serafinowicz), and Antoni Słonimski.

Among sympathizers with Skamander were Maria Pawlikowska-Jasnorzewska, who had a gift for expressing emotion, and Władysław Broniewski, a powerful lyrical poet who used traditional metres and forms to express concern with current social and ideological problems. A writer of great importance was Bolesław Leśmian, considered the outstanding 20th-century Polish lyrical poet. His symbolic Expressionist poetry, collected in *Łaka* (1920; "The Meadow"), *Napój cienisty* (1936; "The Shadowy Drink"), and *Dziejba leśna* (1938; "Songs of the Forest"), is remarkable for the inventiveness of its vocabulary, its sensuous imagery, and philosophic content.

Skanda, also called KĀRTTIKEYA, KUMĀRA, or SUBRAHMAṆYA, Hindu god of war and the first-born son of Śiva (Shiva). The many legends giving the circumstances of his birth are often at variance with one another. One account is given by Kālidāsa (4th and 5th centuries AD) in his epic poem *Kumārasaṃbhava* ("The Birth of the War God"). The versions all generally agree that the gods wished for Skanda to be born in order to destroy the demon Tāraka, who had been granted a boon that he could only be killed by a son of Śiva. Śiva, however, was lost in meditation and was not attracted to Pārvatī until struck by an arrow from the bow of Kāma, the god of love. After the many years of abstinence Śiva's seed was so strong that the gods feared the result, and some accounts say it was deposited into the fire (from which comes the name Skanda, in Sanskrit: "spurt of semen").

One tradition has it that Skanda was reared by, or even the son of, the Kṛttikās, six wives of *ṛṣis* who as stars make up the Pleiades, hence the name Kārttikeya (Son of Kṛttikās). He developed his six faces to drink the milk of his six nurses. His relationship with Pārvatī is also acknowledged, and he is often depicted in painting and sculpture as a six-headed child held by his mother, Pārvatī, and accompanied by his brother Gaṇeśa. He is Kumāra ("adolescent, boy") because he is generally considered to have never married and in Yoga represents the power of chastity. He has enormous strength and leads the army of the gods. When he planted his spear in the earth, none could budge it save the god Vishnu, and then mountains and rivers shook.

In South India, where the god originated as Murugaṉ before merging with the North Indian Skanda, he has a large following under



The god Skanda, stone sculpture, Gupta period; in Bharat Kala Bhavan, Vārānasi, India

By courtesy of Bharat Kala Bhavan, Banaras Hindu University

the name Subrahmaṇya ("dear to the Brāhmaṇas"); his temples or shrines are found in every village, no matter how small.

Skanda is often represented in sculpture with either six heads or one, holding a spear or bow and arrows, and either riding on or accompanied by his mount, the peacock.

Skanderbeg, byname of GEORGE KASTRIOTI, or CASTRIOTA, Albanian GJERGJ KASTRIOTI (b. 1405, northern Albania—d. Jan. 17, 1468, Lezhë, Alb.), national hero of the Albanians.

A son of John (Gjon) Kastrioti, prince of Emathia, George was early given as hostage to the Turkish sultan. Converted to Islām and educated at Edirne, Tur., he was given the name Iskander—after Alexander the Great—and the rank of bey (hence Skanderbeg) by Sultan Murad II. During the defeat of the Turks at Niš (1443), in Serbia, Skanderbeg abandoned the Turkish service and joined his Albanian countrymen against the forces of Islām. He embraced Christianity, reclaimed his family possessions, and in 1444 organized a league of Albanian princes, over which he was appointed commander in chief.

In the period 1444–66 he effectively repulsed 13 Turkish invasions, his successful resistance to the armies of Murad II in 1450 making him a hero throughout the Western world. Through the years he elicited some support from Naples, Venice, and the papacy and was named by Pope Calixtus III captain general of the Holy See. In 1463 he secured an alliance with Venice that helped launch a new offensive against the Turks. Until the end of his life he continued to resist successfully all Turkish invasions. Within a few years of his death, however, his citadel at Krujë had fallen (1478), and Albania passed into several centuries of obscurity under Turkish rule.

skandha (Sanskrit: "aggregates"), Pāli KHANDHA, according to Buddhist thought, the five elements that sum up the whole of an individual's mental and physical existence. The self (or soul) cannot be identified with any one of the parts, nor is it the total of the parts. They are: (1) matter, or body (*rūpa*), the manifest form of the four elements—earth, air, fire, and water; (2) sensations, or feelings (*vedanā*); (3) perceptions of sense objects (Sanskrit *saṃjñā*; Pāli *saññā*); (4) mental formations (*saṃskāras/sankhāras*); and (5) awareness, or consciousness, of the other three mental aggregates (*vijñāna/viññāṇa*). All individuals are subject to constant change, as the elements of consciousness are never the same, and man may be compared to a river, which retains an identity, though the drops of water that make it up are different from one moment to the next.

Skåne, also called SCANIA, *landskap* (province), southern Sweden, composed of the administrative *län* (counties) of Malmöhus and Kristianstad and traditionally known as "the granary of Sweden." Occupying the peninsular southern tip of Sweden, its land area of 4,224 sq mi (10,939 sq km) is bounded by water on three sides—the Baltic on the east and south, and The Sound (Öresund) on the west. On the north it borders the traditional *landskap* (provinces) of Halland and Småland, and on the northeast that of Blekinge. Inland from the flat coastal region, with its beaches and summer resorts, are plains that are among the most fertile in Sweden; deciduous trees, notably beech, predominate in the southern part, while coniferous trees are found toward the north. Medieval churches and 16th- and 17th-century castles and manor houses are characteristic of the area. After numerous battles Skåne was ceded to Sweden by Denmark in the Peace of Roskilde (1658).

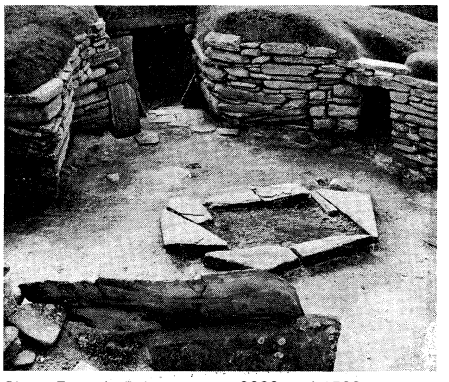
Although the province is of only moderate size, it is of great importance as Sweden's chief food producer. Among the chief crops are wheat, rye, barley, oats, potatoes, and sugar beets. Grain production is of prime importance, but Skåne also has well-developed industries, including food processing, shipbuilding, metalworking, and manufacturing. Besides Malmö—Skåne's principal city and Sweden's third largest—leading towns include Hälsingborg, Landskrona, Kristianstad, Trelleborg, and Ystad. In addition to good transportation links with the rest of Sweden, there are ferry connections with Denmark, Germany, and Poland, as well as an international airport at Bulltofta, near Malmö. Pop. (1984 est.) 1,024,152.

Skåne question, Skåne also called SCANIA, in medieval and modern Baltic and Scandinavian history, international problem involving control of the southern Scandinavian Peninsula province of Skåne, which affected the political and economic power relationships of the northern European maritime powers.

Although contiguous with the Swedish polity, Skåne belonged to Denmark when the Middle Ages began (*c.* 500). The Danes thus controlled the Baltic–North Sea passageway, and this accounted in large part for Denmark's great power status. Skåne was coveted by other Baltic powers at least since the 14th century, when the Danes lost complete control of it for brief periods. It became a serious "question" in the 17th century when the ascendant Swedish state wrested it from the Danes (1658). The population of Skåne was not receptive to Swedish rule, a fact that helped the Danes win the Scanian War (1676–79) against the Swedes. Victory, however, did not result in a return of the province; France vetoed the move. Further Danish attempts at recovery in the 18th century were likewise foiled by the maritime powers, which did not want any one power to control the Baltic–North Sea passage; the fast political and cultural assimilation of the Scanian population into Sweden was also a factor. In the 19th century, with both Sweden and Denmark reduced to lesser power status, the Skåne question disappeared.

Skara, town in the *län* (county) of Skaraborg, south central Sweden, southeast of Vänern (lake). One of Sweden's oldest towns, it was a religious centre both before and after the arrival of Christianity. In 1015 it became the seat of Sweden's first bishop. The cathedral was built in the 12th century and has been restored several times. One of Sweden's earliest secondary schools was established there in 1641. In Skara is the provincial Västergötland Museum with the adjoining Fornbyn open-air museum. About 10 mi (16 km) east of the town is the Varnhem Abbey Church, begun about 1250. Pop. (1984 est.) mun., 17,887.

Skara Brae, one of the most perfectly preserved Stone Age villages in Europe, which was covered for hundreds of years by a sand dune on the shore of the Bay of Skaill, Mainland Island, Orkney Islands, Scot. Exposed



Skara Brae, built between *c.* 2000 and 1500 BC
J. Allan Cash

by a great storm in 1850, four buildings were excavated during the 1860s by William Watt. After another storm in 1926, further excavations were undertaken by the Ancient Monuments branch of the British Ministry of Works. Archaeologists estimated that Skara Brae had been built *c.* 2000 BC–1500 BC.

Though the dwellings at Skara Brae are built of undressed slabs of stone from the beach, put together without any mortar, the drift sand that filled them immediately after their evacuation preserved the walls in places to a height of eight feet. Because there were no trees on the island, furniture had to be made of stone and thus also survived. The village consisted of several one-room dwellings, each a rectangle with rounded corners, entered through a low, narrow doorway that could be closed by a stone slab.

When the village was abruptly deserted it consisted of seven or eight huts linked together by paved alleys. Six huts had been put artificially underground by banking around them midden consisting of sand and peat ash stiffened with refuse, and the alleys had become tunnels roofed with stone slabs. The whole residential complex was drained by a sewer into which the drains from individual huts discharged.

The inhabitants of the village lived mainly on the flesh and presumably the milk of their herds of tame cattle and sheep and on limpets and other shellfish. They probably dressed in skins. For their equipment the villagers relied exclusively on local materials—stone, beach pebbles, and animal bones. Vessels were made of pottery; though the technique was poor, most vessels had elaborate decoration. As ornaments the villagers wore pendants and coloured beads made of the marrow bones of sheep, the roots of cows' teeth, the teeth of killer whales, and boars' tusks. Games were played with dice of walrus ivory and with knucklebones.

A number of stones in the walls of the huts and alleys bear roughly scratched lozenge and similar rectilinear patterns. Beneath the walls the foundations of older huts were discovered. In plan and furniture these agreed precisely with the material found covering them. The pottery of the lower levels was adorned with incised as well as relief designs. Among these was the true spiral represented on one potsherd—the only example of this pattern in pottery known in prehistoric Britain.

Skaraborg, *län* (county), south central Sweden, between the lakes Vänern and Vättern. Its land area of 3,065 sq mi (7,938 sq km) comprises the northern part of the traditional *landskap* (province) of Västergötland. Its surface is hilly, rising to the summits of Hökensås (1,161 ft [354 m]), Alleberg (1,096 ft), and Kinnekulle (1,004 ft), and is drained by several rivers. Soil deposits from the Yoldia Sea, an extension of the Baltic Sea that is believed to have covered the region *c.* 7500 BC, have produced fertile areas, and agriculture is dominant. Industries include limestone quarrying, automobile assembling, and the manufacture of cement and matches. Mariestad is the capital, and Falköping is an ancient city that contributed heavily to Swedish culture and law. Skara, the pre-Christian religious centre, became the seat of Sweden's first bishop in 1015 and was an important city in the Middle Ages. Pop. (1983 est.) 270,613.

Skarga, Piotr, in full PIOTR SKARGA POWESKI (b. February 1536, Grójec, Masovia—d. Sept. 27, 1612, Kraków), militant Jesuit preacher and writer, the first Polish representative of the Counter-Reformation.

After a difficult childhood during which both his parents died, he studied at Jagiellonian University, then became rector of a parish school in Warsaw. After some travel, he became a parish priest in Lwów. Subsequently, he travelled to Rome, joined the Society of Jesus, and moved to Vilna, where he enjoyed considerable success in converting Protestants to Roman Catholicism. He became the first rector of the University of Vilna in 1579, when it was created from the old Jesuit academy there. He next went to Kraków, where he eventually became court chaplain to King Sigismund III Vasa. There he became famous as a powerful speaker and writer on religious subjects. Though his forthrightness in condemning the public and private sins of the court could have exposed him to reprisals, he never hesitated to speak his mind. An ardent believer in his faith, he was no less intolerant than others of his time.

Kazania sejmowe (1597; "Diet Sermons") is considered Skarga's best work. These sermons are said to have been delivered before the King and his Diet. Other works include *Żywoty świętych* (1579; "The Lives of Saints"), still widely read in Poland today, and collections of sermons such as *Kazania na niedziele i święta* ("Sermons for Sundays and Holidays") and *Kazania przygodne* ("Incidental Sermons").

skarn, in geology, metamorphic zone developed in the contact area around igneous rock intrusions when carbonate sedimentary rocks are invaded by large amounts of silicon, aluminum, iron, and magnesium. The minerals commonly present in a skarn include iron oxides, calc-silicates (wollastonite, diopside, forsterite), andradite and grossularite garnet, epidote, and calcite. Many skarns also include ore minerals; several productive deposits of copper or other base metals have been found in and adjacent to skarns. The typical rock of a skarn is hornfels, a fine-grained, flinty rock produced by the heat and solutions given off by the intruding magma. Granitic and dioritic magmas are most commonly associated with skarns. Skarns can be zoned, with the inner zones successively replacing the outer ones as the wave of metamorphism moves through the surrounding rocks.

Skarżysko-Kamienna, town, Kielce *województwo* (province), southeastern Poland, on the Kamienna River. An important metallurgical centre since the end of World War II (1945) and rail junction on the Warsaw–Kraków line, it is part of the Staropolskie Zagłębie Przemysłowe, or the Old Poland Industrial Basin, which encompasses the area surrounding Skarżysko-Kamienna and the Góry Świętokrzyskie (Holy Cross Mountains) region. Just east of the town at Wąchock, the area's mining industry began in the 16th century, reaching its peak in the 19th. Mining operations have been centred on Skarżysko-Kamienna since the mid-1940s. Pop. (1982 est.) 44,300.

Skat, card game played in Germany, where it is the most popular card game, and by Germans throughout the world. It is an elaboration of Schafkopf (Sheepshead), a Wendish game dating at least to the middle 1700s, and includes features from Tarok and Kalabrias.

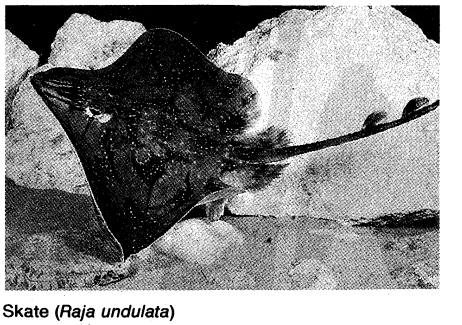
Skat is for three players. A pack of 32 cards, omitting the 2s, 3s, 4s, 5s, and 6s, is used. Each player receives 10 cards; the remaining 2 are dealt face down for a skat (widow). The players bid a certain number of points, the lowest being 10; the high bidder then names one of about 15 "games" that will be played out. In the game *tournee,* trump is fixed by a card turned from the skat—it may be a *grand* (in which only knaves [jacks] are trumps) if a knave is turned, or trumps may be the suit of the knave. *Solo* is played without using the skat: the player names a trump suit, or *grand. Gucki* is a *grand* using the skat. *Null* is a bid to take no tricks, at no trumps. *Ramsch* is played if all three players pass, the object being to win fewest points in tricks, with knaves trumps.

The bidding and scoring values of the games are determined by their assigned base values times the sum of all due multipliers. The multipliers arise from various sources—points won in play, prediction or announcement as to this outcome, and *matadors* (top trumps in unbroken sequence).

To make his bid, a declarer must take a majority of the 120 card points: aces count 11, 10s count 10, kings 4, queens 3, knaves 2. Except in *ramsch,* the other two players become temporary partners to try to defeat the bidder.

Rauber Skat, popular in club play but not in tournaments, eliminates the game *tournee.* Instead, the high bidder always has the option of taking the skat or of playing without it. In the latter case, he earns an extra multiplier.

skate, in zoology, any of numerous flat-bodied, cartilaginous fishes constituting the suborder Rajoidea of the order Batoidei (skates, rays, and others). Skates are found in most parts of the world, from tropical to



Skate (*Raja undulata*)
Jacques Six

near-Arctic waters and from the shallows to depths of more than 2,700 metres (8,900 feet). Nine genera of skates are placed in three families: Rajidae, Arynchobatidae, and Anacanthobatidae.

Skates are rounded to diamond-shaped in form. They have large pectoral fins extending

from or nearly from the snout to the base of the slender tail, and some have sharp "noses" produced by a cranial projection, the rostral cartilage. Skates may be solid coloured or patterned. Most have spiny or thornlike structures on the upper surface, and some have weak electrical organs in the tail. Typical skates (Rajidae), the majority of the living forms, have two dorsal fins on the tail; the Arynchobatidae have one, and the Anacanthobatidae have none. The mouth and gill openings of all skates are on the underside of the body, and all, so far as is known, lay eggs. The eggs, the mermaid's purses often found on beaches, are oblong and protected by leathery cases.

Skates vary in size. The little, or hedgehog, skate (*Raja erinacea*) of the western Atlantic, for example, is adult at a length of 50 centimetres (20 inches) or less. In contrast, the big skate (*R. binoculata*) of the North American Pacific may be 2.5 metres long. Skates are innocuous bottom dwellers, often found lying partly buried. They swim with a graceful undulating movement of their pectoral fins. Skates feed on mollusks, crustaceans, and fishes, trapping active prey by dropping down on it from above. In Europe, skates are sold commercially as food.

Skate, first production-model nuclear-powered submarine of the U.S. Navy, similar to the "Nautilus" but displacing only 2,360 tons. The "Skate," launched in 1957, was the first submarine to make a completely submerged transatlantic crossing (1958) and the first to surface at the North Pole (1959). It was armed with torpedoes and was capable of speeds greater than 20 knots on the surface and 25 knots submerged. Three other submarines of the Skate class were built: "Swordfish" (commissioned 1958), "Sargo" (1958), and "Seadragon" (1959).

skate, in sports, one of a pair of devices worn on the feet for skating on ice or, when wheeled, for skating on a surface other than ice. See ice-skating; roller-skating.

skate sailing, the sport of moving over ice on skates by carrying a small sail for propulsion by the wind. It probably originated in the Scandinavian countries and was practiced in some form or another almost immediately after the invention of the skate.

The skate sail is generally rectangular or triangular in shape and about 50 to 60 square feet (5 to 6 square metres) in area. It is stretched to drumhead tightness on spars and rigging and carried on the sailor's windward shoulder; that is, between the sailor and the wind. Sails are made of sheeting or unbleached muslin, lightweight sailcloth, balloon silk, or nylon. Long, tubular racing skates 16 to 18 inches (41 to 46 centimetres) in length are used, and speeds up to about 55 miles (90 kilometres) per hour have been reported.

One of the first skate-sailing organizations was the Ice-Skate Sailing Club, formed in Stockholm in 1901. The sport was taken up by members of the London Skating Club in England in the 1890s and was introduced to North America in the early 1900s. The Skate Sailing Association of America was organized in 1922. The sport never became very popular, however, and by the second half of the 20th century it was little practiced.

skateboarding, form of recreation popular among youths, in which a person rides standing balanced on a small board mounted on wheels. Most skateboards are about 2 ft 6 in. (0.76 m) long and 4 in. (10 cm) wide. Originally, they were made of wood, but later they were also made of aluminum, fibre glass, and plastic. There are two kinds of skateboards: stiff and flexible.

The skateboard first appeared in the early 1960s on paved areas along California beaches as a makeshift diversion for surfboard aficionados when the ocean was flat. Rollerskate wheels were simply affixed to miniature surfboards. Skateboards were revived in the mid-1970s after the development of the faster and more manoeuvrable polyurethane wheel. The craze became worldwide, and skateboard parks were built, providing a variety of slopes and banked surfaces for sudden turns and stunts. Portable ramps were also built to provide a course similar to that for slalom skiing. Accidents to skateboarders led to the creation of special skateboard helmets, knee and elbow pads, and goggles. Such variations as a 9 ft 11 in. skatecar, with the driver prone (which reached a speed of nearly 60 mph), the use of sails with wheel-mounted boards, and an ice-skate version appeared later.

skating (sport): *see* ice-skating; roller-skating.

Skaw, The (Denmark): *see* Skagen.

Skeat, Walter William (b. Oct. 14, 1866, Cambridge, Cambridgeshire, Eng.—d. July 24, 1953, London), British ethnographer of the Malay Peninsula whose detailed works laid the foundation for later ethnographic studies of the area.

Following a classical education at Christ's College, Cambridge, Skeat in 1891 joined the civil service of the state of Selangor in the Malay Peninsula. He became interested in ideas of magic found among Malays and in the customary practices and daily life of the aborigines living in the interior.

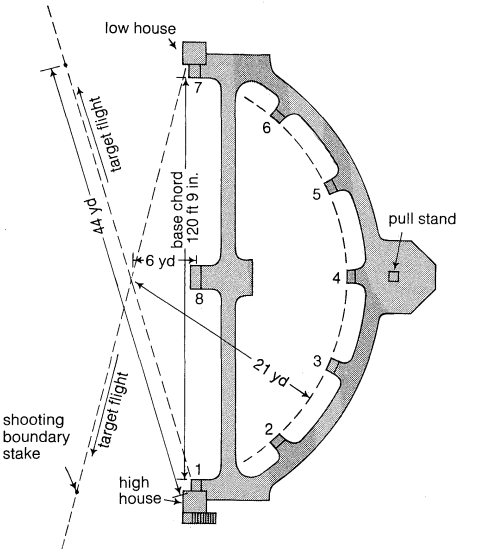
During 1899 he carried out an expedition to Trengganu (Terengganu) and Kelantan, Malay states then under Siamese suzerainty, to collect data on Malay beliefs, traditions, and ways of life in areas not yet subjected to European influence. Illness contracted on this trip forced him to resign from the colonial service, and he spent the remainder of his life in London, serving as one of the Studeley lecturers at the British Museum from 1914 until his retirement in 1932.

His researches led to publication of two major works: *Malay Magic* (1900) and *Pagan Races of the Malay Peninsula* (1906, with C.O. Blagden). At his death he left a substantial volume of unpublished material.

Skeena River, stream in western British Columbia, Canada, rising in the Skeena Mountains in the northern part of the province and flowing generally southwestward, receiving its two major tributaries, the Babine and Bulkley rivers, before emptying into Chatham Sound (an arm of the Pacific Ocean), south of Prince Rupert, after a course of about 360 mi (580 km). The Skeena is an important salmon-fishing stream with several canneries near its mouth; it is navigable for steamers for 100 mi inland. The lower courses of the Bulkley and Skeena are paralleled by the Canadian National Railway and Yellowhead Highway between Prince George and Prince Rupert. Riverine settlements include Terrace, Hazelton, and Smithers (the latter on the Bulkley River). Skeena is derived from an Indian word meaning "divide."

skeet shooting, sport in which marksmen use shotguns to shoot at clay targets thrown into the air by spring devices called traps. It differs from trapshooting (*q.v.*), from which it derived, in that in skeet traps are set at two points on the field and targets may be thrown diagonally across the shooter's field of vision as well as directly away from him. The sport was developed in 1915 by William Foster of the United States as informal shooting practice to provide hunters with a greater variety of shooting angles than was possible with trapshooting.

In competition 25 targets comprise the usual round. Two shots, at single targets thrown from each trap house, are fired from each of eight shooting stations. Eight shots are fired at four double targets, one thrown from each house at the same time, from the first, second, sixth, and seventh stations. A 25th shot



Layout of a skeet shooting field

is taken after the first miss, or, if there are no misses in the first 24 shots, as an optional shot from any part of the field.

A semi-automatic, open-bore, 12-gauge shotgun is the usual weapon, although in less formal contests other kinds of guns may be used. In some competitions shooters are grouped according to the gauge of their guns.

Skeet shooting was included in Olympic Games competition for the first time in 1968. Each competitor fires 8 rounds of 25 targets. For Olympic champions, *see* Olympic Games. International and world championship skeet events are supervised by the International Shooting Union. For world records, *see* Sporting Record: *Shooting.*

skeletal muscle: *see* striated muscle.

skeleton, the supportive framework of an animal body. In vertebrates the skeletal system is mainly internal, consisting for the most part of bone and cartilage; in invertebrates it is sometimes external and may consist of a variety of nonbony, noncartilaginous materials.

A brief treatment of skeletal systems follows. For full treatment, *see* MACROPAEDIA: Supportive and Connective Tissues.

For a depiction of some of the structures that make up the human skeletal system, shown in relation to other parts of the gross anatomy, *see* the colour Trans-Vision in the PROPAEDIA: Part Four, Section 421.

Animal skeletons are composed of six basic types of structures, and often the same chemical compounds are present in different skeletal structures, although their mechanical characteristics may differ greatly. Moreover, elements of more than one type may make up a single skeletal system, especially in the more complex higher animals.

The first type of skeleton is the hard structure. This ranges in complexity from the simple deposits excreted by the individual coral colony member, which harden and form a ridgy structure serving both as a base for growth and a place of refuge, to the more intricate bones of vertebrates. Other examples include the shells of clams, the spiky skeleton of the starfish, and the tough exoskeleton of the arthropods (insects, spiders, and crustaceans), which is composed of dead cells secreted by the outer skin and often is so hard that in order to grow, the animal must shed it several times during its lifetime. Calcium

compounds contribute to the rigidity of many of these structures, as silica often does in marine skeletons; in arthropods dehydration can also be an important factor.

Semirigid skeletal structures are a second type. In the arthropod exoskeleton, for example, some softening is needed at the joints to permit movement, which semirigid tissue accomplishes, while still protecting the animal's body. Cartilage in vertebrates is another type of semirigid skeletal material.

A third skeletal element is connective tissue, which in more complex multicellular animals exists as layers of fibrous material, often composed of a protein called collagen. In many animals connective tissue serves as an anchor for muscles, as in the arthropods, where it grows on the inner layer of the exoskeleton and is not shed during molting. In animals with an inner cavity, or coelum (*i.e.,* at the level of earthworm or higher), connective tissue holds inner organs in place, and in vertebrates it serves as the base for the formation of membranous bones.

A hydrostatic skeleton is a fourth type of skeletal structure and can be the major skeletal element (as in the earthworm) or simply one of several. Fluid-filled cavities inside the animal exert pressure on the outer layers, much like water in a hose, and such pressure serves in some animals as a base against which muscles can work. (This is how the earthworm, for instance, moves along the ground.) Different cavities perform this function in different animals (the coelum, for instance, in earthworms, but the circulatory system in arthropods). But in more complex animals—higher arthropods and the vertebrates—the development of hard skeletons, whether internal or external, has all but supplanted the hydrostatic skeleton in determining movement.

Elastic structures, a fifth skeletal element, permit animals to return to their normal body shape after the movement of muscles. The jellyfish, for example, contracts its entire bell-shaped body, propelling itself by a jet stream; its elastic framework then refills itself with water. Elastic elements in vertebrate musculature are responsible for their ability to stretch.

The sixth skeletal element present in animals consists of buoyancy devices, which enable many marine animals to sense water pressure and to rise and fall to different water levels. In land vertebrates, the ear is a remnant of these buoyancy devices in fish.

In vertebrates the bony skeleton aids in the functions of support, movement, and protection. It is subdivided into the axial and appendicular skeletons. The former includes the skull and the vertebral column, the latter, the limbs and the girdles that anchor the limbs to the axial skeleton. Sometimes a third region, the visceral, is distinguished, which includes the lower jaw and portions of the upper jaw. Vertebrates, although comprising a wide variety of animals, have basic similarities in their skeletal structures. While a few vertebrate fishes retain their notochord (a flexible, longitudinal rod, serving as the structural axis of the body during early embryonic development) into adulthood, in most vertebrates the notochord is replaced quickly by a column of bony segments (vertebrae) sandwiched together by cartilaginous intervertebral disks and organized—moving from the head down the column—into the cervical (neck), thoracic, lumbar (loin), sacral (pelvic), and caudal (tail) regions. The number of vertebrae in each region differs according to species. Attached near the top of the vertebral column is the skull, which protects the brain and houses the ears, eyes, nose, and mouth.

The vertebral column plays an extremely important role in the body: above all, it protects the spinal cord; but it also helps anchor many of the body's muscles; serves as the attachment for the rib cage, a bony and cartilaginous structure protecting the heart, lungs, and other organs; anchors the appendicular skeleton; and generally contributes to the free movement of the entire animal. The human vertebral column has developed as a function of the erect posture and in adults forms the shape of an S. This curvature helps cushion the shock of movement; in its concave areas it provides more room for internal organs and helps bear their weight, and it makes the skeleton less vulnerable to fractures. The transition from water to land caused the vertebral column to become much more flexible, when the back-and-forth motion of the whole body, which fish use to move around, was replaced with the up-and-down movement of the limbs of terrestrial animals.

The appendicular skeleton, consisting of the limbs and the limb girdles, has evolved from the paired fins of fishes. The pectoral girdle connects the forelimbs to the axial skeleton; the pelvic girdle connects the hind limbs. Each limb consists of three parts—the proximal (closest to the body), containing a large bone; the medial, containing one large and one small bone; and the distal, containing the several small bones that make up the feet (or in primates, the hands and feet). The limb sections are connected to the girdles at joints, which give the vertebrate skeleton an extreme degree of manoeuvrability.

skeleton shrimp, any of certain marine crustaceans of the family Caprellidae (order Amphipoda), particularly of the genera *Caprella* and *Aeginella.* The common name derives from the slender body structure. Most species



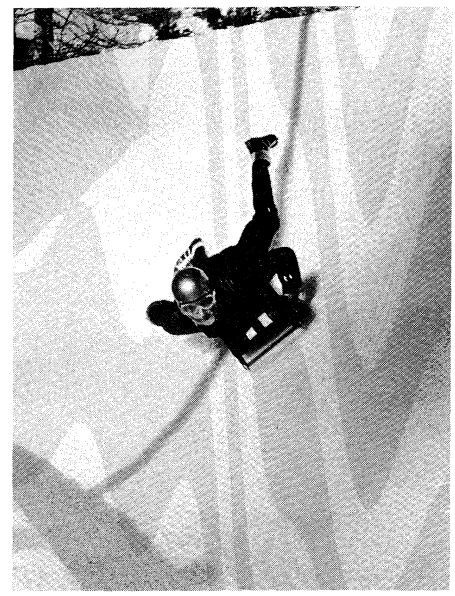
Skeleton shrimp *(Caprella)*
R. Mariscal—Bruce Coleman Inc.

are predators on other small animals, but some feed on organic debris.

Aeginella longicornis (*longicornia*), which occurs among eelgrass, sponges, and wharf pilings between Labrador and the mid-Atlantic coast of the United States, is about 2.5 centimetres (1 inch) long and muddy green or brown in colour. Like most other skeleton shrimp, it moves with a high-arching action similar to that of the measuring worm.

Caprella septentrionalis, with habits similar to those of *A. longicornis,* is found in the North Sea and on the North American coast from Greenland to New England; it attains a length of 3.2 centimetres (1.3 inches). *C. grahami* lives between the tubefeet of the common starfish *Asterias forbesi* and feeds on organic matter adhering to mucus secreted by the starfish.

skeleton sledding, also called CRESTA SLEDDING, winter sport in which the skeleton sled, or Cresta, consisting of steel runners fastened to a platform chassis with sliding seat, called a toboggan, is ridden in a headfirst, prone position, like the steel-runnered sled that is common in North America. Skeleton sledding has been practiced exclusively on the 1,327-yard- (1,213-metre-) long Cresta Run, built in 1884 at Sankt Moritz, Switz. Annual Grand National championships have been contested on this course since 1885. Competitive speeds generally average nearly 50 miles (80 kilometres) per hour. This sport, administered by the Sankt Moritz Tobogganing Club, was included twice in the Olympic Winter Games, in 1928 and 1948, each time at Sankt Moritz. *See* Olympic Games.



Skeleton sledding
Bavaria-Verlag

Skellefteå, town and port, in the *län* (county) of Västerbotten, northern Sweden, on the Skellefteälv (river) near the Gulf of Bothnia. Although incorporated in 1845, it did not become important until after the discovery, in 1918, of the rich Boliden mineral deposits northwestward. In 1952 Skellefteå absorbed several surrounding communities. Gold, silver, copper, arsenic, and other metals, as well as timber products, are shipped from Skelleftehamn, the outport. Copper smelting and refining at Skelleftehamn is the principal industry. The Skellefte Museum exhibits items found locally, some of which predate the Iron Age. Landsförsamlings Kyrka, the old parish church, was built in the 18th century but contains 12th- and 15th-century German woodwork. Pop. (1984 est.) mun., 74,247.

Skelmersdale, new town, West Lancashire district, county of Lancashire, England, on the western periphery of the older industrial town of Wigan. During the early 10th century Scandinavians settled in the area, naming it Skjalmar's Dale. In Domesday Book (1086) it was noted as a small agricultural hamlet. Between 1861 and 1881 coal mining began, and the town grew in importance. In 1962 Skelmersdale was selected as the first new town in Lancashire. Large modern housing estates have sprung up all around the old town, and a large industrial estate has attracted various light industries. Pop. (1981) 39,400.

Skelton, John (b. *c.* 1460—d. June 21, 1529, London), Tudor poet and satirist of both political and religious subjects whose reputation as an English poet of major importance has been restored only in the 20th century and whose individual poetic style of short rhyming lines, based on natural speech rhythms, has been given the name of Skeltonics.

His place of birth and childhood is unknown. He was educated at the University of Cambridge and later achieved the status of "poet laureate" (a degree in rhetoric) at Oxford, Louvain in the Netherlands (now in Belgium), and Cambridge. This success and also his skill at translating ancient Greek and Roman authors led to his appointment in 1489 first as court poet to Henry VII and later, in addition, as "scolemaster" to the Duke of York

(later Henry VIII). In 1498 Skelton took holy orders and in 1502, when Henry became heir to the throne and the royal household was reorganized, he became rector of Diss, in Norfolk, a position he held until his death, though from 1512 he lived in London. In about 1512 Henry VIII granted him the title of orator regius, and in this capacity Skelton became a forthright adviser to the King, in court poems, on public issues, and on church affairs.

Little of Skelton's early work is known, but his reputation was such that Desiderius Erasmus, greatest figure in the northern Renaissance, visiting England in 1499, referred to him as "the incomparable light and glory of English letters." His most notable poem from his time at court is *Bowge of courte,* a satire of the disheartening experience of life at court; it was not until his years at Diss that he attempted his now characteristic Skeltonics. The two major poems from this period are *Phyllyp Sparowe,* ostensibly a lament for the death of a young lady's pet but also a lampoon of the liturgical office for the dead; and *Ware the Hawke,* an angry attack on an irreverent hunting priest who had flown his hawk into Skelton's church. Skelton produced a group of court poems, mostly satirical: *A ballad of the Scottysshe Kynge,* a savage attack on the King's enemies, was written in 1513 after the Battle of Flodden; and in the next year he entertained the court with a series of "flyting" poems of mock abuse. In 1516 he wrote the first secular morality play in English, *Magnyfycence,* a political satire, followed by *The Tunnyng of Elynour Rummynge,* a brilliant portrayal of a drunken woman in an alehouse, which, though popular, contributed largely to Skelton's later reputation as a "beastly" poet. His three major political and clerical satires, *Speke Parrot* (written 1521), *Collyn Clout* (1522), and *Why come ye nat to courte* (1522), were all directed against the mounting power of Cardinal Thomas Wolsey, both in church and in state, and the dangers—as Skelton saw them—of the new learning of the Humanists. Wolsey proved too strong an opponent to attack further, and Skelton turned to lyrical and allegorical themes in his last poems, dedicating them all to the Cardinal himself. Skelton's reputation declined rapidly in a 16th-century England predominantly Protestant in religion and Italianate in poetic style. A new appreciation of his qualities, however, has emerged in the 20th century.



John Skelton, detail of the frontispiece to *The Garlande of Laurelle,* printed by Richard Faukes, 1523; in the British Museum

Reproduced by courtesy of the trustees of the British Museum

Skelton, Red, byname of RICHARD BERNARD SKELTON (b. July 18, 1913, Vincennes, Ind., U.S.), U.S. pantomimist and radio and television comedian, host and star performer of the National Broadcasting Company (NBC) variety program "The Red Skelton Show" from 1951 to 1971. In this television series Skelton re-created a number of fictional characters whom he had used in vaudeville and radio, among them Clem Kaddiddlehopper, Sheriff Deadeye, Junior, the Mean Widdle Kid, and Cauliflower McPugg. Skelton employed a style combining buffoonery and emotional complexity.

Skelton's father, a circus clown, died two months before Skelton was born, and he had to help support himself from an early age. He was a newsboy by the age of 7, and when he was 10 he took to the road with a medicine show touring the midwestern United States, putting an end to his schooling. He went on to minstrel shows, burlesque, circus clowning, and radio. He took roles in some 30 movies, including a film starring Ginger Rogers, *Having a Wonderful Time* (1938). His appearance on "The Rudy Vallee Show" in 1937 led to other bookings. Entering radio, he was voted the outstanding new radio star of 1941. His other movie credits included *Excuse My Dust* (1939), *Bathing Beauty* (1944), and *The Fuller Brush Man* (1948).

Skelton Glacier, Antarctic glacier situated on the Hillary Coast of Victoria Land, to the northeast of the Cook Mountains, near McMurdo Sound. It flows sluggishly southward into the Ross Ice Shelf. The greatest known thickness of ice along its 39-mi (62-km) length occurs at a point about 30 mi from the tip of its floating terminus. There the ice is about 4,760 ft (1,450 m) thick. The east side of the glacier is covered by a discontinuous belt of graywacke-like metasedimentary and metavolcanic rock.

skene (from Greek *skēnē,* "scene-building"), in ancient Greek theatre, a building behind the playing area that was originally a hut for the changing of masks and costumes but eventually became the background before which the drama was enacted. First used *c.* 465 BC, the skene was originally a small wooden structure facing the circle of spectators. It developed into a two-story edifice decorated with columns, with three doors used for entrances and exits and the appearance of ghosts and gods; it was flanked by wings (*paraskēnia*). By the end of the 5th century BC, the wooden skene was replaced by a permanent stone structure. In the Roman theatre it was an elaborate building facade. The modern concept of the theatrical scene, which is an integral and functional part of the play, evolved from the Renaissance. In the ancient theatre the skene was merely a conventional background.

Consult the INDEX *first*

Skepticism, also spelled SCEPTICISM, the philosophical attitude of doubting the knowledge claims set forth in various areas and asking what they are based upon, what they actually establish, and whether they are indubitable or necessarily true. Skeptics have thus challenged the alleged grounds of accepted assumptions in metaphysics, in science, in morals and manners, and especially in religion.

A brief treatment of Skepticism follows. For full treatment, see MACROPAEDIA: Philosophical Schools and Doctrines.

Skeptical philosophical attitudes are prominent throughout the course of Western philosophy; as early as the 5th century BC the Eleatic school of thinkers denied that reality could be described in terms of ordinary experience. Evidence of Skeptical thought appears even earlier in non-Western philosophy, in particular in the *Upaniṣads,* philosophic texts of the later Vedic period (*c.* 1000–*c.* 600 BC) in India.

Pyrrhon of Elis (*c.* 360–*c.* 272 BC), credited with founding Greek Skepticism, sought mental peace by avoiding commitment to any particular view; his approach gave rise in the lst century BC to Pyrrhonism, proponents of which sought to achieve *epochē* (suspension of judgment) by systematically opposing various kinds of knowledge claims. One of its later leaders, Sextus Empiricus (2nd or 3rd century BC), challenged the claims of dogmatic philosophers to know more than what is evident. His goal was the state of *ataraxia,* wherein a person willing to suspend judgment would be relieved of the frustration of not knowing reality and would live, without dogma, according to appearances, customs, and natural inclination. The Pyrrhonians criticized Academic Skepticism, first developed in Plato's Academy in Greece in the 3rd century BC; the Academics argued that nothing could be known, and that only reasonable or probable standards could be established for knowledge.

Academic Skepticism survived into the Middle Ages in Europe and was considered and refuted by St. Augustine, whose conversion to Christianity convinced him that faith could lead to understanding. Among Islāmic philosophers also there arose an antirational Skepticism that encouraged the acceptance of religious truths by faith.

Modern Skepticism dates from the 16th century, when the accepted Western picture of the world was radically altered by the rediscovery of ancient learning, by newly emerging science, and by voyages of exploration, as well as by the Reformation, which manifested fundamental disagreement among Roman Catholics and Protestants about the bases and criteria of religious knowledge. Prominent among modern Skeptical philosophers is Michel de Montaigne, who in the 17th century opposed science and all other disciplines and encouraged acceptance, instead, of whatever God reveals. His view was refuted in part by Pierre Gassendi, who remained doubtful about knowledge of reality but championed science as useful and informative. René Descartes also refuted Montaigne's Skepticism, maintaining that by doubting all beliefs that could possibly be false, a person can discover one genuinely indubitable truth: "I think, therefore I am" (*cogito ergo sum*), and that from that truth one can establish the existence of God and the existence of the external world, which Descartes claimed can be known through mathematical principles. At the end of the 17th century Pierre Bayle employed Skeptical arguments to urge that rational activity be abandoned in favour of pursuit of the conscience.

In the 18th century David Hume assembled some of the most important and enduring Skeptical arguments. He claimed that the very basis of modern science, the method of induction—by which regularities observed in the past justify the prediction that they will continue—is based on the uniformity of nature, itself an unjustifiable metaphysical assumption. Hume also sought to demonstrate that the notion of causality, the identity of the self, and the existence of an external world lacked any basis. In rebuttal, Immanuel Kant maintained that, in order to have and describe even the simplest experience, certain universal and necessary conditions must prevail.

In the 19th century Søren Kierkegaard developed religious Existentialist thought from an irrational Skepticism, asserting that certainty can be found only by making an unjustifiable "leap into faith." Nonreligious Existentialist writers, such as Albert Camus in the 20th century, have claimed that rational and scientific examination of the world shows it to be unintelligible and absurd, but that it is necessary for the individual to struggle with that absurdity. In the 20th century other forms of Skepticism have been expressed among Logical Positivist and Linguistic philosophers.

sketch, traditionally a preliminary rough drawing or painting in which an artist notes down his preliminary ideas for a work that will eventually be realized with greater precision and detail. The term also applies to brief creative pieces that *per se* may have artistic merit.

In a traditional preliminary sketch, the emphasis usually is laid on the general design, composition, and arrangement of the work and on overall feeling. Such a sketch is generally intended for the artist's own guidance; but sometimes, in the context of a bottega (studio-shop) type of production, in which an artist such as Raphael or Rubens would employ many assistants, sketches were made by the master for works to be completed by others. There are three main types of functional sketches. The first—sometimes known as a croquis—is intended to remind the artist of some scene or event he has seen and wishes to record in a more permanent form. The second—a pochade—is one in which he records, usually in colour, the atmospheric effects and general impressions of a landscape. The third type is related to portraiture and consists of notations of the look on a face, the turn of a head, or other physical characteristics of a prospective sitter.

From the 18th century onward, however, sketch came to take on a new meaning, which has almost come to supersede the traditional one. The emphasis on freshness and spontaneity, which was an integral part of the Romantic attitude, the fact that there was a great increase in the number of amateur artists, and the growing appreciation of nature, accompanied by an expansion of facilities for travel, transformed the sketch into something regarded as an end in itself—a slight and unpretentious picture, in some simple medium (pen and ink, pencil, wash, or watercolour) recording a visual experience. This led to a revaluation of sketches that had originally been created for other works. Contemporary taste, for instance, tends to value John Constable's sketches as highly as his finished works.



"Madonna and Child," black chalk and pen sketch by Raphael; in the Albertina, Vienna
By courtesy of the Albertina, Vienna

ski: *see* skiing.

ski jumping, competitive skiing event, in which contestants ski down a steep ramp that curves upward at the end or takeoff point. Skiers leap from the end, trying to cover as much horizontal distance in the air as possible. Jumping competitions are held on carefully graded and prepared hills, classed according to size as 100-metre, 80-metre, 70-metre, etc.; most senior international events are held on 90-m and 70-m hills. The approach, or inrun, often starts on a scaffold, or tower; the jumper skis down it in a crouched position accumulating speed (as much as 120 kph [75 mph]) until he reaches the takeoff, where he springs outward and upward. The best competitors lean far forward from the ankles with knees straight and skis held parallel and inclined slightly upward. This position minimizes wind resistance and contributes an aerodynamic lifting effect to increase the length of the jump. The landing is made on a steep section of the hill in a more upright position, with the shock of contact taken up by the knees. After the slope levels off, the jumper stops his forward momentum by turning.



Yukio Kasaya of Japan, winner of an Olympic gold medal, competing in the ski jumping event
Toichi Sakakibara

Competitors make two jumps. Performance is decided partly by distance covered and partly by form, on the basis of style marks awarded by judges. Since jumping hills vary, distances achieved at different locations are not strictly comparable.

Ski flying is similar to ski jumping in every respect except its scoring system, which emphasizes distance over style. Under ideal conditions top contestants are capable of leaps of 150 m (500 ft) or more.

See Sporting Record: *Skiing. See also* Olympic Games.

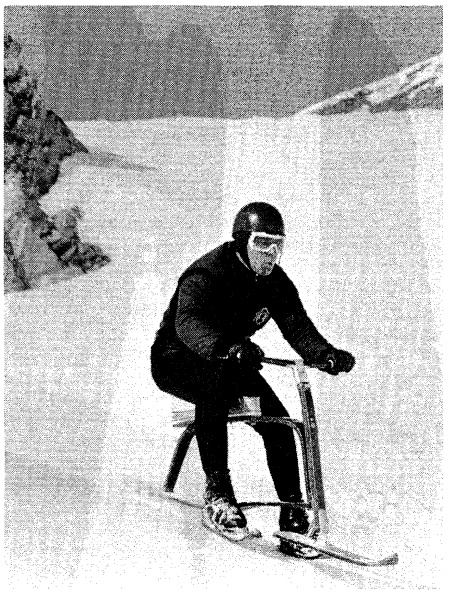
ski patrol, group of paid or volunteer workers at ski resorts whose primary function is to promote skiing safety and provide first aid for injured skiers. Ski patrolmen are proficient skiers trained in first aid and cold weather rescue and survival techniques. One of the largest such organizations in the world is the National Ski Patrol System of the United States, founded in 1938, with headquarters in Denver, Colo.

skibobbing, also called SKIBOB RACING, a winter sport using a guidable, single-track vehicle, an adaptation of the bicycle, the bobsled, and skis. The longer rear ski is fixed, and the shorter front ski is mobile for steering; a bicycle-like saddle and a steering bar with handles complete the rig. The assembly is kept flexible to provide smooth passage over bumps and is lightweight, made of wood, aluminum, or plastic for portability. The skibob measures 1.9 to 2.29 metres (6 feet 3 inches to 7 feet 6 inches) in length. The rider wears short skis and a helmet, but goggles are optional.

In racing, skibobbers run a marked course, usually from 3 to 5 kilometres (2 to 3 miles) as quickly as possible. International events, such as the European and World championships held from 1963 and 1967, are held under the jurisdiction of the Fédération Internationale de Skibob (FISB), founded in 1961 and headquartered in Vienna.

The first skibob-like device was patented in the United States in 1892 and an Austrian device in 1902. Swiss mailmen and delivery boys used the device, but the sport did not develop until after World War II. In 1948 the German Georg Gefäller manufactured his *Gefäller Ei* (Gefäller Egg), which was called a skibob. The sport slowly became international as it spread from Austria to the Swiss Alps, West Germany, France, Italy, and Czechoslovakia, and then from Europe to the United States, Canada, Japan, and elsewhere around the world.

Skibob events include the downhill, the giant slalom, and the special slalom (similar to skiing events), with a course having, for the downhill, a minimum 365-m (1,200-ft) drop for women and 600-m (2,000-ft) drop for men. The giant slalom has a less severe drop and has 31 gates. The special slalom has even less drop but 50 to 60 gates for men and 30 to 40 for women. Noncompetitive speeds range from 40 to 65 kilometres per hour, but on the downhill, speeds of more than 160 kph have been reached.



Skibobbing
By courtesy of the Swiss National Tourist Office

Skien, town and seat of Telemark *fylke* (county), southern Norway, on the Skienselva (river). Originally the site of a monastery, the town, founded in 1110, is one of the oldest in Norway; it was incorporated in 1346. An industrial centre and port, Skien's lumber and mining concerns began the development of the area in the mid-1600s. The ore has been exhausted, but the town has important foundries and a thriving lumber and pulp trade. The Bandak Kanal (also known as the Telemark Canal) is Norway's longest; completed in 1892, it runs 65 mi (105 km) between Skien and Dalen in western Telemark. The Regional Museum of Telemark and Grenland is also located there. Skien was the birthplace of the playwright Henrik Ibsen. Pop. (1982 est.) mun., 46,734.

Skierniewice, *województwo* (province), central Poland, established 1975, comprising an area of 1,529 sq mi (3,959 sq km). It is bordered by the provinces of Warsaw on the northeast, Radom on the southeast, Piotrków Trybunalski on the south, Łódź on the west, and Płock on the northwest. Created from the western parts of the former Warsaw and Łódź provinces, Skierniewice lies in Poland's fertile Middle Polish Lowlands. In the north are extensive fields of wheat and rye. The southern area produces potatoes and sugar beets. The Bzura River, a tributary of the Vistula, flows in a northeasterly direction through the province. Skierniewice city is the provincial capital. The economy of Skierniewice province is based on agriculture, textile manufacturing, and food processing, together with the manu-

facture of chemicals, building materials, and paper products. Pop. (1987 est.) 411,500.

skiing, recreation, sport, and mode of transportation involving moving over snow by the use of a pair of long flat runners, called skis, attached to shoes or boots.

History. The oldest skis, found in bogs in Sweden and Finland, are believed to be 4,000 to 5,000 years old. Some of the first skis were short and broad, more resembling snowshoes than the long, narrow skis. A rock carving of two men on skis, found near the Arctic Circle in Norway, dates from 2000 BC. There are references to skiing in northern China in the 7th century. The Vikings used skis in the 10th and 11th centuries, and somewhat later Laplanders hunted on skis.

Skis were first used for transport and are still used for travel in Norway, Sweden, Finland, and some eastern European countries in rural areas. In the military, Norwegian men on skis reconnoitred before the Battle of Oslo (1200). Ski troops were also used in Sweden in 1452; and from the 15th through the 17th century, skis were used in warfare in Finland, Norway, Poland, Russia, and Sweden. Captain Jens Emmahausen wrote the first skiing manual for Norwegians in 1733. From 1767 there have been military ski competitions with money prizes. Military skiing persisted into the 20th century where snow conditions and terrain favoured their use for scouts and for a sort of mounted infantry with first-strike advantage against small objectives.

Recreational skiing probably also existed when skiing was used primarily for transport. Certainly cross-country skiing as both a recreation and sport was a natural development from skiing as transport. Until after the mid-19th century, however, skiing was limited by primitive bindings. Sondre Nordheim of Norway in about 1860 first used bindings around the heel from each side of the toe strap and thus radically transformed skiing. One of the first sporting events was a cross-country race at Tromsø, Nor., in 1843. There was competitive skiing in California in the 1860s on straight downhill courses using 12-foot (366-centimetre) skis with only toe straps.

Skiing events are divided into two kinds, Nordic and Alpine, the former incorporating cross-country and jumping skills. The first big jumping event was held at Oslo in 1879 with the Norwegian king and 10,000 spectators looking on. Alpine skiing was largely developed after *Paa Ski Over Gronland* (1890), Fridtjof Nansen's account of his 1888–89 trans-Greenland expedition on skis, was translated into English, French, and German in 1891. Norwegian skiers had already visited the Alps, as had the British. There was jealousy between the Nordic and the Alpine skiers; the former long considered their annual cross-country and jumping events at Holmen Kollen Hill near Oslo (from 1892) and Nordic Games (quadrennially from 1905 to 1917 and 1922 to 1926) of greatest importance. The Alpine events include downhill racing and slalom. Ski mountaineering followed in the Alps at about the end of the 19th century and was revived in the late 1970s as a means of descent.

In the 20th century skiing became an increasingly popular activity, first in Europe and North America. It spread rapidly in Australia and New Zealand in the 1930s, in Chile and Argentina (the Andes) in the 1940s, and in Japan in the 1950s. Following World War II it also spread to Yugoslavia and Greece, the Pyrenees in Spain and Portugal, Morocco and Algeria, the Soviet Union, Lebanon, Turkey, Iran, and India.

At first the Alpine skier had to climb heights to ski down. In the early 1900s only mountain railways or aerial cable cars carried skiers uphill in the Alps. But in the 1930s there began the introduction of a succession of devices from rope tows to chair lifts and gondola lifts that made it possible for a skier to ski downhill four to five times more in a day than earlier skiers could. The introduction of snow-making machines guaranteed adequate snow for skiers if the weather failed.

The improvement of skis also promoted proficiency and added to the popularity of the recreation and sport. Skis were originally made from one piece of wood, usually hickory, but from the 1930s laminated constructions were also used. From the 1950s plastic running surfaces increased speed and durability. Skis of metal, usually with a wood or plastic core, became increasingly popular. As early as the 19th century, Nordheim had designed skis with incurving sides, which became the pattern for all modern skis.

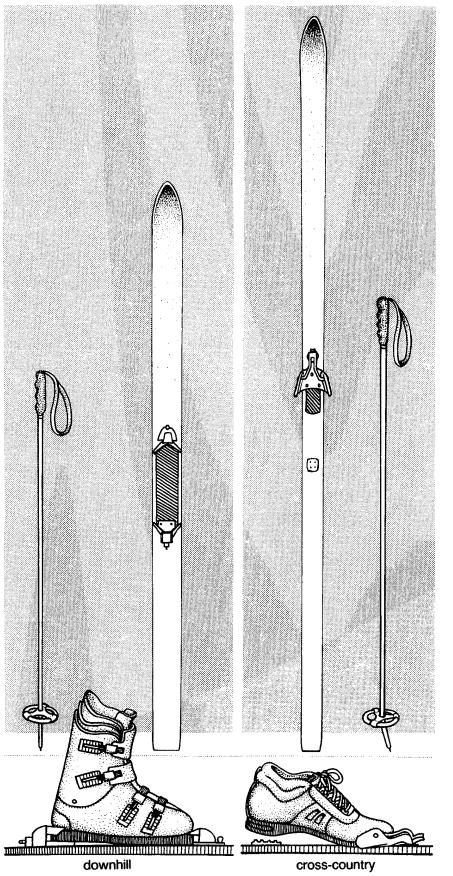
New fabrics and manufacturing techniques made skiers more comfortable on the slopes. A seemingly endless variety of waxes to be used on running surfaces for varying snow conditions and kinds of skiing increased the average skier's proficiency and provided a subject for friendly disputes in ski lodges everywhere.

Organization. Early local and national ski clubs were the Trysil in Norway (1861); a club at Berlin, N.H., in the United States (1872); the first Swedish ski club (1879); the Norwegian Ski Association (1883); and the Ski Club of Great Britain (1903; from 1964 the National Ski Federation of Great Britain).

In 1924 the International Ski Federation (Fédération Internationale de Ski [FIS]) was founded as the world governing body. It also held world championships quadrennially (Nordic only for men, from 1925 to 1931, for men and women thereafter; Alpine for men and women from 1931). Skiing became an Olympic sport in the 1924 Games, Nordic only for men until 1948, when Alpine events for both men and women were introduced. Nordic events for women were introduced in the 1950s and '60s. In 1967 an annual World Cup championship was established, supervised by the FIS but privately sponsored; and in the 1969–70 season the World Cup became entirely private and professional. Increasing charges of professionalism in the 1960s by the International Olympic Committee, mainly for the acceptance of equipment and money for endorsements, led to the disqualification of a leading skier in the 1972 Olympic Games, and professionalism, hitherto confined to skiing instructors, became overt. Televising of world-class skiing, both amateur and professional, did much to increase the popularity of skiing. For world champions in Alpine and Nordic events, *see* Sporting Record: *Skiing. See also* Olympic Games.

Equipment. Skis vary in length, the downhill ski for the average adult man being less than 7 feet (210 cm) long and about 3 inches (7.6 cm) wide and the cross-country skis being somewhat longer and narrower. All types of skis—downhill (including slalom), jumping, and cross-country (both for racing and touring)—are pointed, turned up, and usually slightly wider at the front (the tip, or shovel) and squared at the rear (or tail). They are thickest in the midsection under the foot and thinnest just before the ends. Skis are built with a slight arch, or camber, so as to distribute the skier's weight along the length of the ski. The downhill ski has a shallow groove running lengthwise along the centre of the bottom to give directional stability. Such skis have sharp steel edges along the bottom to bite into hard snow or ice. Jumping skis are about 8 feet (244 cm) long and are wider, thicker, and heavier than downhill skis. They ordinarily have three grooves in the bottom and no steel edges. Cross-country skis, often of laminated wood, are much lighter than downhill skis.

Close-fitting, heavy boots, of leather or plastic, held firmly by bindings (often with release features in case the skier falls), have flat, stiff soles to help maintain precise control of the skis. Lighter, more flexible boots with a binding that allows the heel to be raised are worn for jumping and cross-country.



Standard equipment for (left) downhill and (right) cross-country skiing

For downhill skiing a light pole of metal tubing about 4 feet (122 cm) long is carried in each hand. For cross-country skiing the pole is typically longer and lighter. Poles aid the skier in pushing himself along on level terrain and in climbing. They are also used to maintain balance when running downhill and to assist in turning. Each pole has a wrist strap at the top, to prevent its loss if the skier falls, and a ring or wheel near the bottom, which prevents the point from sinking too deeply in the snow.

See also cross-country skiing; downhill skiing.

Skikda, formerly PHILIPPEVILLE, town, Mediterranean port, northeastern Algeria, situated on the Gulf of Stora. Founded by French Marshal Sylvain-Charles Valée in 1838 as the port of Constantine, it has an artificial harbour. Skikda occupies the site of ancient Rusicade, port of 4th-century Cirta, and has the largest Roman theatre in Algeria (used as a quarry, this has been greatly depleted). Roman artifacts are in the local museum. The town lies near the mouth of the Wadi Safsaf, escaping the humidity of the alluvial plain by its situation on a saddle between Mount Skikda (east) and Mount Bou Yala (southwest). A natural-gas pipeline from Hassi R'Mel to Skikda became operational in 1970, and liquefied-gas, oil-refining, and petrochemical industries have developed. The port is now a major outlet for oil brought by pipeline from the Hassi Messaoud fields, and it also exports the agricultural and mineral products (lead, iron, marble, and cement) of the Safsaf Valley and the hinterland. Imports

are redistributed via Constantine throughout eastern Algeria. There is considerable passenger traffic through Skikda, which, with Stora (its outport), is also a centre for sardine fishing and canning. Formerly the population was predominantly of Italian and Maltese origin, but after Algerian independence in 1962 there was an influx of Muslim refugees and an exodus of Europeans. Pop. (1987) mun., 128,747.

skimmer, any of three species of water birds that constitute the family Rynchopidae in the order Charadriiformes. The skimmer is distinguished by a unique bladelike bill, the lower



Black skimmer (*Rynchops nigra*)
Earl Kubis from Root Resources—EB Inc.

mandible of which is one-third longer than the upper mandible.

By day the skimmer rests onshore, and at twilight the bird feeds, skimming calm, shallow water with the bill tip submerged; when a fish or crustacean is encountered, the upper mandible snaps down.

Skimmers nest in small colonies, laying three to five eggs. The young are fed by regurgitation until the mandibles assume their adult form.

Found chiefly in estuaries and along wide rivers in warm regions, the three species are dark above and white below, with white face and forehead. The short legs and the bill are red, and the long narrow wings are black. The largest skimmer is the black skimmer (*Rynchops nigra*) of America, which grows to 50 cm (20 inches) long. The African skimmer (*R. flavirostris*) and the Indian skimmer (*R. albicollis*) are smaller.

skimmer (insect): *see* water strider.

skin, in human anatomy, complex layers of tissue that cover the surface of the body and protect internal structures from contact with the environment. The skin consists of two general layers: the epidermis, the outer layer that is the chief protective barrier; and below this the dermis, a fibrous layer supporting and strengthening the epidermis.

The epidermis consists of cells that contain keratin, an impermeable substance that creates the skin's barrier. These cells, called keratinocytes, are produced by basal cells along the bottom of the epidermis; as the keratinocytes move upward, they flatten out and form overlapping protective layers. The basal epidermis also contains melanocytes; these are pigment-producing cells that transfer small packets of pigment (melanosomes) to the keratinocytes, giving the skin its colour. Other epidermal cells include Langerhans cells, which play a role in the body's immune defenses, and Merkel cells, which form parts of sensory structures. Skin structures such as hair, nails, and sweat glands are specialized derivations from the epidermis.

The dermis contains sensory nerves for touch, pressure, temperature, pain, and itch and also contains an elaborate network of blood vessels supplying nutrients to the epidermis. Most of the dermis consists of collagen, a tough organic fibre that resists deformation or tearing under stress; these fibres are loosely organized in the upper dermis and more tightly packed near the base of the dermis. A second, more flexible dermal fibre, elastic fibre, helps the skin return to its original shape after it has been stretched. The rest of the dermis is made up of amorphous ground substance, which contains water, electrolytes, proteins, and mucopolysaccharides; this ground substance contributes to the skin's malleability and to the process of wound healing.

The two main skin layers are separated by the basement membrane, which is made up of semipermeable membranes and fibrous components originating in the dermis. The two main skin layers are structurally linked by fingerlike extensions of the dermis called papilli, which anchor the epidermis in place.

Below the epidermis and the dermis is a subcutaneous fat layer consisting chiefly of fat cells (lipocytes) arranged into collagen-bounded lobules. This fat serves as a nutritional storage depot for the entire body, and it cushions the skin and insulates the body against temperature extremes. *See* integument.

skin beetle, any of the widely distributed chunky insects classified by some authorities as the family Trogidae (about 150 species) and by others as the subfamily Troginae of the scarab family (Scarabaeidae). They belong to the order Coleoptera. Skin beetles have a rough body surface, are less than 12 mm (0.5 inch) long, and are dull brown in colour. Skin beetles are beneficial scavengers and feed on dry animal carcasses. When disturbed they pull in their legs and pretend to be dead. Because they are small and usually covered with dirt, they are not often seen. The dermestid beetle (*q.v.*) of the family Dermestidae is also known as a skin beetle.

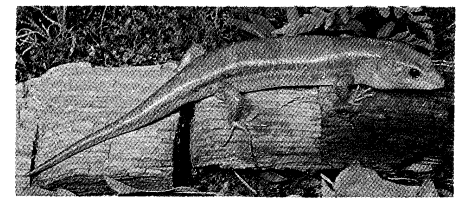
skin diving, also called FREE DIVING, swimming done underwater, usually with a face mask and flippers but without portable oxygen equipment. *See* underwater diving.

skin effect, in electricity, the tendency of alternating high-frequency currents to crowd toward the surface of a conducting material. This phenomenon restricts the current to a small part of the total cross-sectional area and so has the effect of increasing the resistance of the conductor. Because of the skin effect, induction heating can be localized at the surface and the heated area controlled by a suitable choice of shape and size of the inductor coil (*see* induction heating). The skin effect becomes more pronounced as the frequency is increased.

skin graft, transplantation of healthy skin from one area of the body to cover and heal a large wound or burn in another area of a similar skin type. The two most widely used techniques are (1) split-thickness grafts, which remove the upper layer (epidermis) and part of the lower layer (dermis) of the skin, allowing the donor site to heal naturally, and (2) full-thickness grafts, which transfer the entire dermis so that the donor site must be surgically closed. An earlier technique, pinch grafting, which used many small grafts instead of one large one, has been abandoned for the most part because of unsightly scarring at the donor site. The most common sites employed as sources for skin grafts are the inner thigh, leg, upper arm, and forearm.

skin test, introduction of a specific test substance into the skin of an individual, either by injection or by scratching the skin, to determine that individual's possible allergy to certain substances or his susceptibility or immunity to certain diseases. A skin test is usually considered positive when the skin becomes red and swollen at the site of contact with the test material and is considered negative when there is no skin reaction. *See also* tuberculin test.

skink (family Scincidae), any of about 1,275 species of lizards represented throughout the world's tropics (and in temperate regions of North America) but especially diverse in Southeast Asia and associated islands. Skinks are typically cylindrical in shape and have



Striped broad-headed skink (*Eumeces laticeps*)
John H. Gerard from The National Audubon Society Collection/Photo Researchers—EB Inc.

cone-shaped heads and long, tapering tails. They reach a maximum length of about 66 cm (26 inches), and most remain under 20 cm (8 inches). Most species are secretive ground dwellers or burrowers and may show such adaptations as a transparent ("window") scale in place of the movable lower eyelid, so that the animal can see and still protect its eyes from rough particles while burrowing. Other species of skinks may have such peculiarities as reduced or absent limbs and sunken eardrums. Some species are arboreal (tree climbers) or somewhat aquatic. Skinks eat insects and similar small invertebrates; large species are herbivorous. Some species lay eggs, while others give birth to fully developed young.

The more common skinks include keeled skinks (*Tropidophorus*), which are semiaquatic and are found from Southeast Asia to northern Australia. Mabuyas (*Mabuya*), with about 105 species, are ground dwellers and are distributed worldwide in the tropics. Sand skinks (*Scincus*), also called sandfish, are burrowers with fringes of scales on their claws; they are native to the deserts of North Africa and southern Asia. Slender skinks (*Lygosoma*), of which there are about 300 species, have thick and muscular tails and reduced legs; their eyelids are often partially transparent. They are found throughout the Old World tropics. Snake-eyed skinks (*Ablepharus*) are extremely variable in colour and are the only skinks with a fixed plate (spectacle) in place of a movable eyelid; they are worldwide in the tropics. Most of the approximately 60 species of striped skinks (*Eumeces*) have longitudinal stripes; they are the dominant genus of skinks in the north temperate regions but are absent from Europe.

Skinner, B(urrhus) F(rederic) (b. March 20, 1904, Susquehanna, Pa., U.S.—d. Aug. 18, 1990, Cambridge, Mass.), American psychologist and an influential exponent of behaviourism, which views human behaviour in terms of physiological responses to the environment and favours the controlled, scientific



B.F. Skinner, 1971
By courtesy of Alfred A. Knopf; photograph, Ken Heyman

study of response as the most direct means of elucidating man's nature.

Skinner was attracted to psychology through the work of the Russian physiologist Ivan Pavlov on conditioned reflexes, articles on behaviourism by Bertrand Russell, and the ideas of John B. Watson, the founder of behaviourism. After receiving his Ph.D. from Harvard University (1931), he remained there as a researcher until 1936, when he joined the faculty of the University of Minnesota, Minneapolis, where he wrote *The Behavior of Organisms* (1938).

As professor of psychology at Indiana University, Bloomington (1945–48), Skinner gained some measure of public attention through his invention of the Air-Crib, a large, soundproof, germ-free, air-conditioned box designed to serve as a mechanical baby tender, supposed to provide an optimal environment for child growth during the first two years of life. In 1948 he published one of his most controversial works, *Walden Two,* a novel on life in a utopian community modeled on his own principles of social engineering.

As a professor of psychology at Harvard University from 1948 (emeritus 1974), Skinner came to influence a generation of psychologists. Using various kinds of experimental equipment that he devised, he trained laboratory animals to perform complex and sometimes quite exceptional actions. A striking example was his pigeons that learned to play table tennis. One of his best-known inventions, the Skinner box, has been adopted in pharmaceutical research for observing how drugs may modify animal behaviour.

His experiences in the step-by-step training of research animals led Skinner to formulate the principles of programmed learning, which he envisioned to be accomplished through the use of so-called teaching machines. Central to his approach is the concept of reinforcement, or reward. The student, learning by use of the machine at his own pace, is rewarded for responding correctly to questions about the material he is trying to master. Learning is thereby presumably reinforced.

In addition to his widely read *Science and Human Behavior* (1953), Skinner wrote a number of other books, including *Verbal Behavior* (1957), *The Analysis of Behavior* (with J.G. Holland, 1961), and *Technology of Teaching* (1968). Another work that generated considerable controversy, *Beyond Freedom and Dignity* (1971), argued that concepts of freedom and dignity may lead to self-destruction and advanced the cause of a technology of behaviour comparable to that of the physical and biological sciences. Skinner published an autobiography in three parts: *Particulars of My Life* (1976), *The Shaping of a Behaviorist* (1979), and *A Matter of Consequences* (1983). The year before his death, *Recent Issues in the Analysis of Behavior* (1989) was published.

Skinner, Cornelia Otis (b. May 30, 1901, Chicago, Ill., U.S.—d. July 9, 1979, New York, N.Y.), American actress and author who, with satirical wit, wrote light verse, monologues, anecdotes, sketches, and monodramas in which she displayed her versatile and distinctive acting skills.

Skinner made her first professional stage appearance with her father, the tragedian Otis Skinner, in *Blood and Sand* (1921) and collaborated with him in writing her first play, *Captain Fury* (1925). During the 1930s she wrote and staged her own monodramas, including *The Loves of Charles II, The Empress Eugénie, The Mansions on the Hudson,* and *The Wives of Henry VIII.* In each of these shows she played several different characters, adeptly transforming herself from one role to another. It was not until 1939 in *Candida* that Skinner established a reputation as a fine actress, and she confirmed her excellence as a dramatic actress in *Theatre* (1941). Other performances that won critical acclaim included her roles in *Lady Windermere's Fan* (1946), *Paris '90* (1952), and *The Pleasure of His Company* (1958), which she wrote with Samuel Taylor.

Skinner's diverse writing ability was evident in her 1942 best-seller, *Our Hearts Were Young and Gay,* written with Emily Kimbrough, and in the serious and moving *Madame Sarah* (1967), which chronicled the life of the French actress Sarah Bernhardt.

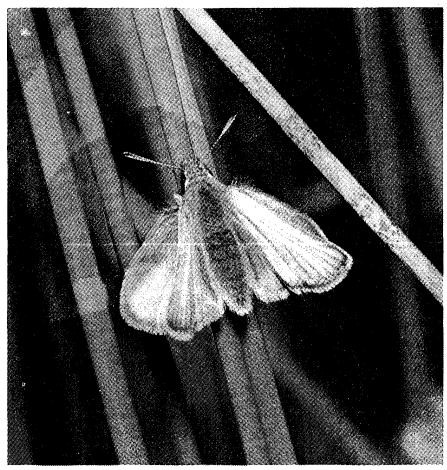
Skinner, Otis (b. June 28, 1858, Cambridge, Mass., U.S.—d. Jan. 4, 1942, New York, N.Y.), American actor who played hundreds of roles in all parts of the world in a career extending over more than 60 years.

Skinner's first stage appearance was at the Philadelphia Museum in 1877 in *Woodleigh.* After two years in the stock company at the Walnut Street Theatre in Philadelphia, Skinner made his New York City debut in 1879. During the next five years he developed a classical repertory and a successful acting style, first with Edwin Booth, at Booth's Theatre, and then, for three years, with Lawrence Barrett. In 1884 he joined Augustin Daly's company at Daly's Theatre, remaining with it for four years. He made his London debut in 1886 with Daly's company. After two years with the Booth-Modjeska company, he became, in 1892, leading man opposite Helena Modjeska. In 1903 he starred with Ada Rehan. In addition to his Shakespearean roles, Skinner's chief successes were in *Kismet,* which he played between 1911 and 1914, and *Blood and Sand* (1921), in which he played the matador, Juan Gallardo. Skinner was active in the theatre until his death. He was the author of *Footlights and Spotlights* (1924) and *Mad Folk of the Theatre* (1928).

skip rope (game): *see* jump rope.

skipjack: *see* click beetle.

skipper, any of the approximately 3,000 species of the cosmopolitan insect family Hesperiidae (order Lepidoptera), named for their fast, darting flight. Skippers are considered an intermediate form between butterflies and moths. The head and small, stout body of the adult tend to resemble those of a moth; when at rest, however, most skippers hold the first pair of wings vertically, as butterflies do. In addition, skippers usually lack the wing-coupling structures (frenula) typical of most moths. Their antennae are clubbed like those of the butterfly, but most have a slender hooked portion extending beyond.



Small skipper (*Thymelicus sylvestris*)
Stephen Dalton—EB Inc.

Skippers are generally small; powerful wing muscles enable them to attain speeds up to 30 km (20 miles) per hour. Larvae feed on plants such as legumes and grasses and usually live inside folded or rolled leaves often woven together. Pupation occurs in thin cocoons of silk or silk and leaves.

Many authorities do not classify certain skippers in the family Hesperiidae but separate them into the regent skipper family (Euschemonidae), which contains one Australian species, and the New World giant skipper family (Megathymidae), whose adults have a wingspan of about 9 cm (3.5 inches). The larvae, which bore in agaves and yuccas, are considered a delicacy in Mexico, where they are fried in deep fat, canned, and sold as *gusanos de maguey.*

skipper, a tiny, shiny black fly about 5 mm (0.2 inch) long with long fleshy mouthparts and a habit of skipping when alarmed. Skippers belong to the family Piophilidae (order Diptera), which means "fat-loving," and breed in fatty materials (*e.g.,* cheese, meat) or in decaying animal material. Skipper species have been known to live in the formalin-soaked human cadavers used in medical schools.

Skirophoria (Greek religion): *see* Scirophoria.

Skíros (Greece): *see* Skyros.

skittles, game of bowling at pins played primarily in Great Britain. Skittles was played for centuries in public houses or clubs, mostly in western England and the Midlands, southern Wales, and the Lothian region of Scotland. The rules and methods of scoring varied from place to place, but the basic principle of bowling a wooden or rubber ball (weighing about 10 pounds [4.5 kilograms]) at nine large, oval-headed pins, set in diamond formation 21 feet (about 6.5 m) away, remained the same. The player who knocked down all the pins (scored as "chalks") in the fewest throws was the winner. In the London area, however, the bowlers used a flat, round, loaf-shaped "cheese" made of lignum vitae wood and weighing from 12 to 14 pounds (5.4 to 6.4 kg). Control of this older form of the game was assumed by the Amateur Skittle Association, which specified the dimensions of the alley and the distance between each of the nine pins in the diamond frame.

Skobelev (Uzbek S.S.R.): *see* Fergana.

Skobelev, Mikhail Dmitriyevich (b. Sept. 29 [Sept. 17, Old Style], 1843, St. Petersburg, Russia—d. July 7 [June 25], 1882, Moscow), military officer who played prominent roles in Russia's conquest of Turkistan and in the Russo-Turkish War of 1877–78.

Sent to Tashkent (in modern Uzbekistan) in 1868, Skobelev participated in General Konstantin P. Kaufmann's successful campaign (1873) against the Khanate of Khiva in the lower Amu Darya region. Subsequently, when a rebellion in the Khanate of Kokand (1875) resulted in Kaufmann's invasion of that region, Skobelev captured the city of Andizhan (January 1876), enabling the Russians to occupy the whole khanate. The Russian govern-



Skobelev, engraving
Novosti Press Agency

ment then annexed Kokand (Feb. 19, 1876), renamed it the province of Fergana, and appointed Skobelev, who had been promoted to major general, to be its first Russian governor.

When war broke out between Russia and Turkey in 1877, Skobelev was transferred to the European front. His forces defeated the Turks in several strategic battles and finally captured Edirne (Adrianople) and San Stefano, thus forcing the Turks to conclude an armistice (Jan. 31, 1878). Because he always appeared in the midst of battle wearing a white uniform and riding a white horse, Skobelev became known by his soldiers as the "White General."

Skobelev returned to Turkistan and in 1880 took command of the Russian campaign against the Turkmen living between the Caspian and Aral seas and the Persian province of Khorāsān. Having captured Göktepe (Jan. 24, 1881), where he slaughtered the male population in the vicinity, he forced the region into submission and was proceeding against Ashkhabad when he was recalled and given command of the Minsk Army Corps.

At the beginning of 1882 Skobelev entered the political arena, making speeches in Paris and Moscow in favour of militant pan-Slavism and predicting an inevitable conflict between the German and Slav peoples. Those views, however, clashed with the official policy of the Russian government, which in 1881 had concluded an alliance with Germany and Austria-Hungary. Skobelev therefore was immediately recalled to St. Petersburg, where he suffered a fatal heart ailment.

Skoblikova, Lidiya Pavlovna (b. March 8, 1939, Zlatoust, Russian S.F.S.R.), Russian speed skater who became the first athlete to win four gold medals in a single Winter Olympic competition (1964). The combination of these four medals with the two she had won in 1960 made her also the first athlete to earn six gold medals in the Winter Olympic Games.

In 1957 Skoblikova established Soviet records for women in the 1,500-metre and 3,000-metre races. She won a gold medal in each of those events in the 1960 Winter Olympics at Squaw Valley, Calif. On Feb. 20–21, 1963, at Karuizawa, Japan, she set world records (subsequently broken by other skaters) at 500 metres (45.4 sec) and 1,000 metres (1 min 31.8 sec). In the 1964 Winter Olympic Games at Innsbruck, Austria, she finished first in all four women's skating races: 500, 1,000, 1,500, and 3,000 metres.

Educated at the Chelyabinsk Pedagogic Institute, Skoblikova taught physiology there from 1962 until 1974. That year she was appointed head of the physical education department at a university in Moscow.

Škoda, Emil von (b. Nov. 19, 1839, Plzeň, Bohemia—d. Aug. 8, 1900, Amstetten, Austria), German engineer and industrialist who founded one of Europe's greatest industrial complexes, known for its arms production in both World Wars.

After studying engineering in Germany, Škoda became chief engineer of a small machine factory in Plzeň (Pilsen), which three years later he bought and rapidly expanded, building his own railway connection to the main Vienna–Cheb line in 1886 and adding an arms factory in 1890 to produce a newly invented machine gun for the Austrian Army. In 1899 he incorporated his growing collection of machine shops, forges, and tool-and-die shops in Plzeň as the Škoda Works.

Skokie, village, Cook County, northeastern Illinois, U.S., northern suburb of Chicago. Called Niles Center until 1940, Skokie (renamed for the Potawatomi word for "swamp") was settled in 1834 and attracted a colony from Luxembourg, Belg. A trading centre in its early years, it was known primarily for its greenhouse produce. In the late 1920s a development boom followed the extension of railroad services through the village from Chicago. After World War II there was an influx of light industry. Printing and publishing are important, and in 1952 Rand McNally & Company (mapmaker and publishers) moved its international headquarters there from Chicago. Hebrew Theological College, established in Chicago in 1922, moved to Skokie in 1958. Inc. 1888. Pop. (1980) 60,278.

Skopje, Albanian SHKUP, Serbo-Croatian SKOPLJE, Turkish USKÜB, principal city and capital of Macedonia and third largest city in Yugoslavia.

Standing on the banks of the Vardar River amid mountainous country, Skopje began as ancient Scupi, an Illyrian tribal centre. It became the capital of the district of Dardania (part of the Roman province of Moesia Superior) under the emperor Diocletian in the 4th century. In 518 it was totally destroyed by an



New building constructed in Skopje, Yugos., since the 1963 earthquake

Salmer—Plessner International

earthquake. A brief Slav incursion occurred in the 7th century, and in the 9th and 10th centuries the town grew rapidly. The Serbs first captured Skopje in 1189, and in 1392 the Turks after conquering Macedonia made it their provincial capital and an important commercial centre. In 1689 it was burned to the ground by Austrian forces to eradicate a cholera epidemic, after which it declined until a revival in the 19th century with the building of the Belgrade–Thessaloníki railway. By treaty Skopje was in 1913 incorporated into Serbia, and in 1918 it became part of the new Yugoslavia. During World War II the Germans occupied it in April 1941, and it was then garrisoned by Bulgarian troops. Liberated in 1944, it became the capital of Macedonia in 1945.

The old city is located on the terraced riverbank dominated by an ancient fortress, north of which is a Roman aqueduct. Medieval monasteries in the vicinity include that of Nerezi (1164), with fine 12th-century frescoes. Other notable buildings are a medieval Turkish inn, the Kuršumli Han, and several mosques. The former strongly Turkish aspect of the city has been altered, however, by reconstruction since 1963, when a severe earthquake left some 80 percent of Skopje in ruins, with 1,070 persons dead and more than 120,000 homeless. Relief in money and kind, including medical, engineering, and building teams with supplies, came from 78 countries. From this, Skopje was called the "City of International Solidarity" by the Yugoslavs. A completely new earthquake-resistant town plan was formulated, with several satellite residential nuclei and four industrial regions. On the left bank are the houses of the representative bodies of the republic of Macedonia, educational institutions, library, concert halls, and radio and television stations. On the right bank is the economic and commercial centre. Skopje is an industrial, commercial, and administrative centre. Industries produce chemicals, cement, agricultural machinery, electrical goods, bricks, ceramics, glass, beer and spirits, canned fruit and vegetables, and tobacco; there is also leather processing, woodworking, chrome refining, and a steelworks. Skopje is an important transportation centre, with rail and road connections and a modern airport. It has a university (1949) and engineering school and is the site of the Macedonian Academy of Science and Art. Pop. (1981 prelim.) metropolitan area, 506,547.

Skorzeny, Otto (b. 1908, Vienna—d. July 5, 1975, Madrid), Nazi SS officer, who gained fame in 1943 for his daring rescue of Benito Mussolini from confinement at Campo Imperatore in the Abruzzi mountains where he had been imprisoned by Marshal Pietro Badoglio.

Skorzeny joined the Nazi Party in 1933 and became a colonel in the Waffen SS during World War II. In 1944 he played a leading part in the roundup and torture of anti-Hitler conspirators after the failure of the July 20 assassination plot. On Oct. 17, 1944, he led an SS unit to the Budapest royal palace and arrested the Hungarian leader Adm. Miklos Horthy. In the course of the Germans' Ardennes offensive during Christmas week 1944, Skorzeny directed the infiltration of hundreds of English-speaking Germans clad in U.S. uniforms behind the Allied lines. After the war he was acquitted by the International Military Tribunal (1947) in Nürnberg on the testimony of a British officer who maintained that Skorzeny had done nothing that his Allied counterparts would not have attempted. While awaiting a West German denazification trial in 1949, he escaped from Darmstadt prison and spent his remaining years in Spain.

Where the same name may denote a person, place, or thing, the articles will be found in that order

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Skövde, town, *län* (county) of Skaraborg, southern Sweden, on the eastern slope of Billingen upland (985 ft [300 m]). Although the settlement dates from the 12th century, it was not named a town until 1413. It received its charter in 1526. As the burial site of St. Helena (Elin), a local noblewoman who was canonized in 1164, it early became a place of pilgrimage but otherwise remained relatively insignificant until the coming of the railway and the beginning of industrialization in 1860. In 1905 it became a garrison town. Limestone quarrying and the manufacture of motors, chemicals, bricks, cement, and insulating materials are leading industries. Notable buildings include the Church of St. Helena (1250) and the 18th-century town hall. Pop. (1984 est.) mun., 46,009.

Skowronska, Marta: *see* Catherine I (empress of Russia).

Skram, Amalie, *née* ALVER (b. Aug. 22, 1846/47, Bergen, Nor.—d. March 15, 1905, Copenhagen), novelist, one of the foremost Naturalist writers of her time in Norway.

The daughter of an unsuccessful speculator, Skram had an unhappy childhood in a divided home. She grew up to be a lovely and admired woman, but she was disappointed by her early marriage to an older man, which ended in divorce. She later married a Danish writer, Erik Skram. Her early life seems to have had a strong effect on her writing and to have been in part responsible for her extreme pessimism.

Many of her works deal with unhappy marriages. She was convinced that mankind was entirely subjected to the tyranny of natural laws. Her best work is a tetralogy, considered the classic of Norwegian Naturalism, *Hellemyrsfolket* (1887–98; "People of Hellemyr"), in which she tells of the relations of a family over four generations, of family ambitions and inferiority feelings, and of family decay. One of her works, translated into English, is not a novel but a vivid description of her treatment for a nervous disorder, *Professor Hieronymus* (1895; Eng. trans., 1899).

Skryabin, Vyacheslav Mikhaylovich: *see* Molotov, Vyacheslav Mikhaylovich.

Skrzynecki, Jan Zygmunt (b. Feb. 8, 1787, Zebrak, Bohemia, Austrian Empire—d. Jan. 12, 1860, Kraków, Pol.), Polish general who organized the Polish army in the revolution of 1830.

After completing his education at the University of Lemberg, he entered the Polish Legion formed in the Grand Duchy of Warsaw and distinguished himself at the Battle of Leipzig (1813). At Arcis-sur-Aube, in 1814, he saved Napoleon from the sudden onslaught of the enemy by sheltering him in the midst of his battalion.

On the formation of the Kingdom of Poland in 1815 Skrzynecki was put in command of five infantry regiments and, on joining the insurrection of 1830, was entrusted with the organization of the Polish army. He soon became commander in chief but at first avoided all decisive operations as he hoped for the pacific intervention of the powers in favour of Poland. When at last Skrzynecki did take the offensive, his opportunity was gone, and, after a bloody contest with the Russians, he fell back upon Warsaw, where he demanded a reconstruction of the government and his own appointment as dictator. To this the Diet would not consent. Skrzynecki resigned his post, joined a guerrilla corps, and took refuge in Austrian territory. Subsequently he resided at Prague and finally retired to Kraków (1839).

Skrzyński, Aleksander, Hrabia (Count) (b. March 18, 1882, Zagórzany, Galicia, Austria-Hungary—d. Sept. 25, 1931, Ostrów, Pol.), Polish statesman, foreign minister in different governments from 1922 to 1925, and premier from November 1925 to May 1926.

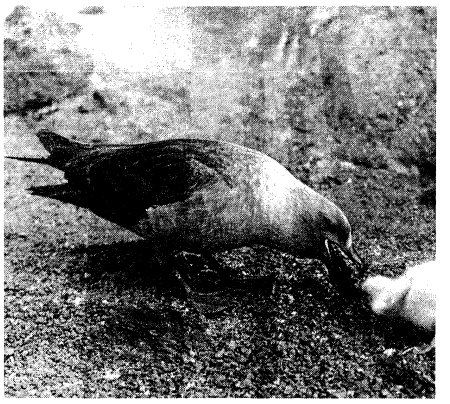
Skrzyński entered the diplomatic service in 1906 and, when the new Polish state was established, was appointed Polish minister plenipotentiary at Bucharest. In December 1922, after the murder of Gabriel Narutowicz, the first international president of the Republic, Skrzyński became minister of foreign affairs. When a cabinet of the right was formed in May 1923, Skrzyński lost office. In August 1924 he again became minister of foreign affairs. By a number of conventions, the regulation of the British and American debts, the concordat with the Vatican, and the rapprochement with Czechoslovakia, Skrzyński strengthened Poland's international position, taking an active part in the League of Nations in elaborating the scheme for the Geneva Protocol and in securing settlement of the Danzig disputes in a manner favourable to Poland.

On Nov. 13, 1925, Skrzyński was entrusted with the formation of a new government, but it had fallen by the time of Józef Piłsudski's coup d'etat of May 1926.

In the following month, June 1926, Count Skrzyński took part in a duel after a political quarrel with Stanisław Maria, Count Szeptycki, former minister of war, but refused to fire after the general had missed him from 15 paces.

Sku lnga (Buddhism): *see* Five Great Kings.

skua, any of several predatory seabirds. In American usage, the name is restricted to *Catharacta skua,* called great skua in Britain; three smaller birds also known in Britain as



Skua (*Catharacta skua*) disgorging partly digested food to feed young
Paul Popper

skuas are called jaegers in the United States (*see* jaeger). All belong to the family Stercorariidae (order Charadriiformes).

The great skua, or bonxie, is a bird about 60 centimetres (24 inches) long, resembling a gull but heavily built, with a brownish body and large, white wing patches. It is the only bird that breeds both in the Arctic and in the Antarctic. It nests from the Orkney Islands to Iceland and from the tip of South America to within 150 miles (240 kilometres) of the South Pole (going nearer to the South Pole than any other creature except man). Although breeding populations occupy separated ranges and show colour differences, they apparently represent a single species. In the north, skuas breed only in the Atlantic (Scotland to Iceland) and are somewhat rusty in plumage. In the south, several forms occur, from pale reddish to dark brown in colour. Skuas go to sea in winter: southern birds drift northward, regularly crossing the Equator in the Pacific, and northern birds also reach the tropics.

Agile and swift, skuas force other birds to disgorge food; they nest near such birds as penguins, petrels, and terns and steal their eggs and young. In the north they also eat lemmings and, like the giant fulmar, eat carrion.

skull, bony framework of the head of vertebrates, composed of several bones fused into a unit that protects the brain and some sense organs. The upper jaw, but not the lower, is part of the skull. The human cranium, the part that contains the brain, is globular and relatively large in comparison to the face. In most other animals the facial portion of the skull, including the upper teeth and the nose, is larger than the cranium. In humans the skull is supported by the highest vertebra, called the atlas, permitting nodding motion. The atlas turns on the next lower vertebra, the axis, to allow for side-to-side motion.

In humans the base of the cranium is the occipital bone, which has a central opening (foramen magnum) to admit the spinal cord. The parietal and temporal bones form the dome of the cranium, and the frontal bone forms the forehead; the cranial floor consists of the sphenoid and ethmoid bones. The facial area includes the malar (cheek) bones, which join with the temporal bones to form the zygomatic arch below the eye socket; the palatine bones; and the maxillary, or upper jaw, bones. The nostrils are separated by the vomer and are formed of the nasal, lachrymal, and turbinate bones. In infants the sutures (joints) between the various skull elements are loose, but with age they fuse together. Many mammals, such as the dog, have a sagittal crest down the centre of the skull; this provides an extra attachment site for the temporal muscles, which close the jaws.

For a depiction of the skull in human anatomy, shown in relation to other parts of the body, *see* the colour Trans-Vision in the PROPAEDIA: Part Four, Section 421.

skull cult, veneration of human skulls, usually those of ancestors, by various prehistoric and some modern primitive people. Begun probably as early as the Early Paleolithic Period, the practice of preserving and honouring the skull apart from the rest of the skeleton appears to have continued in different forms throughout prehistoric times. Although some scholars believe that these skulls demonstrate prehistoric man's cannibalism, most authorities agree that the skulls were cleaned and set up for worship long after death.

Prehistoric man also paid special attention to animal skulls. This practice is believed to have been a type of hunting magic, whereas the human skulls were honoured with the reverence accorded to heroic ancestors and perhaps also were thought to assure the possessor of the protection and help of the deceased.

skunk, also called POLECAT, or ZORRINO, any of 11 species of New World carnivores of the weasel family (Mustelidae), noted for the offensive odour produced by glands on either



Striped skunk (*Mephitis mephitis*)
E.R. Degginger—EB Inc.

side of the anal opening. Most species exhibit characteristic warning behaviour, such as foot stamping and (in spotted skunks) "hand-standing" on the front feet. If the threat continues, the animal turns its hindquarters toward the target and ejects a fine spray of yellow, odoriferous liquid as far as 3.7 metres (12 feet).

Species vary in size, but all have black and white fur patterns. Most species are nocturnal and principally terrestrial; they feed primarily on rodents, insects, eggs, birds, and plants. Their gestation period lasts about 42–72 days; litters contain 2 to 10 young.

Skunks are readily tamed as pets and skunk pelts have commercial value. Their scent gland secretions provide a perfume base; their flesh, food.

The best-known skunks are the following:

Hog-nosed skunks (*Conepatus*), seven species occurring in open and wooded regions throughout the Western Hemisphere; named for the characteristic long, naked snout; also called badger, or white-backed, skunk; head and body length, 30–49 centimetres (12–20 inches); tail length, 16–41 cm; weight, 2–4.5 kilograms (4.5–10 pounds); fur, coarse, black with a white tail and, usually, a solid white back (the Amazonian, or striped hog-nosed skunk, *C. semistriatus*, of Central and South America has two white dorsal stripes).

Hooded skunk (*Mephitis macroura*) of southern North America and Central America, particularly in desert habitats; named for the

typical neck ruff; head and body length, 31–41 cm; tail length, 28–44 cm; weight, 2.5 kg or less; two colour phases—one with a predominantly white back and tail, one with a black back and white stripes on the sides.

Spotted skunks (*Spilogale*), two species frequenting dry areas of North and Central America; also called civet, polecat, little striped skunk, civet cat, and hydrophobia cat; head and body length, 12–35 cm; tail length, 7–22 cm; weight, usually 0.2–1.0 kg; hair, silky, black, variably patterned with numerous broken body and face stripes or spots; playful.

Striped skunk (*Mephitis mephitis*), North American species found in most regions; also called common skunk, wood pussy, and polecat; head and body length, 31–46 cm; tail length, 18–40 cm; weight, 1–6 kg; colour pattern, variable, but most frequently black with a narrow white forehead stripe and a white head patch extending onto the back, or even onto the tail, as a single band or as two stripes.

skunk bear: *see* wolverine.

skunk cabbage, any of three species of plants that grow in bogs and meadows of temperate regions. In eastern North America the skunk cabbage (called in Canada *tabac du diable* or *chou puant*) is *Symplocarpus foetidus,* which belongs to the arum family (Araceae, order Arales, *q.v.*). It is a fleshy, herbaceous plant with large leaves, purple-brown spathes, and a skunklike odour; a variety grows in northeastern Asia.

The ill-smelling western, or yellow, skunk cabbage (*Lysichitum americanum*), of the same family, having a large yellow spathe, is found from California to Alaska and eastward to Montana. Another skunk cabbage (*Veratrum californicum*) is the poisonous corn lily, or false hellebore, which grows from New Mexico and Baja California northward to Washington.

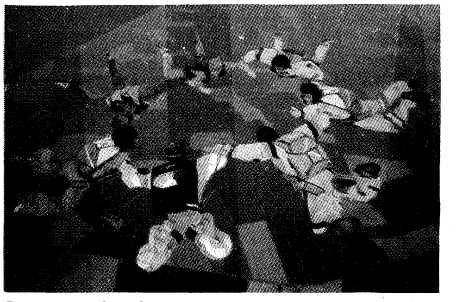
Skunk River, river rising in Hamilton County, north central Iowa, U.S., and flowing generally south to Ames, where it veers to the southeast, paralleling the Des Moines River to enter the Mississippi River below Burlington in Des Moines County, after a course of 264 mi (425 km). It is joined by the North Skunk, southeast of Sigourney, Iowa.

skutterudite, one of a series of cobalt and nickel arsenide minerals that occur with other cobalt and nickel minerals in moderate-temperature veins. The members of the series, which all form crystals of isometric symmetry, are skutterudite, nickel-skutterudite, smaltite, and chloanthite; their compositions approach that of $(Co,Ni)As_{3-x}$.

Sky God (religion): *see* High God.

skydiving, also called PARACHUTING, the use of a parachute for recreation and competition. In sport jumping, the jump is usually made from a slow-moving plane, often at less than 10,000 feet (3,000 metres). When the jumper delays opening the parachute, he creates a free-fall. Skydiving events include jumping for style, landing with accuracy, and performing in teams. The first world championship in skydiving was held in Yugoslavia in 1951, and later world championships followed at two-year intervals under the auspices of the Fédération Aéronautique Internationale (FAI), with as many as 40 national teams competing.

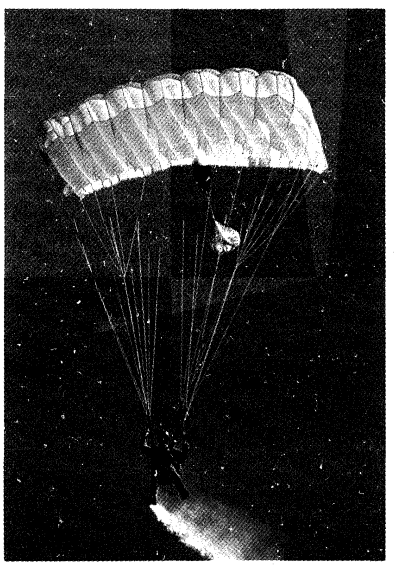
In jumping for style, competitors are required to perform a number of stunts, such as a back turn in the shortest time possible during the period of free-fall, and are judged solely on form. The place of landing is irrelevant. In accuracy jumping, the object is to land as close as possible to the centre (a 5-cm- [1.97-in.-] diameter disk) of a 37-cm-diameter electronically sensitive circular target on the ground. In team events, members perform such maneuvers as passing a baton while falling, linking into a circle, or performing



Seven-man free-fall hookup
Guy Sauvage—Agence Vandystadt/Photo Researchers

some other figure—all called "relative work." In "canopy relative work" the members link or perform figures after their parachutes have opened.

The sport parachute, unlike that designed as a safety device, has certain panels missing for ease of maneuverability. Sport parachutes may also be rotated by a pull or control knob that regulates the direction of the escaping air. The venting arrangement of a parachute allows the sky diver to guide his descent after he has opened the parachute at an altitude designated by the FIA judges. The jumper must also leave the airplane in a predetermined man-

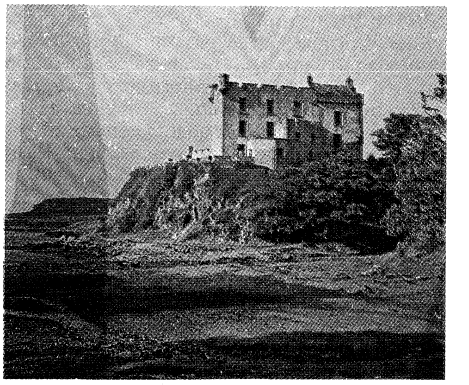


Skydiving with a Parafoil parachute
Jim Larsen

ner and form. In recreational parachuting, the jumper usually carries an altimeter, which, along with providing information on the rate of descent, tells the jumper when to open his chute. Newer forms of sport parachuting include paragliding, which requires the use of flexible wings added to the chute, and para-ascending, in which the parachute jumper is attached to a long line connected to his harness and is lifted into the wind by a vehicle on the ground.

Skye, largest and most northerly island of the Inner Hebrides; it is the nearest of these islands to the Scottish mainland, being separated at the Kyleakin ferry crossing by only a few hundred yards. Administratively it is part of Skye and Lochalsh district, of Highland region. Skye is almost 50 mi (80 km) long and is so deeply indented that no part is more than 5 mi from the sea. The Cuillin Hills (more than 3,300 ft [1,000 m]) dominate the landscape in south central Skye. North of Portree, seat of the district authority, is the curious basaltic group of pinnacles at Storr, the most remarkable of which, the Old Man of Storr, is a landmark for sailors.

Much of Skye is moorland. The crofting system is still widespread. During the late 18th and early 19th centuries, the poverty of the crofters was extreme, and large numbers were forced to emigrate. Improvements came after the passage of the Small Landholders (Scotland) Acts, 1886–1911, and the subse-



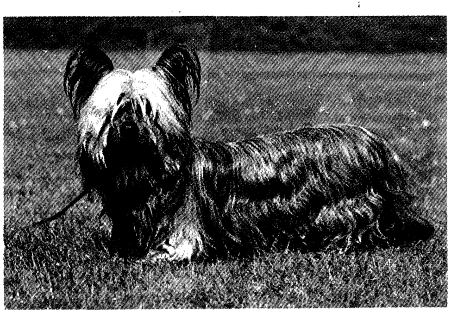
Dunvegan Castle on the isle of Skye, Scotland
Tourist Photo Library

quent introduction of government subsidies for growing potatoes and raising cattle and sheep. The fishing industry, once a mainstay of the economy, has declined. Other occupations include whisky distilling at Carbost and, just north of Storr, the reworking of extensive diatomite deposits, with a processing plant at Uig. Tourism is a major industry. Portree lies at the head of a fine harbour on the eastern coast and manufactures tweeds, tartans, and other woolens.

Skye was ruled by Norsemen until the 13th century, when the Hebrides became part of Scotland. Dunvegan Castle, home of the MacLeods, the chief clan of Skye, was built in the 9th century and has been occupied longer than any other house in Scotland. Pop. (1981) 8,139.

Skye and Lochalsh, district, Highland region, northwestern Scotland. Created by the reorganization of 1975, it includes parts of the former counties of Ross and Cromarty and of Inverness. The district, area 960 sq mi (2,486 sq km), consists of hilly southwestern Ross, terminating at Kyle of Lochalsh, and the nearby isle of Skye, formerly part of Inverness. There is connecting ferry service between the mainland and Kyleakin on the isle. Portree, on Skye, is the seat of the district authority. Pop. (1984 est.) 11,077.

Skye terrier, breed of dog that was originated as a hunter on the Isle of Skye, Scotland, and has remained relatively unchanged



Skye terrier
Sally Anne Thompson—EB Inc.

for about 400 years. In the 19th century the Skye was one of the most popular terriers, a working dog as well as the pet of the nobility. It is characterized as sturdy, alert, and good-tempered. It has a large head, long body, and short legs, and its ears are either erect or hanging. The long, straight coat ranges from black

to pale yellowish brown. Adult height is 9.5 to 10 inches (24 to 25.5 cm); weight is about 24 pounds (11 kg).

skyjacking, the hijacking of a flying airplane (*see* hijacking).

Skylab Program, formerly APOLLO APPLICATIONS PROGRAM, space program of the United States that launched its first space station (named Skylab) into Earth orbit on May 14, 1973, by means of a Saturn V rocket. Three successive teams of astronauts conducted experiments in geography, engineering, earth resources, biomedicine, and other scientific areas in and from Skylab between May 25, 1973, and Feb. 8, 1974, for a total of 171 days in space. Skylab's orbit was then adjusted to an altitude believed sufficient to keep the craft in space until 1983, when the orbit would again be adjusted in the future space-shuttle program. Increased sunspot activity, however, caused greater atmospheric drag on Skylab than had been predicted, and the space-shuttle program was delayed. Skylab first wandered from its orbit in June 1978 and finally broke into the Earth's atmosphere on July 11, 1979, the first pieces striking the Earth's surface at 5:37 PM Greenwich Mean Time in the Indian Ocean and southwestern Australia.

skylark, species of lark (*q.v.*).

Skyros, Modern Greek SKÍROS, island, the largest and easternmost of the northern Sporades in the Aegean Sea, Greece. The island has an area of 81 square miles (210 square km). On the island's deeply indented southern coast is found the main harbour, Linariá, while in the north is Skíros, the capital, on the site of the ancient capital. The southern part of the island culminates in Mount Kokhílas (2,602 feet [790 m]). Traditionally the island was a sanctuary of the legendary hero Achilles, and there Theseus, king of Athens, was treacherously killed. In 475 BC it was seized by Athens; when the Romans took it in 196 BC, it was under Macedonian rule. Present-day Skyros has become a resort. Pop. (1981) 2,757.

skyscraper, very tall, multistoried building. The name first came into use during the 1880s, shortly after the first skyscrapers were built, in the United States. The development of skyscrapers came as a result of the coincidence of several technological and social developments. The term "skyscraper" originally applied to buildings of 10 to 20 stories, but by the late 20th century the term was used to describe high-rise buildings of unusual height, generally greater than 40 or 50 stories.



Home Insurance Company Building, Chicago, designed by William Le Baron Jenney, 1884–85
By courtesy of the Chicago Historical Society

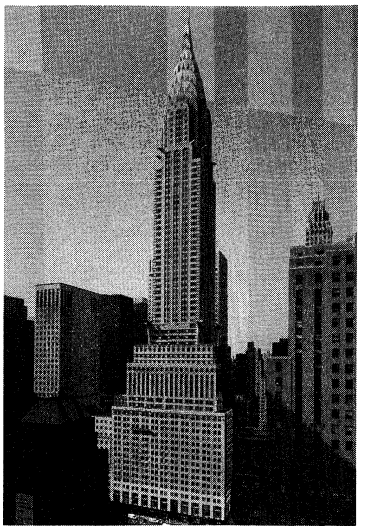
The increase in urban commerce in the United States in the second half of the 19th century augmented the need for city business space, and the installation of the first safe passenger elevator (in the Haughwout Department Store, New York City) in 1857 made practical the erection of buildings more than four or five stories tall. Although the earliest skyscrapers rested on extremely thick masonry walls at the ground level, architects were soon able to turn to the use of a cast-iron and wrought-iron framework to support the weight of the upper floors, allowing for more floor space on the lower stories. James Bogardus had built the Cast Iron Building (1848, New York City) with a rigid frame of iron providing the main support for upper-floor and roof loads.

It was, however, the refinement of the Bessemer process, first used in the United States in the 1860s, that allowed for the major advance in skyscraper construction. As steel is stronger and lighter in weight than iron, the use of a steel frame made possible the construction of truly tall buildings, and it was William Le Baron Jenney's 10-story Home Insurance Company Building in Chicago that, in 1885, first made use of steel-girder construction. Jenney's skyscrapers also first employed the curtain wall, an outer covering of masonry or other material that bears only its own weight and is affixed to and supported by the steel skeleton. Structurally, skyscrapers consist of a substructure of piers beneath the ground, a superstructure of columns and girders above the ground, and a curtain wall hung on the girders.

As the population density of urban areas has increased, so has the need for buildings that rise rather than spread. The skyscraper, which was originally a form of commercial architecture, has been used in the United States and throughout the world increasingly for residential purposes as well.

The design and decoration of skyscrapers have passed through several stages. Jenney and his protégé, Louis Sullivan, styled their buildings to accentuate verticality, with delineated columns rising from base to cornice. There was, however, some retention of, and regression to, earlier styles as well. As part of the Neoclassical revival, for instance, skyscrapers such as those designed by the firm of McKim, Mead, and White were modeled after Classical Greek columns. The Metropolitan Life Insurance Building in New York City (1909) was modeled by Napoleon Le Brun after the Campanile of St. Mark's in Venice, and the Woolworth Building (1913), by Cass Gilbert, is a prime example of neo-Gothic decoration. Even the Art Deco carvings on such towers as the Chrysler Building (1930), the Empire State Building (1931), and the RCA Building (1931) in New York City, which were then considered as modern as the new technology, are now viewed as more related to the old ornate decorations than to truly modern lines.

The International Style (*q.v.*) with its total simplicity seemed ideally suited to skyscraper design, and, during the several decades following World War II, it dominated the field, notable early examples being the Seagram Building (1958) in New York City and the Lake Shore Drive Apartments (1951) in Chicago. The stark verticality and glass curtain walls of this style became a hallmark of ultramodern urban life in many countries. During the 1970s, however, attempts were made to redefine the human element in urban architecture. Thus, zoning ordinances encouraged the incorporation of plazas and parks into and around the bases of even the tallest skyscrapers, just as zoning laws in the first decades of the 20th century were passed to prevent city streets from becoming sunless canyons and led to the shorter, stepped skyscraper. Office towers such as the World Trade Center (1970–77) in New York City and the Sears Tower (1973) in Chicago continue to be built, but most of them—such as the Citicorp Center (1978) in New York City—feature lively and innovative space for shopping and entertainment at the street level.



Chrysler Building, New York City, designed by William Van Alen, 1930
© Peter Mauss/Esto

Another social factor influencing skyscraper design and construction in the late 20th century was the need for energy conservation. Earlier, sealed windows that made necessary continuous forced-air circulation or cooling, for instance, gave way in mid-rise buildings to operable windows and glass walls that were tinted to reflect the Sun's rays. Also, perhaps in reaction to the austerity of the International Style, the 1980s saw the beginnings of a return to more classical ornamentation, such as that of Philip Johnson's AT&T Building (1982) in New York City. *See also* high-rise building.

Skytrain (U.S. aircraft): *see* DC-3.

Sla (Morocco): *see* Salé.

Slade, Jack, byname of JOSEPH A. SLADE (b. 1824, Carlyle, Ill., U.S.—d. March 10, 1864, Virginia City, Mont.), gunfighter and murderer of the American West.

Born in Illinois, Slade ran away while still a boy and became a cowboy in the Southwest, serving in the army in the Mexican War (1848). He gained a reputation as a vicious gunman when, in 1859 in Cold Springs, Colo., during a drunken bout, he had an old enemy, Jules Bene, tied to a stake and used him for target practice, killing him. Later, in Fort Halleck, Colo., he was indicted on another charge of assault and fled north to Virginia City, Mont. (1861). There he gained such notoriety for drunkenness, brawling, menacing gunplay, and shooting that local vigilantes dragged him from a saloon in 1864 and hanged him.

slag, by-product formed in smelting, welding, and other metallurgical and combustion processes from impurities in the metals or ores being treated. Slag consists mostly of mixed oxides of elements such as silicon, sulfur, phosphorus, and aluminum; ash; and products formed in their reactions with furnace linings and fluxing substances such as limestone. Slag floats on the surface of the molten metal, protecting it from oxidation by the atmosphere and keeping it clean. Slag forms a coarse aggregate used in certain concretes; it is used as a road material and ballast and as a source of available phosphate fertilizer.

Molten ash formed upon combustion of coal in some high-capacity boiler furnaces is also sometimes termed slag. *See also* flux.

Slagelse, city, Vestsjællands *amtskommune* (county), Sjælland (Zealand), Denmark. One of the oldest towns in Denmark (chartered 1288) and a prosperous trade centre in the Middle Ages, it retains few signs of antiquity, due to repeated fires. The commercial centre of western Sjælland, its industry includes vegetable and meat canning; margarine, yeast, and tobacco factories; and distilleries. The famous fortress of Trælleborg (about 5 mi [8 km] west-southwest) is one of the most important Viking remains in Denmark. Pop. (1981) city, 28,539; (1982 est.) mun., 33,432.

Slagle, Eleanor Clarke, *née* CLARKE (b. Oct. 13, 1871, Hobart, N.Y., U.S.—d. Sept. 18, 1942, Philipse Manor, N.Y.), U.S. social welfare worker and early advocate of occupational therapy for the mentally ill.

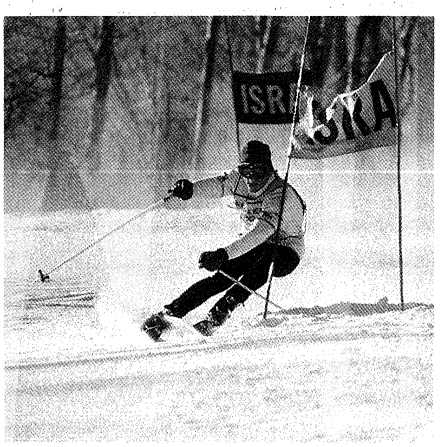
While a social worker, Slagle became interested in the new field of occupational therapy, and in 1917 she conducted occupational therapy training courses at Hull House in Chicago. From 1918 to 1922, she directed occupational therapy research for the state of Illinois and then organized a therapy program for the state's mental hospitals. In 1922 she was named New York state director of occupational therapy, a post she held until her death. She demonstrated the first large-scale occupational therapy program for a state hospital system and also founded an annual training institute for state therapists that became a model for similar programs throughout the United States.

Slagle was one of the founders of the American Occupational Therapy Association in 1917.

slaked lime, calcium hydroxide, a soft white powder that is widely used as a raw material in the chemical industry (*see* calcium).

slalom, ski race that follows a winding course between gates (pairs of poles topped with flags), devised by British sportsman Sir Arnold Lunn in the early 1920s. It is one of the Alpine events, so called because it originated in the Alps of Europe.

The course is carefully designed to test the skill, timing, and judgment of the competitors. The gates are placed in varying combinations, and it demands great skill to achieve the best



Skier competing in the giant slalom
Laura Riley—Stock, Boston

line of approach and exit with the different combinations. A skier who misses a gate is disqualified unless he returns and passes through it from the proper side. The gates are at least 76 centimetres (30 inches) wide and 3 metres (10 feet) apart. For Olympic and world championship events the men's course must have a vertical descent of 180 to 220 m; for other events and less skilled contestants the course may be shorter and less difficult. Men's events use 55 to 75 gates; women's use 40 to 60.

The giant slalom has characteristics of both the slalom and downhill, the latter a longer, faster race. Giant slalom gates are wider and set farther apart and its course is longer than in the slalom. The event was first included in the world championships in 1950.

In top international events, slalom competitors usually take two runs without practice on the same course or on two different courses. The winner is the one with the lowest combined time.

For world champions, *see* Sporting Record: *Skiing. See also* Olympic Games.

Slammin' Sam (golfer): *see* Snead, Sam.

Slaney, River, river, rising on Lugnaquillia Mountain (3,039 ft [926 m]), County Wicklow, Ireland. It turns westward in a steep torrential course to the Glen of Imail, a granite basin 500–700 ft above sea level and runs south through the farmed lowlands of County Carlow to Bunclody, where it is joined by the Clody and continues southeast through the Slaney Gap. It receives two major tributaries, the Derry, above Bunclody, and the Bann, north of Enniscorthy, where the river becomes tidal. Quays were built there in the 19th century for barge traffic to Wexford. The Slaney finally enters Wexford Harbour, a sheltered inlet of more importance for shipping in the 19th century than at present. Its length is 73 mi (118 km).

slang, nonstandard vocabulary composed of words or senses characterized primarily by connotations of extreme informality and usually by a currency not limited to a particular region. It is composed typically of coinages or arbitrarily changed words, clipped or shortened forms, extravagant, forced, or facetious figures of speech, or verbal novelties.

A brief treatment of slang follows. For full treatment, *see* MACROPAEDIA: Language.

Slang consists of the words and expressions that have escaped from the cant, jargon, and argot (and to a lesser extent, from dialectal, non-standard, and taboo speech) of specific subgroups of society so that they are known and used by an appreciable percentage of the general population, even though the words and expressions often retain some associations with the subgroups that originally used and popularized them. Thus, slang is a middle ground for words and expressions that have become too popular to be any longer considered as part of the more restricted categories, but that are not yet (and may never become) acceptable or popular enough to be considered informal or standard. (Compare the slang "hooker" and the standard "prostitute.")

Under the terms of such a definition, "cant" comprises the restricted, non-technical words and expressions of any particular group, as an occupational, age, ethnic, hobby, or special-interest group. (*Cool, uptight, do your thing* were youth cant of the late 1960s before they became slang.) "Jargon" is defined as the restricted, technical, or shop-talk words and expressions of any particular group, as an occupational, trade, scientific, artistic, criminal, or other group. (*Finals* used by printers and by students; *Fannie May* by money men; *preemie* by obstetricians were jargon before they became slang.) "Argot" is merely the combined cant and jargon of thieves, criminals, or any other underworld group. (*Hit* used by armed robbers; *scam* by corporate confidence men.)

Slang fills a necessary niche in all languages, occupying a middle ground between the standard and informal words accepted by the general public and the special words and expressions known only to comparatively small social subgroups. It can serve as a bridge or a barrier, either helping both old and new words that have been used as "insiders' " terms by a specific group of people to enter the language of the general public or, on the other hand, preventing them from doing so. Thus, for many words, slang is a testing ground that finally proves them to be generally useful, appealing, and acceptable enough to become standard or informal. For many other words, slang is a testing ground that shows them to be too restricted in use, not as appealing as standard synonyms, or unnecessary, frivolous, faddish, or unacceptable for standard or informal speech. For still a third group of words and expressions, slang becomes not a final testing ground that either accepts or rejects them for general use but becomes a vast limbo, a permanent holding ground, an area of speech that a word never leaves. Thus, during various times in history, American slang has provided *cowboy, blizzard, okay, racketeer, phone, gas,* and *movie* for standard or informal speech. It has tried and finally rejected *conbobberation* (disturbance), *krib* (room or apartment), *lucifer* (match), *tomato* (girl), and *fab* (fabulous) from standard or informal speech. It has held other words such as *bones* (dice), used since the 14th century, and *beat it* (go away), used since the 16th century, in a permanent grasp, neither passing them on to standard or informal speech nor rejecting them from popular, long-term use.

Slang words cannot be distinguished from other words by sound or meaning. Indeed, all slang words were once cant, jargon, argot, dialect, nonstandard, or taboo. For example, the American slang *to neck* (to kiss and caress) was originally student cant; *flattop* (an aircraft carrier) was originally navy jargon; and *pineapple* (a bomb or hand grenade) was originally criminal argot. Such words did not, of course, change their sound or meaning when they became slang. Many slang words, such as *blizzard, mob, movie, phone, gas,* and others, have become informal or standard and, of course, did not change in sound or meaning when they did so. In fact, most slang words are homonyms of standard words, spelled and pronounced just like their standard counterparts, as for example (American slang), *cabbage* (money), *cool* (relaxed), and *pot* (marijuana). Of course, the words *cabbage, cool,* and *pot* sound alike in their ordinary standard use and in their slang use. Each word sounds just as appealing or unappealing, dull or colourful in its standard as in its slang use. Also, the meanings of *cabbage* and *money, cool* and *relaxed, pot* and *marijuana* are the same, so it cannot be said that the connotations of slang words are any more colourful or racy than the meanings of standard words.

All languages, countries, and periods of history have slang. This is true because they all have had words with varying degrees of social acceptance and popularity.

All segments of society use some slang, including the most educated, cultivated speakers and writers. In fact, this is part of the definition of slang. For example, George Washington used *redcoat* (British soldier); Winston Churchill used *booze* (liquor); and Lyndon B. Johnson used *cool it* (calm down, shut up).

The same linguistic processes are used to create and popularize slang as are used to create and popularize all other words. That is, all words are created and popularized in the same general ways; they are labelled slang only according to their current social acceptance, long after creation and popularization.

Slang is not the language of the underworld, nor does most of it necessarily come from the underworld. The main sources of slang change from period to period. Thus, in one period of American slang, frontiersmen, cowboys, hunters, and trappers may have been the main source; during some parts of the 1920s and 1930s the speech of baseball players and criminals may have been the main source; at other times, the vocabulary of jazz musicians,

soldiers, blacks, or college students may have been the main source.

For a full understanding of slang, it must also be remembered that a word's use, popularity, and acceptability can change. Words can change in social level, going from any one of the many levels to another level. Thus, some standard words of Shakespeare's day are found only in certain modern-day British dialects or in the dialect of the southern United States. Taboo words of yesterday (*stomach, thigh,* etc.) can be accepted, standard words of today. The status of any word is fluid, and at any one time hundreds, and perhaps thousands, of words and expressions are in the process of changing from one level to another, of becoming more acceptable or less acceptable, of becoming more popular or less popular.

Slánský, Rudolf (b. July 31, 1901, Nezvěstice, near Plzeň, Austria-Hungary—d. Dec. 3, 1952, Prague), Czech Communist leader who was the central victim in the November 1952 "Slánský trial."

Of Jewish descent, Slánský joined the Communist Party in 1921 and became editor of the party organ, *Rudé Právo,* in 1924. He became regional party secretary in Ostrava in 1927 and a member of the Central Committee of the party in 1929. In 1935 he was elected to the Czechoslovak National Assembly. He was prominent in the Czechoslovak Communist leadership in Moscow during World War II when Czechoslovakia was under German occupation. He served on the Ukrainian front and fought with partisans in Slovakia during the uprising of 1944 against the Germans. After the war he was named secretary general of the party, second only to the leader, Klement Gottwald. He had a major role in the Communist takeover of Czechoslovakia in February 1948, becoming a vice premier.

In 1949 Slánský was active in the reorganization of the Czechoslovak Communist Party. During 1951, however, his own political position deteriorated. In September 1951 he was removed from his secretariat, and in November he was arrested. Under strong psychological and physical pressure, he confessed to the charges that had been prepared against him, among others that he had been a Zionist agent and had engaged in espionage for the West. In November 1952 he and 13 others were tried; 11 of them, including Slánský, were sentenced to death. The Slánský trial was marked by strongly anti-Semitic overtones (most of the condemned were Jews), and the falseness of the charges proved an embarrassment to the party leadership in later years. The Slánský case was later reviewed, and in 1963 he was posthumously absolved of the criminal charges of treason and espionage for which he had been condemned. He was restored to party membership in 1968.

Slaný, town, Kladno *okres* (district), northern Středočeský *kraj* (region), Czech Socialist Republic, northwestern Czechoslovakia. Located northwest of Prague, the national capital, Slaný lies in the slightly hilly country west of the Vltava (Moldau) River Valley, in an area that grows barley, wheat, hops, sugar beets, corn (maize), and raises chickens and hogs. During the 1970s bituminous coal deposits of about 150,000,000 tons (136,000,000 metric tons) were found in the area around and northeast of the town in seams located 2,625 to 4,265 ft (800 to 1,300 m) below ground. Mine preparation began in 1979, with extraction scheduled to start in the 1990s. Slaný also manufactures machinery and electronics equipment. It is linked by railroad to Most and to the Prague–Chomutov line and is a highway junction. Pop. (1983 est.) 15,370.

slapstick, a type of physical comedy characterized by broad humour, absurd situations, and vigorous, usually violent action. The slapstick comic, more than a mere funnyman or buffoon, must often be an acrobat, a stunt man, and something of a magician—a master of uninhibited action and perfect timing.

Outrageous make-believe violence has always been a key attraction of slapstick comedy, and, fittingly, the form took its name from one of its favourite weapons. A slapstick was originally a harmless paddle composed of two pieces of wood that slapped together to produce a resounding whack when the paddle struck someone. The slapstick seems to have first come into use in the 16th century, when Harlequin, one of the principal characters of the Italian commedia dell'arte, used it to belabour the posteriors of his comic victims.

The rough-and-tumble of slapstick stage business has been a part of low comedy and farce since ancient times, having been a prominent feature of Greek and Roman mime, in which bald-pated, heavily padded clowns exchanged quips and beatings to the delight of the audience.

The Renaissance produced the athletic zanies of the commedia dell'arte and even rougher clowns, such as the hunch-backed, hook-nosed, wife-beating Pulcinella, who survives even today as the Punch of children's puppet shows.

Slapstick reached another zenith in the English and U.S. music halls and vaudeville theatres of the late 19th century; such English stars as George Formby and Gracie Fields carried its popularity well into the 20th century. Motion pictures provided even greater opportunities for visual gags, and comedians Charlie Chaplin, Harold Lloyd, and Mack Sennett's Keystone Kops introduced such classic routines as the mad chase scene and pie throwing, often made doubly hilarious by speeding up the camera action. Their example was followed in sound films by Laurel and Hardy and the Marx Brothers, whose stage careers predated their films and whose films were frequently revived in the 1960s and 1970s and affectionately imitated by modern comedy directors. The best of the slapstick comedians may be said to have turned low humour into high art.

slash-and-burn agriculture, method of cultivation often used by tropical-forest root-crop farmers in various parts of the world and by dry-rice cultivators of the forested hill country of Southeast Asia. Areas of the forest are burned and cleared for planting; the ash provides some fertilization, and the plot is relatively free of weeds. After several years of cultivation, fertility declines and weeds increase; the area is left fallow and reverts to secondary forest of bush. Cultivation then shifts to a new plot; after about a decade the old site may be reused.

Śląsk: *see* Silesia.

slate, fine-grained, clayey metamorphic rock that cleaves, or splits, readily into thin slabs having great tensile strength and durability; some other rocks that occur in thin beds are improperly called slate because they can be used for roofing and similar purposes. True slates do not, as a rule, split along the bedding plane but along planes of cleavage, which may intersect the bedding plane at high angles. Slate was formed under low-grade metamorphic conditions; *i.e.,* under relatively low temperature and pressure. The original material was a fine clay, sometimes with sand or volcanic dust, usually in the form of a sedimentary rock (*e.g.,* a mudstone or shale). The parent rock may be only partially altered so that some of the original mineralogy and sedimentary bedding are preserved; the bedding of the sediment as originally laid down may be indicated by alternating bands, sometimes seen on the cleavage faces. Cleavage is a super-induced structure, the result of pressure acting on the rock at some time when it was deeply buried beneath the Earth's surface. On this account, slates occur chiefly among older rocks, although some occur in regions in which comparatively recent rocks have been folded and compressed as a result of mountain-building movements. The direction of cleavage depends upon the direction of the stresses applied during metamorphism.

Slates may be black, blue, purple, red, green, or gray. Dark slates usually owe their colour to carbonaceous material or to finely divided iron sulfide. Reddish and purple varieties owe their colour to the presence of hematite (iron oxide), and green varieties owe theirs to the presence of much chlorite, a green micaceous clay mineral. The principal minerals in slate are mica (in small, irregular scales), chlorite (in flakes), and quartz (in lens-shaped grains).

Slates are split from quarried blocks about 7.5 centimetres (three inches) thick. A chisel, placed in position against the edge of the block, is lightly tapped with a mallet; a crack appears in the direction of cleavage, and slight leverage with the chisel serves to split the block into two pieces with smooth and even surfaces. This is repeated until the original block is converted into 16 or 18 pieces, which are afterward trimmed to size either by hand or by means of machine-driven rotating knives.

Slate is sometimes marketed as dimension slate or crushed slate (granules and flour). Dimension slate is used mainly for electrical panels, laboratory tabletops, roofing and flooring, and blackboards. Crushed slate is used on composition roofing, in aggregates, and as a filler. Principal production in the United States is from Pennsylvania and Vermont; northern Wales provides most of the slate used in the British Isles.

Slater, Samuel (b. June 9, 1768, Belper, Derbyshire, Eng.—d. April 21, 1835, Webster, Mass., U.S.), founder of the U.S. cotton textile industry.

As an apprentice in England to Jedediah Strutt (partner of Richard Arkwright), Slater gained a thorough knowledge of cotton manufacturing. He immigrated to the United States in 1789, attracted by the bounties offered there for workers skilled in the manufacturing of cotton. He was forced to keep his knowledge and skills a secret from authorities, however, because at the time emigration of textile workers and the export of drawings of textile machinery were forbidden by British law. With his detailed knowledge of textile machinery, financial backing from the Rhode Island firm of Almy and Brown, and the assistance of skilled artisans, he constructed versions of Arkwright's spinning and carding machinery and established the first successful cotton mill in the United States (Pawtucket, R.I., 1793). He subsequently established a number of other plants in New England and founded the town of Slatersville, R.I.

Slatin, Rudolf (Anton) Karl, Freiherr von (baron of), also called SLATIN PASHA (b. June 7, 1857, near Vienna—d. Oct. 4, 1932, Vienna), Austrian soldier in the service of England in the Sudan, famous for his imprisonment by the Mahdists (religious and nationalist revolutionaries in the Sudan) and his subsequent escape. His nearly 40 years in the Sudan indelibly influenced its development.

Slatin first came to the Sudan in 1874 and was made governor of Darfur province (in the western Sudan) in 1881, a year before the Mahdist revolution began. Though Slatin fought with determination (even converting to Islām to improve the morale of his Sudanese troops), he was forced to surrender at the end of 1883 and was held prisoner while the Mahdists controlled the country.

He escaped in 1895 and was made a pasha (the highest rank in the Egyptian court) by

the khedive (Ottoman viceroy) of Egypt. His book, *Feuer und Schwert im Sudan*, 2 vol. (1896, 1922; "Fire and Sword in the Sudan"), was instrumental in enlisting support against the Mahdists. After serving with Lord Kitchener (1897–98) in the reconquest of the Sudan, he was named inspector general of the Sudan in 1900 and served there until 1914.

Slatina, town, capital, Olt *judeţ* (district), southwestern Romania, on the Olt River, where there once was a fort. The local museum has chipped-stone tools used by prehistoric (Lower Paleolithic) man and found in the Dirjov Valley south of Slatina. Roman artifacts, money, and arms and ancient books and costumes are also found in the museum. Eugene Ionesco was born in the town in 1912. A thermoelectric power station and an aluminum works operate near the town. Highways and a railway connection extend through Slatina. Pop. (1982 est.) 61,473.

Slauerhoff, Jan Jacob (b. Sept. 14, 1898, Leeuwarden, Neth.—d. Oct. 5, 1936, Hilversum), Dutch poet whose romanticism led him to go to sea as a ship's doctor and whose pessimistic poetry reflects his subsequent disillusionment.

His restlessness and contemptuous hatred of Holland are prominent themes throughout his work, from the first volume, *Archipel* (1923; "Archipelago"), to the last, *Een eerlijk zeemansgraf* (1936; "An Honourable Sailor's Grave"). Other negative elements are also apparent, such as the revenge wish and preoccupation with violent death and the destructive course of history. The image of his soul is the ship's prow, borne along by the sea of fate. Slauerhoff was aware of his weakness and destructiveness, as he shows in the poem "In memoriam mijzelf" (1931; "In Memory of Myself").

Slaughterhouse Cases (1873), in U.S. history, legal dispute that resulted in a landmark U.S. Supreme Court decision limiting the protection of the privileges and immunities clause of the Fourteenth Amendment to the U.S. Constitution.

In 1869 the Louisiana state legislature granted a monopoly of the New Orleans slaughtering business to a single corporation. Other slaughterhouses brought suit, contending that the monopoly abridged their privileges and immunities as U.S. citizens and deprived them of property without due process of law. When the suit reached the Supreme Court in 1873, it presented the first test of the Fourteenth Amendment, a Reconstruction measure ratified in 1868.

By a five-to-four majority, the Court ruled against the other slaughterhouses. Associate Justice Samuel F. Miller, for the majority, declared that the Fourteenth Amendment had "one pervading purpose": protection of the newly emancipated blacks. The amendment did not, however, shift control over all civil rights from the states to the federal government. States still retained legal jurisdiction over their citizens, and federal protection of civil rights did not extend to the property rights of businessmen.

Dissenting justices held that the Fourteenth Amendment protected all U.S. citizens from state violations of privileges and immunities and that state impairment of property rights was a violation of due process.

The Slaughterhouse Cases represented a temporary reversal in the trend toward centralization of power in the federal government. More importantly, in limiting the protection of the privileges and immunities clause, the court unwittingly weakened the power of the Fourteenth Amendment to protect the civil rights of blacks.

Slav, member of the most numerous ethnic and linguistic body of peoples in Europe, residing chiefly in eastern and southeastern Europe but extending also across northern Asia as far as the Pacific Ocean. Their language belongs to the Indo-European family. Customarily they are subdivided into east Slavs (chiefly Russians, Ukrainians, and Belorussians), west Slavs (chiefly Poles, Czechs, Slovaks, and Wends, or Sorbs), and south Slavs (chiefly Serbs, Croats, Slovenes, and Macedonians). Bulgarians (*q.v.*), though of mixed origin like the Hungarians, speak a Slavic language and are frequently designated as south Slavs.

In religion, the Slavs traditionally divided into two main groups: those associated with the Eastern Orthodox Church (Russians, most Ukrainians, some Belorussians, Serbs, and Macedonians) and those associated with the Roman Catholic Church (Poles, Czechs, Slovaks, Croats, Slovenes, some Ukrainians, and most Belorussians). The division is further marked by the use of the Cyrillic alphabet by the former (but including all Ukrainians and Belorussians) and the Latin alphabet by the latter. There are also many minority religious groups, such as Muslims, Protestants, and Jews; and in recent times in such countries as the Soviet Union, the Communists' official encouragement of atheism, together with a general trend toward secularism, has eroded membership in the traditional faiths.

Prehistorically, the original habitat of the Slavs was Asia, from which they migrated in the 3rd or 2nd millennium BC to populate parts of eastern Europe. Subsequently, these European lands of the Slavs were crossed or settled by many peoples forced by economic conditions to migrate. In the middle of the 1st millennium BC, Celtic tribes settled along the upper Oder, and Germanic tribes settled on the lower Vistula and lower Oder, usually without displacing the Slavs there. Finally, the movement westward of the Germans in the 5th and 6th centuries AD started the great migration of the Slavs, who proceeded westward into the country between the Oder and the Elbe–Saale line, southward into Bohemia, Moravia, Hungary, and the Balkans, and northward along the upper Dnepr (Dnieper). When the migratory movements had ended, there appeared among the Slavs the first rudiments of state organizations, each headed by a prince with a treasury and defense force, and the beginning of class differentiation.

In the centuries that followed, there developed scarcely any unity among the various Slavic peoples. The west Slavs had their cultural and political life integrated into the general European pattern; they experienced, more than other Slavs, all the philosophical, political, and economic changes in the West, such as feudalism, Humanism, the Renaissance, the Reformation, and the French and Industrial revolutions. As their lands were invaded by Mongols and Turks, however, the Russians and Balkan Slavs remained for many centuries without any close contact with the European community; they evolved a system of bureaucratic autocracy and militarism that tended to retard the development of urban middle classes and to prolong the conditions of serfdom. The supremacy of the state over the individual tended to become more firmly rooted.

A faint kind of Slavic unity sometimes appeared. In the 19th century, Pan-Slavism developed as a movement among intellectuals, scholars, and poets, but it rarely influenced practical politics. The various Slavic nationalities conducted their policies in accordance with what they regarded as their national interests, and these policies were as often bitterly hostile toward other Slavic peoples as they were friendly toward non-Slavs. Even political unions of the 20th century, such as that of Yugoslavia, have not always been matched by feelings of ethnic or cultural accord; nor has the sharing of Communism since World War II necessarily provided more than a high-level political and economic alliance.

Slav'ansk (Ukrainian S.S.R.): *see* Slavyansk.

Slav'ansk-na-Kubani (Russian S.F.S.R.): *see* Slavyansk-na-Kubani.

Slave, also called SLAVEY, AWOKANAK, or ETCHAREOTTINE, group of Athabascan-speaking Indians of Canada, originally inhabiting the western shores of the Great Slave Lake, the basins of the Mackenzie and Liard rivers, and other neighbouring riverine and forest areas. Their name, Awokanak, or Slave, was given them by the Cree, who plundered and often enslaved numbers of them, and this name became the familiar one used by the French and English, for the Slave had a general reputation for timidity or pacifism, whether deserved or not.

Like most other Athabascan tribes, the Slave were separated into a number of independent bands, each of which was rather loosely organized, with only nominal leaders, and was associated with certain hunting territories. An informal council of hunters settled disputes. Women and the aged were treated with a respect and kindness that was not typical of all Athabascans.

The Slave were inhabitants of the forests and riverbanks; they hunted moose, woodland caribou, and other game but also relied heavily on fish for food. Animal skins were made into robes, shirts, leggings, moccasins, and other clothing; fringes and ornaments made of antlers, porcupine quills, and other natural materials were popular. Their dwellings consisted of brush-covered tepees in summer and rectangular huts formed of poles and spruce branches in winter.

The Slave believed in guardian spirits, in the power of medicine men, and in an undefined life after death. A common practice was the deathbed confession of sins, thought to contribute to the delay of death.

Slave DYNASTY (1206–90), line of sultans at Delhi that lasted for nearly a century. Its family name was Mui'zzī.

The Slave dynasty was founded by Quṭb-ud-Dīn Aybak, a favourite slave of the Muslim general and later sultan Muḥammad of Ghūr. Quṭb-ud-Dīn had been among Muḥammad's most trusted Turkish officers and had overseen his master's Indian conquests. When Muḥammad was assassinated in 1206, Quṭb took power in Lahore. He managed to consolidate his position in a seesawing war with a rival Slave ruler, Tāj-ud-Dīn Yildiz, during which he captured and lost Ghazna. He was eventually confined to being a purely Indian sovereign. He died in 1210 as a result of a polo accident, and the crown shortly passed to Iltutmish, his son-in-law.

By the time of Iltutmish's accession, the family's holdings had been severely reduced. Iltutmish, the greatest of the Slave kings, defeated and put to death Yildiz (1216), restored the Bengal governor to obedience, and added considerable new territory to the empire, including the Lower Sind.

After the death of Iltutmish, his able daughter Raziyya attempted to serve as sultan but was defeated by opposing Turkish Slave nobles. After 1246 the sultanate was controlled by Ghiyās-ud-Dīn Balban, who was to be sultan himself from 1266 to 1287. Under Balban the Delhi Sultanate fought off several Mongol invasions. The Slave dynasty ended when Jalāl-ud-Dīn Fīrūz Khaljī staged a successful coup on June 13, 1290, and brought the Khaljīs to power.

Slave Coast, in 18th- and 19th-century history, the section of the coast of the Gulf of Guinea, in Africa, extending approximately from the Volta River in the west to Lagos, in modern Nigeria, or, alternatively, the Niger Delta in the east (in the present-day re-

publics of Togo, Benin, and Nigeria). Although North Germans, Danes, French, Portuguese, Swedish, and Spanish made efforts to establish forts and stations in this coastal region, it became primarily a sphere of Afro-British and Afro-Dutch trade in slaves and in various commodities.

slave labour: *see* forced labour.

slave narrative, American literary genre consisting of a former slave's memoir of daily plantation life, his sufferings as a slave, and his eventual escape to freedom. The narratives are filled with humorous anecdotes of the deception and pretenses that the slave was forced to practice in order to ingratiate himself with the master, expressions of religious fervour and superstition, and, above all, a pervasive longing for freedom, dignity, and self-respect.

The first example of the slave narrative, *A Narrative of the Uncommon Sufferings and Surprising Deliverance of Briton Hammon, a Negro Man,* appeared in Boston in 1760. This was followed by other early examples, such as *A Narrative of the Lord's Wonderful Dealings with J. Murrant, a Black, Taken Down from His Own Relation* (1784) and *The Interesting Narrative of Olaudah Equiano, or Gustavus Vassa, the African* (1789).

In the early and mid-19th century, when their publication was encouraged by the Abolitionists, the accounts, many of them based on oral relations, multiplied. Although some of these narratives, such as *Scenes in the Life of Harriet Tubman* (1869), are factual autobiographies, many others are influenced or sensationalized by the writer's desire to arouse sympathy for the Abolitionist cause. Such reworkings and interpolations are usually obvious. In some cases, such as *The Autobiography of a Female Slave* (1856) by Mattie Griffith, the account was entirely fictitious. The slave-narrative genre reached its height with Frederick Douglass' classic autobiography *Narrative of the Life of Frederick Douglass, an American Slave* (1845). A much later example of a slave narrative is *The Story of My Life and Work,* or *Up From Slavery* (1901), by Booker T. Washington.

In the first half of the 20th century a number of folklorists and anthropologists compiled documentary narratives based on recorded interviews with former black slaves. A notable compilation of narratives is B.A. Botkin's *Lay My Burden Down* (1945). In the second half of the 20th century the growth of black cultural consciousness stimulated a renewed interest in slave narratives as embodying the slaves' point of view of a much-discussed social institution.

slave rebellions, in American history, periodic acts of violent resistance by black slaves during more than two centuries of chattel slavery, signifying continual deep-rooted discontent with the condition of bondage and resulting in ever more stringent mechanisms for social control and repression in slaveholding areas.

The myth of the "contented slave" was essential to the preservation of the South's "peculiar institution," and the historical record of rebellions was frequently clouded by exaggeration, censorship, and distortion. Estimates of the total number of slave revolts vary according to the definition of insurrection. For the two centuries preceding the American Civil War (1861–65), one historian found documentary evidence of more than 250 uprisings or attempted uprisings involving 10 or more slaves whose aim was personal freedom. Few of these, however, were systematically planned, and most were merely spontaneous and quite short-lived disturbances by small groups of slaves. Such rebellions were usually attempted by male bondsmen and were often betrayed by house servants who identified more closely with their masters.

Three rebellions or attempted rebellions by slaves do deserve special notice, however. The first large-scale conspiracy was conceived by Gabriel (*q.v.*) in the summer of 1800. On August 30 more than 1,000 armed slaves massed for action near Richmond, Va., but were thwarted by a violent rainstorm. The slaves were forced to disband, and 35 were hanged, including Gabriel. The only free person to lead a rebellion was Denmark Vesey (*q.v.*), an urban artisan of Charleston, S.C. Vesey's rebellion (1822) was to have involved, according to some accounts, as many as 9,000 slaves from the surrounding area, but the conspiracy was betrayed in June before the plan could be effected. As a result 139 blacks were arrested, of whom 37 (including Vesey) were hanged and 32 exiled before the end of the summer. The third notable slave rebellion was led by Nat Turner (*q.v.*), at Southampton County, Va., in the summer of 1831. On the evening of August 21 a band of 6 slaves started their crusade against bondage, killing a total of 57 whites and attracting up to 70 fellow slaves to the conspiracy during the next few days. On the 24th, hundreds of militia and volunteers stopped the rebels near Jerusalem, the county seat, killing at least 40 and probably nearer 100. Turner was hanged on November 11. As usual, a new wave of unrest spread through the South, accompanied by corresponding fear among slaveholders and passage of more repressive legislation directed against both slaves and free blacks. These measures were aimed particularly at restricting the education of blacks, their freedom of movement and assembly, and the circulation of inflammatory printed material.

In the decades preceding the American Civil War, increasing numbers of discontented slaves escaped to the North or to Canada via the Underground Railroad (*q.v.*). Publicity in the North concerning black rebellions and the influx of fugitive slaves helped to arouse wider sympathy for the plight of the slave and support for the Abolition Movement.

Slave River, river in northern Alberta and southern Northwest Territories, Canada, forming an integral part of the Mackenzie River waterway. Explored by Samuel Hearne in 1771–72, the river was named after the Slave Indians who inhabited its banks. From the confluence of the Peace River and several small streams draining Lake Athabasca, the Slave flows northward for 258 miles (415 km) through northeastern Alberta and southern Northwest Territories before emptying into Great Slave Lake near Fort Resolution. Portage roads join the two most important settlements, Fort Fitzgerald (Alberta) and Fort Smith (Northwest Territories), bypassing a 16-mile- (26-kilometre-) stretch of rapids to make the Slave completely navigable. For the first half of its course the river forms the eastern boundary of Wood Buffalo National Park.

slavery, condition in which one human being is owned by another. A slave was considered in law as property, or chattel, and was deprived of most of the rights ordinarily held by free persons.

A brief treatment of slavery follows. For full treatment, *see* MACROPAEDIA: Slavery.

Slavery has existed in various forms throughout almost the whole of recorded history. Slaves were obtained in a number of ways. Most often enslavement was involuntary, being achieved by such procedures as capture in war, kidnapping, or slave raiding; punishment for criminal acts; payment for debt; direct sale by one's parent, guardian, or chieftain; or the transfer of ownership from one master to another. The children of slaves usually, but not invariably, themselves became slaves. Freedom from slavery could usually be gained only by the granting of manumission by the master, although in the 19th century there were several proclamations of mass emancipation by the governments of various Western nations.

A distinction has been made between two major types of slavery: household (or domestic) slavery and productive slavery. Slaves of the first type served their owners primarily as menials in the household, while productive slaves were mostly employed to produce marketable commodities in mines or on plantations.

Slavery probably developed after civilization reached a pastoral, as opposed to a hunting and gathering, stage. The slave helped the master tend the flocks and was treated as a member of the household. In somewhat more advanced civilizations such as those of ancient Egypt and Mesopotamia, slaves in cities worked as domestics, while country slaves worked in large gangs in the fields and mines of the master. As a society's economy changed from one of subsistence-level agricultural production to that of a market type capable of producing surpluses, the status of slaves was lowered considerably. The slave was no longer a servant but instead became a commodity who was bought and sold for profit.

Throughout most of Greek and Roman civilization, slavery was an accepted way of life, and slaves often assumed managerial and secretarial posts as well as their usual domestic and agricultural duties. Toward the end of the Roman Empire, however, groups of slaves could not be sold apart from the estate to which they belonged.

Along the Arabian Peninsula, where Islām emerged, wars between Arabs, Turks, and Christians provided a large slave population. The Qur'ān, however, taught that the freeing of a slave was a pious act, and freed slaves were readily absorbed into the community.

Slavery was also a common practice among the native Indian tribes of South America. When the Spanish conquered a large part of the New World in the late 15th century, they put the Indians to work in their mines and fields. The Indians, however, died quickly because of exposure to European diseases and harsh working conditions. To remedy this problem, the Spaniards began importing slaves from Africa in 1517. The Africans were sent first to the West Indies and then to the mainland, where the sugar industry was flourishing. Thus began the harsh institution of black plantation slavery.

The first African slaves in North America arrived at the English colony of Virginia aboard a Dutch ship in 1619. The English were then developing highly profitable plantations where tobacco, sugar, and, later, cotton were grown. As the number of slaves required to work the fields increased, trading in slaves became even more profitable than exporting crops, and an elaborate trade network was set up between North America, the West Indies, and West Africa. In 1681 there were about 2,000 slaves in Virginia, but by the mid-19th century, the slave population in America had risen to more than 4,000,000.

As the Enlightenment developed in Europe during the 18th century, moral abhorrence of slavery began to spread. Societies were formed in Britain and the United States to end the slave trade. The Anti-Slavery Society, established in Britain in 1823, succeeded in freeing slaves in the British colonies in the Western Hemisphere by 1833. France abolished slavery in the West Indies in 1848, and slavery was permanently ended in the United States in 1865 with the passage of the 13th Amendment to the Constitution. Slavery is no longer legally recognized by any government in the world; it was made illegal in its last holdout, the Arabian Peninsula, in 1970.

The sociology of slavery is an important area of study. Generally, slaves were outsiders, being of a different race, ethnicity, nationality,

or religion from that of their owners. In most cases a slave was taken against his will from his own society and transplanted in an enslaved condition to another society. Regardless of the slave's origin, he was usually a marginal person in the society in which he was enslaved, and he was often an object of contempt, neglect, abuse, or brutality. A society's attitude toward its slaves depended on various factors. Generally, the greater the difference between the racial, ethnic, or cultural characteristics of the slave and those of his owner, the worse the slave's condition was and the fewer rights he had. In Rome, for example, where both owners and slaves were white, manumission was frequent. Similarly, in Africa, where both owners and slaves were black, slaves in most societies were allowed to participate in many aspects of social life. In the American South, however, where the owners were of white European stock and the slaves were of black African stock, the degree of social isolation and the contempt for slaves was extraordinary. *See also* forced labour; serfdom.

Slavey (people): *see* Slave.

Slaveykov, Petko Rachev; and Slaveykov, Pencho Petkov (respectively b. Nov. 17, 1827, Turnovo, Bulg.—d. July 1, 1895, Sofia; b. April 27, 1866, Tryavna, Bulg.—d. May 28, 1912, Brunate, Italy), father and son, both writers, who helped to enrich Bulgarian literature by establishing a modern literary language and introducing contemporary ideas from other European countries.

Petko Rachev Slaveykov became an itinerant schoolteacher at 17. His early poems were lyrical and patriotic (*Smesena Kitka, Pesnopoyka,* both 1852), and, by reestablishing the vernacular as a medium for literature (the language of his translation of the Bible in 1862 was based on Bulgarian dialects), he prepared for the flowering of native poetry. As a patriot and politician he helped to shape resurgent Bulgaria, producing political pamphlets notorious for their outspokenness against Turkish oppression and against the spiritual domination of the Greek patriarchate. In 1863 he moved to Istanbul, where he contributed to Bulgarian émigré reviews and edited satirical and political periodicals. After his country's liberation (1878), he became an active politician, both as president of the constituent assembly and as cofounder of the Democratic Party. After the 1881 coup d'état he went to Plovdiv, then still under Turkish rule, and there edited the newspaper *Nezavisimost* ("Independence").

Pencho Slaveykov, who was inspired especially by Johann Wolfgang von Goethe, Heinrich Heine, and Friedrich Nietzsche, as well as by the simple eloquence and realism of Bulgarian folk songs, is best-known for his unfinished epic poem *Kurvava Pesen* ("Song of Blood"; written 1911–12; published 1913), which describes the sacrifices of the Bulgarian people in their struggle for independence. He was also an outstanding essayist and translator of German literature.

Slaviansk (Ukrainian S.S.R.): *see* Slavyansk.

Slaviansk-na-Kubani (Russian S.F.S.R.): *see* Slavyansk-na-Kubani.

Slavic languages, also called SLAVONIC LANGUAGES, group of Indo-European languages used as native languages in most of eastern Europe, much of the Balkans, parts of central Europe, and the northern part of Asia. The Slavic group of languages is most closely related to the languages of the Baltic group (Lithuanian, Latvian, and the now extinct Old Prussian).

A brief treatment of the Slavic languages follows. For full treatment, *see* MACROPAEDIA: Languages of the World.

Scholars divide the Slavic languages into three branches: (1) South Slavic, including Serbo-Croatian and Slovene in Yugoslavia, Bulgarian in Bulgaria and adjacent areas, and Macedonian in Yugoslavia and the adjacent part of Greece; (2) West Slavic, including Czech and Slovak in Czechoslovakia, Lusatian (or Sorbian) in Germany, and Lekhitic (Polish and related dialects); and (3) East Slavic, including Russian, Ukrainian (Little Russian), and Belorussian (White Russian). Russian is used as a second language by most people of the Soviet Union.

The tripartite division of the Slavic languages does not take into account the spoken dialects of each language. Of these, certain so-called transitional dialects and hybrid dialects often bridge the gaps between different languages, showing similarities that are not apparent when Slavic literary (*i.e.,* standard) languages are compared. There are, however, enough differences existing between the various Slavic dialects and languages to make communication between Slavs of different nationalities difficult, but not impossible. Within the individual Slavic languages, dialects may vary to a lesser degree, as in Russian, or to a much greater degree, as in Slovene. Modern mass communication, however, has helped to minimize variation in all the Slavic languages.

Slavic languages descend from a dialect of Proto-Slavic, their parent language, which developed from a language that was also the ancestor of Proto-Baltic, the parent of the Baltic languages. It is believed that Proto-Balto-Slavic, this ancestral language, was spoken in the territories surrounding what is today known as Lithuania at some time after the Indo-European area had been separated into different dialect regions (*c.* 3000 BC).

Slavs lived north of the Carpathian Mountains until the first centuries AD, when they began to expand rapidly, first to the west and east, then southward through and around the Carpathians, appearing all along the Danube River in the 6th century AD. Although Slavs were divided into different groups by this time, they basically shared the same language. It was divided, like all languages, into regional dialects, but the points of divergence were insignificant.

From the 9th to 11th century, Slavic states began to form. From the 10th to 12th century, Slavic dialects underwent a major change in the vowel system that yielded different results in each dialect, eventually causing the development of separate language groups that are similar to present-day divisions among the Slavic language branches. Historical events and foreign cultural influences were also responsible for breaking the connection between the South Slavic and West Slavic groups and between South and East Slavic groups.

Church Slavonic, developed in the 9th century by St. Cyril and St. Methodius, was progressively modified by local dialects and provided Slavs with a written language. But during the 11th century, when the Orthodox and Roman churches separated, Church Slavonic was suppressed in the West Slavic region and in most of the western part of the South Slavic area.

Today, Slavic languages in the east and southeast are written in the Cyrillic alphabet, which replaced St. Cyril's Glagolitic. In the west, Roman Catholic Slavs use the Roman alphabet. Serbo-Croatian is written in Cyrillic by Serbs and Montenegrins and in Roman by Croats.

In vocabulary, ancient borrowings from Iranian and Germanic are evident in Slavic languages. The vocabulary of the individual languages reflects more recent local influences, the most important being German in the west and Turkish in the Balkans. New terminology is often created by adapting Greek and Latin terms, and inter-Slavic borrowings are widespread. The liberal use of prefixes and suffixes also has helped the vocabulary of Slavic languages to grow.

Because they have retained the Proto-Slavic case system (nominative, genitive, dative, accusative, locative, instrumental, vocative) Slavic languages are said to be synthetic (*i.e.,* they express grammatical information through word endings). Modern Bulgarian and Macedonian are more analytic (*i.e.,* they express grammatical information more through word order). Verbs are inflected (*i.e.,* their form is changed to show grammatical relationships) for past and present tenses and show two aspects—the perfective, expressing a completed action, and the imperfective, expressing an uncompleted action.

Slavonic language, Old: *see* Old Church Slavonic language.

Slavophile, in Russian history, member of a 19th-century intellectual movement that wanted Russia's future development to be based on values and institutions derived from the country's early history. Developing in the 1830s from study circles concerned with German philosophy, the Slavophiles were influenced greatly by Friedrich Schelling. The movement was centred in Moscow and attracted wealthy, well-educated, well-traveled members of the old aristocracy. Among its leaders were Aleksey S. Khomyakov, the brothers Konstantin S. and Ivan S. Aksakov, the brothers Ivan V. and Pyotr V. Kireyevsky, and Yury F. Samarin. Their individual interests covered a broad range of topics, including philosophy, history, theology, philology, and folklore; but they all concluded that Russia should not use western Europe as a model for its development and modernization but should follow a course determined by its own character and history.

They considered western Europe, which had adopted the Roman Catholic and Protestant religions, as morally bankrupt and regarded Western political and economic institutions (*e.g.,* constitutional government and capitalism) as outgrowths of a deficient society. The Russian people, by contrast, adhered to the Russian Orthodox faith; thus, according to the Slavophiles, through their common faith and church, the Russian people were united in a "Christian community," which defined natural, harmonious, human relationships.

The Slavophiles considered the Russian peasant commune an uncorrupted representation of the "Christian community." They also believed that the autocratic form of government was well-suited to a people spiritually bound together. Viewing Russia as potentially able to develop according to the "Christian community" model, the Slavophiles also thought that once such a society was established, Russia's duty would be to revitalize the West by reintroducing spiritual values there to replace rationalism, materialism, and individualism.

But the Slavophiles also realized that their contemporary society did not represent their ideal. They believed that Peter I the Great (reigned 1682–1725), by introducing reforms imitating the West, had corrupted Russia, driven a wedge between the nobility and the peasantry, and upset the natural social relationships. They despised the state bureaucracy organized under Peter and his church reforms that had undermined spiritual authority.

In order to perfect Russian society and to restore the autocracy and the church in their ideal forms, the Slavophiles urged extensive reforms, including the emancipation of serfs, curtailment of the bureaucracy, the granting of civil liberties (*i.e.,* freedom of speech, press, and conscience), and the establishment of an institution representing the whole people (similar to the *veche* or the *zemsky sobor* of pre-Petrine Russia).

Although they enthusiastically approved some facets of Russian society and held views resembling the government's official doctrine

of *narodnost* ("nationality"), which emphasized the superior character of the Russian people, Nicholas I objected to their criticism of his regime (which, of course, was based on Peter's reforms). His government censored their journals and generally tried to suppress the movement. The Slavophiles were also opposed intellectually by the Westernizers, a group that developed simultaneously with them but insisted that Russia imitate the Western pattern of modernization.

The Slavophiles were most active during the 1840s and 1850s. After the Crimean War (1853–56), the death of its foremost leaders (1856 and 1860), and the promulgation of the reforms of Alexander II (1860s), the movement declined. Its principles were adapted and simplified by extreme nationalists, Pan-Slavists, and revolutionary Populists (Narodniki). In addition to their influence on those movements, the Slavophiles individually made significant contributions to their various fields of study, particularly theology (with Khomyakov's theory of *sobornost,* a spiritual unity and religious community based on a free commitment to Orthodoxy), Russian history, and folklore.

Slavyansk, also spelled SLAVIANSK, or SLAV'ANSK, city, Donetsk *oblast* (administrative region), Ukrainian Soviet Socialist Republic, at the confluence of the Kazenny Torets and Sukhoy Torets rivers. Founded in 1676 as Tor and renamed Slavyansk in 1794, it is today the main centre of the northwestern part of the Donets Basin industrial area. The presence of saline and mud springs, rock salt, and coal makes Slavyansk an unusual combination of health resort and industrial town. There is an important chemical industry; machinery, furniture, and pencils are also made. Slavyansk has a teacher-training institute. Pop. (1983 est.) 142,000.

Slavyansk-na-Kubani, also spelled SLAVIANSK-NA-KUBANI, or SLAV'ANSK-NA-KUBANI, city and centre of Slavyansk *rayon* (district), Krasnodar *kray* (territory), Russian Soviet Federated Socialist Republic. It is situated on the left bank of the Protoka River, an arm of the Kuban. Until 1958 it was known as *stanitsa* (Cossack village) Slavyanskaya; thereafter it was a city. Agricultural-processing industries are based on the city's hinterland; there is a college devoted to agricultural studies. Other factories produce tractor parts and clothing. Pop. (1983 est.) 55,000.

Slayton, Donald Kent, byname DEKE SLAYTON (b. March 1, 1924, Sparta, Wis., U.S.), one of the original seven U.S. Project Mercury astronauts chosen in 1959. He did not make a space flight until 1975.

Slayton entered the U.S. Air Force in 1942 and flew combat missions in Europe and Japan during World War II. He left the service and entered the University of Minnesota, at Minneapolis. After graduating in 1949 he became an engineer with Boeing Aircraft Company. Recalled to active duty in 1951, he was a pilot and maintenance officer in Germany until 1955, when he became a test pilot at Edwards Air Force Base, California. After he joined the astronaut program, he was chosen command pilot of the Aurora 7 mission (1962) but was grounded because of a minor heart ailment, though he remained an astronaut and later became director of flight crew operations.

At the age of 51 Slayton was named docking module pilot for the Apollo-Soyuz mission (July 15–24, 1975; with Thomas P. Stafford and Vance D. Brand). After that flight was completed, Slayton was named manager of the orbital flight tests of the space shuttle.

sled, also called SLEIGH, vehicle usually drawn by either horses or dogs over ice or snow in winter and occasionally used at other times to haul goods over grassy, muddy, or earthen areas. Its predecessor, the sledge, in the form of the travois and the sidecar, is believed to be the first vehicle used by humans.

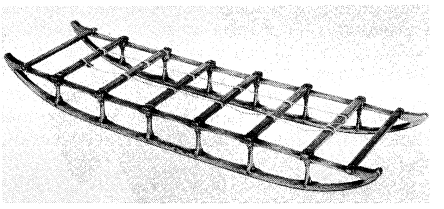
The body of a sled is supported on runners, or straight, narrow skids. Sleds are generally used where wheeled vehicles would encounter difficulty or bog down; for example in Lapland and on the Alaskan, Canadian, and Asian tundras.

sled dog, any canine used in Arctic climates to pull a sledge across snow and ice. The breeds most commonly associated with this work are the Siberian husky, Alaskan Malamute, Samoyed, and Laika—all large, powerful dogs with thick coats and high endurance.

On the North American continent, a "fan hitch" where each of 12 to 15 dogs was separately attached to the sleigh by its own lead was used to carry both people and supplies. Now a team, usually of eight dogs, in a "pair hitch" (double file and side by side) is the most common. In the Siberian regions of the Soviet Union, smaller teams are used.

sledding, winter recreation and sport involving the riding of sleds over ice or snow. For various forms of sled racing, *see* tobogganing, bobsledding, lugeing, Cresta sledding, and dogsled racing.

sledge, any freight- or passenger-carrying device dragged or pushed without the aid of wheels. The travois of the North American Indian was a sledge consisting of two transversely connected wooden shafts dragged at an angle to the ground. Sledges date back to antiquity; Assyrian and Egyptian reliefs depict huge statues being pulled by sledge. The arrival of the wheel and axle ended the use of the sledge except in its snow-and-ice surface form of sled—a body mounted on runners. *See also* litter.



Sledge model, 1859; in the Science Museum, London

By courtesy of the Science Museum, London, lent by Mr. H.J. McClintock

sleep, normal, easily reversible, and spontaneous state of decreased and less efficient responsiveness to external stimulation; it contrasts with wakefulness, in which there is an enhanced potential for sensitivity and an efficient responsiveness to external stimuli.

A brief treatment of sleep follows. For full treatment, *see* MACROPAEDIA: Sleep and Dreams.

Sleep is a regularly recurring suspension of consciousness that serves recuperative and adaptive functions. Sleep usually requires the presence of flaccid or relaxed skeletal muscles and the absence of the overt, goal-directed behaviour often seen in wakeful organisms. An electroencephalogram (EEG) recording the electrical activity of the human brain shows a distinctive pattern during sleep.

The normal human sleep requirement varies from 6 to 9 hours each night, with 7½ hours being the average. Age determines length and pattern of sleep. A newborn may sleep as much as 16 hours a day in intermittent periods, a two-year-old from 9 to 12 hours. In the normal maturation process, a pattern of many short periods of sleep shifts to one of a single, long, uninterrupted period. Elderly people may revert to sleep patterns of childhood, napping often during the day and sleeping only a few hours at night.

REM and NREM sleep. A revolution in sleep research occurred in 1953 when Eugene Aserinsky and Nathaniel Kleitman described sleep in relation to rapid eye movements (REM's). REM sleep, when measured by central nervous system activity, is closely akin to wakefulness. NREM (non-REM) sleep is of a different quality. It has four stages measurable by EEG; the fourth stage is the deep, restorative, quiet sleep we associate with "a good night's rest." REM sleep is characterized by increased physiological activity, with greater flow of blood and oxygen to the brain, more bodily movement, and twitching. REM sleep has elements of both light, easily disrupted sleep and deep, sound sleep, as opposed to NREM sleep, which has discrete periods of light and deep sleep. Sleep stages progress cyclically and by steps, with a gradual progression from Stage 0 (restful alpha transitional state) to Stages 1,2,3, and 4, then backward to Stage 1 and REM sleep (about 90 minutes after sleep onset), and so on throughout the night. REM sleep time tends to lengthen throughout the night, averaging 20–22 percent of total sleep time.

Research in general sleep deprivation (either partial or total) and specific sleep deprivation (i.e., REM or Stage 4 NREM) investigates the function of sleep. Quantitative studies show that a three-hour schedule of sleep time is not a telescoped version of an eight-hour schedule. The amounts of REM and Stage 4 (restorative) NREM sleep are greater in a three-hour sleep schedule than in the first three hours of an eight-hour schedule, and the usual quota of NREM sleep is maintained. The REM percentage, although increased, does not achieve the usual quota, and on "recovery nights" there is a compensatory reaction in which the amount of REM sleep is increased. In human subjects, sleep deprivation for many days produces fatigue, memory loss, and irritability, but it does not cause psychosis or longterm psychological or physiological damage. Recovery sleep immediately following a long period of deprivation shows an increase in both REM and Stage 4 NREM sleep.

Qualitative studies demonstrate the importance of both NREM and REM sleep. In the past, studies of REM sleep were linked to dream-deprivation studies, but with the knowledge that dreams occur in NREM sleep as well, research now focuses on REM sleep and its effects on thinking and on the regulation of biological drives.

Sleep pathology. A distinction can be made between primary sleep disorders and disorders that are accentuated during sleep. Primary pathological conditions include encephalitis, a viral infection; narcolepsy, a defect of the area of the brain that regulates the sleep-wakefulness pattern; hypersomnia, characterized by an increased sleep time and daytime torpor; and hyposomnia, a decrease in sleep time. Other abnormalities—sleepwalking, sleep talking, bed-wetting, tooth grinding, and snoring—although associated with sleep, are not sleep disorders. Nightmares, while frightening, are not indicative of psychological pathology. The sleeping state can, however, aggravate existing medical conditions. Symptoms of angina and duodenal ulcers occur during REM sleep; epileptic discharge occurs during NREM. The fragility of REM sleep makes it highly susceptible to alteration by drugs. Hypnotics (*e.g.,* barbiturates), stimulants, and tranquillizers reduce the proportion of REM sleep in relation to NREM. With longterm alcohol use, REM-sleep rebound occurs as it does when hypnotics or stimulants are withdrawn.

Behavioral psychologists and neurophysiologists continue to explore functional and neural theories of sleep. Researchers have investigated the role of the central nervous system and of neural centres in regulating sleep and wakefulness; the question of whether sleep and its component periods are active or passive

states; and the functions of sleep. Because of the different qualities of REM and NREM sleep, some functional theorists have hypothesized that NREM sleep may be a state of "bodily repair," while REM sleep may be one of "brain repair," or "restitution."

See also biofeedback; dream; hallucination; hypnosis; insomnia; narcolepsy; sleepwalking.

sleeper, any of the marine and freshwater fish of the family Eleotridae of the suborder Gobioidei (order Perciformes). Sleepers, found in warm and tropical regions, are so named because most species habitually lie quietly on the bottom. Elongated fishes with two dorsal fins, they are distinguished from most other gobies in having their pelvic fins separate, rather than joined to form a weak, rounded suction cup.

The many species of sleepers range in length from a few centimetres to about 90 cm (3 feet) in the Malayan *Oxyeleotris marmoratus,* apparently the largest of all gobies. Among the better-known species are the bigmouth sleeper, or guavina (*Gobiomorus dormitor*), of the American tropics, and the purple-striped gudgeon (*Mogurnda mogurnda*) of Australia.

Sleeping Bear Dunes, one of the world's largest complexes of shifting dunes, extending for 7 miles (11 km) along Lake Michigan's northeastern shore in the vicinity of Empire and Glen Haven, Leelanau County, Michigan, U.S. Rising almost 500 feet (152 m) above the lake, the dunes comprise unusual sand formations, with forest remnants that include bleached pine, white birch, cedar swamps, and a few bogs of sphagnum moss. Wildlife includes skunks, bobcats, deer, and porcupines. The constant rising winds against the western slopes (which cause the sands to creep inland) have made the dunes popular for hang gliding. Other activities include sand skiing, climbing, and dune-buggy riding.

The name derives from a Chippewa Indian legend about a mother bear and her two cubs who swam across the lake to escape a Wisconsin fire. The mother reached the shore and waited in her sleep for her two cubs, who never came; she became a heap atop the sands (Sleeping Bear Point), while her exhausted cubs remained offshore to become North and South Manitou islands. D.H. Day State Park (established in 1920 and Michigan's oldest state park) is on the back side of the dune. In 1970 the U.S. Congress designated 34 miles (55 km) of the shoreline as Sleeping Bear Dunes National Lakeshore, headquartered at Frankfort (site of the National Soaring and Hang Gliding Festival [June–July]).

sleeping car, also called SLEEPER, railroad coach designed for overnight passenger travel. The first sleeping cars were put in service on American railroads as early as the 1830s, but these were makeshift; the first car designed for comfortable nighttime travel was the Pullman sleeper, which was introduced in 1859. The sleeping car made its appearance in Britain and Europe somewhat later and was variously named with words meaning "car" and "bed" or "sleep," as in French *wagon-lit* or German *Schlafwagen.*

A typical 20th-century sleeping car has six bedrooms, each with two beds, in the centre of the car; and six roomettes, with single beds, at each end. The consequent low density makes for high fares, creating a basic economic problem for railroads seeking to compete with airlines. This problem led to new design efforts to provide larger capacity; one result was the development of the "slumbercoach" with numerous deeply reclining seats.

sleeping sickness, also called AFRICAN TRYPANOSOMIASIS, infection with the flagellate protozoan *Trypanosoma gambiense* or the closely related species *T. rhodesiense,* transmitted by the tsetse fly; it is characterized by fever, inflammation of the lymph nodes (especially those of the posterior cervical triangle), and involvement of the brain and spinal cord leading to profound lethargy, frequently ending in death. The earlier the disease is diagnosed and treated, the greater are the chances for recovery. For the Gambian type of infection, a synthetic arsenical, tryparsamide, is highly effective, although it may produce acute optic neuritis with possible loss of vision. Suramin sodium, a non-arsenical, is also effective for the Gambian infection, as well as for the Rhodesian type during the early stage, but all treatment of *T. rhodesiense* infection is useless once the fulminating toxemic stage has developed.

Heroic efforts have been made to control African trypanosomiasis, including (1) isolation and proper treatment of all infected persons, including large numbers of asymptomatic chronic carriers; (2) protection of man from bites of tsetse flies by the use of insecticides and by maintaining extensive clearings around villages and residence compounds; (3) prophylactic doses of suramin or of diamidine compounds once every 60 to 90 days for persons who must enter the jungle, so that they will not become infected from tsetse fly bites; and (4) occasional removal of entire villages from endemic to disease-free zones. The need is at times suggested of exterminating wild game reservoirs of the disease.

Concerted campaigns were carried out to control African trypanosomiasis following the conference on sleeping sickness that met in London in 1925. In the Cameroons, by persistent tryparsamide treatment of all diagnosed cases, Gambian infection was reduced from a high percentage of extensive population groups to less than 1 percent, and entire tribes were saved from extinction by this single measure.

sleepwalking, also called SOMNAMBULISM, a neurotic reaction in which the sleeper leaves his bed and engages in some activity that is believed to fulfill a wish or to release tension. The sleeper may reenact a past event, look for a lost object, or even write a letter. Somnambulism is classified among the dissociative reactions—*i.e.,* neurotic reactions in which certain thoughts or attitudes are isolated from the conscious personality and expressed independently.

sleet, globular, generally transparent ice pellets that have diameters of 5 mm (0.2 inch) or less and that form as a result of the freezing of raindrops or the freezing of mostly melted snowflakes. Larger particles are called hailstones (*see* hail). Sleet may occur when a warm layer of air lies above a below-freezing layer of air at the Earth's surface. In Great Britain and in some parts of the United States, a mixture of rain and snow is called sleet, and the term has sometimes been used to identify the clear ice on objects that is more correctly known as glaze.

sleigh: *see* sled.

sleight of hand (popular theatre): *see* conjuring.

Sleipnir, in Norse mythology, the god Odin's magical horse. *See* Odin.

slendro, Javanese and Balinese five-toned musical scale system. *See* gamelan.

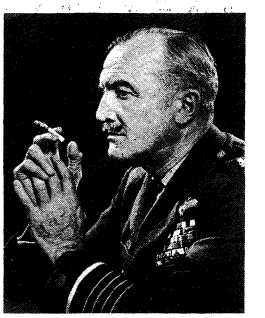
Slepian, Joseph (b. Feb. 11, 1891, Boston—d. Dec. 1, 1969, Swissvale, Pa., U.S.), American electrical engineer and mathematician credited with important developments in electrical apparatus and theory.

Slepian studied at Harvard University, earning the Ph.D. in 1913. After a postdoctoral year in Europe he taught mathematics at Cornell University, Ithaca, N.Y., for a year before joining the research staff of the Westinghouse Electric Company (from 1945, Corporation). There he worked for the next 40 years, becoming associate director of research in 1938.

Slepian's work led to improvements in such electronic devices as lighting arresters, circuit breakers, high-voltage fuses, and rectifiers. He invented the autovalve lightning arrester, a device for the protection of large power-distribution systems, and he studied the effect of thunderstorms on electric-power transmission and distribution circuits. He proposed new theories about the conduction of electricity through gases and about the nature of arc cathodes.

In 1927 he patented a method of electron acceleration by magnetic induction, which became the basis of the betatron. During World War II he worked on an ionic centrifugal method for the separation of uranium isotopes.

Slessor, Sir John Cotesworth (b. June 3, 1897, Rhanikhet, India—d. July 12, 1979, Wroughton, Wiltshire, Eng.), British marshal of the Royal Air Force who was one of the architects of British air strategy during and after World War II.



Sir John Cotesworth Slessor
Karsh of Ottawa—Camera Press

Slessor was educated at Haileybury College, Hertfordshire. A childhood victim of polio, he was at first rejected for military service in World War I but managed to gain entry to the Royal Flying Corps. He served as a pilot in France, Egypt, and the Sudan, where he was wounded and received the Military Cross. During the interwar period he held staff appointments and commands in Britain and India and became director of plans at the Air Ministry in 1937. While still an RAF instructor at the Army Staff College in Camberley from 1931 to 1934, Slessor wrote *Air Power and Armies* (1936), which became a military classic. From 1942, as assistant chief of air staff and later as head of Coastal Command, Slessor used his skills as a negotiator to ensure closer Anglo–U.S. collaboration in the war effort. In addition, while serving Coastal Air Command, Slessor made significant contributions to the defeat of the German submarine offensive in the Atlantic Ocean; aircraft under his command sank an average of seven U-boats per month.

From 1944 to 1945 he was commander in chief, RAF, in the Mediterranean and Middle East, then served at the Air Ministry, where he was responsible for demobilizing 1,000,000 servicemen, until his appointment as chief of air staff (1950–52). Slessor was firmly convinced of the need for a combined defense strategy and did much to achieve this during his period of command. After his retirement, he devoted his time to writing on defense. Slessor was knighted in 1948. His works include *Strategy for the West* (1954), *The Great Deterrent* (1957), and *What Price Coexistence?* (1961). His autobiography, *The Central Blue,* was published in 1956.

Slessor, Kenneth (b. March 27, 1901, Orange, N.S.W., Australia—d. July 30, 1971, Sydney), Australian poet and journalist best known for his poem "Beach Burial," a mov-

ing tribute to Australian troops who fought in World War II.

Slessor became a reporter at the age of 19 for the *Sydney Sun*, was editor of the journal *Smith's Weekly* for a time, and then was a World War II correspondent (1940–44). He continued as an editor and literary critic after the war.

His earliest poetry, collected in *Earth Visitors* (1926), is characterized by gaiety and technical experimentation. The influence of the poets T.S. Eliot and Ezra Pound is evident in the sophisticated *Cuckooz Country* (1932). *Five Bells: XX Poems* (1939) and *Poems* (1957) demonstrate the poet's mature mastery of technique.

Slezak, Leo (b. Aug. 18, 1873, Šumperk, Austria-Hungary—d. June 1, 1946, Egern, W.Ger.), Austrian opera singer and film comedian, known for his performances of Wagnerian operatic roles.

Slezak made his debut at Brno (now in Czechoslovakia) in *Lohengrin* in 1896. By 1909 he had established his reputation in London and New York City as a heroic tenor in the part of Othello, and he won further esteem for his Wagnerian interpretations. In later years he abandoned singing and became known as a film comedian in Austria. His son, Walter Slezak (1902—), a well-known U.S. actor, wrote an autobiography, *What Time Is the Next Swan?* (1962); the title refers to his father's famous ad lib in Wagner's *Lohengrin*, when the swan moved off stage without him.

Slezko: *see* Silesia.

Sliabh Speirín (Northern Ireland): *see* Sperrin Mountains.

slick, glassy patch or streak on a relatively undisturbed ocean or lake surface, formed where surface tension is reduced by a monomolecular layer of organic matter produced by plankton or by man; closer to shore most of the material is man-made hydrocarbon pollutant. Slicks are patchy when the wind velocity is less than about 13 kilometres per hour (7 knots). Winds with higher velocities break slicks into narrow, closely spaced windrows aligned parallel to the wind direction. Elongate parallel slicks may also form over and migrate with the trailing slopes of internal waves.

slickhead, also called SMOOTHHEAD, any of several deep-sea fishes, family Alepocephalidae (order Salmoniformes), found in almost all oceans at depths up to 5,500 metres (17,800 feet) or more. Slickheads are dark, soft, and herring-like; species vary greatly in structure, and a few possess light-producing organs. Some common features of the family are absence of a swim bladder, presence of a lateral line, and position of the dorsal fin far back and above the anal fin.

slide rule, a rule consisting of graduated scales capable of relative movement, by means of which simple calculations may be carried out mechanically. In ordinary slide rules these operations include multiplication, division, and extraction of square roots, as well as, in some cases, calculation of trigonometric functions and logarithms. The slide rule remained an essential tool in the mathematics of science and engineering and was widely used in business and industry as well until it was superseded by the portable electronic calculator late in the 20th century.

The logarithmic slide rule is a compact device for rapidly performing calculations with limited accuracy. The invention of logarithms in 1614 by the Scottish mathematician John Napier and the computation and publication of tables of logarithms made it possible to effect multiplication and division by the simpler operations of addition and subtraction. Napier's early conception of the importance of simplifying mathematical calculations resulted in his invention of logarithms, and this invention made possible the slide rule.

The first known slide rule in which the slide worked between parts of a fixed stock was made by Robert Bissaker in 1654. Others were due to the enterprise of Seth Partridge (1657) and Henry Coggeshall (1677)—a slide in a two-foot folding rule adapted to timber measure—and Thomas Everard (1683) for gauging purposes. The usefulness of the slide rule for rapid calculation became increasingly recognized, especially in England, during the 18th century, and the instrument was made in considerable numbers, with slight modifications.

Improvements in the direction of increased accuracy in graduation were initiated by Matthew Boulton and James Watt from about 1779 in connection with calculations in the design of steam engines at their works at Birmingham, Eng.

Amédée Mannheim, an officer of the French artillery, invented in 1859 what may be considered the first of the modern slide rules. This rule had scales on one face only and although it was quite simple it was made and designated by his name for more than a century. The Mannheim rule, which also brought into general use a cursor, or indicator, was much used in France, and after about 1880 was imported in large numbers into other countries.

In 1815 Peter M. Roget invented his "log-log" slide rule for performing the involution and evolution of numbers. The fixed scale, instead of being divided logarithmically, is divided into lengths which are proportional to the logarithm of the logarithm of the numbers indicated on the scale; the sliding scale is divided logarithmically.

In 1890 William Cox introduced a revolutionary construction providing for scales on both front and back of the slide rule. An indicator with glass on both sides made it possible to refer to all the scales on both sides of the rule simultaneously.

Most important of later improvements was the arrangement of the scales, trigonometric and log-log, so that they operate together and at the same time maintain consistent relationship to the basic scales. This arrangement gave added speed and flexibility to the solving of many problems, simple and complex alike, since it produced solutions by continuous operation, without the need of intermediate readings.

Slidell, John (b. 1793, New York City—d. July 29, 1871, London), U.S. and Confederate diplomat whose seizure with James M. Mason precipitated the Trent Affair during the American Civil War.

A graduate of Columbia College in 1810, he moved to New Orleans in 1819, where he practiced maritime law, married into a distinguished Creole family, and participated actively in politics. He sat in the U.S. Congress from 1843 to 1845.

In 1845 he was sent to Mexico by Pres. James K. Polk to secure territorial concessions and at the same time to avert the approaching war. Though he was not received officially by the Mexican government, he remained as an observer until the eve of war. Returning to the United States, he represented Louisiana in the U.S. Senate from 1853 to 1861. He was a staunch supporter of Pres. James Buchanan and a vigorous opponent of Stephen A. Douglas.

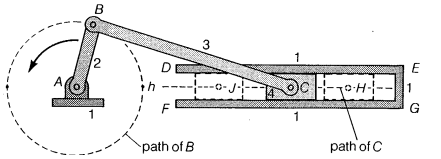
When Louisiana seceded, Slidell cast his lot with the Confederacy. Entering the Confederate foreign service, he was sent to France in late 1861, but on his way there he and Mason were removed by a federal man-of-war from the British steamer "Trent" and imprisoned at Ft. Warren in Boston harbour. The British government strongly protested this action, and the two men were released in January 1862 at Pres. Abraham Lincoln's insistence and over Secretary of State W.H. Seward's objections. In France, Slidell's relations with Napoleon III, though cordial, were unofficial. Thus this second mission, like that to Mexico, had little result, save that financial negotiations with the Erlangers of Paris and Frankfurt led to the Confederate cotton loan of 1863.

Following Lee's surrender at Appomattox in 1865, Slidell and his family lived in Paris until the Franco-German War, when he moved to London.

Consult the INDEX *first*

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slider-crank mechanism, arrangement of mechanical parts designed to convert straight-line motion to rotary motion, as in a reciprocating piston engine, or to convert rotary motion to straight-line motion, as in a



Slider-crank mechanism

reciprocating piston pump. The basic nature of the mechanism and the relative motion of the parts can best be described with the aid of the accompanying figure, in which the moving parts are lightly shaded. The darkly shaded part 1, the fixed frame or block of the pump or engine, contains a cylinder, depicted in cross section by its walls *DE* and *FG*, in which the piston, part 4, slides back and forth. The small circle at *A* represents the main crankshaft bearing, which is also in part 1. The crankshaft, part 2, is shown as a straight member extending from the main bearing at *A* to the crankpin bearing at *B*, which connects it to the connecting rod, part 3. The connecting rod is shown as a straight member extending from the crankpin bearing at *B* to the wristpin bearing at *C*, which connects it to the piston, part 4, which is shown as a rectangle. The three bearings shown as circles at *A*, *B*, and *C* permit the connected members to rotate freely with respect to one another. The path of *B* is a circle of radius *AB*; when *B* is at point *h* the piston will be in position *H*, and when *B* is at point *j* the piston will be in position *J*. On a gasoline engine, the head end of the cylinder (where the explosion of the gasoline-air mixture takes place) is at *EG*; the pressure produced by the explosion will push the piston from position *H* to position *J*; return motion from *J* to *H* will require the rotational energy of a flywheel attached to the crankshaft and rotating about a bearing collinear with bearing *A*. On a reciprocating piston pump the crankshaft would be driven by a motor.

Sliema, town, eastern Malta, on a headland between Marsamxett (Marsamuscetto) Harbour to the east and St. Julian's Bay to the west. It is a suburb of the capital, Valletta, which it faces southward across the harbour, with Fort Tigné dominating the entrance. A modern residential community with a concentration of hotels and villas, it is the most English part of Malta. St. Julian's Watchtower, a medieval watchtower once used to spot corsairs, still stands on the northern Mediterranean Sea front. Pop. (1983 est.) 20,163.

Slieve Croob, mountain in Banbridge district (established 1973), formerly in County Down, Northern Ireland, the highest point (1,755 ft [535 m]) of the Slieve Croob or Mid-Down group. It lies between the lower Lagan low-

lands to the north and the Mourne Mountains to the south. The uplands are of igneous origin, and Slieve Croob is a granite mass. The River Lagan rises on its western slopes. The mountain is a moorland with no trees and is extensively used as a hill pasture area. Vegetation includes rough grassland, gorse, and holly.

Slieve Donard, highest peak (2,796 feet [852 m]) in the Mourne Mountains at the border of Down district and Newry and Mourne district, formerly in County Down, Northern Ireland. It is near the coast at the northeastern end of the Mournes. Intensive glacial and periglacial action has produced bare crags, peaks, and rock debris on the lower slopes. There are some remains of an oratory erected on the summit in the 5th century by St. Domhangort (Donard), after whom the mountain is named.

Sligo, Irish SLIGEACH ("Shelly River"), county in Connaught province, Ireland. With an area of 693 square miles (1,796 square km), it is bordered by Counties Leitrim (east), Roscommon (southeast), and Mayo (southwest); an arm of the Atlantic Ocean forms its other borders. Nearly half of Sligo is rough pasture, mainly in the mountains, hills, and peat bogs. On the east the boundary with Leitrim runs southward through the coastal lowland to the limestone Dartry Mountains (including Ben Bulben, 1,730 feet [527 m]), which have spectacular scarped edges. The boundary then crosses Glencar and an area of plateau to Lough (lake) Gill, in which is the island of Innisfree, celebrated in a lyric by the Irish poet William Butler Yeats, who is buried in Drumcliff. To the south of Lough Gill is a long ridge broken by gaps called *alt*s. West of the Collooney Gap, the ridge forms the Ox Mountains, a peat moorland 7 to 10 miles (11 to 16 km) wide and rising above 1,700 feet (520 m). North of the Ox Mountains is an area of continuously farmed lowland, from the mouth of the River Moy to the Leitrim border. Sligo Bay has three long estuaries, leading to Drumcliff, Sligo, and Ballysadare, which receive the waters of the Rivers Drumcliff, Garravogue, and Owenmore.

Sligo has a long tradition of fishing, but only salmon is profitable. The lowland is divided into small farms that depend on cattle, sheep, and poultry. Peat is cut in the plateau areas, especially in the Ox Mountains. Rosses Point and Strandhill are noted tourist resorts. Inland from the Ox Mountains, the farmed lowlands are broken by scenic lakes and limestone hills. Both dairy and beef cattle are kept, and many are sold at local fairs.

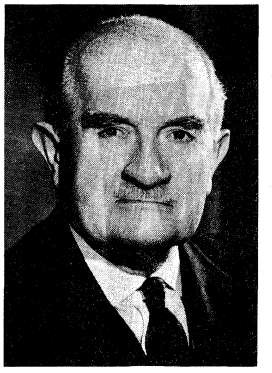
In antiquity, Sligo was MacDermott country. After the Anglo-Norman invasion in the 12th century, it was dominated by the power of the De Burgos. In 1333 the O'Connor Sligo became lord of the town and county under O'Donnell patronage and suzerainty, and the O'Dowds were established in the west. In 1567, by surrender and regrant, Donal O'Connor Sligo received from the crown a grant for life of the whole area. It was made a county in 1579. Forming part of Connaught, which was reserved by Oliver Cromwell for Irish proprietors after the English conquest in the 17th century, the district long retained its Irish social pattern.

A county council meets in Sligo, the county town (seat) and only urban district; but the county is joined with Leitrim under one county manager. Most of the towns are small market centres. There are mills and a variety of factories. Pop. (1986) 56,046.

Sligo, Irish SLIGEACH ("Shelly River"), seaport and county town (seat), County Sligo, Ireland, on Sligo Bay and the River Garavogue, between Lough (lake) Gill and the sea. Its Roman Catholic cathedral serves the diocese of Elphin, and there is a Church of Ireland cathedral. Sligo has ruins of a castle and friary dating from the 13th century. Early in the reign of James I the town was granted a market and two annual fairs; in 1613 it was incorporated and received the privileges of a borough. The borough was disenfranchised in 1870.

Sligo is one of the three principal ports on the west coast of Ireland and a centre of salmon fishing. Industries include textiles, pharmaceuticals, and dehydrated foods. Some cattle are exported, and coal, iron, timber, and foodstuffs are imported. At nearby Carrowmore is a large group of megalithic monuments, and on Knocknarea (1,078 feet [329 m]), west of Sligo, is a cairn traditionally held to be the burial place of Queen Maeve of Connaught. The town is the site of a regional technical college. Pop. (1986) 17,259.

Slim, William (Joseph), 1ST VISCOUNT SLIM OF YARRALUMLA AND BISHOPSTOP (b. Aug. 6, 1891, Bristol, Gloucestershire, Eng.—d. Dec. 14, 1970, London), British field marshal and chief of the imperial general staff who turned back an attempted Japanese invasion of India and defeated the Japanese armies in Burma (Myanmar) during World War II.



Slim
Walter Bird—Camera Press

Joining the British army as a private at the outbreak of World War I, Slim soon became an officer and campaigned in the Dardanelles, France, and Iraq. In 1920 he received a regular commission and joined the Indian army, in which he served throughout the interwar period.

Commanding an Indian brigade at the beginning of World War II, Slim participated in the British conquest of Italian East Africa (1940). The next year he led the 10th Indian Division in its attacks against Vichy French units and native pro-German forces in Iraq and made first contact with Soviet forces in Tehrān during the Allied occupation of Iran. Appointed to the command of the 1st Burma Corps in March 1942, he was forced to retreat against superior Japanese forces enjoying almost total air superiority. He succeeded in bringing his men to the Indian frontier and, in early 1944, frustrated the Japanese drive to invade northeast India. Devising new tactics adapted to jungle warfare in broken terrain with no continuous front lines, he used guerrilla methods to supplement his main effort of pushing the Japanese out of most of Burma. Rangoon (Yangôn) fell on May 3, 1945, and in June he became supreme Allied commander of ground forces in Southeast Asia. The Japanese surrender on Aug. 14, 1945, however, cut short his plans for the invasion of Malaya.

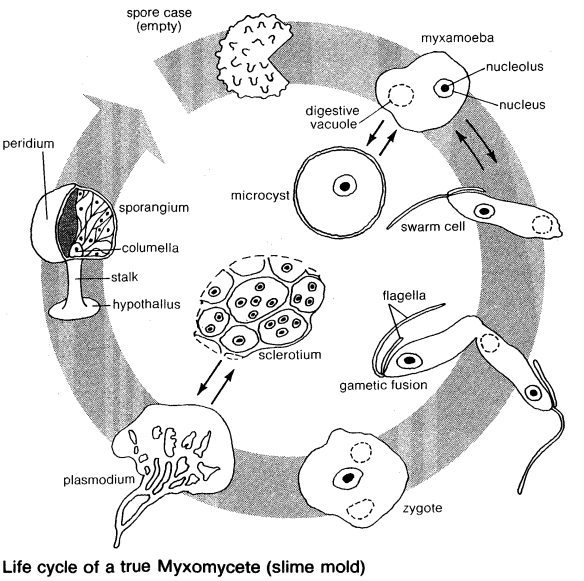
Appointed commandant of the Imperial Defence College in 1946, Slim became chief of the imperial general staff in 1948 and was promoted to field marshal. He served as governor-general of Australia from 1953 to 1960, when he was created a viscount. His memoirs, *Defeat into Victory,* appeared in 1956.

slime eel: *see* hagfish.

slime mold, any of about 500 species of primitive organisms containing true nuclei and resembling both protozoan protists and fungi.

The term slime mold embraces a heterogeneous assemblage of organisms whose juxtaposition reflects a historic confusion between superficial resemblances and actual relationships. The Myxomycetes (true slime molds) are characterized by a plasmodial stage and definite fruiting bodies. Other slime molds include Protostelia (minute, simple slime molds), Acrasia (cellular slime molds), Plasmodiophorina (parasitic slime molds), and Labyrinthulina (net slime molds). Slime molds are found worldwide and typically thrive in dark, cool, moist conditions such as prevail on forest floors. Bacteria, yeast, molds, and fungi provide the main source of slime-mold nutrition, although the Plasmodiophorina feed parasitically on the roots of cabbage and other mustard-family plants.

The life cycle of the Myxomycetes is, allowing for minor variations, representative of that of slime molds generally. The cycle begins with a spore that has a diameter of 4 to 15 micrometres (1 micrometre equals 0.001 mm, or 0.000039 inch) and that, in the presence of water, releases a small mass of cytoplasm called a swarm cell. It is propelled by whiplike appendages (flagella) until it comes in con-



Life cycle of a true Myxomycete (slime mold)

tact with a surface and puts forth pseudopods (lobes of cellular material) that allow it to creep along. In its creeping phase it resembles an amoeba and is known as a myxamoeba. Both swarm cells and myxamoebae function as sex cells (gametes), and the fusion of two such cells constitutes the reproductive act of myxomycetes that begins the next stage of growth, the plasmodium.

As the flagella are permanently retracted, the fertilized cell begins to grow by repeated division of its nuclei. The plasmodium moves gradually in successive waves, creating a characteristic fan shape. A layer of slime, in some species similar to saliva or mucus, covers the whole plasmodium.

The most remarkable metamorphosis of the slime molds occurs next: the growth from the shapeless plasmodium of an intricately organized spore case, or sporangium. Droplets form at the cell wall and coalesce to form a cushion and then a stalk that can grow to be 1.25 cm (0.5 inch) wide and 2.5 cm (1 inch) tall. As the column changes to purple and then black, the sporangium forms at its tip, filled with the dark spores. The sporangium wall dries and disintegrates, allowing air currents or a sudden movement to release the spores and begin the cycle again.

sling, implement for propelling missiles, one of the first missile weapons used in warfare. It consisted of a small strap or socket of leather to which two cords were attached. The warrior, or slinger, held the ends of the cords in one hand, placed the missile snugly in the strap, and whirled the socket and missile rapidly around his head; by letting go of one cord at the right moment, the slinger could let the missile fly out of the socket at a high speed. In another type, the sling was attached to a short staff that was held in both hands; it was used for heavier missiles, especially in siege operations during the European Middle Ages.

There are many references to slings and slingers in the Bible; the left-handed slingers of Benjamin were famous (Judges 20:16), and the young David slew Goliath with a sling (1 Samuel 17). Assyrian monuments show slings, which were also used by the Egyptian army after the 8th century BC. The Greek historian Herodotus (5th century BC) spoke of the slingers in the army offered by Gelon to serve against the Persians. Other ancient Greek writers indicated that the sling was primarily a weapon of barbarian troops, though the Achaeans are credited with having invented a sling that discharged a bolt with an iron head. In the Roman army of the time of the Punic Wars (3rd–2nd century BC), the slingers were auxiliaries from Greece, Syria, and Africa. The Balearic islanders who constituted a part of Hannibal's Carthaginian army fighting the Romans were renowned as slingers.

In medieval times the sling was much-used by Frankish armies, especially in defending trenches, while the staff sling was used against fortifications in the 14th century. Until the 17th century the sling was used to throw grenades. A variation of the ancient hand weapon is the slingshot, a forked stick with an elastic band attached for hurling small pellets.

slip, in engineering and physics, sliding displacement along a plane of one part of a crystal relative to the rest of the crystal under the action of shearing forces. Much of the permanent, or plastic, deformation of materials under stress is the result of slip within the individual crystals that constitute the material. Slip and an alternate mode of deformation, twinning, are the only ways that crystals in solids can be permanently deformed. In slip, all the atoms on one side of the slip (or glide) plane do not slide simultaneously from one set of positions to the next. The atoms move sequentially one row at a time into the next position along the plane because of structural defects or spaces, called edge dislocations, in the crystal that move at the same rate in the opposite direction.

Viewed as a large-scale phenomenon as in the deformation of a piece of metal, slip involves the passage of a large number of dislocations on nearby slip planes within many of the individual crystals. Slip lines in crystals, seen with the aid of an optical microscope, appear as bands of many slip planes under the greater magnification of the electron microscope.

Slipher, Vesto Melvin (b. Nov. 11, 1875, near Mulberry, Ind., U.S.—d. Nov. 8, 1969, Flagstaff, Ariz.), American astronomer whose systematic observations (1912–25) of the extraordinary radial velocities of spiral galaxies provided the first evidence supporting the expanding-universe theory.

Born on an Indiana farm, Slipher studied at Indiana University (B.A., 1901; M.A., 1903; Ph.D., 1909). In 1901 he joined the staff of the Lowell Observatory at Flagstaff (though he returned to Indiana at times for graduate study), and he became its acting director in 1916 and director in 1926. There he organized and guided the search that resulted in the discovery of Pluto, the ninth known planet of the solar system. Slipher's extensive investigations led to the determination of the rotational periods of several planets. His discovery of dark absorption bands in the spectra of Jupiter, Saturn, and Neptune led to the identification of some of the chemical constituents of their atmospheres. He demonstrated that many diffuse nebulae (clouds of dust and gas) shine by the reflected light of nearby stars and discovered the bright radiations of the night sky and their changes in intensity. He also proved that sodium and calcium are scattered throughout interstellar space.

slipmouth, also called SLIMY (family Leiognathidae), any of certain fishes (order Perciformes) that are characterized by slimy bodies with small scales. They derive their name from the small but extendable mouth that slips out during feeding. The 3 genera and about 21 species are restricted to salt or brackish waters in the Indo-Pacific region.

Slipmouth are small, deep-bodied, compressed fishes that usually attain lengths of less than 15 cm (6 inches). *Leiognathus equula,* the largest species, reaches 30 cm (12 inches). Slipmouth are abundant in shallow coastal waters and are widely used for food. One species, *L. klunzingeri,* is one of only two dozen Red Sea fishes known to have traversed the Suez Canal and successfully established populations in the Mediterranean Sea.

slipped disk (medicine): *see* herniated disk.

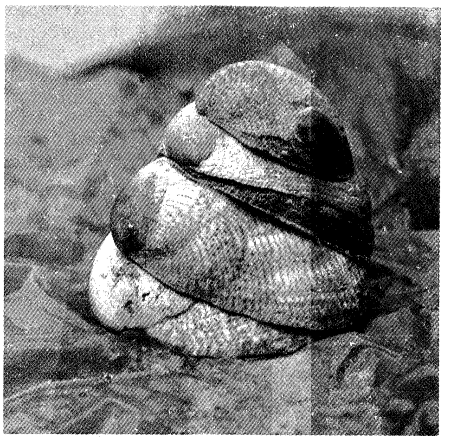
slipper flower, also called POCKETBOOK FLOWER, SLIPPERWORT, or POUCH FLOWER (genus *Calceolaria*), any of about 500 species of flowering plants native from Mexico to South America and named for their flowers' pouchlike shape. Many large-flowered and showy varieties of slipper flower exist in the florist trade. The flowers are usually yellow or purple with contrasting spots.



Slipper flower (*Calceolaria*)
Gordon L. Maclean

slipper lobster, any of several species of the family Scyllaridae. *See* lobster.

slipper shell (genus *Crepidula*), any marine snail (family Calyptraeidae, subclass Prosobranchia), in which the humped or flattened shell has a decklike half partition inside. Slipper shells occur worldwide in shallow waters. Adults are fixed to rocks or live within the empty shells of other mollusks. The common Atlantic slipper shell (*C. fornicata*), often called slipper limpet, is about 4 cm (1.5 inches) long and yellowish; it is abundant from Nova Scotia to Texas and has been introduced on the coast of Europe, where it is a nuisance in oyster beds.



Four Atlantic slipper shells (*Crepidula fornicata*)
Lynwood M. Chace from The National Audubon Society Collection/Photo Researchers—EB Inc.

slipware, pottery that has been treated, in one way or another, with semiliquid clay, or slip, sometimes called barbotine. Originally, defects of body colour suggested the use of slip, either white or coloured, as a wash over the vessel before firing. The decorative uses of slip later evolved include sgraffito and carving, painting, trailing, marbling, and inlay. In sgraffito decoration (used, for example, in Islāmic pottery), a pattern is incised through the slip, revealing the different body colour beneath. In the related slip carving (practiced by Islāmic potters and by Chinese potters of the Sung dynasty [960–1279]), the coating of slip, which is thicker, is carved out with a knife, leaving a slightly raised design. Slip painting was widely used in ancient Egyptian pottery, in which animal and scenic motifs are painted in white slip on a red body, and in North American Indian wares. Another form of slip decoration is the piping on of trails of slip in



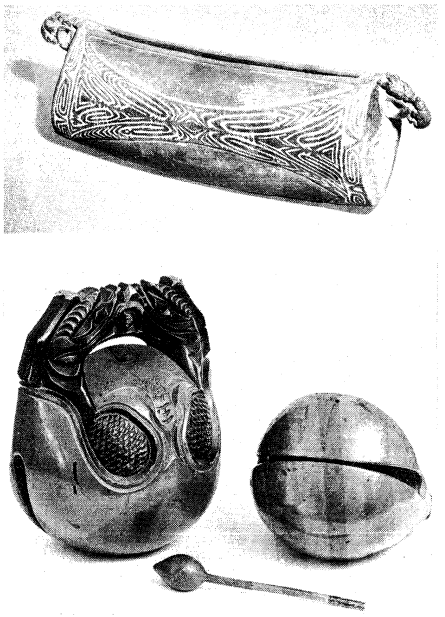
English slipware dish by Thomas Toft of northern Staffordshire, *c.* 1680; in the Victoria and Albert Museum, London
By courtesy of the Victoria and Albert Museum, London

the manner of cake icing, so that a design is achieved in lines of colour (often white) contrasting with the body of the vessel. Further molding of the applied slip may be carried out or small blobs of slip dropped on and then molded or stamped with a raspberry, rosette, or other shape.

Dotted and trailed slip decoration was probably never so well executed as in 17th-century England, where the north Staffordshire potters and those of Wrotham, Kent, depicted human and animal figures, stylized flowers, and fluid linear patterns. The technique demanded great dexterity and control, and some of its happiest effects were in a naively calligraphic treatment of figures and writing.

A marbled effect was sometimes achieved (as in Chinese pottery of the T'ang dynasty [618–907]) by mingling, with a comb, slips of contrasting colours after they had been applied to the vessel. Slip has also been used by the Koreans for their inlay technique known as *mishima:* designs were first incised into the clay, and the incisions were then filled with black-and-white slip.

slit drum, percussion instrument formed by hollowing a tree trunk through a lengthwise slit and sounded by the players' stamping feet or by beating with sticks; the edges of the slit are usually of different thicknesses, so as to produce different pitches. Unlike membrane drums, which are classified as membranophones, slit drums are idiophones, or resonant solids.



(Top) Oceanian slit drum, wood, from New Guinea, in the Metropolitan Museum of Art, New York City; (bottom) Chinese wooden fish (temple blocks), in the James Blades Collection

(Top) By courtesy of the Metropolitan Museum of Art, New York City, The Michael C. Rockefeller Memorial Collection of Primitive Art, bequest of Nelson A. Rockefeller, 1979; (bottom) photograph, James Blades

Slit drums are found in Asia, the Americas, Africa, and Oceania. They vary in size from huge tree trunks (20 feet [6 m] or more in length and 7 feet [2.1 m] or more in width) enclosed in huts and played by several men to small bamboo instruments used in Malaysia by watchmen. Large slit drums are sometimes less precisely called slit gongs.

Slit drums are frequently ritual instruments that are regarded as possessing magical attributes and are often associated with water and with death and resurrection. Because of their great carrying power and resonance, they are often also used as signaling instruments, in some places transmitting messages by reproducing the inflections of human speech. Frequently, slit drums are carved as elaborately stylized animals. Among the Aztecs (as the *teponaztli*) and earlier Meso-American peoples, the slit drum was hollowed through an H-shaped slit, the two tongues of which produced different pitches; several instruments are believed to have been combined in order to play melodies.

Two smaller, Chinese offshoots of the slit drum are the wood block and the wooden fish (Chinese *mu yü;* also known as temple block), carved in the shape of a mythical fish and lacquered red. Both were used in religious ritual, and the former was also in Chinese opera orchestras. Producing a clear, penetrating sound, they were adopted into the Western orchestra in the 20th century.

A list of the abbreviations used in the MICROPAEDIA *will be found at the end of this volume*

slit-faced bat, also called HOLLOW-FACED BAT, any of about 13 species of tropical bats forming the genus *Nycteris* and the family Nycteridae, found in Africa and in the Malaysian and Indonesian regions. Slit-faced bats have a longitudinal hollow on their faces and a nose leaf (fleshy structure on the muzzle) that is split in the centre. They are about 5–8 cm (2–3 inches) long, excluding a tail of about the same length; weigh 10–30 g (1/3–1 ounce); and are usually grayish to brown. They eat insects and usually roost in dark, humid shelters, such as caves, tree hollows, small buildings, and animal burrows.

slit moss, any of a number of plants in the granite moss (*q.v.*) group.

Sliven, town, east-central Bulgaria. It lies in the southern foothills of the eastern Balkan Mountains at the confluence of the Novoselska and Asenovska rivers. It dates as a town from 1153, but there are significant Roman remains in the area. Destroyed by the Turks, it was rebuilt during their occupation (15th–19th century) and called Enidzhe Kariesi ("New Town"); it developed as a textile and handicraft centre. The first Bulgarian textile mill was founded there in 1834, and the tradition is maintained by a textile factory. Other industries are stocking and carpet manufacture, woodworking, engineering, glasswork, and the preparation of wines and foodstuffs; the town is located on the Sofia–Burgas rail line and is intersected by several roads. Sliven is associated with the Bulgarian cultural revival of the 19th century, and it now supports a library, theatre, museum, and symphony orchestra. Pop. (1986 est.) 102,455.

sliver, in yarn production, loose, soft, untwisted ropelike strand of textile fibre having a roughly uniform thickness. It is produced by the carding process, which separates raw fibres to prepare them for spinning.

The carded fibres may be combed to remove any short fibres and make the remaining sliver fibres lie parallel. Several slivers may be combined and elongated by the drawing process, which further straightens the fibres and reduces the thickness of the strand. Thickness may be further reduced by roving, a process that also imparts a slight twist to the sliver.

Sloan, Alfred P(ritchard), Jr. (b. May 23, 1875, New Haven, Conn., U.S.—d. Feb. 17, 1966, New York City), American corporate executive and philanthropist who headed General Motors (GM) as president and chairman for more than a quarter of a century.

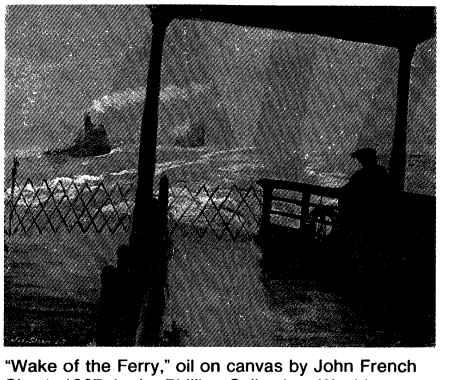
The son of a coffee and tea importer, he was brought up in Brooklyn, N.Y. After earning a degree in electrical engineering from the Massachusetts Institute of Technology in 1895, he joined the Hyatt Roller Bearing Company of Harrison, N.J., a firm in which his father had an interest. As president of Hyatt from the age of 26, he built up the business as a supplier of roller bearings to the growing American automobile industry. Hyatt was later acquired by General Motors, and Sloan became a GM vice president and member of the executive committee in 1918. Sloan was named a vice president of GM in 1920, and when Pierre S. Du Pont and John J. Raskob wrested control of GM from William C. Durant in 1920, Sloan became the company's operating vice president. He became president and chief executive officer of GM in 1923.

Sloan was an administrative genius, and he transformed GM from a loose cluster of business units into the model of a modern business organization, giving it the structure it retains to the present day. He reorganized the company into five different automobile divisions, with each producing cars in a different price range. He decentralized production, giving each operating division the freedom of initiative to compete for more business, while he centralized administration, creating a strong central office that had large financial and advisory staffs in order to devise and coordinate overall company policies. Under Sloan, GM surpassed the Ford Motor Company in American automobile sales in the late 1920s and eventually became the largest business corporation in the world. GM came to dominate the market, accounting for more than half of American auto sales.

Sloan relinquished the presidency and became chairman of the board of GM in 1937 after he refused to negotiate with the United Automobile Workers when they staged sit-down strikes in GM plants. He ceased to be chief executive officer in 1946, and he retired from the chairmanship in 1956, though remaining as honorary chairman. He outlined his management policy in *My Years with General Motors* (1964) and also wrote (with Boyden Sparkes) *Adventures of a White-Collar Man* (1941).

In the late 1930s, Sloan endowed the foundation named for him. He supported various philanthropies, including the Memorial Sloan-Kettering Cancer Center in New York City, a centre for advanced engineering study at the Massachusetts Institute of Technology, and a school of management there.

Sloan, John French (b. Aug. 2, 1871, Lock Haven, Pa., U.S.—d. Sept. 7, 1951, Hanover, N.H.), American painter, etcher and lithographer, cartoonist, and illustrator, known for the vitality of his depictions of everyday life in New York City in the early 20th century.



"Wake of the Ferry," oil on canvas by John French Sloan, 1907; in the Phillips Collection, Washington, D.C.

By courtesy of the Phillips Collection, Washington, D.C.; photograph, Henry Beville

Sloan was a commercial newspaper artist in Philadelphia, where he studied with Robert Henri. He followed Henri to New York, where in 1908 Henri, Sloan, and six others exhibited together as "The Eight." Sloan's realistic paintings of urban genre gave rise to the ep-

ithet "Ashcan School." For most of his life Sloan taught intermittently and, interested in social reform, did illustrations for the socialist periodical *The Masses*. In 1939 he published *The Gist of Art*.

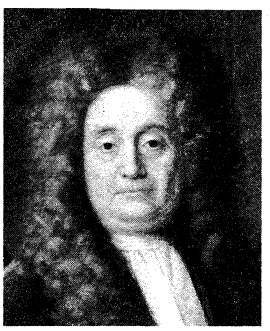
His best period was from 1900 to 1920. In works such as "Sunday, Women Drying Their Hair" (1912); "McSorley's Bar" (1912); and "Backyards, Greenwich Village" (1914), he drew his inspiration directly from life, from the warm, pungent humanity of the New York scene. They are usually sympathetic portrayals of working men and women. More rarely his works evoke a mood of romantic melancholy, as in the "Wake of the Ferry" (1907). Occasionally, as in "Fifth Avenue Critics," Sloan imparted a sharp, satiric note into his work. Late in life Sloan turned back to the Art Nouveau motifs which had characterized his early work.

Sloan, Tod, byname of JAMES FORMAN SLOAN (b. Aug. 10, 1874, near Kokomo, Ind., U.S.—d. Dec. 21, 1933, Los Angeles), U.S. jockey who popularized the "monkey crouch" riding style, which at first was derided but later was adopted by most jockeys. A colourful, self-assertive personage, he squandered his considerable earnings and died in poverty.

Sloan's nickname of "Tod" (he inaccurately stated that his full name was James Todhunter Sloan) was originally "Toad," referring to the appearance his disproportionately short legs gave him. Because of his unusual build he found it convenient to use short stirrups and to ride low, with his head almost resting on the horse's neck. Although this seat probably was devised by an older jockey, Edward ("Snapper") Garrison, the majority of jockeys evidently copied it from Sloan.

Sloan raced first in the Midwest. After winning many races in the United States for William Collins Whitney's stable, he went to England in 1896, and the next year he became rider for the stable of the Prince of Wales, afterward King Edward VII. In 1901 the English Jockey Club denied him a riding license because of unspecified "conduct prejudicial to the best interests of the sport," and by 1906 he had been ruled off the turf everywhere. After an unsuccessful motion-picture career, he died impoverished.

Sloane, Sir Hans, BARONET (b. April 16, 1660, Killyleagh, County Down, Ire.—d. Jan. 11, 1753, London), British physician and naturalist whose collection of books, manuscripts, and curiosities formed the basis for the British Museum, Bloomsbury, London.



Sloane, detail of an oil painting by S. Slaughter, 1736; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

After studying medicine in London, he travelled in France, taking his M.D. degree at the University of Orange in 1683. During a visit to Jamaica (1687–88) he collected about 800 new species of plants, of which he published an elaborate catalog in Latin in 1696. Sloane was created a baronet in 1716, being the first medical practitioner to receive a hereditary title. He became first physician to George II and president of the Royal Society in 1727. His great stroke as a collector was to acquire the cabinet of William Courten (1642–1702), who had made collecting the business of his life. When Sloane retired from active work in 1741, his library and cabinet of curiosities had grown to be of unique value, and on his death, he bequeathed his collection to the nation, on condition that Parliament pay his executors £20,000. The bequest was accepted and went to form the collection opened to the public as the British Museum in 1759.

Sloane had no son that survived beyond infancy, and the baronetcy became extinct upon his death.

Slob-dpon (Buddhist mystic): *see* Padmasambhava.

Slobozia, town, capital of Ialomiţa *judeţ* (district), southeastern Romania, on the Ialomiţa River in the middle of the Bărăgan Plain. The town was built on what remained of the Roman settlement of Netindava. It is a collecting and marketing centre for a rich agricultural region in which cereals and cattle predominate. Amara is a bathing and health resort found just to the north. An ethnographic museum contains a collection of work created by regional artists. Highways and railway lines extend through Slobozia, including a highway and a railway connection between Bucharest and Craiova. Pop. (1982 est.) 39,664.

Slocum, Joshua (b. Feb. 20, 1844, Wilmot, Nova Scotia, Can.—d. 1909/10, at sea), Canadian seaman and adventurer who was the first man in recorded history to sail around the world singlehandedly.

Slocum joined the crew of a merchant vessel at 16 and from that time on spent most of his life at sea. In 1889 he wrote *Voyage of the Liberdade* about one of his passages and in 1894 *Voyage of the Destroyer* about another. In April 1895 he set sail from Boston in the 36-foot 9-inch (11.1-metre) "Spray," an old fishing boat built around 1800 that he had rebuilt. He sailed alone, following a route that took him to Nova Scotia, the Azores, Gibraltar, South America, Samoa, Australia, South Africa, the West Indies, and finally, in June 1898, to Newport, R.I., to complete his circumnavigation. He had sailed 46,000 miles (74,000 kilometres) in three years, two months, and two days. In 1899 he wrote *Sailing Alone Around the World,* which became a classic in the literature of the sea. In 1909 he set sail from New England in "Spray" to spend the winter in Grand Cayman and was lost at sea. He was assumed to have been the victim of a collision; he and "Spray" were never found, and in 1924 he was declared legally dead.

sloe (shrub): *see* blackthorn.

Slonim, city and centre of Slonim *rayon* (district), Grodno *oblast* (administrative region), Belorussian Soviet Socialist Republic. The city arose in the latter part of the 10th century as a fortified point and later developed into a market centre. After becoming a railway junction, it expanded its industrial base, and it now has varied food, consumer, and engineering industries, as well as a medical school. Pop. (1975 est.) 33,700.

sloop, single-masted sailing vessel with fore-and-aft rigging, including mainsail, jib, and sometimes one or more headsails. A sloop of war was a small sloop-rigged warship, mounting about 20 guns. In modern usage, the sloop is practically synonymous with the cutter.

slot machine, byname ONE-ARMED BANDIT, gambling device operated by dropping a coin in a slot to activate one to three or more reels marked into horizontal segments by varying symbols. The machine pays off by dropping into a cup or trough from two to all the coins in the machine, depending on how and how many of the symbols line up when the reels come to rest. Symbols used include stars; card suits; bars; numbers (7 and 11 are favourites); various pictured fruits—cherries, plums, oranges, lemons, and watermelons; and the word jackpot. Coins of all denominations are used, but penny slots are rare.

The term slot machine was originally used for automatic vending machines as well as for the gambling devices, but in the 20th century the term became restricted to the latter. The first such gambling devices in the United States were mere novelties that did not return coins but presented gambling opportunites, such as those having atop them two horses that would race after a coin was inserted. Such devices set on a bar in a saloon attracted wagering between patrons. By 1892, machines that paid off in coins were in existence, usually in the form of a circular display with a spinning indicator that came to rest or pointed to a number, colour, or picture. One such machine had a roulette layout. Early in the 20th century the slot machine settled into its three-reel form (occasionally later increased to five) with a window showing coins played into the machine, constituting the jackpot, or highest payoff.

Forces of morality, and then of law, opposed the operation of slot machines, and some were disguised, ejecting a piece of gum or candy or a token for free drinks or playing a tune as well as paying off in coins. In the second half of the 20th century, one type of slot machine in England paid off only in prizes. Throughout the 1920s, the machines were popular throughout much of the United States, especially in resort areas, and continued to be popular into the Great Depression years of the 1930s. Belief that the distribution of slot machines was controlled by organized crime led to legislation restricting their sale and transportation as well as their use except in private social clubs. Prohibition outside Nevada, which long had legalized gambling, was virtually total by 1951, although illegal operation, especially in private clubs, was widely ignored.

Later, as other states and countries permitted gambling, moved by the prospect of revenue, the machines came into wide use throughout the world, both in casinos and elsewhere. United States manufacturers had a prime segment of the market. By the late 1970s, electronic machines operated by push buttons and having visual displays were in use, but mainly for the machine play of such games as Poker, Keno, and Blackjack. For the slot-machine addict, the action of pulling the handle, the sound of the reels falling into line, and most of all the jangle of cascading coins when protruding metal fingers in the machine triggered the coin release, all were part of the attraction. By playing adjacent machines, an addict in a hurry could even use both hands. The quarter-sized Susan B. Anthony dollar introduced by the U.S. Mint was a dismal failure pitted against the larger silver dollar or the casino-manufactured counter of the same size. To a hard-bitten player of "the slots," a Susan B. Anthony dollar jackpot sounded like a jackpot of quarter-dollars.

From the beginning, players cheated by using magnets, wires manipulated through coin slots or through holes drilled in the shell of the machine, and slugs. Manufacturers countered such thefts by devising goose-necked coin slots and antislug arresters, and operators strengthened security measures and personnel. Early machines tended to display telltale patterns that presaged big payoffs, but randomizing the timing of the reels removed this problem.

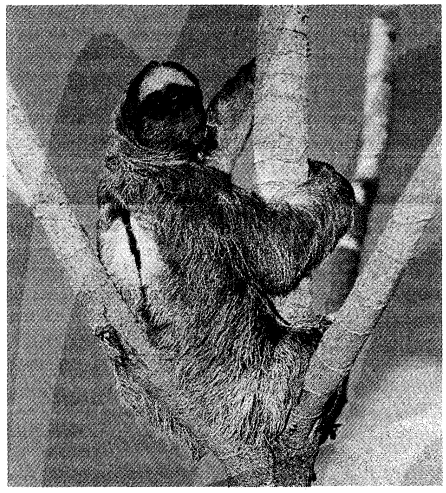
The slang term one-armed bandit arose from the single handle and the ability of the operators to adjust the rate of payoff, decreasing it

in times of high-volume playing and increasing it in slack periods. Some state gaming commissions attempted to assure a minimum rate of payoff. In the late 20th century the record jackpot for a five-reel dollar machine taking one to five U.S. dollars was $1,000,000.

sloth, tree-dwelling mammal belonging to the family Bradypodidae and placed with armadillos and anteaters in the order Edentata. The six living species are found in tropical South and Central America. Their extinct relatives, the ground sloths, once ranged into areas of the North American continent.

Sloths have rounded heads, inconspicuous ears, and flattened faces. The head and body are about 60–70 cm (24–27 inches) long, and the tail is short or rudimentary. The forelimbs are longer than the hind limbs, with long, curved claws sharp enough to cause deep wounds. The four species of three-toed sloths, or ais (*Bradypus*), have three toes on each limb; the two species of two-toed sloths, or unaus (*Choloepus*), have two on the forelimbs but three on the hind limbs. Although most mammals have seven neck vertebrae, three-toed sloths have nine, and two-toed sloths have six or seven. Three-toed sloths can turn the head through a 270° arc.

Sloths seldom voluntarily descend to the ground. Because they cannot walk but must pull themselves along the ground with their claws, they are easy prey for jaguars and other predators. They cling erect to tree trunks and

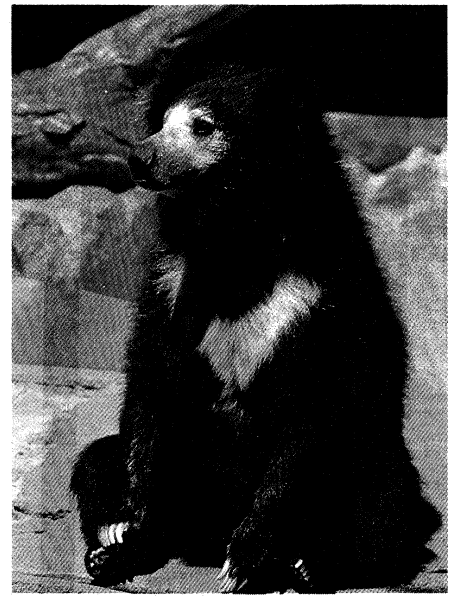


Three-toed sloth (*Bradypus tridactylus*)
Des Bartlett—Bruce Coleman Ltd.

branches or hang upside down and move with extreme deliberation, hand over hand, through the trees, feeding on the vegetation. They are nocturnal and are generally solitary, fighting off others of the same sex. Sloths can swim well and are able to survive immersion better than other land mammals. In the trees they are well camouflaged among the leaves, especially during the rainy season, when a green alga grows among their stiff, brownish hairs. Generally silent, they can utter a shrill cry or a hiss.

A single young is born after about four to six months' gestation and clings to the fur of the mother from birth until about five weeks of age. In captivity the unau has lived more than 20 years; the ai rarely survives more than a few months, partly because of its apparent dietary restriction to the leaves of a trumpet tree (*Cecropia*).

sloth bear, also called HONEY BEAR, Hindi BHALU (species *Melursus ursinus*), forest-dwelling member of the family Ursidae that inhabits tropical or subtropical regions of India and Sri Lanka. Named for its slow-moving habits, the sloth bear has poor senses of sight and hearing but has a good sense of smell. Various adaptations equip this nocturnal animal for raiding insect colonies. With long, curved front claws (extending from large paws), it digs toward and rips open a nest of bees or termites. Inserting its long snout into the nest and closing its nostrils (thereby preventing entry of insects into its respiratory passages), the sloth bear opens its protrusible lips and sucks in the insects through the gap caused by the lack of central upper incisors. Supplements to this diet include fruit, honey, grains, and small vertebrates.



Sloth bear (*Melursus ursinus*)
Bucky Reeves from The National Audubon Society Collection/Photo Researchers—EB Inc.

An adult usually stands about 75 cm (30 inches) at the shoulder, weighs 91–113 kg (200–250 pounds), and is about 1.5 m (5 feet) long, with a 7–12-centimetre (3–8-inch) tail. Shades of gray, red, or brown may tinge its black, shaggy coat, composed of long hairs—longest between the shoulders. Whitish- to yellowish-coloured hair marks its snout and forms a crescent or chevron on its chest.

Following the normal gestation period of seven months, the female bears a litter of one to three cubs. Reportedly remaining with her two to three years, these cubs often ride around on their mother's back.

Slough, district (borough), county of Berkshire (until 1974 it was in Buckinghamshire), England, on the western periphery of the Greater London metropolitan area on the Great West Road and M4 motorway. The town of Slough developed into a centre of varied light industries after World War I, when an industrial park was established on the site of a wartime army depot, and has subsequently grown rapidly. More recent developments include a large covered shopping centre opened in 1976. Slough district covers an area of 11 square miles (28 square km). Pop. (1986 est.) district, 98,500.

Slovak language, Slovak SLOVENČINA, West Slavic language closely related to Czech, Polish, and the Sorbian languages of eastern Germany. It is spoken in eastern Czechoslovakia, where it is the official language of the Slovak Republic. (Czech is the official language of the Czech Republic.) Slovak is written in the Roman (Latin) alphabet. Although there are traces of the Slovak language in Latin documents of the 11th–15th century and in the Czech of the 14th–16th century, the earliest-known attempts to increase the use of written Slovak came in the 17th and 18th centuries, when the Catholics centred at the University of Trnava tried to introduce Slovak for use in their hymnal and other church books. The language did not become accepted as a literary language, however, until a group led by the Protestant L'udovít Štúr (1815–56) began to write in the central Slovak dialects. The language of these writings, as modified and codified by Martin Hattala in his grammar of 1852, rapidly gained approval and was accepted as standard.

There are three major Slovak dialect groups: Eastern, Central, and Western. The Eastern and Western groups are closer to one another than either is to the Central dialects, which possess some features in common with South Slavic. The Eastern dialects have some similarities with Polish, such as the loss of long vowels, while the Western dialects of Slovak shade into the Moravian dialects of the Czech language. Except for perhaps the extreme Eastern Slovak dialects and the Bohemian Czech dialect, all dialects of Slovak and Czech are mutually comprehensible, for there are no sharp linguistic frontiers. In general, Slovak has been more conservative while Czech has undergone far-reaching changes since the 14th century; thus, Slovak has retained long syllabic *l* and *r* and a series of diphthongs. Slovak did not develop the distinctive sibilant *ř* sound of Czech. *See also* Czech language.

Slovak Ore Mountains, Slovak SLOVENSKÉ RUDOHORIE, segment of the Carpathians, in south-central Slovakia, Czechoslovakia. The mountains extend (west-east) for about 90 miles (145 km) between Zvolen and Košice and rise to 4,846 feet (1,477 m) in Stolica. They are noted for their mineral resources, especially high-grade iron ore, which is important to the Czechoslovak economy. The mountains give rise to the Ipel and Slaná rivers, and the ice caverns of Dobšiná are on their northern slopes.

Slovakia, officially SLOVAK REPUBLIC, formerly (1969–90) SLOVAK SOCIALIST REPUBLIC, Slovak SLOVENSKO, SLOVENSKÁ REPUBLIKA, or (1969–90) SLOVENSKÁ SOCIALISTICKÁ REPUBLIKA, federal republic roughly coextensive with the historic region of Slovakia, easternmost of the two major elements of Czechoslovakia. Bordered by the Czech Republic to the west, Poland to the north, the Ukraine, U.S.S.R., to the east, Hungary to the south, and Austria to the southwest, its 18,933-square-mile (49,036-square-kilometre) area is subdivided into three *krajs* (regions)—Západoslovenský, Stredoslovenský, and Východoslovenský—and the separately administered capital area of Bratislava.

Slovakia was inhabited in the first centuries AD by Illyrian, Celtic, and then Germanic tribes. It was settled by the Slavic Slovaks in the 6th or 7th century and was subjected to Avar rule before being incorporated in the 9th century into Great Moravia, which included all of Bohemia, the southern part of modern Poland, and the western part of modern Hungary. After the Moravian state was destroyed early in the 10th century, Slovakia became a land of the Hungarian crown (11th century).

Although Czech Hussites overran the country in the 15th century and Lutheranism and Calvinism became popular among the German, Slovak, and Magyar populations of Slovakia during the Reformation (16th century), Roman Catholicism was successfully restored by the Habsburg rulers, who succeeded to the Hungarian throne in 1526 and then ruled Slovakia until 1918.

Late in the 18th century a Slovak national renaissance began, and, after the Hungarian Revolution of 1848–49, Slovak nationalism received encouragement from the Habsburgs' centralized administration that favoured non-Magyars. But after the Austro-Hungarian *Ausgleich* (Compromise) of 1867, the Hungarian government resumed control over Slovakia and pursued a policy of Magyarization there,

which stimulated many Slovaks to emigrate, particularly to the United States.

At the end of World War I the Slovaks dissociated themselves from Hungary and joined the Czechs of the Czech Lands (Bohemia, Moravia, and part of Silesia) to form the new state of Czechoslovakia. On Oct. 6, 1938, when Adolf Hitler's Germany was threatening to dismember Czechoslovakia, the Slovaks declared themselves an autonomous unit within a federal Czecho-Slovak state. After the Germans occupied Prague, Slovakia became nominally independent under German protection (March 14, 1939). But Slovak resentment against the Germans mounted, and by August 1944 there was enough opposition to bring about a serious anti-German uprising.

Early in 1945, as Soviet and Czechoslovak armies were occupying the country, the Slovaks agreed to join a reconstituted Czechoslovak state on the basis of complete equality between Czechs and Slovaks. After the communists gained power (February 1948), however, Slovakia was subjected to a strictly centralized, Czech-dominated government. By the constitution promulgated on July 11, 1960, Slovakia gained theoretically equal rights with the Czech Lands. From Jan. 1, 1969, it was called the Slovak Socialist Republic and was represented equally with the Czech Socialist Republic in the Federal Assembly, the two-chamber legislative body of the Czechoslovak Socialist Republic. In July 1960 Slovakia was subdivided into three administrative regions, Western Slovakia, Central Slovakia, and Eastern Slovakia (*see* Západoslovenský; Stredoslovenský; Východoslovenský). With the fall from power of the communists in Czechoslovakia in 1989–90, the word "Socialist" was dropped from Slovakia's official name.

Mountains dominate the republic, rising northward to Czechoslovakia's highest peak, Gerlach Peak, 8,711 feet (2,655 m), in the High Tatras (Vysoké Tatry) in Stredoslovenský *kraj*. Lowlands occur in the southwestern and southeastern *krajs*. Two major rivers, the Morava (March) and the Dunaj (Danube), form parts of the republic's southern border. The principal rivers draining the mountains include the Váh, Hron, Hornád, and Bodrog, all flowing south, and the Poprad, draining northward. More than two-fifths of the republic's area is forested, and only about one-third is cultivated. Wheat, barley, corn (maize), sugar beets, rye, and vegetables are grown in the lowlands, where cattle and hogs are the primary livestock. Potatoes, oats, and flax are grown in the mountain valleys, where sheep are the principal livestock. Tobacco and fruits are grown in the Váh River valley, and vineyards thrive on the slopes of the Carpathian ranges in Západoslovenský *kraj*.

Substantial deposits of iron ore, copper, magnesite, lead, and zinc and smaller quantities of mercury, asbestos, tin, barite (barium sulfate), siderite (clay ironstone), perlite (glass sands), silver, and gold are mined in the mountains. The chief energy source for industry is hydroelectric power, generated by a series of dams on the Váh, Orava, Hornád, and Slaná rivers. Heavy industry is centred in the towns along the Váh, and at Bratislava and Košice.

Tourists are attracted by winter sports, hiking, camping, and fishing in the Tatra ranges and by thermal and mineral-water spas. Airports are located at Bratislava, Lučenec, Žilina, Zvolen, Poprad, and Košice, and railroads and highways cross the mountains, making most places easily accessible.

The population is about nine-tenths Slovak. Hungarians, concentrated in the southern districts, form the largest minority, and Czechs, Ukrainians, Germans, Russians, and Poles are found in the western and the northeastern districts. Pop. (1988 est.) 5,236,252.

Slovene language, also called SLOVENIAN, Slovene SLOVENŠČINA, South Slavic language written in the Roman (Latin) alphabet and spoken in Slovenia (an autonomous region in the northwestern corner of Yugoslavia) and in adjacent parts of Austria and Italy. Grammatically, Slovene is marked by the retention of forms expressing dual number (two persons or things) in nouns and verbs. Slovene has great dialectal variation; some scholars distinguish as many as 46 individual dialects.

Although the earliest written record in the Slovene language is found in the Freising manuscripts dating from about AD 1000, the language was not generally written until the Reformation, when Protestants translated the Bible and wrote tracts in Slovene. A Roman Catholic translation of the Bible in Slovene appeared at the end of the 18th century and was followed by grammars of the language during the first few years of the 19th century; by the middle of the 19th century, a standard written language was in use. Slovene is closely related to its eastern neighbour, Serbo-Croatian, from which it separated between the 7th and 9th centuries AD; the transition from the eastern Slovene dialects to the Kajkavian dialect of Serbo-Croatian is a gradual one.

Slovenia, officially REPUBLIC OF SLOVENIA, Serbo-Croatian REPUBLIKA SLOVENIJA, constituent republic, northwestern Yugoslavia. It is bounded on the west by Italy, on the north by Austria, on the northeast by Hungary, and on the southeast by Croatia and has an area of 7,819 square miles (20,251 square km).

The Slovenes arrived in their present territory and farther north in the 6th century AD. At that time they owed allegiance to the Avars. In 627 a Slavic kingdom, extending from the Sava River valley as far north as Leipzig, emerged under Samo. In 748 the territory was incorporated into the Frankish empire of the Carolingians. With the partitioning of that empire in the 9th century, the country was assigned to the German kingdom. The Germans reduced the Slovenes to serfdom, and most of the Slovene settlements north of the Drava River were Germanized. That the Slovenes preserved their identity through centuries of German rule was due largely to intensive educational work, conducted chiefly by native Roman Catholic priests.

The suzerainty of the Habsburgs over the Slovenian lands was gradually established from the late 13th century. Sporadic peasant uprisings occurred in the 15th and 16th centuries. The lot of the Slovene peasantry was somewhat improved by the reforms decreed by the Habsburg empress Maria Theresa and by her son Joseph II in the 18th century.

After a brief period (1809–14) of French Napoleonic rule, Austrian Habsburg rule was restored in the region. In 1848 the first Slovene national political program was formulated: it demanded a unified Slovene province within the Austrian Empire. Hopes for a political union of South Slavs (Slovenes, Serbs, and Croats) began to be expressed in the 1870s, and the first political parties in Slovenia were formed in the 1890s.

In 1918, at the end of World War I, Slovene political leaders cooperated in the formation of the Kingdom of Serbs, Croats, and Slovenes (renamed Yugoslavia in 1929). At the Paris Peace Conference of 1919, however, the Allies awarded Gorizia (Gorica) and adjacent territory, containing a large Slovene population, to Italy.

Early in World War II, Slovenia was partitioned by the Axis powers: Italy took the southwest while Germany took the northeast, and Hungary took a smaller area. During that conflict Slovene resistance movements sprang up, by far the most significant being the communist-led Liberation Front.

After the Allied victory of 1945, Slovenia became a constituent republic of Yugoslavia. Under communist rule from the mid-1940s, Slovenia enjoyed a fair degree of independence in the economic and cultural field, though it was politically subordinate to the Yugoslav League of Communists (the ruling national communist party). In 1974 the republic was renamed the Socialist Republic of Slovenia following the constitutional changes of that year. In the late 1980s, Slovenia's communist leaders began moving to create a multiparty system in their republic, thus putting them at odds with Yugoslavia's national communist party. In February 1990, Slovenia's ruling communist party broke away from the national communist party and reconstituted itself as the centre-left Party of Democratic Renewal. In April Slovenia held the first contested multiparty elections in Yugoslavia since before World War II. The elections were won by Demos, a centre-right coalition calling for an independent Slovenia.

Slovenia is largely mountainous and wooded, with deep and fertile valleys and numerous rivers. Its northwestern tip reaches into the Julian Alps, where Mount Triglav (9,396 feet [2,864 m]) towers over a region of great natural beauty. From this region the Sava River flows southeastward through the republic. The river bypasses Ljubljana, the capital, and then cuts a gorge through the hilly countryside.

Slovenia has historically been one of the more prosperous regions of the Balkans, and it is the most prosperous and most industrialized republic in the Yugoslav federation. Iron and steel plants and other heavy industry are located in the capital as well as in Jesenice, Maribor, and Javornik. Textile plants are situated in Maribor, Kranj, and Trzic. Coal is extracted from mines located at Zagorje, Trbovlje, and Hrastnik. Potatoes, rapeseed, grains (wheat, corn [maize], rye, oats), and fruit are the principal crops. Forestry and livestock raising also are important.

The vast majority of the republic's population is Slovene, and the Slovenes are almost exclusively Roman Catholic. Slovenes constitute less than one-tenth of the Yugoslavian population but maintain a strong linguistic and cultural identity with a strong Western heritage. Pop. (1988 est.) 1,943,000.

Słowacki, Juliusz (b. Sept. 4 [Aug. 23, Old Style], 1809, Krzemieniec, Pol.—d. April 3, 1849, Paris, Fr.), poet and playwright who, with Adam Mickiewicz and Zygmunt Krasiński, dominated the Romantic movement in Polish literature. His technical virtuosity, his rich and inventive vocabulary, and his evocative imagery made him a precursor of the Symbolist poets.

The son of a university professor, Słowacki was educated in Vilnius, Lithuania, until 1829, when he joined the Department of the Treasury in Warsaw. He was absorbed with reading and writing poetry. In the Polish insurrection of 1830, he appears to have been made an envoy of the insurrectionary government. He resigned from the Treasury in 1831 and traveled to Dresden, Paris, and London, presumably carrying dispatches. In 1833–35 he was in Switzerland, and a year later he was in Italy, where he wrote his love idyll *W Szwajcarii* (1839; "In Switzerland"). His travels to the Middle East in 1837–38 are described in *Podróż do ziemi świętej* (published posthumously, 1866; "Voyage to the Holy Land"), a narrative poem. He spent most of his exile in Paris, which was the centre for the large number of émigrés who had fled from Poland after the 1830 uprising. His letters to his mother from Paris are classics of Polish prose.

Słowacki's other works include *Anhelli* (1838), a poem in prose, in which he finds in a projection of his own self the promise of Poland's delivery. His visionary views of history also found expression in the poem *Król-Duch* ("The Spirit King"), published partially in 1847 and in full in 1925. He also wrote a va-

riety of plays, largely inspired by Shakespeare, classical Greek and Roman drama, and Calderón, and by contemporary productions seen in Paris. Most of these works, such as *Lilla Weneda* (1840), *Sen srebrny Salomei* (1844; "The Silver Dream of Salomea"), and the anti-Romantic comedy *Fantazy* (1843), were published posthumously in 1866. His plays had a powerful influence on later dramatists and are still staged frequently in Poland.

slowwôrm (lizard): *see* blindworm.

Sluck (Belorussian S.S.R.): *see* Slutsk.

sludge, in sanitary engineering, solid matter that has settled out of suspension in sewage undergoing sedimentation in tanks or basins. There are various sludges representing various stages in the sewage treatment process; *e.g.,* primary (or fresh), chemically precipitated, trickling-filter secondary, activated, and digested. Some sludge is disposed of fresh by hauling or pumping to sea. Some is dried and sold as fertilizer. Some is digested by microorganisms, to reduce organic content, in a chamber such as an Imhoff tank, or sedimentation tank (*q.v.*). During such digestion, the volume decreases, and the residue achieves relative inoffensiveness, having attained the character of humus. It can then be spread on the land.

slug, any mollusk of the class Gastropoda in which the shell is reduced to an internal plate or a series of granules or is completely absent. The term generally refers to a land snail. Slugs belonging to the subclass Pulmonata have soft, slimy bodies and are restricted to moist habitats on land (one freshwater species is known). Some slug species damage gardens. In temperate regions the common pulmonate slugs (of the families Arionidae, Limacidae, and Philomycidae) eat fungi and decaying leaves. Slugs of the plant-eating family Veronicellidae are found in the tropics. Carnivorous slugs, which eat other snails and earthworms, include the Testacellidae of Europe.

Marine gastropods of the subclass Opisthobranchia are sometimes called sea slugs (*see* opisthobranch).

slug caterpillar moth, any of about 500 species of the insect family Eucleidae (also called Limacodidae), order Lepidoptera, widely distributed throughout the world, with the majority in the tropics. The common name



Slug caterpillar moth (*Euclea delphinii*)
Alexander B. Klots

derives from the short, fleshy, sluglike caterpillars; suckers have replaced the typical larval prolegs, and the larvae seem to glide rather than to crawl. Some larvae are brightly coloured and have stinging hairs capable of causing a rash in human beings who touch them. The caterpillars feed on plants and pupate in oval cocoons hung between leaves.

One species, the hag moth (*Phobetron pithecium*), derives its name from the larva's fleshy appendages, which are covered with brown stinging hairs resembling dishevelled or tousled hair. When the caterpillar spins its cocoon the appendages are transferred to the outside of the cocoon, where they serve for protection and camouflage.

slump, in geology, downward intermittent movement of rock debris, usually the consequence of removal of buttressing earth at the foot of a slope of unconsolidated material. It commonly involves a shear plane on which a back-tilting of the top of the slumped mass occurs. The plane is slightly concave upward and outward and separates the slump block from unslumped material of the same character. In sedimentary strata the slumping material generally bends elastically until the rock strength is exceeded, when it breaks and moves rapidly. *See also* sedimentary structure.

slump, submarine: *see* submarine slump.

Słupsk, *województwo* (province), northern Poland, established 1975, comprising an area of 2,878 sq mi (7,453 sq km). It is bordered by the Baltic Sea on the north, Gdańsk and Bydgoszcz provinces on the east, Piła province on the south, and Koszalin province on the west. Słupsk is drained by the Łeba, Łupawa, Słupia, Wieprza, and Brda rivers. The northern part of the province has three coastal lakes (Łebsko, Gardno, and Wicko) separated from the Baltic Sea by narrow sandy strips of land. The province is sparsely populated and covered by extensive forests and farmlands.

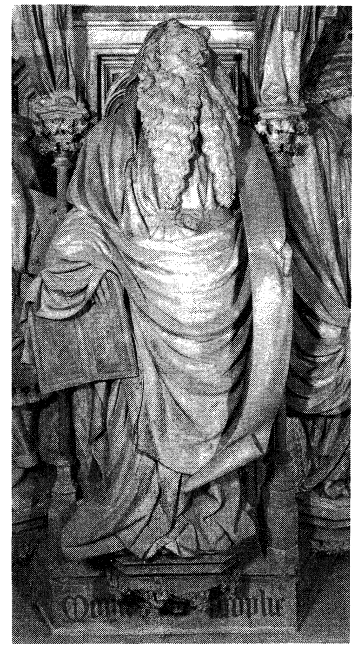
Agriculture (rye and potatoes), the shipping industry, food processing, lumber milling, and the manufacture of textiles, electrical machinery, building materials, and porcelain are economically important. Słupsk city is the provincial capital; other important cities are Lębork, Ustka, Bytów, and Sławno. Pop. (1982 est.) 374,400.

Słupsk, German STOLP, city, capital of Słupsk *województwo* (province), northern Poland, on the Słupia River, 11 mi (18 km) from the Baltic coast. A manufacturing centre producing primarily furniture for export, it is situated on the Gdynia–Szczecin railway line. Beginning as an 8th-century Slavic stronghold, Słupsk was united with Poland in the 10th century as part of Pomerania. It was repeatedly attacked by German forces, and the 18th century brought a long period of Germanization. It was returned to Poland in 1945. Pop. (1982 est.) 87,500.

Sluter, Claus, Claus also spelled CLAES, or KLAAS (b. *c.* 1340/50, Haarlem?, Holland—d. between Sept. 24, 1405, and Jan. 30, 1406, Dijon, Burgundy), influential master of early Netherlandish sculpture, who moved beyond the dominant French taste of the time for grace, delicacy, and elegance into highly individual monumental, naturalistic forms. Three works are of outstanding importance, all for the chapel of the Carthusian monastery Chartreuse de Champmol in Dijon: the figures on the central dividing column of the chapel portal, the hexagonal "Well of Moses" in the cloister, and the figures on the tomb of his patron, Philip the Bold, duke of Burgundy (the last now in the Musée des Beaux-Arts in Dijon, Fr.).

The works of Claus Sluter infuse realism with spirituality and monumental grandeur. His influence was extensive among both painters and sculptors of 15th-century northern Europe. Born in the mid-14th century, he is known through his works rather than accounts of his person. He is thought to be the Claes de Slutere van Herlam (Haarlem) listed in the records of the stonemason's guild in Brussels about 1379. The sculptured consoles—brackets that support cornices or ornaments—that projected from the Brussels town hall, now in the Musée Communal, are thought to show if not his hand at least his guiding spirit. From ducal archives he is known to have entered in 1385 the service of Philip the Bold, at the Burgundian capital of Dijon. Philip, duke of Burgundy, was ruler of the Netherlands and regent of France in the last decades of the century. He founded the Carthusian monastery of Champmol at Dijon in 1383 and made its chapel a dynastic mausoleum adorned with sculpture by Sluter.

All of the surviving sculpture known to be by Sluter was made for Philip. Two compositions are still at the site of Champmol: the figures, on the central pillar that divided the portal of the chapel, showing the Duke and



"Moses" from the "Well of Moses," marble sculpture by Claus Sluter, 1395–1404/05; in the cloister of the Chartreuse de Champmol, Dijon, Fr.
Lauros—Giraudon from Art Resource/EB Inc.

Duchess presented by their patron saints John the Baptist and Catherine to the Virgin and Child and the "Well of Moses" in the cloister, the remains of a wellhead that had been surmounted by a group showing the Calvary of Christ (the head and torso fragment of Christ is in the Musée Archéologique, Dijon). The other extant work is the Duke's own tomb, which once stood in the chapel at Champmol but is now reassembled in the Musée des Beaux-Arts.

The archives in Dijon provide some information on Sluter's sculptural commissions. In 1389 he succeeded Jean de Marville as chief sculptor to the Duke, replacing Marville's assistants with sculptors from Brussels. In that year he began carving the portal sculptures, which had been planned as early as 1386. He replaced the portal's damaged central canopy and by 1391 had completed the statues of the Virgin and Child and the two saints. By 1393 the statue of the Duchess was completed, and it is presumed that the Duke's statue also was finished by then. In 1392 he bought alabaster in Paris, and in the following year he inspected work at Mehun-sur-Yèvre by André Beauneveu, talented sculptor to the greatest art patron of the period, Philip's extravagant brother, Jean, duc de Berry. In 1395 Sluter travelled in the Low Countries, going to Dinant for marble and to Malines. That same year he began the Calvary group for the cloister and in 1396 brought to Dijon his nephew Claus de Werve and more sculptors from Brussels to assist in his numerous ducal commissions. The architectural portion of the Duke's tomb had been completed by 1389, but only two mourning figures of the sculptural composition were ready when the Duke died in 1404; three weeks earlier, Sluter, to ensure the peace of his soul and body and for shelter and protection in his old age, pur-

chased—in modern terms—a retirement plan at the abbey of Saint-Étienne, Dijon. It seems, however, he never availed himself of that retreat before his own death in 1406. Philip's son, Duke John the Fearless, contracted in 1404 for the completion of his father's tomb within four years, but Sluter's nephew did not finish it until 1410, and he used it as the model for Duke John's own tomb. (Many of the mourning figures around the base are copies of what must be Sluter's work, though the problem of establishing his exact contribution is difficult because the two tombs were disassembled in the French Revolution and extensively restored from 1818 to 1823.)

Sluter, an innovator in art, moved beyond prevailing French taste for graceful figures, delicate and elegant movement, and fluid falls of drapery. In his handling of mass, he also moved beyond the concern with expressive volumes visible in Beauneveu's sculpture. The grandeur of Sluter's forms can only be paralleled in Flemish painting (by the van Eycks and Robert Campin) or in Italian sculpture (by Jacopo della Quercia and Donatello) several decades later.

The portal of the Champmol chapel is now somewhat damaged (the Virgin's sceptre is missing, as are the angels, once the object of the child's gaze, holding symbols of the Passion). This work, though begun by Marville, must have been redesigned by Sluter, who set the figures strongly before an architecture with which they seem intentionally not closely aligned, the doorway becoming a background for the adoring couple of Duke Philip and his wife. This transforms traditional portal design into a pictorial form in which architecture has become a foil, the framework for a figured triptych. Projecting canopies and jutting corbels carved with figures, deep undercuttings, and swirling draperies aid Sluter's dynamic naturalism. This is a weighty, massive art of dominantly large, balanced forms.

The six-sided "Well of Moses," now lacking its crowning Calvary group, which made the whole a symbol of the "fountain of life," presents six life-sized prophets holding books, scrolls, or both. The figures, beginning with Moses, proceed counterclockwise to David, Jeremiah, Zechariah, Daniel, and Isaiah (the first three were in place by 1402). The French art historian Émile Mâle (1862–1954) popularized the discovery that their scrolls contain the prophetic passages the figures spoke in a medieval mystery play, *The Trial of Christ,* foretelling the death of Christ for the redemption of mankind. Six angels at the corners of the cornice mourn the event at one time depicted above. Moses was placed directly below the face of Christ, and the location of Zechariah, father of John the Baptist, was at Jesus' back, as befits a precursor. Zechariah looks down sadly as youthful Daniel vigorously points to his prophecy. On the other side of Daniel, and serving to balance Daniel's passionate temperament, is the calm reflective Isaiah. This juxtaposition reveals Sluter's use of alternating naturalistic balances. The head and torso fragment of Christ from the Calvary reveal a power and intensity of restrained expression that conveys overwhelming grandeur. Suffering and resignation are mingled, a result of the way the brow is knitted, though the lower part of the face, narrow and emaciated, is calm and without muscular stress. The "Well of Moses" was originally painted in several colours by Jean Malouel, painter to the Duke, and gilded by Hermann of Cologne (the figure of Jeremiah even wore copper spectacles for which there exists a payment record of 1403). The figures of the composition dominate the architectural framework but also reinforce the feeling of support the structure provides through their largeness of movement.

Sluter's latest preserved work, the tomb of Philip the Bold, was first commissioned from Jean de Marville, who is responsible only for the arcaded gallery below the sepulchral slab of black marble from Dinant. Forty figures, each about 16 inches (41 centimetres) high and either designed or executed by Sluter, made up the mourning procession. Not all the figures are still in position at the tomb; three are lost, three are in the Cleveland Museum of Art, and one is in a French private collection. They served as models for Sluter's nephew Claus de Werve, Juan de la Huerta, and other artists for sculptured tombs in France and beyond its borders. Sluter did not invent the mourning procession nor did he design the setting. But he conceived of the figures as *pleurants* (weepers), of whom no two are alike; some are openly expressing their sorrow, others are containing their grief, but all are robed in heavy wool garments that occasionally veil a bowed head and face to convey a hidden mourning. The voluminous draperies continue to suggest the sense of large movement visible in such a figure as the Moses of the wellhead. The figures for the tomb are a culmination of Sluter's awareness of natural forms and individual expression, the supreme realization in sculpture of the volatility of his age that was so quick to respond to opposite moods, to weep as strongly as it laughed, that in one moment contemplated with gloom this sinful world and in the next moment delighted in the variety of nature. Spiritualist and naturalist in one, Sluter epitomized in sculpture the growing awareness of an individualized nature with discoverable laws and an enduring grandeur. (C.D.Cu.)

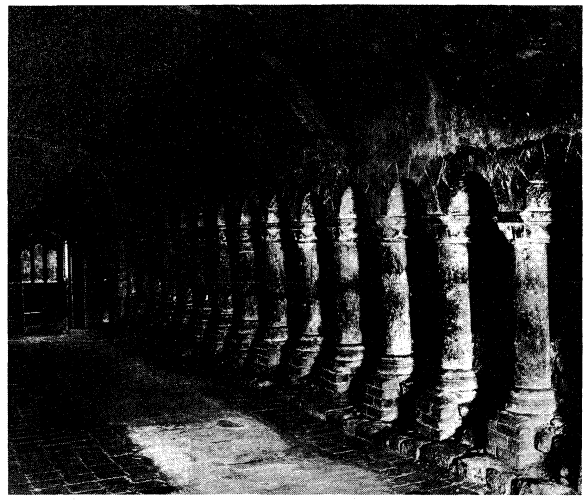
MAJOR WORKS. The known extant works of Sluter were constructed for the Chartreuse de Champmol (Dijon, Fr.), which was destroyed in 1792. The only works of Sluter remaining there are parts of the portal of the Chapel (1385–93) and the remains of the "Puits de Moïse," or "Well of Moses" (1395–1404/05), still in the cloister of the Chartreuse. The Musée des Beaux-Arts in Dijon, in the palace of the dukes of Burgundy, contains the tomb of Philip the Bold (1389–1410), now extensively restored. The Musée Archéologique in Dijon contains fragments of the Calvary group (1395–1400), which was originally the upper part of the "Well of Moses," including the head and upper torso of the Christ.

BIBLIOGRAPHY. Receipts and accounts by and concerning Sluter and the ducal workshop are located in the Archives de la Côte-d'Or and the Bibliothèque Municipale (Dijon) and are also catalogued by the Musée des Beaux-Arts (Dijon). An important catalog of that museum, from the exhibition "La Chartreuse de Champmol, foyer d'art au temps des Ducs Valois," (1960), contains plates of Sluter's works and an extensive bibliography.

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Slutsk, also spelled SLUCK, city and centre of Slutsk *rayon* (district), Minsk *oblast* (administrative region), Belorussian Soviet Socialist Republic. The city dates from the 12th century and was incorporated in 1795. In the 18th century it was a centre of weaving and other handicrafts, including the working of gold and silver. It now has food, engineering, metalworking, furniture, and linen industries. Pop. (1974 est.) 40,500.

slype, in architecture, covered passageway in a medieval English cathedral or monastery. The slype may lead from either the transept or the nave of the church proper to either the chapter house (the monks' assembly room) or the deanery (the residence of the dean). Most often it is adjacent to and east of the cloisters, covered walks lying south of the transept in most cruciform churches (those laid out in the shape of a cross). Slypes are found in large Christian churches of around the late 11th century such as the Winchester and Durham cathedrals and the abbey church of St. Albans. In those three examples the slype lies between the transept and the chapter house. In Gloucester cathedral (begun in 1029), the slype lies at the western terminus of the nave.



Slype, Gloucester cathedral, Gloucestershire, England, *c.* 1100

By courtesy of Maurice H. Ridgeway and the Courtauld Institute

Småland, *landskap* (province), southern Sweden, extending from the Baltic on the east to the *landskap* (provinces) of Halland and Västergötland on the west and from Östergötland on the north to Skåne and Blekinge on the south. Occupying a land area of 11,321 sq mi (29,322 sq km), it is the largest traditional *landskap* in southern Sweden and is composed mostly of three administrative *län* (counties): Jönköping, Kronoberg, and Kalmar. Its name means "many small lands," referring to the many small *landskap* from which the present one grew. The undulating surface of the north, rising to wooded heights of up to 1,000 ft (300 m), gives way in the south to plateau-like land, some of which is less than 330 ft. Even

the steep, deeply indented, skerry- (island-) fringed coastline of the north changes south of Oskarshamn to a low one with shallow bays and few skerries. There are large areas of forestland, heaths, peat bogs, and swampland, and lakes are numerous. Coniferous trees and birch predominate, but beech is common in the south and oak and elm in the coastal region and in the northwest, near Vättern (lake).

In spite of poor soil, agriculture is practiced, together with cattle raising, especially in the eastern part, which produces most of the *landskap*'s wheat; other crops include oats, rye, and potatoes. Fruit growing is prevalent in the Urshult area on the southern shore of Åsnen (lake) and around Gränna, a small town on the shores of Vättern, famous for pears and peppermint candy, called *polkagrisar*. The leading industries, based largely on forest products, include the manufacture of furniture, matches, and paper. Småland is also famous for its glassworks, those at Orrefors, Boda, and Kosta being world renowned.

Besides Jönkoping and Kalmar, the seats of their respective *län*, and Växjö, the seat of Kronoberg, principal towns include Ljungby, Nybro, Oskarshamn, Västervik, Nässjö, Värnamo, Vetlanda, Tranås, and Huskvarna, known for the manufacture of home appliances. Pop. (1984 est.) 701,525.

Small, Albion W(oodbury) (b. May 11, 1854, Buckfield, Maine, U.S.—d. March 24, 1926, Chicago), sociologist who won recognition in the United States for sociology as an academic discipline with professional standards. In 1892 he became the first professor of sociology in the United States, at the University of Chicago, where he organized the first U.S. sociology department. In 1895 he founded, and for the rest of his life edited, the *American Journal of Sociology,* the first U.S. periodical of consequence devoted to the subject.

Through his mother's family, Small was a distant relative of Abraham Lincoln. He received a theological education in New England, studied in Germany for two years, earned a doctorate at Johns Hopkins University in 1889, and from that year to 1892 served as president of Colby College, Waterville, Maine.

With a Chicago colleague, George E. Vincent, Small wrote what is considered the world's first sociology textbook, *An Introduction to the Study of Society* (1894). He called the attention of U.S. scholars to contemporary German-language social theories, particularly those of the Austrian soldier and philosopher Gustav Ratzenhofer, whose ideas strongly influenced Small's *General Sociology* (1905).

Small's own strictly sociological theories and methods soon became obsolete, but he had a more lasting effect on political and economic thought. In political science his conception of the state as a mediator of conflicting group interests was taken up by subsequent writers. The institutional school of economists was influenced by his attack on capitalism, *Between Eras from Capitalism to Democracy* (1913), for which he drew on the ideas of Karl Marx; Thorstein Veblen, the U.S. economist of dynamics analysis, and Werner Sombart, the German sociological economist.

small-headed fly: *see* balloon fly.

small intestine, in most vertebrates, a long, narrow, folded or coiled tube extending from the stomach to the large intestine; it is the region where most digestion and absorption of food takes place. In man it is about 6.7 to 7.6 metres (22 to 25 feet) long, highly convoluted, and contained in the central and lower abdominal cavity. A thin membranous material, the mesentery, supports and somewhat suspends the intestines. The mesentery contains areas of fat that help retain heat in the organs, as well as an extensive web of blood vessels. Nerves lead to the small intestine from two divisions of the autonomic nervous system: parasympathetic nerves initiate muscular contractions (peristalsis) that move food along the tract; and sympathetic nerves suppress intestinal movements.

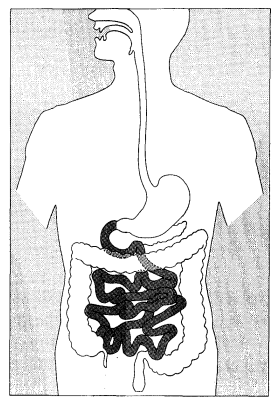
In humans and other mammals, three successive regions of the small intestine are customarily distinguished: duodenum, jejunum, and ileum. These regions form one continuous tube, and, although each area exhibits certain characteristic differences, there are no distinctly marked separations between them. The first area, the duodenum, is adjacent to the stomach; it is only 25 to 30 centimetres (10 to 12 inches) long, has the widest diameter, and is not supported by the mesentery. Ducts from the liver, gallbladder, and pancreas enter the duodenum to provide juices that neutralize acids coming from the stomach and help digest proteins, carbohydrates, and fats. The second region, the jejunum, in the central section of the abdomen, comprises about two-fifths of the remaining tract. The colour of the jejunum is deep red because of its extensive blood supply; its peristaltic movements are rapid and vigorous, and there is little fat in the mesentery that supports this region. The ileum is located in the lower abdomen. Its walls are narrower and thinner than in the previous section, blood supply is more limited, peristaltic movements are slower, and the mesentery has more fatty areas.

The mucous membrane lining the intestinal wall of the small intestine is thrown into transverse folds called plicae circulares (*see* plica circularis), and in higher vertebrates minute fingerlike projections known as villi (*see* villus) project into the cavity. These structures greatly increase the area of the secreting and absorbing surface.

The walls of the small intestine house numerous microscopic glands. Secretions from Brunner's glands, in the submucosa of the duodenum, function principally to protect the intestinal walls from gastric juices. Lieberkühn glands, occupying the mucous membrane, secrete digestive enzymes, provide outlet ports for Brunner's glands, and produce cells that replace surface-membrane cells shed from the tips of villi.

Peristaltic waves move materials undergoing digestion through the small intestine, while churning movements called rhythmic segmentation mechanically break up these materials; mix them thoroughly with digestive enzymes from the pancreas, liver, and intestinal wall; and bring them in contact with the absorbing surface.

In humans, passage of food through the small intestine normally takes from three to six hours. Such afflictions as inflammation (enteritis), deformity (diverticulosis), and functional obstruction may impede passage.



Small intestine

For a depiction of the small intestine in human anatomy, shown in relation to other parts of the body, *see* the colour Trans-Vision in the PROPAEDIA: Part Four, Section 421.

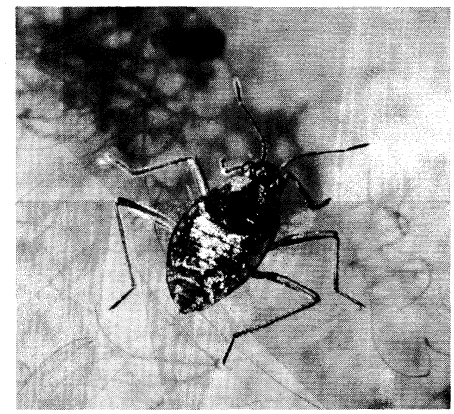
smallage (*Apium graveolens*), wild celery; strongly scented, erect, biennial herb of the carrot family (Apiaceae, or Umbelliferae) widely distributed in moist places within the temperate zones, and grown for use as a flavour-



Smallage (*Apium graveolens*)
Shunji Watari—EB Inc.

ing similar to celery. In traditional medicine, smallage roots are used as a carminative and its leaf stalks as a soothing tea.

smaller water strider, also called RIPPLE BUG, OR BROAD-SHOULDERED WATER STRIDER (the latter name derives from the fact that the body, widest at the middle or hind legs, tapers to the abdomen, giving the impression



Smaller water strider (*Microvelia californiensis*), nymph
William E. Ferguson

of broad shoulders), any of the approximately 300 species of the insect family Veliidae (order Heteroptera). Smaller water striders—which may be brown, black, or silvery in colour—occur throughout the world. They are small (usually less than 5 millimetres [0.2 inch] long) and stout-bodied; both long-winged and short-winged or wingless forms exist within a species.

The legs are evenly spaced, except in the genus *Rhagovelia,* which has the middle pair closer to the hind pair. Insects of this genus are often seen running against a rapid current, aided by a fan-shaped arrangement of bristles on its second pair of legs. It can also dive and swim underwater. The genus *Velia* occurs around moderately rapid streams and bogs. *Microvelia,* smaller than *Rhagovelia,* is usually found in swarms along the shore but runs on the water surface when disturbed.

smallpox, also called VARIOLA, one of the world's most dreaded plagues until 1977, when it was declared eradicated. The disease was described as early as 1122 BC in China and is referred to in ancient Sanskrit texts of India. The mummified head of the Egyptian pharaoh Ramses V (died *c.* 1156 BC) bears evidence of the disease.

Smallpox is an acute infectious disease caused by a virus, characterized by fever and, begin-

ning about two days later, an eruption that, after passing through the stages of papule, vesicle, and pustule, dries up, leaving more or less distinct scars. The characteristic eruption may be so profuse as to be confluent, especially on the face, or so scanty that the lesions are missed altogether.

Modifications, both toward fewer lesions and toward their being more superficial, may occur either naturally or because of vaccination that was not recent enough to give complete protection against the disease. With nearly complete vaccinal protection, few lesions will appear; but even if vaccination has been effected many years before, smaller and more superficial lesions are the rule in cases in which an unvaccinated person would have a severe attack. Such superficial lesions are also characteristic of the naturally occurring mild strains of the disease (variola minor).

Besides the characteristic focal eruptions (papule to vesicle to pustule to scab to scar), there is sometimes a toxic eruption during the initial fever, before the appearance of the true smallpox rash. These toxic rashes may be diffuse blushes on trunk or limbs, somewhat suggestive of scarlet fever or measles; they may, on the other hand, be deeper red, with small hemorrhages like fleabites or larger blotches in the skin. The first type of rash is clinically unimportant, but the deep red, hemorrhagic rash occurs in the most severe, usually fatal cases of the disease. Frequently such patients die before the true smallpox rash has time to develop, and the disease is not diagnosed. These cases are not usually sources of infection, however, because smallpox is not infectious until the characteristic focal eruption comes out in the throat and on the skin.

Each case of smallpox arises from contact, direct or indirect, with another case of the disease. There are no natural animal carriers or natural propagation of the virus outside the human body. The virus is very stable and can survive for long periods outside the body. It has survived in bales of cotton for 18 months, so that laundry contaminated by a smallpox patient is a source of infection, and in outbreaks in Europe laundry has often been shown to have spread the disease. The virus can also survive dried in dust, probably for several months, so that terminal disinfection of wards or sickrooms after the removal or death of a patient is important. Most victims are, however, infected by contact with an infected person by inhalation of the virus expelled in the breath or mouth spray.

Despite the hardiness of the virus, smallpox is not a highly infectious disease; a patient does not usually infect more than one or two of his closest contacts. The great danger from the disease is that it can cause very mild attacks in vaccinated persons, and these persons can spread the fatal form of the disease to their contacts without knowing that they themselves have been infected. It is therefore essential in dealing with an outbreak to make thorough enquiry into all possible contacts of patients and to follow these contacts until it is certain they have escaped infection or to isolate them at once if they show any sign of infection.

The smallpox virus exists in one main strain, varida major, and a vaccine prepared from varida major will also protect man against the one or two other closely related strains, such as variola minor, which causes a much milder form of the disease. The availability of one single-type vaccine against all forms of clinical smallpox, combined with the absence of any reservoir of smallpox virus in nature, made possible the attempt by the World Health Organization to eradicate smallpox from the world. This immense project involved following all contacts of every case of smallpox and vaccinating them in time, in order to prevent the spread of infection. The project is believed to have been successful. Smallpox is estimated to have caused 2,000,000 deaths in 1967. No cases were reported from 1977 to 1980, with the exception of two cases in England in 1978 whose source was virus in a laboratory. Routine smallpox vaccination has been discontinued in most countries, and the virus is to be kept in not more than four laboratories throughout the world, ready to make vaccine should it ever again be necessary.

Smalls, Robert (b. April 5, 1839, Beaufort, S.C., U.S.—d. Feb. 22, 1915, Beaufort), Negro slave who became a naval hero for the Union in the U.S. Civil War (1861–65) and went on to serve as a congressman from South Carolina during Reconstruction (1865–77).

The son of plantation slaves, Smalls was taken by his master in 1851 to Charleston, S.C., where he worked as a hotel waiter, hack driver, and rigger. Impressed into the Confederate Navy at the outbreak of the war, he was forced to serve as wheelman aboard the armed frigate "Planter." On May 13, 1862, he and 12 other slaves seized control of the ship in Charleston harbour and succeeded in turning it over to a Union naval squadron blockading the city. This exploit brought Smalls great fame throughout the North. He continued to serve as a pilot on the "Planter" and became the ship's captain in 1863.

After the war, Smalls rose rapidly in politics, despite his limited education. From 1868 to 1870 he served in the South Carolina House of Representatives and from 1871 to 1874 in the state senate. He was elected to the U.S. Congress (1875–79, 1881–87), where his outstanding political action was support of a bill that would have required equal accommodations for both races on interstate conveyances. In 1877, however, he was convicted of having taken a $5,000 bribe while in the state senate; sentenced to three years in prison, he was pardoned by the governor. In 1895 he delivered a moving speech before the South Carolina constitutional convention in a gallant but futile attempt to prevent the virtual disenfranchisement of blacks.



Smalls

By courtesy of the Library of Congress, Washington, D.C.

A political moderate, Smalls spent his last years in Beaufort, where he served as port collector (1889–93, 1897–1913).

smaltite, a cobalt-rich, arsenic-poor member of a series of cobalt nickel arsenide minerals (*see* skutterudite).

Sman-bla (Buddha): *see* Bhaiṣajyaguru.

Smart, Christopher (b. April 11, 1722, Shipbourne, Kent, Eng.—d. May 21, 1771, London), English religious poet, best known for *A Song to David* (1763), in praise of the author of the Psalms, notable for flashes of childlike penetration and vivid imagination. In some respects his work anticipated that of William Blake and John Clare.

After his education at the University of Cambridge, Smart was elected a fellow of Pembroke Hall (1745), but at about the age of 27 he became a hack writer in London. Three times confined for madness (a mild religious mania), his strange yet engaging personality won such friends as Samuel Johnson, actor-manager David Garrick, playwright Oliver Goldsmith, and both Dr. Charles Burney, the musicologist, and his daughter, Fanny, the novelist. Smart died in a debtor's prison.



Smart, oil painting by an unknown artist, *c.* 1745; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

To make the best use of the Britannica, consult the INDEX *first*

smart bomb, also called SMART MISSILE, bomb with a guidance system that directs its path toward a target. Fins or wings on the bomb have control surfaces which move in response to guidance commands. Guidance systems can be electro-optical, laser, or infrared. They typically are mounted in the nose of the weapon. In the electro-optical system, sensors send pictures of the target area to a member of the aircrew, who then locks the weapon onto the target or actively guides it all the way to impact. Laser-guided weapons follow reflections of a laser beam trained on the target from another source, such as a ground force unit, releasing aircraft, or another target-control aircraft. Infrared guidance responds to the heat generated by the target. More sophisticated versions of these weapons are called smart missiles. Smart bombs or missiles such as the Walleye were extensively used in the Vietnam War to give pinpoint bombing accuracy. The Walleye designation applies to three models of unpowered glide bombs with television guidance.

Smart bombs and missiles allow smaller planes and smaller numbers of planes to make successful attacks on clearly defined targets. These targets can be destroyed using fewer and larger explosive warheads than would be the case in the "scatter" or "carpet" bombing techniques of World War II. Also, launching aircraft are less vulnerable to anti-aircraft fire than they would be in low-altitude or dive bombing runs, otherwise necessary for sufficient accuracy. *See also* missile.

Smārta sect, orthodox Hindu sect composed of members of the "twice-born," or initiated upper classes (Brahman, Kshattriya, and Vaiśya), whose primarily Brahman followers are characterized by their allegiance to all the gods of the Hindu pantheon and by their adherence to rules of ritual and of conduct laid down in the ancient *sūtra* texts.

The name Smārta comes from the Sanskrit *Smṛti,* a class of texts that are considered to be of human authorship—in contrast to the Vedas, which are considered to have been divinely revealed. The *sūtras* (brief aphorisms) followed by the Smārta sect form part of the

Smṛti literature. Their greatest teacher and, according to some, the founder of the sect was the 8th-century philosopher Śaṅkara, the proponent of Advaita (nondualist) Vedānta. The monastery he founded at Sringeri, in Karnataka (formerly Mysore state), continues to be the centre of the sect, and the head of the monastery, the *jagadguru* ("teacher of the world"), is the spiritual authority of the Smārtas in south India and Gujarāt and one of the chief religious personages in India.

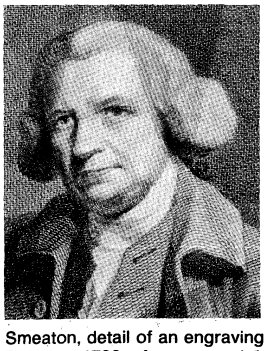
The Smārtas of the North differ somewhat from their counterparts in the South and in Gujarāt, in that the nomenclature does not necessarily connote followers of Śaṅkara. Also the number of pure Smārta temples are fewer in the North.

The Smārtas may give preference to one deity above the others, and Śiva is highly favoured among them today. But they pay allegiance in their worship to the five major gods—Śiva, Vishnu, Śakti, Sūrya, and Gaṇeśa—in the *pañcāyatana pūjā* ("five-shrines worship").

Smārta Brahmans consider themselves orthodox and have tended to rigidly hold the traditional values of Hinduism. They are active in all branches of learning and have earned the honorary title of *śāstrī* (Sanskrit: "men of learning"), or, in Tamil, *ayyar,* which often follows their names.

Smeaton, John (b. June 8, 1724, Austhorpe, Yorkshire, Eng.—d. Oct. 28, 1792, Austhorpe), English engineer noted for his all-masonry lighthouse on Eddystone reef off Plymouth, Devon, and as the founder of the civil-engineering profession in Great Britain.

Smeaton learned mathematical instrument making in London, where his scientific papers led to his election to the Royal Society in 1753. Smeaton visited the Low Countries during 1754, studying canals, harbours, and mills; the tour was the turning point in his career. In 1756–59 he built the third Eddystone Lighthouse, using dovetailed blocks of portland stone to withstand the pounding of the waves; this technique became standard for such wave-swept structures. While planning



Smeaton, detail of an engraving by W. Bromley, 1798, after a portrait by J. Brown

By courtesy of the Science Museum, London

the lighthouse, he discovered the best mortar for underwater construction to be limestone with a high proportion of clay, and thus he was the first to recognize what constitutes a hydraulic lime.

Smeaton also constructed the Forth and Clyde Canal in Scotland, which opened a waterway between the Atlantic and the North Sea; built bridges at Perth, Banff, and Coldstream, Scot.; and completed the harbour at Ramsgate, Kent.

Smeaton took a leading part in the transition from wind-and-water to steam power. He introduced cast-iron shafts and gearing into windmills and water mills, receiving the Royal Society's Copley Medal for *An Experimental Enquiry Concerning the Natural Powers of Water and Wind to Turn Mills* (1759).

Owing to his improvements, the Newcomen atmospheric steam engine achieved its maximum performance. He designed large atmospheric pumping engines for Long Benton colliery in Northumberland, Chacewater mine in Cornwall, and the docks of Kronshtadt in Russia. He also improved the safety of the diving bell by fitting an air pump to the bell.

Smeaton founded the Society of Civil Engineers in 1771. In 1791 he wrote *Narrative of the Building . . . of the Eddystone Lighthouse.*

smell, also called OLFACTION, the detection and identification by sensory organs of airborne chemicals. The concept of smell, as it applies to humans, becomes less distinct when invertebrates and lower vertebrates (fish and amphibians) are considered, because many lower animals detect chemicals in the environment by means of receptors in various locations on the body, and no invertebrate possesses a chemoreceptive structure resembling the vertebrate nasal cavity. For this reason, many authorities prefer to regard smell as distance chemoreception and taste as contact chemoreception.

Olfaction by air-breathing vertebrates depends primarily on chemically sensitive nerves with endings in the lining (epithelium) of the nasal cavity. Mammals such as carnivores, which rely heavily on the sense of smell for locating food or for warning against predators, have intricately curled turbinal bones (which support the nasal epithelium), providing greater surface area, thus increasing olfactory sensitivity.

In addition to the nasal epithelium, Jacobson's organ, located in the roof of the mouth, also serves for chemoreception in some animals. *See also* chemoreception; nose; perception.

Smellie, William (b. 1697, Lanark, Lanark, Scot.—d. March 5, 1763, Lanark), Scottish obstetrician who was the first to teach obstetrics and midwifery on a scientific basis.

After 20 years of village practice Smellie went to London to give obstetrical lecture-demonstrations to midwives and medical students. He delivered poor women free of charge if his students were allowed to attend the delivery, thus establishing a trend toward the attendance of medically trained persons at childbirth.

Smellie invented an obstetric forceps but is best known for his description of "the mechanism of labour," or how the infant's head adapts to changes in the pelvic canal during birth.

Smellie wrote *A Set of Anatomical Tables* (1754) and *Treatise on the Theory and Practice of Midwifery,* 3 vol. (1752–64).

Smellie, William (b. 1740, Edinburgh—d. June 24, 1795, Edinburgh), Scottish compiler of the first edition of the *Encyclopædia Britannica* (1768–71) and a distinguished natural historian.

The son of a master builder and stonemason, Smellie left his grammar school at the age of 12 to be an apprenticed printer. Because the printing shop was near the university and because Smellie was an able boy, he



Smellie, detail of a portrait by an unknown artist

was allowed to attend some lectures; thus he continued to learn and to keep in touch with eminent scholars and rising contemporaries. Two years before his apprenticeship ended, he was made a corrector of the press, a responsible position combining subeditorial duties with constant contact with authors and the seeing of their work through the press. He also won for his firm the Edinburgh Philosophical Society's prize for the most accurately printed edition of a Latin text.

Smellie became a master printer in 1765 and, at about that time, received a letter from the engraver Andrew Bell, asking him to take on responsibility for "fifteen capital sciences" and "likewise to prepare the whole work [the *Encyclopaedia Britannica*] for the press." For £200, Smellie took hold of the project and with "a pair of scissars," much industry, and considerable editorial acumen produced a synthesis of current knowledge.

As early as 1760 Smellie was a founder of the Newtonian Society for mutual improvement. In 1765 he won a gold medal for a dissertation on the sexes of plants, opposing the views of the Swedish botanist Carolus Linnaeus. In 1780 he helped to found the Society of Antiquaries of Scotland, and in 1781 he became keeper and superintendent of the Edinburgh Museum of Natural History. He translated the Count de Buffon's famous *Natural History,* 9 vol. (1781), wrote a distinguished work, *The Philosophy of Natural History,* 2 vol. (1790–99), and was made secretary of the Society of Scottish Antiquaries. But he was not solemn. His friend the poet Robert Burns wrote of him ("Crochallan"):

> Crochallan came:
> The old cock'd hat, the brown surtout the same,
> His grisly beard just bristling in its might
> ('Twas four long nights and days to shaving-night):
> His uncomb'd, hoary locks, wild-staring, thatch'd
> A head for thought profound and clear unmatch'd;
> Yet, tho his caustic wit was biting rude,
> His heart was warm, benevolent, and good.

Smelser, Neil Joseph (b. July 22, 1930, Kahoka, Mo., U.S.), American sociologist noted for work on the application of sociological theory to the study of economic institutions, collective behaviour, social change, and personality and social structure.

Smelser was a Rhodes scholar at the University of Oxford from 1952 to 1954 and received his Ph.D. from Harvard University in 1958. He also studied at the San Francisco Psychoanalytic Institute and joined the University of California at Berkeley faculty, becoming a full professor of sociology in 1962. He was made associate director of the Institute for International Relations (1969–73, 1980–81).

Besides serving on numerous national sociological-research boards and associations, he published his sociological theories in such work as *Economy and Society* (1956; with Talcott Parsons), *Social Change in the Industrial Revolution* (1959), *Theory of Collective Behavior* (1962), *The Sociology of Economic Life* (1963; 2nd ed. 1975), *Essays in Sociological Explanation* (1968), *Sociological Theory: A Contemporary View* (1971), *Comparative Methods in the Social Sciences* (1976), and *The Changing Academic Market* (1980; with Robin Content).

smelt, any of certain silvery, chiefly marine food fishes, family Osmeridae, closely related to salmon and trout and found in cold northern waters. Smelts, like trout, have a small, adipose (fleshy) fin. They are slender carnivores and spawn short distances upstream, in the surf or in ponds.

The American smelt (*Osmerus mordax*) has been introduced from the Atlantic Ocean to the Great Lakes and supports a sizable commercial fishery. The largest smelt, about 37.5 cm (15 inches) long, spawns in late winter or spring, its sticky eggs adhering to objects they touch. The European smelt (*O. eperlanus*) is similar.

Among related Pacific species are the rainbow herring (*O. dentex*), surf smelt (*Hypomesus pretiosus*), capelin (*Mallotus villosus*), and eulachon, or candlefish (*Thaleichthys pacificus*), a fish that at spawning time is so oily that it can be dried and burned as a candle.

The silversides (*q.v.*) and other unrelated fishes are sometimes also called smelts.

smelting, process by which a metal is obtained, either as the element or as a simple compound, from its ore by heating beyond the melting point, ordinarily in the presence of oxidizing agents, such as air, or reducing agents, such as coke. The first metal to be smelted in the ancient Middle East was probably copper (by 5000 BC), followed by tin, lead, and silver. To achieve the high temperatures required for smelting, furnaces with forced-air draft were developed; for iron, temperatures even higher were required. Smelting thus represented a major technological achievement. Charcoal was the universal fuel until coke was introduced in 18th-century England; meanwhile, the blast furnace had achieved a high state of development.

In modern ore treatment, various preliminary steps are usually carried out before smelting in order to concentrate the metal ore as much as possible. In the smelting process a metal that is combined with oxygen—for example, iron oxide—is heated to a high temperature and the oxide is caused to combine with the carbon in the fuel, escaping as carbon monoxide or carbon dioxide. Other impurities, collectively called gangue, are removed by adding a flux with which they combine to form a slag.

In modern copper smelting, a reverberatory furnace is used; concentrated ore and a flux, commonly limestone, are charged into the top, and molten matte—a compound of copper, iron, and sulfur—and slag are drawn out at the bottom; a second heat treatment, in another (converter) furnace, is necessary to remove the iron from the matte.

Smendes, also called NESBENEBDED (fl. 11th century BC), king of Egypt (1070–44 BC), founder of the 21st dynasty, who permanently established the capital at Tanis, in the northeast Nile delta, while high priests of Amon ruled Thebes and Upper Egypt.

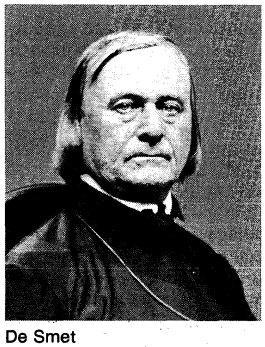
Smendes, a native of the delta, probably secured his right to rule though his queen, Tentamon, who was possibly related to the previous dynasty. Though the high priests of Amon held the real power in Upper Egypt, they recognized Smendes as pharaoh and cooperated with him. Smendes was evidently buried at Tanis, as shown by a piece of his funerary equipment found there.

Smenkhkare (fl. 14th century BC), king of the 18th dynasty of Egypt (reigned 1335–32 BC), probably in coregency with Akhenaton, his predecessor, for most of the period. He moved to Thebes from Akhenaton's capital, Akhetaton (modern Tell el-Amarna), and began restoration of the cult of Amon, the god of Thebes.

As shown by medical and serological analysis of his mummy, Smenkhkare was almost certainly a brother of Tutankhamen, his successor. Akhenaton was certainly, and Tutankhamen was perhaps, a son of Amenhotep III, Akhenaton's predecessor; therefore Smenkhkare was possibly also his son. After the death or downfall of Akhenaton's queen, Smenkhkare was married to Akhenaton's eldest daughter and elevated as coregent. The length of the coregency is a subject of debate, and he may also have had a short independent reign. Some scholars believe that Smenkhkare fashioned a reconciliation with the supporters of Amon, whom his father-in-law had persecuted severely, and restored the Amon cult at Thebes.

Smerdis (6th century BC), the son of Cyrus the Great of Persia and brother of Cambyses. Although he was actually named Bardiya, he was called Smerdis in the writings of Herodotus. According to Darius' account in his inscription at Bisitūn, the true Smerdis was murdered by Cambyses and was later successfully impersonated by Gaumata, a Magian, who seized the throne in 522 BC. Aeschylus and others, however, believed that King Smerdis really was the son of Cyrus. Whoever Smerdis may have been, he did, according to Herodotus, confer great benefits on his subjects, so that his death at the hand of Darius was greatly mourned.

Smet, Pierre-Jean de (b. Jan. 30, 1801, Termonde, Belg.—d. May 23, 1873, St. Louis, Mo., U.S.), Belgian-born Jesuit missionary whose pioneering efforts to Christianize and pacify Indian tribes west of the Mississippi River made him their beloved "Black Robe" and cast him in the role of mediator in the U.S. government's attempt to secure their lands for settlement by whites.



De Smet

By courtesy of the Library of Congress, Washington, D.C.

Arriving in the United States in July 1821, de Smet entered the Jesuit novitiate at White Marsh, Md. With eight companions he went in 1823 to Missouri, where he was ordained priest in 1827. His association with the Roman Catholic St. Louis College (later University) continued throughout his lifetime.

Among the Potawatomi, he founded (1838) his first mission, near present-day Council Bluffs, Iowa. In 1839 he journeyed along the Missouri River to pacify the Yankton Sioux and the Potawatomi, his first recorded negotiation in what was to become a celebrated career as peacemaker. Learning of the friendly Flathead Indians and their desire for a priest, he left in 1840 on the first of his numerous trips to their homeland in the Bitterroot mountain area in Montana Territory. For them he founded St. Mary's Mission, near present Missoula, Mont., in 1841. Between 1842 and 1844 he toured several European countries to solicit funds. In 1844 he helped establish St. Ignatius' Mission, about 30 miles (48 km) north of Missoula.

In midsummer of 1845, de Smet began his yearlong search for the powerful Blackfeet, who had been preying upon the Flatheads and other weaker tribes. By muleback, snowshoe, dog sledge, bateau, and foot, he traveled thousands of tortuous miles to Fort Edmonton, in what is now Alberta, Can. Although his dangerous quest was unsuccessful, the Blackfeet came to him in September 1846, seeking not Christianity but his "great medicine" to help them acquire more enemy scalps and horses. Between sojourns among the Indians, de Smet carried out administrative duties at St. Louis College. Throughout his lifetime he traveled some 180,000 miles (290,000 km), including 16 crossings to Europe. He became a familiar figure in Washington, D.C., and other cities in the United States and abroad, seeking funds and recruits for the college and support for his missions.

As a friend of the Indians, he was persuaded to go to Fort Laramie, in present-day Wyoming, to attend a government-sponsored peace council (1851), where the Plains chiefs granted white men the rights to travel along the main trails and to construct military forts. Abrogation of that treaty paved the way for future Indian uprisings.

As chaplain in the U.S. Army, a disillusioned de Smet accompanied General William S. Harney's punitive mission to Fort Vancouver (in present-day British Columbia) in 1858. He secured the release of the Coeur d'Alenes accused of killing several army officers, and he visited, for the last time, his favourite charges, the Flatheads. He found St. Mary's Mission abandoned; most of those whom he had known were dead and their children victimized by white exploitation. The aging missionary's talent for Indian diplomacy was again utilized by the federal government when, in 1868, he visited Sitting Bull, chief of the Hunkpapa Sioux, through whose Powder River country the United States wanted to build a road to the Montana goldfields. Although Sitting Bull refused to attend the treaty conference, he did send emissaries, who, with other tribal leaders, granted the United States rights to build its road, providing it abandoned its forts. That treaty, too, was violated, but de Smet did not live to see Sitting Bull driven into exile and the last of the nomadic Indians crowded onto reservations.

Included among de Smet's published works are *Western Missions and Missionaries: A Series of Letters* (1863) and *New Indian Sketches* (1865).

BIBLIOGRAPHY. *Life, Letters, and Travels of Father Pierre-Jean de Smet, S.J.*, 4 vol., by H.M. Chittenden and A.T. Richardson, appeared in 1905. A popular biography is John Terrell's *Black Robe: The Life of Pierre-Jean de Smet, Missionary, Explorer and Pioneer* (1964). A concise chronological table is found in Helene Margaret's *Father De Smet, Pioneer Priest of the Rockies* (1940).

Smetana, Bedřich (b. March 2, 1824, Leitomischl [Litomyšl], Bohemia [now in Czechoslovakia]—d. May 12, 1884, Prague), Bohemian composer of operas and symphonic poems, founder of the Czech national school of music. He was the first truly important Bohemian nationalist composer.

Smetana studied music under his father, an amateur violinist. He early took up piano under a professional teacher and performed in public at the age of 6. He continued his studies and later became music teacher to the family of Leopold, Count von Thun. Encouraged by Liszt he opened a piano school in Prague in 1848 and the following year married the pianist Kateřina Kolářová. In 1856 he wrote



Smetana

By courtesy of the Royal College of Music, London

his first symphonic poems and in the same year was appointed conductor of the philharmonic society of Göteborg (Sweden), where he remained until 1861. He then returned to Prague, where he played the leading part in the establishment of the national opera house.

Smetana's first opera, *Braniboři v Čechách* (*The Brandenburgers in Bohemia*), was produced in Prague in 1866. This was followed by the production on May 30, 1866, of his second opera, *Prodaná nevěsta* (*The Bartered Bride*), which later established Smetana's reputation as a distinctively Czech composer. His later operas were less successful. *Dalibor*, written under the influence of Wagner, was performed in 1868. *Libuše*, named after a legendary figure in the history of Prague and intended to celebrate the projected coronation (which never took place) of the emperor Francis Joseph as king of Bohemia, was not produced until 1881. In 1874 Smetana's health began to deteriorate as a result of syphilis. Greatly concerned, he resigned his conductorship of the Prague Opera. He became totally deaf in late 1874, but between that year and 1879 he wrote the cycle of six symphonic poems bearing the collective title *Má vlast* (*My Country*), which includes *Vltava* (*The Moldau*), *Z českých luhů a hájů* (*From Bohemia's Meadows and Forests*), and *Vyšehrad* (the name of a fortress in Prague). From this period also came the string quartet to which he gave the title *Z mého života* (*From My Life*), considered among his finest works; *Hubička* (*The Kiss*), successfully produced in 1876; *Čertova stěna* (*The Devil's Wall*), performed in 1882; and a number of piano solos, including many polkas. Smetana had been, from early in life, a virtuoso performer on the piano, and for many years most of his works were composed for it. Those compositions, augmented by the more mature piano pieces of his difficult last years, constitute an important body of piano literature. Following attacks of depression and symptoms of mental instability, Smetana entered an asylum at Prague and died there.

The Smetana Society, founded in Prague in 1931, maintains a museum containing the composer's manuscripts and sponsors the publication and performance of his works. Smetana's works, notably *The Bartered Bride*, *My Country*, and the piano trio, continue to be performed throughout the world.

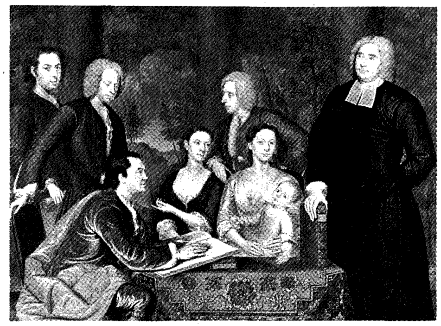
Smetona, Antanas (b. Aug. 10, 1874, Ukmergė District, Lithuania, Russian Empire—d. Jan. 9, 1944, Cleveland), Lithuanian statesman and journalist who in 1919 became the first president of Lithuania and later returned to power as an authoritarian head of state for the last 13 years of his country's independence.

After the Russian Revolution of 1905 broke out, Smetona, who had recently graduated from law school (1902), became editor of the first Lithuanian daily newspaper, *Vilniaus Žinios*, and of the Democratic Party's organ, *Lietuvos Ūkininkas;* he was also elected to the presidium of the Vilnius Diet, which proclaimed Lithuanian autonomy within the Russian Empire (1905). Although the intensity of political activity declined after the revolution was suppressed, Smetona continued his journalistic career, editing the journal *Viltis* (1907–13) and founding *Vairas* (1913), which later became the organ of the Nationalist Party.

During the German military occupation of the country in World War I, Smetona was unanimously elected president (in September 1917) of the Lietuvos Taryba, or Council of Lithuania, and, after the Taryba proclaimed Lithuania's independence (1918), he served as provisional president of the republic (April 1919–June 1920). In 1921 he served as chairman of the Lithuanian delegation at Riga for the settlement of the Latvian–Lithuanian boundary dispute.

After the military coup d'état of Dec. 16–17, 1926, organized by a right-wing Nationalist group and backed by the Christian Democrats, Smetona was again elected president of the Lithuanian Republic. He was reelected in 1931 and in 1938. On June 15, 1940, when Lithuania was occupied by Soviet forces, he fled to Germany and thence, in March 1941, to the United States.

Smibert, John, Smibert also spelled SMYBERT (b. April 2, 1688, Edinburgh—d. March 2, 1751, Boston), Scottish-born painter and architect who established a tradition of colonial portraiture in Boston largely based on the late-Baroque style of Sir Godfrey Kneller.

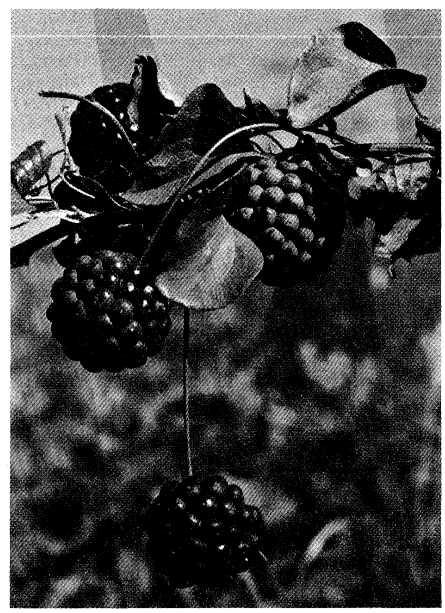


"The Bermuda Group: Dean George Berkeley and His Family," oil painting by Smibert (whose self-portrait appears in upper left), 1729; in Yale University Art Gallery

By courtesy of Yale University Art Gallery, Gift of Isaac Lothrop

Smibert was apprenticed to a house painter in Edinburgh and in 1709 went to London, where he worked for 19 years, except for a three-year visit to Italy. In 1728 he accompanied George Berkeley to Rhode Island as prospective professor of fine arts in the college for Indians that Berkeley hoped to establish in Bermuda. When this project failed, he went in 1730 to Boston, where he spent the rest of his life. He painted many prominent Bostonians but had to supplement his income by keeping a shop, where he sold art supplies and prints. His collection of copies of paintings by old masters and casts of ancient sculpture was unique in colonial America. It influenced the development of several later artists, notably Copley, Feke, Trumbull, and Allston. In 1742 he drew the plans for Faneuil Hall, Boston.

Smilax, genus of plants in the family Smilacaceae, consisting of about 300 species of woody or herbaceous vines, variously known as catbriers and greenbriers, native to tropical and temperate parts of the world. The stems of many species are covered with prickles; the lower leaves are scalelike; and the leathery upper leaves have untoothed blades with three to nine large veins. The white or yellow-green male and female flowers are borne on separate plants. The fruit is a red or bluish-black berry.



Smilax

Mildred Glueck from Root Resources—EB Inc.

Young shoots of *S. aspera* are edible. Carrion flower (*S. herbacea*) and common catbrier (*S. rotundifolia*) of eastern North America are sometimes cultivated to form impenetrable thickets.

Smiles, Samuel (b. Dec. 23, 1812, Haddington, Berwickshire, Scot.—d. April 16, 1904, London), Scottish author best known for his didactic work *Self-Help* (1859), which, with its successors, *Character* (1871), *Thrift* (1875), and *Duty* (1880), enshrined the basic Victorian values associated with the "gospel of work."

One of 11 children left fatherless in 1832, Smiles learned the meaning of self-reliance. Although he qualified in medicine at Edinburgh in 1832, he soon abandoned medical practice for journalism, moving to Leeds, where from 1838 to 1842 he edited the progressive and reformist *Leeds Times*. His radicalism was a practical application of the doctrines of the utilitarian philosophers ("philosophical radicals") Jeremy Bentham and James Mill. He was a zealous advocate of material progress based on individual enterprise and free trade.



Smiles, oil painting by Sir George Reid; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

From 1845 to 1866 he was engaged in railway administration, and in 1857 he published a life of the inventor and founder of the railways, George Stephenson. He followed this with *Self-Help, with Illustrations of Character and Conduct,* the outcome of a series of lectures on self-improvement given to young men in Leeds; 250,000 copies had been sold by the end of the century, and it was widely translated. Smiles wrote many other books, including *Lives of the Engineers* (3 vol., 1861–62; 5 vol., enlarged ed., 1874), a pioneer study in economic history; and an *Autobiography* (ed. by T. Mackay, 1905).

Smilodon, extinct genus of large carnivores known collectively by the common name sabre-toothed cat (*q.v.*).

smith: *see* blacksmith.

Smith, A(rthur) J(ames) M(arshall) (b. Nov. 8, 1902, Montreal—d. Nov. 21, 1980, East Lansing, Mich.) Canadian poet, anthologist, and critic who was a leader in the revival of Canadian poetry of the 1920s.

As an undergraduate at McGill University in Montreal, Smith founded and edited the *McGill Fortnightly Review* (1925–27), the first literary magazine dedicated to freeing Canadian literature from its narrow provincialism. He encouraged other young Canadian writers

to become cosmopolitan in their outlook and to set high literary standards. After receiving his Ph.D. from the University of Edinburgh in 1932, he taught in the United States, mainly at Michigan State University (1936–72). He became a naturalized U.S. citizen in 1941.

In a series of anthologies beginning with *The Book of Canadian Poetry* (1943), Smith approached Canadian literature in a scholarly manner that set the tone for modern Canadian criticism. Later anthologies include *The Blasted Pine* (1957), a collection of Canadian satiric and invective verse, *Modern Canadian Verse in English and French* (1967), and *The Colonial Century: English-Canadian Writing Before Confederation* (1973). In his own poetry, collected in volumes such as *News of the Phoenix* (1943), *Collected Poems* (1962), and *Poems: New and Collected* (1967), Smith displayed careful craftsmanship.

Smith, Adam (baptized June 5, 1723, Kirkcaldy, Fife, Scot.—d. July 17, 1790, Edinburgh), Scottish social philosopher and political economist best known for his major work, *An Inquiry into the nature and causes of the Wealth of Nations* (1776), the first major work of laissez-faire economics.

A brief account of the life and works of Adam Smith follows; for a full biography, *see* MACROPAEDIA: Smith, Adam.

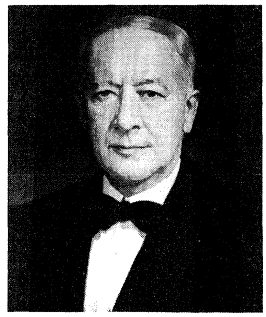
After receiving his elementary education in Kirkcaldy, Smith went to the University of Glasgow in 1737 to study moral philosophy and subsequently studied at Balliol College, Oxford. In 1748 he began delivering public lectures in Edinburgh under the patronage of Lord Kames. Some of these dealt with rhetoric and belles-lettres, but later he took up the subject of "the progress of opulence," and it was then, in his middle or late 20s, that he first expounded the economic philosophy of "the obvious and simple system of natural liberty" which he was later to proclaim to the world. In about 1750 he met David Hume, who became one of the closest of his many friends. Smith was appointed professor of logic (1751) and later of moral philosophy at Glasgow. In 1759 he published *The Theory of Moral Sentiments*, which was on human nature.

From 1764 to 1766 Smith travelled as tutor with the young Duke of Buccleuch. Returning to Kirkcaldy in 1767 he spent much of the next nine years there and in London working on *The Wealth of Nations*. This work contained, among other things, Smith's famous exposition of the "invisible hand" of competition as guiding an economic system based on individual self-interest. After being appointed commissioner of customs and of salt duties for Scotland in 1777, he went to live in Edinburgh with his mother. He died there in 1790 after a painful illness. He had apparently devoted a considerable part of his income to numerous secret acts of charity.

Shortly before his death Smith had nearly all his manuscripts destroyed. In his last years he seems to have been planning two major treatises, one on the theory and history of law and one on the sciences and arts. The posthumously published *Essays on Philosophical Subjects* (1795) probably contains parts of what would have been the latter treatise.

Smith, Alfred E(manuel), byname AL SMITH (b. Dec. 30, 1873, New York City—d. Oct. 4, 1944, New York City), U.S. politican, four-time Democratic governor of New York and the first Roman Catholic to run for the U.S. presidency (1928).

When his father died, young Smith interrupted his schooling and went to work for seven years at the Fulton fish market in New York City to help support his family. His political career was launched in 1895, when Tammany Hall—the New York City Democratic political organization—appointed him an investigator in the office of the city commissioner of jurors. He then served in the state assembly (1903–15), where his lively intelligence, dedication to the voters of his district, and genial manner won him the powerful office of speaker by 1913. Initially a routine politician, he gained a wider point of view on social issues as a member of a commission investigating factory conditions (1911) and as a delegate to the state constitutional revision committee (1915). Tammany Hall made him sheriff of New York County (1915), and in 1917 he was elected president of the Board of Aldermen of Greater New York.



Alfred E. Smith, oil painting by H.R. Rittenberg, 1945; in the New-York Historical Society collection

By courtesy of the New-York Historical Society

Although few believed Smith had a chance in the gubernatorial race the following year, he was elected by a narrow margin. He proved an extraordinary vote getter, though he lost the governorship in the Republican landslide of 1920. He was again elected governor in 1923 and served three more terms until 1928. As governor he fought for adequate housing, improved factory laws, proper care of the mentally ill, child welfare, and state parks. He effected a reorganization of the state government on a consolidated, businesslike basis and repeatedly demonstrated his leadership by forcing Republican legislatures to accept his recommendations.

Smith was the first Roman Catholic to receive serious consideration as a candidate for the presidency of the U.S. His religion, combined with his opposition to Prohibition, resulted in a prolonged deadlock with William G. McAdoo, the "dry" candidate, at the Democratic National Convention of 1924. Neither candidate was nominated. Four years later, Smith's name was again placed in nomination and he won on the first ballot. A champion of urban America, he carried on an aggressive campaign as the "Happy Warrior" and presented a picturesque figure with his brown derby hat, cigar, and colourful speech as his trademarks and "The Sidewalks of New York" as his theme song. The rural districts of the West and the South combined to ensure his defeat by the conservative Republican, Herbert Hoover.

In later years Smith lost contact with his old following, and in 1936 and 1940 he supported the Republican presidential candidates.

Smith, Bernard, byname FATHER SMITH (b. *c.* 1630, Germany—d. Feb. 18, 1708, London), German-born master organ builder in Restoration England.

Smith was an apprentice of the German organ builder Christian Förmer but adapted easily to the English style of building after his emigration there in 1660. Some years after building an instrument for the Chapel Royal at London, Smith was named king's organ maker (1681). Thereafter he built many important instruments, some of which survive. Much of his pipework was incorporated into later instruments. He was organist at St. Margaret's, Westminster, from 1675.

Smith's organs are considered to have been generally superior in tone to those built by his rival Renatus Harris (*q.v.*), as the tone of Smith's wooden pipes was particularly attractive. Organs built by Harris are, however, considered to have been mechanically superior to Smith's.

Smith was a friend of the composers John Blow and Henry Purcell, whom he consulted in musical matters, and, despite his reputedly poor use of the English language, he was a member of a club founded by the scholar Richard Bentley that included Matthew Locke, Sir Isaac Newton, Sir Christopher Wren, and other outstanding figures of the time.

Smith, Bessie (b. April 15, 1898?, Chattanooga, Tenn., U.S.—d. Sept. 26, 1937, Clarksdale, Miss.), U.S. singer, one of the greatest of blues singers.

Born into a poor black family, she began to sing in childhood and was helped into a professional status of sorts through the patronage of the first of the great blues singers, Ma Rainey. For several years she travelled through the Southern states, learning her craft in the saloons and smaller theatres of Atlanta, Savannah, Birmingham, and Memphis. She was eventually discovered by the pianist-composer Clarence Williams, a representative of Columbia Records, and made her first recording in February 1923.



Bessie Smith

By courtesy of Columbia Records; photograph, Carl Van Vechten

Bessie Smith's subject matter was the classic material of the blues: poverty and oppression, love—mostly unrequited—and stoic acceptance of defeat at the hands of a cruel and indifferent world. The great tragedy of her career was that she outlived the topicality of her idiom. For the last few years of her life her record sales and her fame diminished as social forces changed the face of popular music and bowdlerized the earthy realism of the sentiments she expressed in her music. Her gradually increasing alcoholism caused managements to become wary of engaging her, but there is no evidence that her actual singing ability ever declined.

Bessie Smith became known in her lifetime as the "Empress of the Blues," and some idea of the effect she had on her hearers can be found in the recordings she made of well over 150 songs, usually with small groups and outstanding instrumentalists, including Louis Armstrong, Fletcher Henderson, and Benny Goodman. A bold, supremely confident artist who often disdained the use of a microphone, she was a woman of some physical beauty whose art expressed the frustrations and hopes of a whole generation of black Americans. Her tall figure and upright stance, above all her handsome features, are preserved in a short motion picture, *St. Louis Blues* (1929), banned for its realism and now preserved in the Museum of Modern Art, New York City. She died from injuries sustained in a road accident. It was said that, had she been white, she would have received earlier medical treatment, thus saving her life, and Edward Albee made this the subject of his play *The Death of*

Bessie Smith (1960). *Bessie*, a biography by Chris Albertson, was published in 1972.

Smith, Sir Charles Edward Kingsford (aviator): *see* Kingsford Smith, Sir Charles Edward.

Smith, Charlotte, *née* TURNER (b. May 4, 1749, London—d. Oct. 28, 1806, Tilford, near Farnham, Surrey, Eng.), English novelist and poet, highly praised by the novelist Sir Walter Scott. Her poetic attitude toward nature was



Charlotte Smith, engraving by A. Duncan after a portrait by G. Clint

By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

reminiscent of William Cowper's in celebrating the "ordinary" pleasures of the English countryside; her radical attitudes toward conventional morality (the novel *Desmond* tells of the innocent love of a man for a married woman) and political ideas of class equality (inspired by the French Revolution) gained her notoriety, but her work belongs essentially with that of the derivative 18th-century romantic tradition of women novelists.

Her husband fled to France to escape his creditors. She joined him there, until, thanks largely to her, he was able to return to England. In 1787, however, she left him and began writing to support her 12 children. *Elegiac Sonnets and Other Essays*, which she had published in 1784, had been well received, but because novels promised greater financial rewards, she wrote, after some free translations of French novels, *Emmeline; or, The Orphan of the Castle* (1788) and *Ethelinde; or, The Recluse of the Lake* (1789). *Desmond* appeared in 1792 and was followed by her best work, *The Old Manor-House* (1793). Toward the end of her life, she turned to writing instructive books for children, the best being *Conversations Introducing Poetry for the Use of Children* (1804).

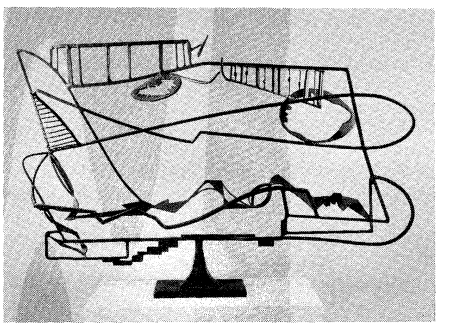
Smith, Cyril Stanley (b. Oct. 4, 1903, Birmingham, Warwickshire, Eng.), U.S. metallurgist who in 1943–44 determined the properties and technology of plutonium and uranium, the essential materials in the atomic bombs that were first exploded in 1945.

Obtaining his education in England and the U.S., Smith became a research associate (1926–27) at the Massachusetts Institute of Technology (MIT), Cambridge, and then spent 15 years with the American Brass Company at Waterbury, Conn., where he organized a research laboratory and carried out numerous projects. He became interested in the history of metallurgy after his marriage to a historian in 1931. He accumulated a library of original source books and, in collaboration with other scholars, made English translations of classics. His book, *A History of Metallography: The Development of Ideas on the Structure of Metals Before 1890* (1960), was based on this work.

In 1942 Smith took a research post in Washington, D.C., with the War Metallurgy Committee of the National Defense Research Committee. The next year he moved to Los Alamos, N.M., to work on the Manhattan Project for developing the atomic bomb and took charge of the exploration of the properties of uranium and plutonium. Smith and his associates also did important work with tungsten carbide and boron.

In 1946 Smith returned to the University of Chicago, becoming head (1946–56) of the Institute for the Study of Metals there. In 1961 he left Chicago for MIT, where he was appointed professor of metallurgy and of the history of technology and science, becoming professor emeritus in 1969. Smith received numerous professional honours, including the Platinum Medal of the Institute of Metals, London (1970) and the Dexter Award of the American Chemical Society (1981).

Smith, David (Roland) (b. March 9, 1906, Decatur, Ind., U.S.—d. May 23, 1965, Albany, N.Y.), U.S. sculptor whose pioneering welded metal sculpture and massive painted geometric forms made him the most original American sculptor to mature after World War



"Hudson River Landscape," steel sculpture by David Smith, 1951; in the Whitney Museum of American Art, New York City

By courtesy of the Whitney Museum of American Art, New York

II and greatly influenced the brightly coloured "primary structures" of Minimal art during the 1960s.

Smith was never trained as a sculptor, but he learned to work with metal in 1925, when he was briefly employed as a rivetter at the Studebaker automobile plant in South Bend, Ind. Dropping out of college after his first year, he moved to New York City and, while working variously as a taxi driver, salesman, and carpenter, studied painting under John Sloan and the Czech abstract painter Jan Matulka.

Smith's sculpture grew out of his early abstract paintings of urban scenes, reminiscent of the work of his friend Stuart Davis. Experimenting with texture, he began to attach bits of wood, metal strips, and found objects to his paintings, until the canvases were reduced to virtual bases supporting sculptural superstructures. Long after he stopped painting, his sculpture continued to betray its pictorial origins: his overriding concern with the interplay of two-dimensional planes and the articulation of their surfaces led Smith to abrade or to paint his sculpture while often ignoring the traditional sculptural problems of developing forms in three-dimensional space.

Smith's interest in freestanding sculpture dates from the early 1930s, when he first saw illustrations of the welded metal sculpture of Pablo Picasso and another Spanish sculptor, Julio González. Following their example, Smith became the first U.S. artist to make welded metal sculpture. He found a creative freedom in this technique that, combined with the liberating influence of the Surrealist doctrine that art springs from the spontaneous expression of the unconscious mind, allowed him soon to produce a large body of abstract biomorphic forms remarkable for their erratic inventiveness, their lack of stylistic unity, and their high aesthetic quality.

In 1940 Smith moved to Bolton Landing, N.Y., where he made sculpture during World War II when not assembling locomotives and tanks. For a time after the war, he continued to work in a bewildering profusion of styles, but toward the end of the decade he disciplined his exuberant imagination by making pieces in stylistically unified series. Such series of sculptures were often continued over a period of years concurrently with other series of radically different styles. With the "Albany" series (begun in 1959) and the "Zig" series the following year, Smith's work became completely nonrepresentational. In "Zigs," his most successful Cubist works, he used paint to emphasize the relationships of planes, but in his "Cubi" (begun in 1963), his last great series, Smith set out to make "real objects" that exist in "real space" instead of illusionistic or symbolic objects restricted to aesthetic space defined by the sculpture's base. Unfortunately, his death in an automobile accident curtailed his exploration of this theme.

Smith, Donald Alexander: *see* Strathcona (and Mount Royal), Donald Alexander Smith, 1st Baron.

Smith, Edmund Kirby: *see* Kirby-Smith, Edmund.

Smith, Erminnie Adele Platt, née PLATT (b. April 26, 1836, Marcellus, N.Y., U.S.—d. June 9, 1886, Jersey City, N.J.), U.S. anthropologist who was the first woman to specialize in ethnographic field work.

Smith graduated from the Female Seminary of Troy, N.Y., in 1853. She married Simeon Smith, a Chicago lumber dealer and merchant, in 1855. When her sons were students in Germany, she studied at Strasbourg, Heidelberg, and Freiberg. Smith's early work was in geology, particularly crystallography. In 1876 she founded the Aesthetic Society, an organization that attracted as many as 500 people to parlor meetings on science, literature, and art. At those meetings, Smith learned of the new science of anthropology. In 1880, financed by the Smithsonian Institution, she began to study American Indian ethnology.

Smith devoted her later years to the investigation of the Iroquois Federation. She amassed their legends and also obtained and compiled more than 15,000 words of the Iroquois dialect. She also introduced the technique, widely used by later ethnologists, of training native informants.

Her publications include numerous scientific papers and *Myths of the Iroquois* (1883).

Articles are alphabetized word by word, not letter by letter

Smith, F(rederick) E(dwin): *see* Birkenhead, Frederick Edwin Smith, 1st earl of.

Smith, Father: *see* Smith, Bernard.

Smith, Florence Margaret (poet): *see* Smith, Stevie.

Smith, George (b. March 26, 1840, London—d. Aug. 19, 1876, Aleppo, Syria), British Assyriologist who advanced knowledge of the earliest (Sumerian) period of Mesopotamian civilization with his discovery of one of the most important literary works in Akkadian, the *Epic of Gilgamesh*. Moreover, its description of a flood, strikingly similar to the account in Genesis, had a stunning effect on Smith's generation.

Apprenticed as a bank note engraver at the age of 14, Smith educated himself in the young science of Assyriology and became adept in deciphering the cuneiform tablets from Nineveh that began arriving at the British Museum, London, about 1861. His publication

of several essays on cuneiform characters of uncertain meaning attracted attention, and soon he became an assistant in the museum's department of Oriental antiquities.

While preparing inscriptions for publication, he was startled to find part of a description of a flood. His report of this discovery prompted *The Daily Telegraph* of London to sponsor an expedition to find the missing fragment needed to complete the deluge account. In May 1873, on the fifth day of digging at Nineveh, Smith found the fragment. His *Chaldean Account of Genesis* (1876) became one of the best-selling books of its time.

Smith, George (b. March 19, 1824, London—d. April 6, 1901, Byfleet, near Weybridge, Surrey, Eng.), British publisher, best known for issuing the works of many Victorian writers and for publishing the first edition of the *Dictionary of National Biography.*

Smith's father, also named George Smith (1789–1846), learned bookselling in his native Scotland and, after moving to London, joined with another Scot, Alexander Elder, in founding (1816) what became Smith, Elder & Co., booksellers and stationers; in 1819 they also became publishers. The young Smith was born over the shop, came to know the business intimately, and, upon his father's death in 1846, took sole control (Elder and a later third partner having left the firm).

For more than 30 years Smith was the friend and publisher of the novelist and critic John Ruskin, and it was with him that Charlotte Brontë found a publisher for *Jane Eyre.* The firm issued works by Charles Darwin, William Makepeace Thackeray, Robert and Elizabeth Barrett Browning, Wilkie Collins, Matthew Arnold, Harriet Martineau, James Payn, Anthony Trollope, and Mrs. Humphry Ward. In January 1860 the first of George Smith's three great undertakings was begun, the illustrated literary journal *Cornhill Magazine* being issued in that month under the editorship of Thackeray. The second venture was the founding in 1865 of the *Pall Mall Gazette,* a paper described as "written by gentlemen for gentlemen." The third and most important was the publication of the *Dictionary of National Biography,* the first volume of which was issued in 1885, it was completed in 1901, in 66 volumes, and this monumental work was the crowning effort of a successful career.

After 1894 Smith did leave the main control of the business in the hands of his younger son, Alexander Murray Smith (who retired from the partnership in 1899), and his youngest daughter's husband, Reginald John Smith (1857–1916), who from 1899 was sole active partner and who, in 1908, rearranged the original 66 volumes of the *Dictionary of National Biography* into 22. (In 1917 the *Dictionary* was given to the University of Oxford—its supplements to be continued by the Oxford University Press.)

Smith, George Washington (b. *c.* 1820, Philadelphia—d. Feb. 18, 1899, Philadelphia), American dancer, ballet master, and teacher, considered the only male American ballet star of the 19th century.

Smith's talents were developed by studying with various visiting European teachers in his native Philadelphia, then a mecca for theatre and dance. His performing debut was made in 1832, and he soon grew into a versatile dancer, admired for his skills as a technician, actor, partner, and pantomimist.

In 1840 the Viennese ballerina Fanny Elssler and her British partner, ballet master James Silvain, arrived in Philadelphia for a two-year American tour. Smith worked with them, performing one of his most noted roles, that of Harlequin. When they left, Smith used his harlequinade talents and appeared in a pantomime, *Mazulme, or The Black Raven of the Tombs,* a role for which he became noted. Smith's ballet studies continued with the Philadelphian P.H. Hazard, under whom he and Mary Ann Lee became the leading dancers in the first American production of *Giselle,* performed in Boston in 1846. Smith was a choreographer and teacher in his later years.

Smith, Gerrit (b. March 6, 1797, Utica, N.Y., U.S.—d. Dec. 28, 1874, New York City), American reformer and philanthropist who provided financial backing for the antislavery crusader John Brown.

Smith was born into a wealthy family. In about 1828 he became an active worker in the cause of temperance, and in his home village, Peterboro, he built one of the first temperance hotels in the country. He became an Abolitionist in 1835, after witnessing the disruption of an antislavery meeting by a mob in Utica. In 1840 he took a leading part in the organization of the antislavery Liberty Party, and in 1848 and 1852 he was nominated for the presidency by the remnant of this organization that had not been absorbed by the Free Soil Party. In 1852 he was elected to the U.S. House of Representatives as an independent. At the end of the first session in 1854 he resigned his seat.

After becoming an opponent of land monopoly, he gave numerous farms of 50 acres each to indigent families, and he also attempted to colonize tracts in northern New York with free blacks, but this experiment was a failure. Peterboro became a station on the "Underground Railroad"; and after 1850 Smith furnished money for the legal expenses of persons charged with infractions of the Fugitive Slave Law. He became very intimate with John Brown, to whom he gave a farm in Essex County (N.Y.), and from time to time supplied him with funds, though it seems without knowing that any of the money would be employed in an attempt to incite a slave insurrection. Under the excitement following the raid on Harper's Ferry in October 1859, he became temporarily insane, and for several weeks was confined in an asylum in Utica.

He favoured a vigorous prosecution of the Civil War but at its close advocated a mild policy toward the late Confederate States, declaring that part of the guilt of slavery lay upon the North. He even became one of the securities for Jefferson Davis, thereby incurring the resentment of Northern Radical leaders.

Smith, Hamilton Othanel (b. Aug. 23, 1931, New York City), American microbiologist who shared, with Werner Arber and Daniel Nathans, the Nobel Prize for Physiology or Medicine in 1978 for his discovery of a new class of restriction enzymes that recognize specific sequences of nucleotides in a molecule of DNA (deoxyribonucleic acid) and cleave the molecule at a particular point.

Smith graduated from the University of California at Berkeley in 1952 and received a medical degree from Johns Hopkins University in 1956. After internship and residency he joined the faculty of the University of Michigan in 1962. In 1967 he returned to Johns Hopkins, becoming professor of microbiology in 1973.

Although Arber and others had already studied restriction enzymes, these scientists cleaved DNA molecules at unpredictable points. While studying the mechanism whereby the bacterium *Haemophilus influenzae* is able to take up DNA from the phage virus P22, Smith and his colleagues discovered the first of what came to be called type II restriction enzymes, whose predictable behaviour make them valuable tools in the study of DNA structure and in recombinant DNA technology.

Smith, Sir Harry (George Wakelyn), BARONET (b. June 28, 1787, Whittlesey, Isle of Ely, Eng.—d. Oct. 12, 1860, London), British general, governor of Cape Colony and high commissioner in South Africa from 1847 to 1852.

Smith began his career in the army as an ensign in 1805 and served with distinction in South America (1807) and, during the Napoleonic Wars, in Spain (1808–14). In the



Sir Harry Smith, detail of a miniature attributed to Hugh Ross; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

War of 1812 Smith was with the British forces that captured and burned Washington, D.C. He returned to Europe in time to be active in the Waterloo campaign.

After military duties in England and Jamaica, he was transferred to Cape Colony (1828) and participated in the Cape Frontier War of 1834–35, during which he made a historic ride from Cape Town to Grahamstown, covering 600 miles in six days to allay the fears of colonists exposed to attack. With the rank of general, Smith was sent to India (1840), where he fought the Sikhs in 1845 and 1846. He won renown at the Battle of Aliwal (Jan. 28, 1846) by leading the final charge in person.

Smith was created a baronet and promoted to major general, and he was sent back to the Cape in December 1847 as governor and high commissioner. When he annexed the territory called the Orange River Sovereignty, the Boers' leader, Andries Pretorius, raised a Boer force. With characteristic vigour, Smith attacked and defeated the Boers at Boomplaats (Aug. 29, 1848). Dissatisfaction with Smith's precipitate manner and with his handling of the costly Cape Frontier War of 1850–53 resulted in his being recalled in March 1852 to Britain, where he held various military posts until his death.

Smith, Hoke (b. Sept. 2, 1855, Newton, N.C., U.S.—d. Nov. 27, 1931, Atlanta, Ga.), legislator, U.S. secretary of the interior (1893–96), and progressive figure in Georgia politics.

Admitted to the bar in 1873, Smith practiced law in Atlanta and became active in local Democratic politics. He published the *Atlanta Journal* (1887–1900), which he used as a forum to champion virtually all progressive measures of the period, with the notable exception of civil rights for blacks.

In 1893 he was appointed secretary of the interior by Pres. Grover Cleveland. During his three years in that post, he proved a capable administrator. It was at Smith's urging that Congress created the National Forest Commission, its members selected by the National Academy of Sciences, to determine the status of American forests in 1896. In that year Smith resigned from the Cabinet to support the presidential campaign of William Jennings Bryan.

As governor of Georgia (1907–09) Smith improved education, transportation, and prison conditions. After an unsuccessful bid for his party's nomination in 1908, he was reelected to the governorship in 1910 but resigned early in his second term to fill a vacant seat in the U.S. Senate. Hoke continued to promote

progressive legislation as a senator (1911–21); he joined conservatives, however, in opposing U.S. participation in the League of Nations.

Smith, Ian (Douglas) (b. April 8, 1919, Selukwe, Rhodesia), first native-born prime minister of the British colony of Southern Rhodesia and ardent advocate of white rule, who on Nov. 11, 1965, declared Rhodesia's independence and its subsequent withdrawal from the British Commonwealth.



Ian Smith
Marion Kaplan

Smith, the son of a farmer who had emigrated from Scotland, attended local schools and entered Rhodes University in Grahamstown, S.Af. He interrupted his studies in 1939 to join the Royal Air Force, and as a fighter pilot in World War II he was shot down twice: the first time, his wounds required plastic surgery; the second time, he was brought down behind the German lines in Italy, where he continued to fight on the ground.

After completing his work at the university, Smith entered politics in 1948. As a member of the opposition Liberals, he was elected to the Southern Rhodesian Assembly. He abandoned the Liberals, however, and joined the governing Federal Party when the Federation of Rhodesia and Nyasaland was formed in 1953. By 1958 Smith had become chief government whip for Sir Roy Welensky, then prime minister, but when the Federalists supported a new constitution allowing greater representation for black Africans in Parliament, Smith founded the Rhodesian Front (1961) and attracted white-supremacist support. Smith maintained that "the white man is the master of Rhodesia. He has built it and intends to keep it." Promising independence from Britain with a government based upon a white minority, his party won a surprise victory in the election of 1962.

When in April 1964 Smith became prime minister of Southern Rhodesia (the Federation had been dissolved in 1963), his first official act was to authorize the arrest and banishment of four black African nationalists. The disorders that followed were suppressed with police action. When the Commonwealth prime ministers' conference met in July 1964, Smith refused to discuss a new constitution that would lead to eventual black-majority rule. Further negotiations with Britain proved futile, and on Nov. 11, 1965, Smith unilaterally declared Rhodesia's independence. In December 1966 the British prime minister, Harold Wilson, met with Smith in fruitless discussions on the future of a Rhodesia where the blacks outnumbered the Europeans 22 to 1. At Britain's request, economic sanctions were applied by the UN Security Council. Smith then severed all ties with the Commonwealth. On March 2, 1970, Rhodesia was declared a republic.

Subsequent efforts to negotiate the differences between Britain and Rhodesia were unsuccessful until 1971, when an agreement was reached under which black Africans would be offered the slender hope of attaining parliamentary parity with whites in 40 to 60 years. When a British investigation commission went to Rhodesia to sound out black opinion of this in January 1972, a violent reaction against the plan greeted them with rioting. Guerrilla activity against the government escalated, led by the Patriotic Front, a coalition of the forces of black nationalists Robert Mugabe and Joshua Nkomo. From 1972 they conducted their activities from bases in Mozambique, and Smith countered with vigorous retaliatory measures with the Rhodesian armed forces. The economy suffered steadily because of the percentage of government funds invested in military support, and the steady increase in guerrilla action was accompanied by a flow of white emigration from Rhodesia.

Smith was compelled finally in 1977 to negotiate with the moderate black leader Bishop Muzorewa, a move that prompted some hard-liners to split from the Rhodesian Front and form the Rhodesian Action Party. A transfer of power in the government to the blacks was initiated in 1978, and Smith was a member of the Transitional Executive Council that oversaw the process. He remained prime minister until May 1979 and then served as minister without portfolio in the black majority government of Zimbabwe-Rhodesia from May to December 1979.

Smith was awarded the Independence Decoration in 1970 and named Grand Commander of the Order of the Legion of Merit of Rhodesia in 1979.

Smith, Jedediah (Strong) (b. June 24, 1798, Bainbridge, N.Y., U.S.—d. May 27, 1831, near Cimarron River), U.S. trader, explorer, and the first American to enter California from the east and return from it using an overland route.

Smith worked on a Lake Erie freighter as a boy, and probably made his first trip west while still in his teens. In 1822 he joined a fur-trading expedition to the Rocky Mountains and continued in the Rocky Mountain trade for the remainder of the decade.

In 1824 Smith belonged to the party that rediscovered the South Pass, a passage to the Northwest through Wyoming. Two years later, he and a trading party (Smith now owned his own trading company) left Great Salt Lake and crossed the Mojave Desert to southern California, becoming the first Americans to enter California from the east.

Blocked by the suspicious Mexican governor of California, Smith altered his plan to go north into Oregon. Instead, in 1827, he journeyed to the American River near Sacramento and then crossed the Sierra Nevada and the desert to return to Great Salt Lake. He thus became the first American to return from California on an overland route.

Later in 1827 he retraced his steps from Great Salt Lake to southern California, but this time Mohave Indians attacked his party and killed 10 of his 18 men. He and the other survivors made it to California, and then in 1828 proceeded north up the coast to Oregon. An attack by the Umpqua Indians slew all but two of the expedition, and Smith retired from the Rocky Mountain trade in 1830. He had succeeded, however, in opening up the coastal route from California to Fort Vancouver on the Columbia River.

In 1831 Smith turned to the Santa Fe trade. In May of that year, however, he was surrounded and killed by Comanche Indians at a water hole near the Cimarron River while en route to Santa Fe.

Smith, John (religious leader): *see* Smyth, John.

Smith, John (baptized Jan. 6, 1580, Willoughby, Lincolnshire, Eng.—d. June 1631, London), English explorer and principal founder of the first permanent English settlement in North America at Jamestown, Va. Smith played an equally important role as a cartographer and a prolific writer who vividly depicted the natural abundance of the New World, whetting the colonizing appetite of prospective English settlers.



John Smith, engraving by Simon van de Passe, 1616
By courtesy of the trustees of the British Museum; photograph, J.R. Freeman & Co. Ltd.

John Smith grew up on his family's farm and was apprenticed in his teens to a wealthy merchant. At the age of 20 his adventuresome spirit found an outlet in the war against the Turks being fought in Hungary. Captured, he escaped to Russia and returned to England in 1604. He then attached himself to a group preparing to establish an English colony in North America. When a royal charter was granted to the Virginia Company of London, Smith and about 100 others set sail on Dec. 20, 1606.

On April 26, 1607, the company arrived at Chesapeake Bay, and on May 14 disembarked at what was to become Jamestown. Smith soon became the leader of the fledgling settlement, focussing particularly on the practical means of survival in the wilderness. He directed the building of houses, traded for corn (maize) with the Indians, and began a series of river voyages that enabled him to draw a remarkably accurate map of Virginia. While exploring the Chickahominy River in December 1607, he was ambushed by Indians of the Powhatan Confederacy and taken to their great chief, Wahunsonacock, known to the settlers as Powhatan. About to be put to death, he was saved (according to his own account) when the chief's 13-year-old daughter, Pocahontas, threw herself between him and his executioners.

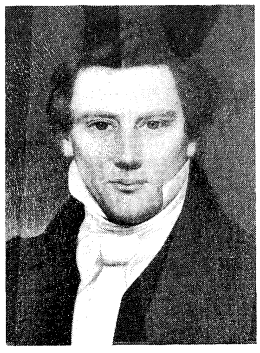
Smith became president of the colony on Sept. 10, 1608. He expanded the fort to form a five-sided enclosure, conducted military training, and continued to secure corn from the Indians when others often failed. Under Smith's direction, small quantities of tar, pitch, and soap ash were made, a well was dug, 20 houses were built, fishing was done regularly, crops were planted, and outlying forts were built. When Smith was injured from a fire in his powder bag (September 1609), he was forced to return to England.

Still eager to explore and settle in America, Smith made contact with the Virginia Company of Plymouth, and sailed in 1614 to the area he named New England, carefully mapping the coast from Penobscot Bay to Cape Cod. On another exploratory voyage the following year, he was captured by pirates and returned penniless to England after escaping three months later. In 1617 he made one final colonizing attempt, but his vessels were windbound for three months, and he never set sail.

Smith wrote and talked about New England for the rest of his life, but he never saw North America again. His writings include *A Description of New England* (1625), a counterpart to his *Map of Virginia with a Description of the Country, . . .* (1612); *The generall Historie of Virginia, New England, and the Summer Isles* (1624); and *The True Travels, Adventures and Observations of Captaine John Smith in Europe, Asia, Africa and America* (1630). Although some of Smith's accounts have been received skeptically, his material was largely corroborated by Bradford Smith in *Captain John Smith, His Life & Legend* (1953), based on contemporary sources.

Smith, Joseph (b. Dec. 23, 1805, Sharon, Vt., U.S.—d. June 27, 1844, Carthage, Ill.), American prophet whose revealed writings, along with the Bible, provide the theological foundation of the Church of Jesus Christ of Latter-day Saints (Mormons).

Smith grew up in western New York at a time of intense religious revivalism. He was a literate but unschooled lad from a large



Joseph Smith, detail from an oil painting by an unknown artist; in the Heritage Hall Museum, the Auditorium, Independence, Mo.

By courtesy of the Reorganized Church of Jesus Christ of Latter Day Saints, Independence, Mo.

family, and his neighbours at Palmyra, N.Y., remembered him as a diviner who dug for buried treasure. One day in the woods, at the age of 14, Joseph Smith experienced what he conceived to be an intense spiritual revelation of God and Jesus Christ. In 1827 he claimed that an angel had directed him to buried golden plates containing a history of the American Indians that described them as descendants of Hebrews who centuries earlier had sailed to North America by way of the Pacific. This *Book of Mormon* he translated from "reformed Egyptian" with the aid of special stones that he called the Urim and Thummim. Published in 1830, the book was offered by him as scientific evidence of his divine calling. Most non-Mormon scholars, however, regard the book as a collection of local legends of Indian origin, fragments of autobiography, and current religious and political controversies (especially that connected with the Anti-Masonic movement), all transformed with remarkable ingenuity into a religious document.

Smith claimed that the church that he organized on April 6, 1830, at Fayette, N.Y., restored the ancient, primitive Christian religion. The converts whom it attracted during the next decade followed him from New York to Ohio, Missouri, and Illinois. But they were forced to press continually westward in search of economic opportunity and freedom from persecution. Their successive neighbours were suspicious of the unorthodox cooperative society ruled by an ecclesiastical oligarchy.

Non-Mormons were hostile toward the rumoured practice of polygyny. Although Smith's revelation on this subject was not made public until 1852, nor is it supported in the *Book of Mormon,* there is evidence that he may have married as many as 50 wives. Publicly, however, he acknowledged only his first, Emma Hale Smith, who bore him nine children.

The young prophet governed his people by announcing periodic revelations on widely divergent matters. He combined elements of Jewish and Christian mysticism with the goal of perpetual prosperity and sought to establish Mormonism as a complete way of life.

In 1839 Smith finally led his flock to Commerce, Ill., which he renamed Nauvoo. Mormon faithful quickly followed, and the population soon reached 20,000, making it the largest city in Illinois. With rival Democrats and Whigs both hoping to win the Mormon vote, the city was granted a liberal charter by the state. Smith served as its mayor and commanded the Nauvoo Legion, a part of the state militia, gaining a reputation as one of the West's most illustrious citizens.

In February 1844, when he announced his candidacy for the U.S. presidency, however, suspicion and rivalry began to close in upon him. A handful of Mormon dissenters attacked him in their opposition newspaper on grounds of polygyny and political ambition. Smith thereupon ordered their press destroyed. Threats of mob violence followed. After the prophet called out troops to protect Nauvoo, he was charged with treason and imprisoned, along with his brother Hyrum, in the Carthage city jail. Despite promises of protection from the governor, Thomas Ford, a mob of armed men with blackened faces stormed the jail on June 27 and murdered the brothers.

Smith was thus elevated to martyrdom. His church was divided, the majority, led by Brigham Young, migrating to Great Salt Lake in Utah. A smaller group, which settled in Independence, Mo., was led by the eldest of Smith's four surviving sons. In addition to the *Book of Mormon,* the Latter-day Saints also use as scriptural sources Smith's *Doctrine and Covenants* (1835) and *The Pearl of Great Price* (1842).

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Smith, Joseph (b. Nov. 6, 1832, Kirtland, Ohio, U.S.—d. Dec. 10, 1914, Independence, Mo.), American religious leader, first president of the Reorganized Church of Jesus Christ of Latter Day Saints. He was the son of Joseph Smith, the founder of Mormonism.

He was a boy of 11 when his father was murdered by a mob, and he did not go to Utah with Brigham Young's group but remained in Nauvoo, Ill., with his mother. A document discovered in 1981 indicated that his father had intended that Joseph succeed him as president.

A farmer and editor, he accepted the presidency of the Reorganized Church in 1860. From 1881 he lived in Lamoni, Iowa, where he helped establish Graceland College. In 1906 he moved to Independence, Mo., where the church's headquarters were established. Throughout his life he attempted to prove that his father had never practiced or encouraged polygyny, and he worked to suppress polygyny in the main Church of Jesus Christ of Latter-day Saints in Utah.

Smith, Joseph F(ielding) (b. Nov. 13, 1838, Far West, Mo., U.S.—d. Nov. 19, 1918, Salt Lake City, Utah), American religious leader, sixth president (1901–18) of the Church of Jesus Christ of Latter-day Saints (Mormons).

After his uncle Joseph Smith, the founder of Mormonism, and his father, Hyrum Smith, were murdered in Carthage, Ill., in 1844, he and his mother fled with the majority of the Mormons to Utah. Made an apostle of the church in 1866, he advanced within the hierarchy to the office of president. He also served on the city council of Salt Lake City and in the territorial legislature (1865–74, 1880, 1882). Smith had six wives, but he accepted the decision to give up polygyny reached by church leaders in 1890 and testified before a United States Senate committee that Mormons no longer accepted the practice.

Smith, Kate, byname of KATHRYN ELIZABETH SMITH (b. May 1, 1909, Greenville, Va., U.S.—d. June 17, 1986, Raleigh, N.C.), American singer on radio and television, long known as the "first lady of radio." Star of "Kate Smith Sings" (CBS, 1931–1947), her theme song, "When the Moon Comes over the Mountain" (an ode to the Shenandoah Mountains), became familiar to millions. (She had helped to write its lyrics.) She also introduced Irving Berlin's song "God Bless America" on Armistice Day, 1938, and for some time thereafter the composer granted her exclusive rights to sing it on the air.

Kate Smith sang from early childhood, growing up in Washington, D.C., but her family wanted her to become a nurse, and she obliged as far as entering training. After a short time she gave up the prospect of nursing and at the age of 17 returned to music, moving to New York City. In 1926 she won a musical comedy role on Broadway as an overweight girl who was the butt of jokes for the rest of the cast. In 1930 she formed a partnership with announcer Ted Collins, who helped her to develop the immensely popular radio show "Kate Smith Sings," one of the most popular shows of the 1930s and early 1940s. With Collins as her manager, she also created the noontime news and gossip program "Kate Smith Speaks" in 1938. From 1950 to 1954 she acted as host of her own television show, "The Kate Smith Hour," and was also the principal performer in "The Kate Smith Evening Hour" (NBC, 1951–52) and "The Kate Smith Show" (CBS, 1960). Subsequently she appeared as a guest on many television variety shows. In 1982 she was awarded the U.S. Medal of Freedom by Pres. Ronald Reagan.

Smith, Sir Keith Macpherson and Sir Ross Macpherson (respectively b. Dec. 20, 1890, Adelaide, S.Aus.—d. Dec. 19, 1955, Sydney, N.S.W.; b. Dec. 4, 1892, Adelaide—d. April 13, 1922, Brooklands, near Walton and Weybridge, Surrey, Eng.), brothers, Australian aviators who made the first flight from England to Australia.

During World War I, Keith Smith flew as a pilot in the Royal Air Force (1917–19), while Ross started with the Australian Light Horse in Gallipoli and Sinai until he learned to fly in Egypt in 1916. He spent the last two years of the war in the Australian Flying Corps in Palestine. Ross made the first flight from Cairo to Calcutta, in 1918.

On their record flight to Australia, the brothers took off from England on Nov. 12, 1919, in a Vickers Vimy twin-engine biplane accompanied by two sergeants, J.M. Bennett and W.H. Shiers, as mechanics. They landed at Darwin, N.Terr., on December 10. Afterward, the brothers were knighted and received a £10,000 prize.

In 1922 they began preparations for a pioneer round-the-world flight in a Vickers pusher-amphibian aircraft, but Ross was killed, together with Bennett, while testing the aircraft at Brooklands, and Keith abandoned the project. Later, he went into business in Sydney.

Smith, Margaret (tennis player): *see* Court, Margaret.

Smith, Preserved (b. July 22, 1880, Cincinnati, Ohio, U.S.—d. May 15, 1941, Louisville, Ky.), American historian noted for his scholarly works on the Protestant Reformation.

The descendant of a Puritan family, Smith's father was a prominent Presbyterian clergy-

man and Old Testament scholar who taught him Greek and Latin when he was a youth and who travelled with him to Europe in 1894. Smith earned his Ph.D. at Columbia University (1907), where he was strongly influenced by the historian James Harvey Robinson. He studied briefly at the Sorbonne and the University of Berlin and returned to the U.S. as a fellow in history at Amherst College (Amherst, Mass.) until 1914. He lectured in history at Harvard University (1919–20) and was made professor of history at Cornell University (1922), where he remained until his death.

Smith's dissertation, *Luther's Table Talk* (1907), was enlarged and published as a full biography, *The Life and Letters of Martin Luther* (1911), in which he viewed the Reformation as the most significant period of change in modern thought and Luther as its leader. In 1913 he developed an interest in the psychoanalytical interpretation of history and wrote an article on "Luther's Early Development in the Light of Psycho-Analysis" that year. By 1920, however, he retreated from psychoanalytic theory and produced his great work, *The Age of the Reformation*, a comprehensive survey of the economic, intellectual, and social context of Protestantism. A later book, *Erasmus: A Study of His Life, Ideals, and Place in History* (1923), probed the relationship between the Renaissance and the Reformation and portrayed Erasmus as the Reformation's proponent of intellectual freedom. Of his projected four-volume *History of Modern Culture,* he completed two volumes entitled *The Great Renewal, 1543–1687* (1930) and *The Enlightenment, 1687–1776* (1934).

Smith, Red, byname of WALTER WELLESLEY SMITH (b. Sept. 25, 1905, Green Bay, Wis., U.S.—d. Jan. 15, 1982, Stamford, Conn.), U.S. sports columnist whose literary craftsmanship, humorous and iconoclastic approach, and deep knowledge of sports made him one of the United States' most popular sportswriters. His columns were literate, and he shunned the jargon of the genre. His popularity persisted nevertheless, and his work profoundly influenced a generation of writers.

Smith grew up in the family of a produce dealer. He attended Green Bay public schools and often went hiking, hunting, and fishing. After graduating from the University of Notre Dame in 1927, Smith worked as a reporter for the *Milwaukee Sentinel*, then took a job as a sports writer at the *St. Louis Star-Times*, where he developed his style. For nine years, from 1936 to 1945, he wrote sports stories for the *Philadelphia Record*.

Beginning in 1945, Smith's column, "Views of Sport," appeared in the *New York Herald Tribune*. Syndicated shortly afterward, it began to appear in newspapers throughout the United States, continuing after the *Herald Tribune*'s demise. He joined *The New York Times* in 1971. For the most part, Smith wrote about such major spectator sports as baseball, football, boxing, and horse racing. Occasionally, never abandoning his wry humour or his keen sense of perspective, he wrote about one of his favourite sporting activities, fly-fishing for trout. His natural and precise use of the English language made him a consultant on usage to a variety of dictionaries and encyclopaedias.

In 1956 Smith's column earned him the second Grantland Rice Memorial Award for outstanding sports writing. His columns provided the material for five books, including *Out of the Red* (1950), *Views of Sport* (1954), and the last, *Strawberries in the Wintertime* (1974).

Smith, Robert (b. Nov. 3, 1757, Lancaster, Pa.—d. Nov. 26, 1842, Baltimore), U.S. secretary of state under James Madison.

Smith, brother of Samuel Smith, the military hero, grew up in Baltimore. He graduated in 1781 from the College of New Jersey (now Princeton University), studied law, and became a prominent and prosperous Baltimore attorney. From 1793 to 1801, Smith was active in Maryland politics, serving in both the state Senate and House of Delegates and in the Baltimore city council. Following Jefferson's election, Smith was appointed secretary of the navy, largely due to the influence of his brother.

During the Jefferson administrations, Smith successfully prosecuted the naval war against the Barbary States, and he conscientiously enforced Jefferson's embargo despite his personal opposition to the policy. It was during those years (1801–09), however, that Smith and Albert Gallatin, secretary of the treasury, became foes.

When James Madison became president, he wanted Gallatin to be secretary of state. But Samuel Smith and other prominent senators opposed Gallatin, and Robert Smith ultimately gained the post. Smith and Madison frequently disagreed—Smith objecting to the President's commercial restrictions, Madison unable to tolerate Smith's incoherent diplomatic communications.

In 1811, in a face-to-face confrontation, Madison accused Smith of inefficiency and of creating discord among members of the administration. The President offered Smith the position of minister to Russia in exchange for resigning. Smith hesitated, then refused, resigned, and retired. He spent the final 30 years of his life in Baltimore.

Smith, Samuel (b. July 27, 1752, Carlisle, Pa.—d. April 22, 1839, Baltimore), U.S. soldier and politician best known as the commander of land and sea forces that defended Baltimore from the British during the War of 1812.

Smith grew up in Baltimore, to which his family had moved in 1760. The son of a wealthy merchant, Smith joined the family business after a brief education at a private academy and lengthy travels in Europe.

Smith fought in the American Revolution, participating in the Battle of Long Island and spending the winter with George Washington at Valley Forge. As commander of Fort Mifflin, he helped prevent Lord Howe's fleet from coming to the aid of General Burgoyne, contributing to the crucial American victory at Saratoga.

After the Revolution, Smith returned to Baltimore, where he became quite wealthy through land speculation as well as the family mercantile concerns. While he continued his military career by serving with the state militia, his main interest turned to politics. From 1793 to 1803 he won election four times to the U.S. House of Representatives, and from 1803 to 1815 he held a seat in the Senate.

During the British invasion of Maryland in 1814, Smith led about 13,000 troops in defending Baltimore. The Americans repulsed the invaders and inflicted heavy losses on them. The American-held citadel Fort McHenry withstood a two-day bombardment (inspiring Francis Scott Key to compose "The Star-Spangled Banner") before the British finally withdrew.

In 1816 Smith returned to the House of Representatives where he stayed until once again moving over to the Senate in 1822. He held his Senate seat until 1833, marking 40 continuous years in Congress. Then in 1835—at the age of 83—he took command of the state militia and put down riots in Baltimore. The grateful city elected Smith mayor, and he served in that capacity until 1838, one year before his death.

Smith, Seba (b. Sept. 14, 1792, Buckfield, Maine, U.S.—d. July 28, 1868, Patchogue, N.Y.), U.S. editor and humorist, creator of the fictional Maj. Jack Downing.

A graduate of Bowdoin College, Smith founded (1829) the *Portland Courier*, in which the Major's fictional letters first appeared in January 1830, continuing later in the *National Intelligencer* until July 1853. Major Jack was a common man magnified as oracle, a Yankee full of horse sense and wise saws, and a threadbare office seeker exposing follies in a mobocracy. Shameless pirating of Smith's invention led to Smith's collection of the letters in book form, the last volume being published in 1859 under the title *My Thirty Years Out of the Senate*. Even more than in the Downing letters, Smith in *Way Down East* (1854) portrays the New England character. Among Smith's followers in satire were James Russell Lowell in his "Hosea Biglow," Artemus Ward, and Will Rogers.

Smith, Stevie, pseudonym of FLORENCE MARGARET SMITH (b. Sept. 20, 1902, Hull, Yorkshire, Eng.—d. March 7, 1971, London), British poet who expressed an original and visionary personality in her work, combining the ludicrous and the pathetic with an absence of sentiment.

For most of her life she lived with an aunt in the same house in Palmers Green, a northern London suburb. After attending school there, she worked, until the early 1950s, as a secretary in the London offices of a magazine publisher. She then lived and worked at home, caring for her elderly aunt who had raised her and who died at age 96 in 1968. Palmers Green and the people there are subjects for some of her poetry.

In the 1960s her poetry readings became popular, and she made radio broadcasts and recordings. She sometimes sang her poems to her own music. Her three novels are *Novel on Yellow Paper* (1936), in a stream-of-consciousness style, *Over the Frontier* (1938), and *The Holiday* (1949). She also wrote short stories, literary reviews, and essays, but she is remembered chiefly for her poetry.

The Collected Poems of Stevie Smith (1975), illustrated with her Thurber-like sketches, includes her first book of poems, *A Good Time Was Had By All* (1937) and *Not Waving but Drowning* (1957), the title poem of which appears in many anthologies. The lines of her verse are often short and telling. They slip in and out of metre and rest on assonance and broken rhyme in ways that arrest attention. Her succinct style recalls William Blake and comparisons have been drawn with John Betjeman. She addresses serious themes with a clarity critics often call childlike. The theme of death recurs often.

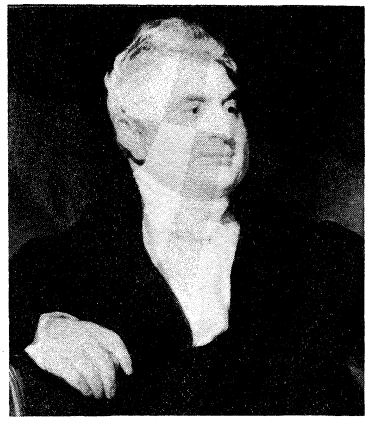
Me Again: Uncollected Writings of Stevie Smith, Illustrated by Herself (1981) is a posthumous compilation of her prose writings, letters, and previously uncollected poetry. Kay Dick, in *Ivy and Stevie: Conversations and Reflections* (1971), is based on recorded conversations with Dame Ivy Compton-Burnett.

Stevie is a play by Hugh Whitemore (published in 1977). The film *Stevie,* directed and produced by Whitemore, opened in London in 1978 and in New York in 1981.

Smith, Sydney (b. June 3, 1771, Woodford, Essex, Eng.—d. Feb. 22, 1845, London), one of the foremost English preachers of his day, a champion of parliamentary reform whose wit, practical energy, argumentative powers, and capacity for ridicule disguised his warmth of feeling. Through his writings he perhaps did more than anyone else to change public opinion on the question of Catholic emancipation.

Smith's father refused to let him study law, and after leaving Oxford he was ordained in the Church of England. He later attended lectures in moral philosophy, chemistry, and medicine at the University of Edinburgh, where he made many friends and helped to found *The Edinburgh Review* (in 1802), contributing trenchant articles to it for 25 years.

In 1803 he moved to London; in 1804 he gave the first of a series of lectures in moral philosophy, which people flocked to hear for their blend of good sense and wit. When the



Sydney Smith, detail of an oil painting by H.P. Briggs; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

predominantly Whig ministry took office in 1806, Smith received the living of Foston-le-Clay, Yorkshire. At first he discharged his duties through a curate, until the Clergy Residence Act put an end to this common practice, and he left London for Yorkshire (1809).

Meanwhile, in March 1807, the Whigs had been forced to resign on the question of Catholic emancipation, which Smith supported. In 1807 he wrote the first of several famous *Letters of Peter Plymley to My Brother Abraham Who Lives in the Country,* attacking Protestant ignorance, obscurantism, and bigotry.

In Yorkshire, although Smith hated the country, he won his parishioners' affection through his energy and cheerfulness; and he continued to write effective polemics on the Catholic question. In 1828 he gained preferment, being installed as prebend of Bristol Cathedral. The Whigs came to power, and it was expected that he would be a bishop; but opposition proved strong. Eventually he succeeded in becoming a canon of St. Paul's Cathedral in London, which necessitated his living in the capital for three months of the year.

Smith had married in 1800, and in 1829 his eldest son died. This caused him lasting grief, and yet his later essays (notably the "Singleton Letters" of 1837 and 1838–39 on church affairs and his petition and letters of 1843 to *The Morning Chronicle* on Pennsylvania's suspension of interest on its bonds) are as vigorous and spirited as the best of his early pieces for *The Edinburgh Review.* On his brother Courtenay's death in 1839 Smith inherited a fortune, bought a house in London, and lived there until his death.

Smith, Theobald (b. July 31, 1859, Albany, N.Y., U.S.—d. Dec. 10, 1934, New York City), U.S. pathologist known for his research into the causes and immunology of infectious and parasitic diseases. Smith's discovery (1889) of *Pyrosoma bigeminum* (now called *Babesia bigemina*), the protozoan that causes Texas cattle fever, and his demonstration (1889–93), with F.L. Kilborne, of its transmission by the cattle tick paved the way for control of malaria, yellow fever, and other insect-borne diseases. He also was the first to clearly differentiate the bovine from human tubercle bacilli, facilitating the work of Robert Koch, who confirmed his research.

After his graduation from Cornell University, Ithaca, N.Y. (M.D., 1883), Smith taught at Columbian University (1886–95; now George Washington University), Washington, D.C., and conducted research for the U.S. Department of Agriculture (1885–95). During that time, he found that an animal can be made immune to a disease (in this case hog cholera; 1884–86) by injecting into the animal a filtered extract of the disease-causing organism. He was also first to describe pleomorphism, or the existence of a single species in distinctly different forms, in bacteria (1886).

While professor of comparative pathology at Harvard University (1896–1915) and director of the pathological laboratory of the Massachusetts State Board of Health (1895–1915), he was first to demonstrate anaphylaxis (an intense antibody reaction in an animal after injection of a foreign protein into its body) from injection of an extract of the diphtheria bacillus (1903), termed by the German immunologist Paul Ehrlich the "Theobald Smith phenomenon." In 1915 Smith joined the Rockefeller Institute for Medical Research, New York City.

Smith, Sir Thomas: *see* Smythe, Sir Thomas.

Smith, Tommie (b. June 12, 1944, Clarksville, Tenn., U.S.), U.S. sprinter who held the world record for the 200-metre dash with turn (1966–68), his best time being 19.83 sec—the first time that the distance was run in less than 20 sec—and for the straightaway 200-metre dash (1965–79), 19.5 sec.

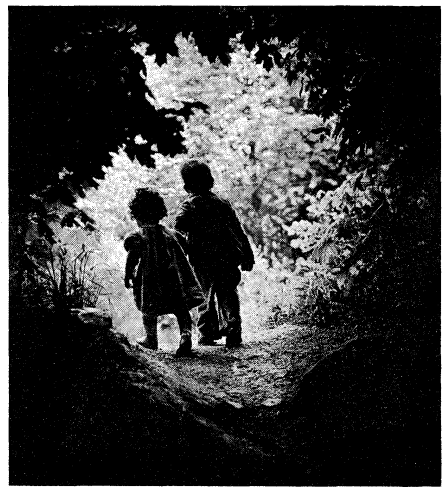
Smith competed for San Jose (California) State College. In the 1968 Olympic Games at Mexico City, he won the gold medal for the 200-metre race, but he and a teammate, John Carlos, were suspended by the U.S. Olympic Committee and threatened with expulsion from the Olympic Village for giving a black-power salute while receiving awards.

During Smith's college career he set world records for the 220-yard (straightaway) dash, for the 200-metre races (with turn and straightaway) at 19.5 sec, and was a member of a 4×200-metre relay team that set a world record (1967–70) of 1 min 22.1 sec.

After retiring from running, Smith became a track coach at Santa Monica (California) College and at Oberlin (Ohio) College, where he also taught sociology.

Consult the INDEX *first*

Smith, W. Eugene (b. Dec. 20, 1918, Wichita, Kan., U.S.—d. Oct. 15, 1978, Tucson, Ariz.), U.S. photojournalist whose compassionate and psychologically penetrating photo-essays made him one of the most important photographers of the mid-20th century.



"The Walk to Paradise Garden" by W. Eugene Smith, 1947

W. Eugene Smith

At the age of 14, Smith began to use photography as an aid to aeronautical studies and within a year he had become a photographer on two local newspapers. He left college after only one year's study to go to New York City, where he worked for a number of large magazines.

In 1942, Smith became a war correspondent for *Life* magazine and covered many of the most important battles of the Pacific theatre, including Tarawa, Saipan, Guam, and Iwo Jima. In 1945, he was critically wounded while covering the invasion of Okinawa.

During the next two years he underwent 32 operations. Toward the end of his painful convalescence in 1947, he took what was to become his most famous photograph, "The Walk to Paradise Garden." This view of his own children entering a forest clearing was the first photograph he took after being wounded. It concluded the exhibition "The Family of Man," organized by the photographer Edward Steichen for the Museum of Modern Art in 1955.

Smith returned to work for *Life* in 1947 and began a series of outstanding photo-essays. "Country Doctor" (1948) was psychologically the most penetrating photo-essay to that time. His photo-essay "Spanish Village" (1951) contains many of his most memorable prints, revealing the villagers' daily struggle to draw life from exhausted soil. "Nurse Midwife" (1951) and "Man of Mercy" (1954) portray two people, a backwoods midwife and Dr. Albert Schweitzer, dedicated to easing the suffering of others.

In 1956, Smith began an ambitious photo-essay on the city of Pittsburgh. Almost simultaneously, he began a series of photographs of New York City street scenes taken from the window of his loft on Sixth Avenue. Part of the series was published in *Life* in 1958 under the title "Drama Beneath a City Window." A book of his photographs, *Japan—Chapter of Image,* was published in 1963.

His last great photo-essay, *Minamata* (1975), dealt with the residents of a Japanese village who were poisoned by mercury wastes from a nearby chemical company. Smith lived in the village for more than three years, becoming a sort of folk hero by defying the company when they tried to drive him out and suppress his work.

Smith, W(illiam) Wallace (b. Nov. 18, 1900, Lamoni, Iowa, U.S.), U.S. religious leader, president of the Reorganized Church of Jesus Christ of Latter Day Saints (1958).

A grandson of Joseph Smith, founder of Mormonism, and a son of Joseph Smith, first president of the Reorganized Church, he was graduated from the University of Missouri (1924) and entered the ministry of the Reorganized Church in 1928. He was a member of the Quorum of the Twelve Apostles (1947–50) and was counsellor to the president of the church from 1950 until he became president in 1958.

Smith, Walker: *see* Robinson, Sugar Ray.

Smith, Walter Bedell (b. Oct. 5, 1895, Indianapolis, Ind., U.S.—d. Aug. 9, 1961, Washington, D.C.), U.S. Army general, diplomat, and administrator, who served as chief of staff for U.S. forces in Europe during World War II.

Smith began his military career as an enlisted man in the Indiana National Guard (1910–15) and in 1917 was commissioned a second lieutenant of infantry in the U.S. Army. He fought briefly in World War I, and, advancing through grades, he served in the U.S. and the

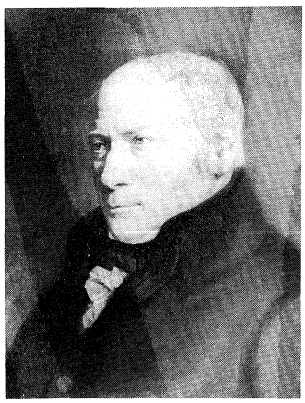


Walter Bedell Smith, 1946
By courtesy of the U.S. Army

Philippines and taught in the infantry school. In February 1942 he was named secretary of the Joint Chiefs of Staff and U.S. secretary of the Combined Chiefs of Staff, with the rank of brigadier general. The following September he became chief of staff, European theatre of operations, and chief of staff to Gen. Dwight D. Eisenhower, serving in those posts until Eisenhower's departure from Europe after the war. He negotiated and accepted for the Allies the surrender of Italy (1943) and of Germany (1945).

On returning to the U.S. in 1945, Smith became chief of the operations and planning division of the war department general staff. Shortly afterward he was appointed U.S. ambassador to the Soviet Union, holding that post from 1946 to 1949. Later he commanded the U.S. 1st Army (1949–50) and was director of the Central Intelligence Agency (1950–53), becoming general in 1951. He retired in 1953 to become undersecretary of state. In October 1954 he resigned from government service and entered private business. He was the author of *My Three Years in Moscow* (1950) and *Eisenhower's Six Great Decisions* (1956).

Smith, William (b. March 23, 1769, Churchill, Oxfordshire, Eng.—d. Aug. 28, 1839, Northampton, Northamptonshire), English engineer and geologist who is best known



William Smith, detail of an oil painting by M. Fourau, 1837; in the collection of the Geological Society of London
By courtesy of the Geological Society of London

for his development of the science of stratigraphy. Smith's great geologic map of England and Wales (1815) set the style for modern geologic maps, and many of the colourful names he applied to the strata are still in use today.

Smith was the son of an Oxfordshire blacksmith of farming stock. Only seven when his father died, Smith was cared for by a farming uncle. He attended a village school, learned the basic methods of surveying from books he bought himself, and collected the abundant fossils of his native Cotswold hills. In 1787 he became an assistant to Edward Webb, a surveyor in nearby Stow-on-the-Wold, who in 1791 helped Smith become established in the Somersetshire coal district southwest of Bath. The steam locomotive had not yet been invented, and canal-building was at its height, particularly for the transportation of coal. There was also abundant work in the enclosure and drainage of fields.

During preliminary surveys for a proposed Somersetshire Coal Canal in 1793, Smith discovered that the strata outcropping in the northern part of the region dip regularly eastward, like so many "slices of bread and butter." On a long trip in 1794 to examine canals and collieries, he had an opportunity to extend his observations. His suspicion that the strata of Somerset could be traced far northward across England was brilliantly confirmed as the familiar beds were encountered again and again during this journey. Excavation of the new canal began in 1795, and Smith, studying the fresh cuts, found that each stratum contained "fossils peculiar to itself."

His work on the canal continued until 1799, when he was abruptly dismissed, probably over an engineering dispute. But Smith had a good reputation in Bath, at that time a major intellectual and social centre, and quickly built a far-flung business as a geological engineer. In 1804 he moved his business headquarters to a house in London, where his fossil collection and geologic maps were always on display.

In 1799 Smith dictated to an amateur geologist in Bath his now-famous table of strata in the vicinity of Bath, which became a principal means for circulating his revolutionary discoveries. He also exhibited his maps and stratigraphic sections at agricultural fairs, such as the Holkham "Sheepshearings," which he regularly attended. Much of his professional work was for the gentleman farmers who supported these shows, but he also supervised major reclamation projects in Norfolk and Wales, restoration of the hot springs at Bath, and a multitude of canal and colliery projects, sometimes travelling 10,000 miles a year (an incredible total made possible by the inauguration of fast mail coaches in 1784).

Smith's intelligence and practical knowledge of geology and groundwater took him to the front rank of his profession, but he never became wealthy because of his personal objective: mapping the geology of England. He always made copious notes of what he saw on the job and spent all his extra time and money on side trips to fill in blank spaces on his map, often sleeping in the coach on the way to his next appointment. Where exposures were few, he used soil, topography, and vegetation to identify underlying rock. His epochal geologic map of England and Wales appeared in 1815 under the title *A Delineation of the Strata of England and Wales, with Part of Scotland.* This was followed by an excellent series of county maps between 1819 and 1824.

During these years, Smith was in financial straits, undoubtedly exacerbated by the agricultural depression that followed the Napoleonic Wars. Failure of a quarry in Somerset lost him the property and forced the sale of his fossil collection to the British Museum in London. When creditors seized his London property after he had spent 10 weeks in debtor's prison in 1819, he sold out and left for Yorkshire. For some years he had no permanent home but finally settled in Scarborough among a small band of geological enthusiasts, one of whom retained him as a consultant on his nearby estate. Recognition of his achievements came from other sources. In 1822 his work was praised by William D. Conybeare and William Phillips in their textbook on English stratigraphy, *Outlines of the Geology of England and Wales.* In 1831 he received from the Geological Society of London the first Wollaston Medal and in 1832 a yearly pension from the crown. He died in 1839 on his way to a scientific meeting in Birmingham.

Smith was not only exceptionally observant but possessed the power to integrate his observations. He saw that different rock layers contained different fossils and used this fact to trace strata over hundreds of miles. So great was his ability that geologists still use all of the techniques he introduced, and current geologic maps of England differ from his primarily in detail. Between 1815 and 1817 he published a few thin volumes on his work, but in a sense they were too late. Smith had always talked freely to anyone interested, and his knowledge was already public property being applied by geologists in every part of Britain. The fame Smith achieved in his lifetime remains undimmed to this day, and he is universally admired as the "Founder of Stratigraphy." (R.W.Ma.)

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Smith, William Robertson (b. Nov. 8, 1846, Keig, Aberdeenshire, Scot.—d. March 31, 1894, Cambridge, Cambridgeshire, Eng.), Scottish Semitic scholar, encyclopaedist, and student of comparative religion and social anthropology.

Smith was ordained a minister in 1870 on his appointment as professor of Oriental languages and Old Testament exegesis at the Free Church College of Aberdeen. When his articles on biblical subjects appeared in the 9th edition of *Encyclopædia Britannica* (notably the article "Bible," published in 1875), the authorities of the Free Church took strong exception to them; in 1877 they suspended him from his teaching duties. He was formally tried, and in 1880 the assembly dropped the indictment against him. After a second attack on his opinions, he was again suspended; in 1881 he was removed from his chair.

Later that year he was appointed joint editor of *Encyclopædia Britannica.* He moved to Edinburgh and wrote *The Old Testament in the Jewish Church* (1881) and *The Prophets of Israel* (1882). He held academic positions at Cambridge University from 1883 and remained editor in chief of *Britannica* until the 9th edition was completed in 1888. His article "Sacrifice" (1886) and his book *Kinship and Marriage in Early Arabia* (1885) are important landmarks in the study of comparative religion. In 1889 he wrote his most original work, *Lectures on the Religion of the Semites.*

Smith Act, formally ALIEN REGISTRATION ACT OF 1940, U.S. federal law passed in 1940 that made it a criminal offense to advocate violent overthrow of the government or to organize or be a member of any group or society devoted to such advocacy. After World War II this statute was made the basis of a series of prosecutions against leaders of the Communist Party and the Socialist Workers Party. The conviction of the principal officers was sustained, and the constitutionality of the "advocacy" provision upheld, by the Supreme Court in *Dennis* v. *United States* (1951); but in a later case (*Yates* v. *United States,* 1957) the court offset this position somewhat by a strict reading of the language of the Smith Act, construing "advocacy" to mean only urging that includes incitement to unlawful action.

Smith Center, city, seat of Smith County, northern Kansas, U.S., 85 mi (137 km) northwest of Salina. It was founded in 1871 by L.T. Reese with the aim of making it the county seat (the county had been named after Maj. J. Nelson Smith, who was killed in a Civil War battle at Little Blue, Mo. [Oct.

23, 1864]). The traditional geographical centre of the contiguous United States (39°50′ N, 98°35′ W), marked by a stone pylon, is 11 miles (18 km) east-northeast of Smith Center. The homestead cabin of Brewster Higley, where he wrote (1873) the lyrics of the well-known song "Home on the Range," is northwest. The city has a grain and livestock economy. Inc. 1886. Pop. (1984 est.) 2,172.

Smith–Connally Anti-Strike Act, also called WAR LABOR DISPUTES ACT (June 25, 1943), measure enacted by the U.S. Congress, over President Franklin D. Roosevelt's veto, giving the president power to seize and operate privately owned war plants when an actual or threatened strike or lockout interfered with war production. Subsequent strikes in such plants seized by the government were prohibited. In addition, war-industry unions failing to give 30 days' notice of intent to strike were held liable for damages.

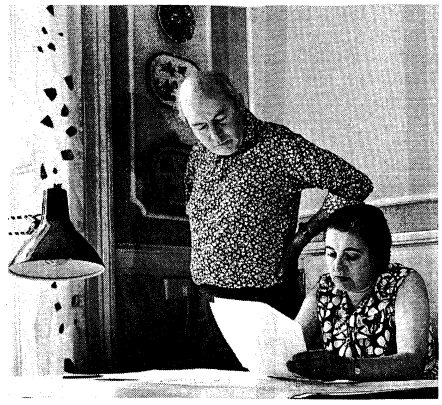
Smith Sound, Arctic sea passage between Ellesmere Island, Can. (west), and northwestern Greenland (east). The sound, 30–45 miles (48–72 km) wide, extends northward for 55 miles (88 km) from Baffin Bay to the Kane Basin. The sound was discovered in 1616 by William Baffin and named for Sir Thomas Smythe (Smith), promoter of voyages to find a Northwest Passage. It was not until the mid-19th century that any explorer reached a more northern latitude.

Smithfield, area in the northwestern part of the old City of London, famous for its meat market. It is historically known as the site of Wat Tyler's fatal meeting with Richard II in 1381. The market existed in 1183, and the site was also used for jousting (a medieval chivalric sport), as a place of execution during the Reformation and the short-lived Counter-Reformation, and for the ancient Bartholomew Fair, a famous London market regarded as the forerunner to the Caledonian Market, Islington. The several sections of the market now handle fresh and frozen meat, poultry, provisions, fish, and fruit. The Church of St. Bartholomew the Great is a fragment of the Augustinian priory, founded 1123. St. Bartholomew's Hospital, founded 1137, was rebuilt beginning in 1730.

Smithian stage, division of Early Triassic rocks and time first recognized in the Mediterranean and eastern Alpine region of Europe (the Early Triassic epoch occurred 245 to 240 million years ago). Smithian rocks overlie those of the Dienerian Stage and underlie those of the Spathian. Smithian rocks were deposited in a deepwater marine environment and are characterized by a distinctive fossil fauna that is dominated by ammonoid cephalopods.

Smithson, Alison and Peter, in full, respectively, ALISON MARGARET SMITHSON, *née* GILL, and PETER DENHAM SMITHSON (respectively b. June 22, 1928, Sheffield, Yorkshire, Eng.; b. Sept. 18, 1923, Stockton-on-Tees, Durham), British architects notable for their design for the Hunstanton Secondary School, Norfolk (1954), which is generally recognized as the first example of Brutalism, an approach to architecture that often stressed stark presentation of materials and structure.

The Smithsons were married in 1949 and after 1950 practiced architecture together. The Hunstanton School, with its formal severity and clarity reminiscent of the work of Mies van der Rohe, exemplified the principles of Brutalism in its exposed steel- and brickwork and exposed electrical conduits. The Economist Building Group, St. James's, London (1959–64), consisted of a 16-story office tower, a smaller residential tower, and a bank building.



Alison and Peter Smithson, 1972
J.S. Lewinski

The three were connected by a raised asymmetrical pedestrian plaza. The cluster made imaginative use of the irregular site and was scaled in keeping with its St. James's Street location. Later works include the Garden Building, St. Hilda's College, Oxford (1968–70). Books by the Smithsons include *Urban Structuring Studies* (1967), *The Euston Arch* (1968), *Ordinariness and Light* (1970), *Without Rhetoric: An Architectural Aesthetic 1955–1972* (1973), and *The Heroic Period of Modern Architecture* (1981).

Smithson, James (b. 1765, Paris—d. June 27, 1829, Genoa), English scientist who provided funds for the founding of the Smithsonian Institution, Washington, D.C.

The natural son of Hugh Smithson Percy, 1st Duke of Northumberland, and Elizabeth Keate Macie, a lineal descendant of Henry VII, he was educated at the University of Oxford. Said to have been the best chemist and mineralogist in his class, he eventually published 27 scientific papers. On the recommendation of Henry Cavendish and others, he was admitted to the Royal Society at the age of 22. The mineral smithsonite (carbonate of zinc) was named for him.

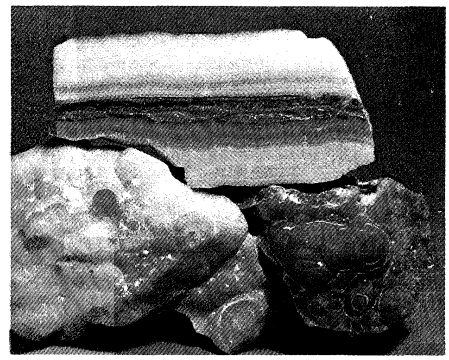
Smithson, who never married, spent much of his life in Europe, where he came to know the leading scientists. His substantial fortune, inherited chiefly through his mother's family, he left to a nephew, Henry James Hungerford, who died without issue. Under terms of Smithson's will, the whole estate went "to the United States of America, to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge."

His reasons for making his bequest to the United States seem related to his resentment over the circumstances of his illegitimate birth. He had once written, "My name shall live in the memory of man when the titles of the Northumberlands and Percys are extinct and forgotten." In 1904 Smithson's remains were brought to the United States under an escort including Alexander Graham Bell and were interred in the original Smithsonian building.

Smithsonian Institution, research institution founded by the bequest of the English scientist James Smithson. Although it was held by John C. Calhoun and other members of Congress that the federal government had no power to accept such a gift, it was finally secured, largely through the efforts of John Quincy Adams, and in 1846 the institution was established by congressional act at Washington, D.C.

The Smithsonian is governed by a board of regents consisting of the U.S. vice president, the chief justice, three senators, three representatives, and six nonofficials. The bureaus under the administration of the Smithsonian Institution include the Archives of American Art, the Cooper-Hewitt Museum of Decorative Arts and Design, the Freer Gallery of Art, the Hirshorn Museum and Sculpture Garden, the International Exchange Service, the John F. Kennedy Center for the Performing Arts, the National Air and Space Museum, the National Armed Forces Museum Advisory Board, the National Gallery of Art, the National Museum of American Art, the National Museum of History and Technology, the National Museum of Natural History, the National Portrait Gallery, the National Zoological Park, the Radiation Biology Laboratory, the Science Information Exchange, the Smithsonian Astrophysical Observatory, the Smithsonian Tropical Research Institute, the Woodrow Wilson International Center for Scholars, the Arthur M. Sackler Gallery (for Asian and Middle Eastern art), and the National Museum of African Art. A monthly magazine is published under the Smithsonian name by a support group.

smithsonite, formerly called CALAMINE, zinc carbonate ($ZnCO_3$), a mineral that was the principal source of zinc until the 1880s, when it was replaced by sphalerite. It is ordinarily found in the oxidized zone of ore deposits as a secondary mineral or alteration product



Smithsonite from Masua, Sardinia; top specimen has been cut and polished; the bottom two are botryoidal masses
By courtesy of the Illinois State Museum; photograph, John H. Gerard—EB Inc.

of primary zinc minerals; notable deposits are at Laurium, Greece; Bytom and Tarnowskie Góry, Pol.; Sardinia, Italy; and Leadville, Colo., U.S. For detailed physical properties, *see* carbonate mineral (table).

Smithton, town, northwestern Tasmania, Australia, at the mouth of the Duck River on Duck Bay. The site was included in a grant made to the Van Diemen's Land Company in 1825 and was settled the next year. The town is the centre of Circular Head municipality. On the Bass Highway and a rail line to Launceston (110 miles [175 km] southeast), it serves a productive dairy-, vegetable-, and potato-farming region. Its industries include dairying (butter and cheese), bacon processing, vegetable canning, and sawmilling. A fishing fleet operates from Smithton's port. Pop. (1986 prelim.) 3,414.

smock, loose, shirtlike garment worn by women in the European Middle Ages under their gowns (also called a chemise). The smock later became a loose, yoked, shirtlike outer garment of coarse linen, used to protect the clothes; it was worn, for example, by field-workers in Europe.

In the 20th century the smock is a loose, lightweight, sleeved garment worn to protect the clothes while working. It also became a popular garment for expectant mothers.

smog, community-wide polluted air. Although the term is derived from the words smoke and fog, it is commonly used to describe the pall of automotive or industrial origin that lies over many cities, and its composition is variable. The term was probably first used in

1905 by H.A. Des Voeux to describe atmospheric conditions over many British towns. It was popularized in 1911 by Des Voeux's report to the Manchester Conference of the Smoke Abatement League of Great Britain on the more than 1,000 "smoke–fog" deaths that occurred in Glasgow and Edinburgh during the autumn of 1909.

At least two distinct types of smog are recognized, sulfurous smog and photochemical smog. Sulfurous smog results from a high concentration of sulfur oxides in the air and is caused by the use of sulfur-bearing fuels. This type of smog, which occurs in many cities in Europe and the eastern United States, is aggravated by dampness and a high concentration of suspended particulate matter in the air.

Photochemical smog, which occurs most prominently in Los Angeles, requires neither smoke nor fog. It is accompanied by a light brownish coloration of the atmosphere, reduced visibility, plant damage, irritation of the eyes, and respiratory distress and is caused by photochemical reactions in the lower atmosphere. Involved in the complex chemical process are hydrocarbons and nitrogen oxides emitted by automobiles and other sources. One undesirable component is the highly toxic gas ozone. *See also* air pollution.

Smohalla, also called SMOWHOLA, SMOHOLLER, SMOKEHOLER, SMUXALE, SNOHALLOW, and SOMAHALLIE (b. *c.* 1815/20, Upper Columbia River, Oregon Country—d. 1895), North American Indian prophet, preacher, and teacher, one of a series of such leaders who arose in response to the menace presented to Indian life and culture by the encroachment of white settlers. He founded a religious cult, the Dreamers, that emphasized traditional Indian values.

Smohalla belonged to the Wanapum (or Wanapam; called Sokulk by Lewis and Clark), a small Sahaptian-speaking tribe closely related to the Nez Percé and centring on the Priest Rapids area of the Columbia River in what is now eastern Washington. He grew up to become a locally celebrated medicine man and a warrior of distinction. After a fight with a rival, he left his home and went south, travelling perhaps as far as Mexico, and was away for several years. When he returned he announced that he had died and been resurrected by God. He began to preach and by 1872 had a large following.

White settlers had been coming into the Northwest in large numbers, and the completion of the Northern Pacific Railway increased the flow. The U.S. government was trying to persuade the Indians to move to reservations or to take up homesteads and become farmers. The Plateau Indians had been largely fishermen and hunters, but many of them accepted the government's proposals and turned to agriculture. Smohalla taught that the Indians alone were real people, the first created, and that whites, Negroes, and Chinese had been created later by God to punish the Indians for leaving their ancient ways. They must live as their fathers had done, and, above all, not plow land (*i.e.*, wound Mother Earth) or sign papers for land, which was against nature.

If they lived as their fathers had, and followed the ritual of his Dreamer cult, they would be aided by the forces of nature, as well as by hordes of Indian dead, who would be resurrected. God would drive away the non-Indians. The Dreamers got their name from the emphasis Smohalla placed on dreams sent to himself and his priests by God to direct them in the right ways. The ritual emphasized drumming, ringing of bells, and ecstatic dancing, all of which combined to bring on visions and exaltation.

Smohalla's influence spread among the Plateau Indians, Chief Joseph and the Nez Percé being among his most devoted followers. The cult was for a generation the greatest barrier to the U.S. government's efforts to settle the Indians of the region and to convert them to white people's ways, and it persisted for several years after Smohalla's death.

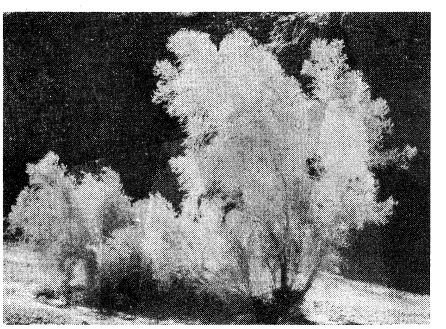
Smohalla was described by a contemporary observer, Maj. J.W. MacMurray of the U.S. Army: "Short, thick-set, bald-headed and almost hunch-backed, he is not prepossessing at first sight; but he has . . . a deep brow, over bright intelligent eyes. . . . Much of [his] influence is due to knowledge gained from white men, but mainly to his native intelligence and qualities as an orator and natural leader of men."

smoke detector, device used to warn occupants of a building of the presence of a fire before it reaches a rapidly spreading stage and inhibits escape or attempts to extinguish it. On sensing smoke the detectors emit a loud, high-pitched alarm tone, usually warbling or intermittent, and usually accompanied by a flashing light. There are two types of smoke detector: photoelectric and ionization. Photoelectric smoke detectors utilize a light-sensitive cell in either of two ways. In one type, a light source, *e.g.*, a small spotlight, causes a photoelectric cell to generate current that keeps an alarm circuit open—until visible particles of smoke interrupt the ray of light, breaking the circuit and setting off the alarm. The other photoelectric detector, widely used in private dwellings, employs a detection chamber shaped so that the light-sensitive element cannot ordinarily "see" the light source (usually a light-emitting diode [LED]). When particles of smoke enter a portion of the chamber that is aligned with both the LED and the photocell, the particles diffuse or scatter the light ray so it can be "seen" by the photocell. As a result a current is generated by the light-sensitive cell and the alarm is triggered.

Ionization detectors employ radioactive material—in quantities so tiny they are believed to pose no significant health hazard—to ionize the air molecules between a pair of electrodes in the detection chamber. This enables a minute current to be conducted by the ionized air. When smoke enters the chamber, particles attach themselves to ions and diminish the flow of current. The reduction in current sets off the alarm circuit.

Photoelectric detectors are relatively slow to respond and are most effective in sensing the large smoke particles generated by a smoldering, slow-burning fire. Ionization detectors are much faster to respond and are best at sensing the tiny smoke particles released by a fast-burning fire. For this reason some manufacturers produce combination versions of detectors. Many fire prevention authorities recommend the use of both photoelectric and ionization types mounted on alternate floors or in various locations in a private home. Either type of detector can be powered by batteries or by house current reduced in voltage through a transformer or other power supply.

smoke tree, common name for several plant species. *Dalea spinosa* is a spiny, grayish-green shrub, of the pea family (Fabaceae), native to arid regions of southwestern North America. It has sparse foliage and bears bluish-violet flowers in terminal spikes. The name smoke tree is also applied to two species of small shrubby plants of the genus *Cotinus* within the cashew family (Anacardiaceae); one is native to Eurasia, the other to North America. Both have short-stalked leaves, yellow flowers, strong-smelling juice, and fleshy, lopsided fruits. The fruits are borne in long clusters with stalks from the sterile flowers; the clusters resemble smoke from a distance. *Cotinus coggygria*, the Eurasian species, has oval leaves; *C. obovatus*, the North American species, has wedge-shaped leaves and is sometimes called chittamwood.



Smoke tree (*Dalea spinosa*)
Randall from Root Resources—EB Inc.

Smokeholer (American Indian cult leader): *see* Smohalla.

smoking, inhaling and exhaling the fumes of burning plant material, especially tobacco, from a cigarette, cigar, or pipe. The American Indians used tobacco in ceremonials (*e.g.*, the smoking of the pipe of peace) and believed it possessed medicinal properties. Christopher Columbus and other early explorers introduced it into Europe. Despite social, religious, and current medical arguments against the use of tobacco, the habit has become worldwide. Nicotine and related alkaloids furnish the narcotic effects of the substance. *See also* tobacco.

Health issues. The deleterious health effects of tobacco smoking have long been recognized. As early as the 19th century, isolated reports were circulated that cigar and pipe smoking caused cancer of the mouth. It was not until the 20th century—in fact, not until 1950—that firm evidence was established that lung cancer was directly related to cigarette smoking. Lung cancer is now the most common cause of cancer deaths in men of most Western countries. Because cigarette smoking became a popular and fairly widespread habit among men during World War II and because this disease has a long latency period, the rise in the incidence of lung cancer during the second part of the 20th century was expected. In the late 20th century, in many countries, as many as one-third of all cancer deaths in men and 10 percent of those in women are attributed to cigarette smoking. As the current trend of males to give up smoking continues, the male percentage will decline. Less optimistically, however, increasingly more women picked up the habit in the 1950s and '60s; the proportion of women dying from a tobacco-related cancer thus was increasing.

In general, the risk of developing a tobacco-related cancer depends on the intensity of the habit as determined by duration of the smoking habit, number of cigarettes smoked per day, tar content of the cigarette, and the depth of inhalation. Cigarette smoking not only is related to the development of lung cancer but also affects the development of cancer of the bladder, oral cavity, and esophagus. As noted, the risk of developing one of these cancers increases with the number of cigarettes smoked per day (one measure of the intensity of the exposure to tobacco). Studies have also shown that various cancer sites are affected differently by different tobacco products, as well as by different intensities. In general, however, those sites that come into direct contact with tobacco smoke—the lungs, oral cavity, and larynx—are those that are the most adversely affected by exposure to smoke.

Smoking is also a prime risk factor in cardiovascular system diseases. Nicotine is known to contract the blood vessels and to release hormones that raise the blood pressure. Both effects could have an adverse effect on the heart. Smokers have distinctly higher levels

of carbon monoxide in their blood than nonsmokers. Carbon monoxide readily combines with hemoglobin, causing many physiological effects. One is a decrease in the amount of hemoglobin available to carry oxygen and a resulting increase in the affinity for oxygen of the hemoglobin that is available. This in turn reduces the availability of oxygen to the tissues. It has been shown that even minute amounts of carbon monoxide decrease the exercise ability of patients with known coronary artery disease.

An additional important piece of epidemiological evidence linking smoking to disease is the fact that as individuals give up smoking, the risk of lung cancer, coronary artery disease, chronic bronchitis, emphysema, and other tobacco-related diseases declines. The speed and degree of this decline depends, as would be expected, on the duration and intensity of the smoking habit. Among those who have smoked more than 20 cigarettes a day for over 20 years, a minimum of three years must elapse after quitting before a decreased risk for cancer is evident; more than 10 years of abstinence is necessary before the degree of risk approaches that for those who have never smoked.

Controls. Public reaction to the reports of the health hazards has been to campaign for the reduction of smoking or, among users, to switch to cigarettes with filter-tips and to prefer brands made of milder tobaccos. There has been a drive by tobacco-producing countries to grow types with low nicotine and "tar" contents.

After the major medical revelations about smoking during the 1950s and 1960s there was an increasing attempt to lessen the influence of tobacco advertising in several countries. Cigarette manufacturers in Canada agreed to end television advertising on Jan. 1, 1972, after a bill to effect that end was passed in the Commons. In West Germany television advertising of cigarettes was to be phased out by the end of 1972. Following a report by Britain's Royal College of Physicians in January 1971 on the number of deaths from cancer, a health campaign was instituted which included warnings on cigarette packages and anti-smoking commercials. The U.S. television cigarette advertising ceased as of January 1971. An agreement reached in April 1971 with major U.S. tobacco companies required a health warning in other advertisements: the agreement subsequently became law. Another means of discouraging smoking was increased taxation. In some countries, especially in Europe, the tax on a pack of cigarettes increased dramatically in the late 20th century.

smoking, in food processing, the exposure of cured meat and fish products to smoke for the purposes of preserving them and increasing their palatability by adding flavour and imparting a rich brown colour. The drying action of the smoke tends to preserve the meat although many of the chemicals present in wood smoke, including formaldehyde and certain alcohols, are natural preservatives as well.

Smoking is one of the oldest of food preservation methods, probably having arisen shortly after the development of cooking with fire. The practice attained high levels of sophistication in several cultures, notably the smoking of fish in Scandinavia and northwestern North America and the production of smoked hams in Europe and the U.S. Interest in smoking meats, which had declined during the mid-20th-century owing to the popularity of chemical preservatives, was revived late in the century by the so-called natural or health food movement.

Whether done on a commercial or a home scale, the smoking technique involves hanging the meat or placing it on racks in a chamber designed to contain the smoke. Commercial smokehouses, usually several stories high, often use steampipes to supplement the heat of a natural sawdust fire. Hickory sawdust is the preferred fuel. Whatever the size of the smoking operation, it is imperative that a hardwood fire be used. The softwood of conifers such as spruce and pine contains pitch, which produces a film on the meat and imparts a bitter taste. Generally, smokehouse temperatures vary from 109° to 160° F (43° to 71° C), and smoking periods vary from as short as a few hours to as long as several days, depending on the type of meat and its moisture content. After smoking, the meat is chilled as rapidly as possible and cut and wrapped for the retail trade.

In the United States, pork and beef hams, bacon bellies, and sausages are the most common commercially smoked meats. However, amateurs using ordinary smoke ovens or adapting barbecue grills to the purpose have successfully used the smoking technique to flavour and preserve not only meat, fowl, and fish but also cheeses, nuts and seeds, hard-boiled eggs, and berries, as well as the variety meats including heart, tongue, and liver.

In order to shorten the production process, commercial meats are sometimes artificially "smoked" by dipping them in a solution of preservative chemicals or by painting them with such a solution. But because this procedure involves no natural drying action, it has practically no preservative effect.

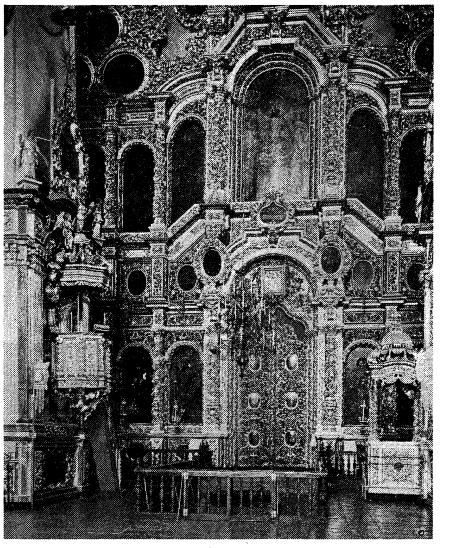
smoky bat, either of the two species of bat that constitute the family Furipteridae (genera *Furipterus* and *Amorphochilus*), found in the South American tropics. Small and delicately built, smoky bats range in size from about 3.7 to 5.8 centimetres (1½ to 2 inches), with tails from about 2.4 to 3.6 cm in length, and weighing about 3 to 5 grams (0.10 to 0.16 ounces). These slaty-gray or brown bats are notable for their reduced thumb, which is covered by the wing membranes right up to the base of the functionless claw. Smoky bats are rarely seen, and very little is known about their habits.

Smoky Hill River, river formed by two headstreams (North and South forks) that rise north of Cheyenne Wells, Cheyenne County, in eastern Colorado, U.S., and flow east into Kansas, continuing past Wallace to unite near Russell Springs. The main stream then continues in a generally eastward direction to Ellsworth, bending north at Lindsborg and northeast at Salina; it then flows past Solomon and Abilene to join the Republican River at Junction City, after a course of 560 mi (900 km), to form the Kansas River. The flood-control dam (1948), near Kanopolis in central Kansas, is part of the Missouri River Basin project. Chief tributaries are the Saline and Solomon rivers.

smoky quartz, very common, coarse-grained variety of the silica mineral quartz (*q.v.*) that ranges in colour from nearly black through smoky brown. No distinct boundary exists between smoky and colourless quartz. Its abundance causes it to be worth considerably less than either amethyst or citrine. Heating bleaches the stone, the colour sometimes passing through yellow; these yellow pieces are often sold as citrine. Crystals of the mineral frequently contain inclusions of gas (carbon dioxide), liquid (often both water and liquid carbon dioxide), or solids (rutile). Smoky quartz from Mt. Cairngorm, Scotland, is known as cairngorm and is a favourite ornamental stone in Scotland, where it is worn in brooches with Highland costume. Its properties are those of quartz (*see* silica mineral [table]).

Smolensk, *oblast* (administrative region), western Russian Soviet Federated Socialist Republic, occupying an area of 19,225 sq mi (49,800 sq km), mostly in the upper Dnepr River Basin. The terminal moraines of the Smolensk-Moscow Upland lie east–west across the *oblast,* rising to 1,050 ft (320 m) and dividing the Dnepr, Volga, and Western Dvina basins. Easy portages between the basins have made the area a focal route since earliest times. The natural vegetation of mixed forest has been largely cleared for agriculture and now covers only 18 percent of the surface, but there are many swamp areas of peat bog and grass marsh in valleys and hollows amid the hummocky morainic relief. Agriculture is dominated by flax cultivation (for which the *oblast* takes second place in the Russian S.F.S.R.), potato growing, and dairying. There are widespread and long-established linen-making, timber-working, and food-processing industries, with engineering in the larger towns. Smolensk city is the administrative centre. Pop. (1983 est.) 1,134,000.

Smolensk, city and administrative centre of Smolensk *oblast* (region), western Russian Soviet Federated Socialist Republic, on the Dnepr River. One of the oldest Russian cities, it was first mentioned in 863, when it was



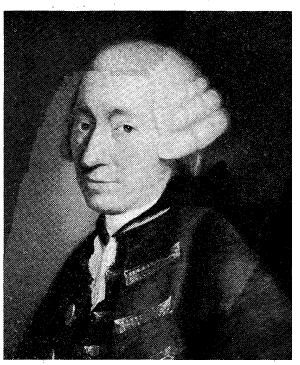
Interior of the Cathedral of the Assumption, founded in the 12th century, Smolensk, Russian S.F.S.R.
Shostal—EB Inc.

a key stronghold controlling the portages between the Dnepr and the Western Dvina and the route between the Moscow region and western Europe. This position gave it both trading importance and a remarkably stormy history. Sacked by the Tatars in their invasion of 1237–40, Smolensk passed to Lithuania and for over four centuries was the object of a bitter struggle between Lithuania-Poland and Russia. Sieges led to its capture by Moscow in 1340 and recapture by Lithuania in 1408; taken again by Russia by 1514, it fell in 1611 to the Poles and was finally taken by Russia in 1654. During Napoleon's invasion in 1812, a major engagement took place at Smolensk; on his retreat Napoleon vainly attempted to rally his army there. During World War II, in 1941 and 1943, bitter battles were fought in and around the city. The ravages of war have left few historic buildings, but several churches, including the Cathedral of the Assumption (17th–18th century), and part of the walls survive. Smolensk has engineering, linen, and other light industries as well as medical, veterinary, teacher-training, and physical-training institutes. Pop. (1983 est.) 321,000.

Smolensk Upland, Russian SMOLENSKAYA VOZVYSHENNOST, formerly SMOLENSK-MOSCOW UPLAND, ridge of high land, Russian Soviet Federated Socialist Republic, running in

a west-southwest to east-northeast direction across the Russian Plain from Orsha, southwest of Smolensk, to Yuryev-Polsky, northeast of Moscow, a distance of 420 miles (680 km). Marking the southern limit of the last glaciation, it consists of limestones in the east and glacial detritus, or disintegrated rocky material, in the west. Its maximum elevation is 1,050 feet (320 m). The route along the ridge is that which has been followed by many invaders of Russia, most notably by Napoleon in 1812.

Smollett, Tobias (George) (baptized March 19, 1721, Cardross, Dumbartonshire, Scot.—d. Sept. 17, 1771, near Livorno, Tuscany [Italy]), English satirical novelist, best known



Smollett, detail of an oil painting by an unknown artist, about 1770; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

for his picaresque novels *The Adventures of Roderick Random* (1748) and *The Adventures of Peregrine Pickle* (1751) and his epistolary novel *The Expedition of Humphry Clinker* (1771).

Smollett came of a family of lawyers and soldiers, Whig in politics and Presbyterian in religion. In 1727 or 1728 he entered Dumbarton grammar school, proceeding from there to the University of Glasgow and apprenticeship to William Stirling and John Gordon, surgeons of that city. His first biographer states that he "attended the anatomical and medical lectures," and, if his first novel, *Roderick Random,* may be taken as evidence, he also studied Greek, mathematics, moral and natural philosophy, logic, and belles lettres. He left the university in 1739 without a degree and went to London, taking with him his play *The Regicide.* A year later he was commissioned surgeon's second mate in the Royal Navy and appointed to HMS *Chichester,* which reached Port Royal, Jam., on Jan. 10, 1741. It is probable that Smollett saw action in the naval bombardment of Cartagena (now in Colombia). In Jamaica he met and was betrothed to—and perhaps there married—an heiress, Anne Lassells. He returned to London alone to set up as a surgeon on Downing Street, Westminster, his wife joining him in 1747. He failed to secure a production of *The Regicide,* but in 1746, after the defeat of the Jacobite rebels at Culloden, he wrote his most famous poem, "The Tears of Scotland." He had by now moved to cheaper accommodations in Chapel Street, Mayfair, no doubt because, despite litigation, he had managed to recover only a fraction of his wife's considerable dowry, which was invested in land and slaves. It was in Chapel Street that he wrote *Advice* and *Reproof,* verse satires in the manner of the Roman poet Juvenal.

In 1748 Smollett published his novel *The Adventures of Roderick Random,* a graphic account of British naval life at the time, and also translated the great picaresque romance *Gil Blas* from the French of Alain-René Lesage. In 1750 he obtained the degree of M.D. from Marischal College, Aberdeen. Later in the year he was in Paris, searching out material for *The Adventures of Peregrine Pickle.* This work contains a great comic figure in Hawser Trunnion, a retired naval officer who, though living on dry land, insists on behaving as though he were still on the quarterdeck of one of his majesty's ships at sea.

In 1752 he published "An Essay on the External Use of Water," an attack on the medicinal properties of the waters of a popular English health resort, Bath. The essay made him many enemies and little money. His financial difficulties were intensified by his generosity in lending money to a hack writer called Peter Gordon, who employed legal stratagems to avoid repayment. Smollett came to blows with Gordon and his landlord and was sued by them for £1,000 and £500, respectively, on charges of trespass and assault. In the event, Smollett was required to pay only small damages. He was now living at Monmouth House, Chelsea, where he was host to such leading literary figures as the authors Samuel Johnson and Oliver Goldsmith, as well as to the actor David Garrick and John Hunter, a famous surgeon and anatomist. On Sundays, if one may take a passage in *Peregrine Pickle* as autobiographical, Smollett threw his house open to "unfortunate brothers of the quill," whom he regaled with "beer, pudding, and potatoes, port, punch, and Calvert's entire butt-beer." He himself seems to have been a man irascible, pugnacious, infinitely energetic, courageous, and generous.

The Adventures of Ferdinand, Count Fathom (now, with *The History and Adventures of an Atom,* the least-regarded of his novels) appeared in 1753. It sold poorly, and Smollett was forced into borrowing from friends and into further hack writing. In June 1753 he visited Scotland for the first time in 15 years; his mother, it is said, recognized him only because of his "roguish smile." Back in London, Smollett set about a commitment to translate *Don Quixote* from the Spanish of Miguel de Cervantes, and this translation was published in 1755. Smollett was already suffering from tuberculosis. Early in 1756 he became editor of *The Critical Review,* a Tory and church paper, at the same time writing his *Complete History of England,* which was financially successful. A year later, his farce *The Reprisal: or, The Tars of Old England* was produced at Drury Lane and brought him a profit of almost £200. In 1758 he became what today might perhaps be called general editor of *Universal History,* a compilation of 58 volumes; Smollett himself wrote on France, Italy, and Germany. His friendship with the politician John Wilkes enabled him to secure the release of Francis Barber, Samuel Johnson's black servant, from the press-gang. But a libel on Admiral Sir Charles Knowles in *The Critical Review* led to Smollett's being sentenced to a fine of £100 and three months' imprisonment in the King's Bench Prison. He seems to have lived there in some comfort and drew on his experiences for his novel *The Adventures of Sir Launcelot Greaves* (1762), which was serialized in *The British Magazine,* of which Smollett became editor in 1760.

Two years later he became editor of *The Briton,* a weekly founded to support the prime minister John Stuart, 3rd Earl of Bute. He was also writing an eight-volume work entitled *The Present State of all Nations,* and he had begun a translation, in 36 volumes, of the varied works of the French writer Voltaire. Smollett was now seriously ill; attempts to secure a post as physician to the army in Portugal and as British consul in Marseille or Madrid were fruitless. In 1763 the death of his only child, Elizabeth, who was 15 years old, overwhelmed him "with unutterable sorrow." He severed his connection with *The Critical Review* and, as he said, "every other literary system," retiring with his wife to France, where he settled at Nice.

In 1766 Smollett published *Travels Through France and Italy,* his one nonfiction work that is still read. He returned to England in that year, visited Scotland, and at Christmas was again in England (at Bath), where he probably began what is his finest work, *The Expedition of Humphry Clinker,* an epistolary novel that recounts the adventures of a family traveling through Britain. In 1768, steadily weakening in health, he retired to Pisa, Italy. During the autumn of 1770 he seems to have written the bulk of *Humphry Clinker,* which was published on June 15, 1771.

Smollett is not the equal of his older contemporaries, the novelists Samuel Richardson and Henry Fielding, but he is unrivaled for the pace and vigour that sustain his comedy. He is especially brilliant in the rendering of comic characters in their externals, thus harking back to the manner of the Jacobean playwright Ben Jonson and looking forward to that of the novelist Charles Dickens. By modern criteria, his art as a satirical novelist is defective, his model being the "picaresque" novel, relating loosely linked episodes in the life of a rogue hero. But his panoramic picture of the life of his times is surpassed only by that given by Henry Fielding, while his account of conditions in the Royal Navy is especially valuable. (W.E.A.)

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Periodical journalism. Contributions to *The Critical Review* (1756–59); *The Briton* (1762–63).

Translations. *The Adventures of Gil Blas of Santillane,* 4 vol. (1748; no known copy); *The History and Adventures of the Renowned Don Quixote,* 2 vol. (1755); *Select Essays on . . . Useful Subjects* (1754); *The Works of Mr. de Voltaire,* 35 vol. (1761–65).

Poetry. "The Tears of Scotland" (*c.* 1746); "Ode to Independence" (1773).

Drama. *The Regicide* (1749); *The Reprisal* (1757).

Other works. "An Essay on the External Use of Water" (1752); *The History and Adventures of an Atom,* 2 vol. (1769); *A Complete History of England,* 4 vol. (1757–58); *Travels Through France and Italy,* 2 vol. (1766).

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Smolyan, formerly (until 1934) PASHMAKLI, town, southern Bulgaria, on the Cherna River in the southeastern Rhodope Mountains. Its elevation, 3,300 feet (1,000 m), makes it the highest town in Bulgaria. It is a local agricultural centre, with a timber industry and, more recently, mining. It is picturesquely lo-

cated among forests, lakes, and highlands. Pop. (1986 est.) 31,571.

Smon-lam chen-mo, also called MONLAM CHENMO (Tibetan: "Great Prayer"), most important Tibetan Buddhist celebration of the year, held annually as part of the New Year festivities in Lhasa at least up until 1959, when the People's Republic of China abolished the hierocratic government of the Dalai Lama.

Smon-lam was established in 1409 by Tsongkha-pa, founder of the Dge-lugs-pa ("Yellow Hat") sect, as a kind of yearly rededication of the country to the Buddhist faith. Prayer services were held three times daily in the Jokhang, the ancient sacred temple of Lhasa, and various ceremonies of expiation took place.

Smon-lam was observed during the first month of the new year (which fell in February according to the Tibetan calendar year or in March of the year after the intercalary month was added). It was preceded by three days of carnival and ritualistic masked dance (*'cham*) symbolizing the triumph of Buddhism over the old religion (Bon). During the days of Smon-lam, thousands of monks from outlying Dge-lugs-pa monasteries crowded Lhasa. Civil authority of the city passed over to the proctor of the 'Bras-spungs (Drepung) monastery, who marked the occasion by levying fines on the townspeople for disorderly conduct and unclean streets or houses.

Consult the INDEX *first*

smooth hound, any of a number of small sharks of the family Triakidae, among them the well-known smooth dogfish. *See* dogfish.

smooth muscle, also called INVOLUNTARY MUSCLE, muscle that shows no cross stripes under microscopic magnification. It consists of narrow spindle-shaped cells with a centrally located nucleus. Smooth-muscle tissue, which contracts slowly and automatically, constitutes much of the musculature of internal organs and the digestive system. *Compare* striated muscle.

smooth snake (*Coronella austriaca*), abundant snake of Europe and Asia Minor, belonging to the family Colubridae. It has smooth, glossy scales and is usually not more than 65 cm (26 inches) long.

It captures lizards, other small vertebrates, and insects. It and a water snake are the only colubrids in Scandinavia and the British Isles, and it is one of the most common snakes of central Europe.

smoothhead (fish): *see* slickhead.

smorgasbord, Swedish SMÖRGÅSBORD, in Swedish cuisine, buffet offering a variety of fish, cheeses, and hot and cold dishes. In the country districts of Sweden, it was customary for guests to contribute to the fare at large gatherings. The foods were set out on long tables from which the diners helped themselves. By the 18th century, festive meals were preceded by appetizers from a *bannvinsbord,* offering aquavit, herring, and other delicacies.

A modern smorgasbord may be a simple appetizer table offering the essential bread, butter, cheese, and pickled and marinated herring, or an elaborate display of scores of hot and cold dishes, including herring prepared a dozen ways, pâtés, cold meats, and salads, and Swedish specialties such as *gravlax* (marinated salmon), meatballs, and "Jansson's temptation," a casserole of potatoes, onions, anchovies, and cream.

The Operakalleren restaurant in Stockholm is credited with reestablishing and perfecting the smorgasbord after World War II.

smother crop, crop sown to suppress persistent weeds. Among the most effective smothering crops is alfalfa, which competes successfully against many weeds for growth space. Sometimes the desired crop plant can be planted so densely that it shades and "chokes out" weedy growth. Annual weeds are generally easier to smother than perennials, particularly such perennials as bindweed, Canada thistle, perennial sow thistle, and quack grass.

Smowhola (American Indian cult leader): *see* Smohalla.

Smrčiny (central Europe): *see* Fichtelgebirge.

Smṛti (Sanskrit: "Recollection"), that class of Hindu sacred literature based on human memory, as distinct from Vedic literature, which is considered to be *Śruti,* or revealed. *Smṛti* literature elaborates, interprets, and codifies Vedic thought but, being derivative, is considered less authoritative than the Vedic *Śruti.* Most modern Hindus, however, have a greater familiarity with *Smṛti* scriptures. The texts include the important religious manuals known as the *Kalpa-sūtras*; the compilations of ancient myth, legends, and history, the *Purāṇas*; and the two great epics of India, the *Rāmāyaṇa* and the *Mahābhārata.* The latter contains within it probably the single most influential text in Hinduism, the *Bhagavadgītā.* In time the term *Smṛti* came to refer particularly to the texts relating to law and social conduct, such as the celebrated lawbook, the *Manu-smṛti* ("Tradition of Manu").

smṛtyupasthāna (Sanskrit: "application of mentality"), Pāli SATIPAṬṬHĀNA, in Buddhist philosophy, one of the preparatory stages of meditation practiced by Buddhist monks aiming for bodhi, or enlightenment. It consists of keeping something in mind constantly. According to the 4th- or 5th-century text *Abhidharmakośa,* there are four types of meditation of this kind: (1) the body is impure, (2) perception is the cause of pain, (3) the mind is transient, and (4) everything is without eternal substance. Practicing each of these meditations at first separately, then together, the adept leads himself to the more advanced stage of meditation. The purpose of these four types of meditation is to keep in mind that these bodily and mental functions have no eternal substance and thus to rid oneself of false views contrary to the contents of these four types of meditation. The *samyak-smṛti* (right recollection), which is the seventh way of the noble Eightfold Path (*āryāṣṭāṅgamārga*), is usually considered to refer to this *smṛtyupasthāna.*

smudge pot, device, usually an oil container with some crude oil burning in the bottom, used in fruit orchards, especially citrus groves, to provide protection against frost. The smoke serves as a blanket to reduce heat losses due to outgoing radiation. Because of the air pollution they generate smudge pots have been generally supplanted by other means of frost protection, such as smokeless burners using natural gas.

smuggling, conveyance of things by stealth, particularly the clandestine movement of goods to evade customs duties or import or export restrictions.

Smuggling flourishes wherever there are high-revenue duties (*e.g.,* on tea, spirits, and silks in 18th-century England, coffee in many European countries, and tobacco almost everywhere) or prohibitions on importation (narcotics) or on exportation (arms and currency).

Smuggling is probably as old as the first tax or regulation on trade. In the 18th century, tea, tobacco, spices, silks, and spirits were smuggled into England in quantities exceeding those brought in legitimately. In France smuggling against the tobacco monopoly and the exorbitant tax on salt became widespread. Britain could not enforce its mercantilist policy of requiring its colonies to trade with the rest of the world only through the mother country, and by 1744 more than 40 vessels from the American colonies were trading directly with the Spanish empire.

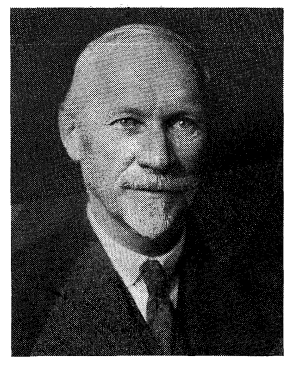
Attempts by the Chinese government to stop the smuggling of opium led to the opium war of the 1840s. British India in the 19th century suffered smuggling of salt between states with different tax rates, while smuggling of all kinds of dutiable goods occurred between Goa and India and between Gibraltar and Spain. In the latter half of the 19th century, smuggling developed in Africa, particularly of spirits from the Portuguese colonies into the Boer states and from French colonies into the Gold Coast and Nigeria.

During the 13 years of the prohibition of the sale of liquor in the United States (1920–33), fleets of ships carried liquor from Europe and the West Indies to the Atlantic coast, while truckloads were run all along the Canadian frontier. In the second half of the 20th century, such drugs as heroin, cocaine, and cannabis were products for smuggling worldwide.

Methods of smuggling change little; all are variants of two main techniques: the undetected running of cargoes across frontiers and the concealment of goods in unlikely places on ships or cars, in baggage or cargo, or on the person.

smut, disease of cereals, corn (maize), grasses, onion, and sorghum, caused by many species of fungi. It is characterized by resting bodies (spores) that accumulate in sootlike masses called sori, formed within blisters in seeds, leaves, stems, flower parts, and bulbs. The sori usually break up into a black powder that is readily dispersed by the wind. Many smut fungi enter embryos or seedling plants, develop systemically, and appear externally only near maturity. Other smuts are localized, infecting actively growing tissues. Control includes growing resistant varieties in noninfested soil, treating seeds with a fungicide, using disease-free transplants, and destroying infected plants or plant parts before the spores are released. *See also* bunt; corn smut.

Smuts, Jan (Christian), Christian also spelled CHRISTIAAN (b. May 24, 1870, Bovenplaats, near Riebeeck West, Cape Colony [now in South Africa]—d. Sept. 11, 1950, Irene, near Pretoria, S.Af.), South African statesman, soldier, and prime minister (1919–24, 1939–48), who sought to promote South Africa as



Smuts
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a responsible member of the (British) Commonwealth.

Early life and career. Jan Christian Smuts was born on a farm near Riebeeck West in the Cape Colony. His ancestors were mainly Dutch, with a small admixture of French and German but no English, though he was born a British subject. Until he went to school at the age of 12, Smuts lived the life of a South African farm boy, taking his share in the work

of the farm, learning from nature, and developing a life-long love of the land. Many years later, when asked by an American botanist why he, a general, should be an authority on grasses, Smuts replied, "But my dear lady, I am only a general in my spare time."

At 16 he went to Victoria College (subsequently the University of Stellenbosch), where he studied science and arts and obtained first-class honours in both. At Stellenbosch he fell in love with a fellow student, Isie Krige, whom he later married and who remained a source of strength through the stresses and strains of an eventful life.

In 1891 he obtained a scholarship and entered Christ's College, Cambridge, where he read law and was generally recognized as one of the most brilliant law students Cambridge had had. He was the first ever to take both parts of the law tripos examinations in the same year, and in both he came first. From Cambridge he went to London, where he came first in the Inns of Court honours examination and was awarded two prizes. It seemed clear that a distinguished academic career lay ahead of him; nevertheless, Smuts wanted to return to South Africa.

Apart from law he read widely in philosophy, poetry, and science, and it was at this time that he first read the poems of Walt Whitman. Many years later he compared the effect that Whitman had on him to St. Paul's experience on the road to Damascus. Whitman's conception of natural man liberated him, he believed, from the sense of sin induced by a strict Calvinist upbringing. Before he left England he wrote a book about Whitman but failed to find a publisher.

Returning to Cape Town in 1895, Smuts was at once drawn into politics. At first he supported Cecil Rhodes, prime minister of Cape Colony. But the raid of L.S. Jameson on the Transvaal destroyed his confidence in Rhodes, and, finding himself without political attachment and with insufficient legal work, Smuts decided to move to Johannesburg. At the end of 1897 he married Isie Krige, moving to Pretoria a year later when he was appointed state attorney by Pres. Paul Kruger. At the age of 28 he was thus at the centre of Transvaal politics and, in effect, at the centre of South African politics. From then until his death he was continuously involved in South African and world affairs.

Role in the Boer War. For the first nine months of the South African (Boer) War, which began in October 1899, Smuts was part official and part soldier, moving between Pretoria and the front. When Pretoria was occupied by the British he became a full-time soldier, eventually receiving an independent command. He was an apt pupil in the guerrilla tactics that were so successfully exploited against the overstretched British lines of communication. In April 1902 he invaded the Cape Colony—to within 120 miles (190 kilometres) of Cape Town, but by then his force was too little and too late. When the war ended he had to be recalled, under British escort, to take part in drafting peace terms.

The Boers lost their independent republics, but Smuts remained firm in his belief in the future of a united South Africa. He returned to Pretoria and family life but was inevitably drawn into public affairs. He and Gen. Louis Botha combined to oppose the high commissioner Alfred Milner's narrow interpretation of the peace terms and to insist on Boer rights. It was a remarkable partnership, in which Smuts supplied the intellectual vigour and Botha a deep knowledge of his fellow men and great wisdom in dealing with them. Their first objective was responsible government for the two former republics; after that would come union of the four colonies. Smuts played a major role in the achievement of responsible government for the Transvaal (1906) and the Union of South Africa (1910).

When Smuts went to England at the end of 1905 to urge the Cabinet to give the Transvaal self-government he came to know a new English world. At Cambridge he had known few Englishmen, and after his return to South Africa he had to devote his energies to fighting the British. But from 1905 his personal friends in England were the intelligent, liberal-minded people whom he now began to meet. To them he escaped from the exacting and exhaustingly boring official social life of London; with them he found the intellectual and spiritual refreshment that, because of long absences, he too seldom enjoyed at home. He had the reputation of being cold and aloof, but among his friends and in his own family circle he was a different man—relaxed and genial, fond of and easy with children.

Role in World War I. Just as Smuts was drawn into the public life of his own country, so, after the outbreak of World War I, he was drawn into international affairs. When he and Botha had suppressed rebellion in South Africa, conquered South West Africa, and launched a campaign in East Africa, he went to England for an imperial conference (March 1917). Prime Minister Lloyd George at once recognized his abilities and made him minister of air. From then on he was used in a variety of tasks. He organized the Royal Air Force and was concerned in all major decisions about the war. At the peace conference at Versailles, the English economist J.M. Keynes regarded him as the greatest protagonist of a moderate peace that would not crush Germany, and he may justly be called one of the principal progenitors of the League of Nations.

A few months after their return from Versailles, Botha died, and Smuts became prime minister. Nearly five years later he was defeated by a coalition of the Nationalist and Labour parties and remained in opposition until 1933, when he and J.B.M. Hertzog joined forces against the more extreme nationalists. Smuts was content to serve under Hertzog, but they were in deep disagreement about whether South Africa should go to war if Britain did. When the crisis came in September 1939 Smuts's view prevailed by a narrow majority of 13 in Parliament. Smuts became prime minister, and South Africa declared war on Germany.

During World War II South Africa played a much greater part than in World War I, but Smuts himself was not as important a figure as he had been during 1914–18. He was consulted by Sir Winston Churchill and other Allied leaders, but his main role was to prevent Germany and Italy from conquering North Africa. Once that objective was achieved, he and his country became of relatively minor importance. Smuts represented South Africa at the 1945 San Francisco Conference at which the Charter of the United Nations was drafted.

At the general election of 1948 Smuts's party was defeated by the Nationalists. D.F. Malan became prime minister, and one of his first acts was to offer Smuts an official airplane to go to Cambridge, where he was to be installed as chancellor, an offer that Smuts accepted. Two years later, at his home near Pretoria, he died.

Assessment. Despite his great abilities and achievements, Smuts was not a popular leader—he had a subtle and sophisticated mind, was impatient, could not tolerate mediocrity, was immensely hardworking, and had no time for the sociabilities that make for popularity. For almost half his lifetime—from 1912 to 1950—he was derided, mistrusted, reviled, and even hated by an increasing majority of his fellow Afrikaners. He was called a lackey of the empire and a betrayer of his own people. Before and during the South African War he was staunchly anti-British and in favour of a united Afrikaner people.

In 1917 and 1919 he persuaded British statesmen to grant dominion status and (in 1920) to drop the word empire. It was believed by some that Smuts was trying to break up the empire. In fact, he knew that the only way to preserve it was to allow as much independence as possible to its components. Nationalist Afrikaners knew this, too—hence, their detestation of Smuts. He was a great South African; they wanted him to be a great Afrikaner. He wanted an independent South Africa closely linked with the Commonwealth; they wanted an independent republic outside the Commonwealth. Ten years after his death the Nationalists achieved their aim.

(L.Ma.)

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Smuxale (American Indian cult leader): *see* Smohalla.

Smybert, John: *see* Smibert, John.

Smyrna (ancient city, Turkey): *see* İzmir.

Smyrna, town, Kent County, central Delaware, U.S., near the Smyrna River. Established in 1768, it was known as Duck Creek Cross Roads (for its location on the creek that flows into the Smyrna River) until 1806, when it was renamed for the biblical Asia Minor seaport. In 1792, a piqued state assembly, barred from the State House at Dover by a sheriff, met in the village tavern and named Duck Creek Cross Roads the state capital; the resolution was repealed later in the session by a calmer assembly. By the mid-19th century, Smyrna had become a busy shipping point for central Delaware produce. The town is now an agricultural, shipping, and industrial centre. A number of historical buildings, including Allee House (1753) and The Lindens (pre-1725), have been preserved. Lake Como, a reservoir (fishing) nearly a mile long, is nearby. Inc. 1859. Pop. (1980) 4,750.

Smyrna carpet, any large, coarse carpet handwoven in western Anatolia and exported



Smyrna carpet from Anatolia, 18th century; in the Textile Museum, Washington, D.C.

Textile Museum Collection, Washington, D.C.; photograph, Otto E. Nelson—EB Inc.

by way of İzmir (Smyrna). Probably, Smyrna carpets originally represented the production of the town of Uşak, to which was added in the late 19th and early 20th centuries the large carpets newly developed at such centres as Ghiordes, Kula, and Demirci.

The name Smyrna has been applied more specifically to a pattern, usually seen in small examples, that represents a degenerate form of a floral pattern used in the Ottoman court production of the 16th and 17th centuries. Since these 18th- or 19th-century Smyrna carpets are rare, it is probable that more imitations than originals exist.

Smyth, John, Smyth also spelled SMITH (d. August 1612, Amsterdam), English religious libertarian and Nonconformist minister, called "the Se-baptist" (self-baptizer), who is generally considered the founder of the organized Baptists of England. He also influenced the Pilgrim Fathers who immigrated to North America in 1620.

Most of Smyth's early years are obscure, but it is known that he studied at Christ's College, Cambridge, where he was a fellow during 1594–98. He was a city preacher at Lincoln from 1600 to 1602, but he renounced Anglicanism in 1606 and became minister at Gainsborough, Lincolnshire, to a group of Separatists who had similarly abandoned the Church of England.

For two years with John Robinson, the minister to the Pilgrims in England and later in Holland, Smyth helped organize Separatists in Nottinghamshire. In 1608 both Smyth and Robinson went with their followers to Amsterdam. Adopting Baptist principles there, Smyth baptized first himself and then others, including Thomas Helwys, later an influential London Baptist.

He admitted that "wee are inconstant in erroer" and frequently revised his convictions according to conscience, a characteristic that naturally caused divisions among his congregation. When he was excommunicated by it, he sought in vain a favourable reception from Dutch Mennonites. He eventually rejected the doctrine of original sin and asserted the right of every Christian to hold his own religious views. Among Smyth's works is *The Differences of the Churches of the Separation* (probably 1608 or 1609).

Smythe, Conn, also called KARRY SMYTHE, byname of CONSTANTINE FALKLAND CARY (b. Feb. 1, 1895, Toronto—d. Nov. 18, 1980, Caledon, Ont., Can.), Canadian ice hockey player, coach, manager, and owner, who founded the Toronto Maple Leafs in the National Hockey League (NHL).

Smythe was educated at the University of Toronto, receiving his engineering degree in 1920. Both before and after World War I, in which he served in the artillery (1915–17) and the air force (1917), he played hockey at the university and coached the varsity (1927) and the Canadian Olympic Games team (1928), which won a gold medal.

In 1927 he organized the New York Rangers in the NHL, and when the club was taken over by Lester Patrick (*q.v.*), he acquired the franchise of the Toronto St. Patricks, which he renamed the Maple Leafs. The team won seven Stanley Cups (1932, 1942, 1945, 1947–49, and 1951) before he sold the club in 1960 to a group led by his son Stafford. In 1931 he built the Maple Leaf Gardens, in which the Leafs played. He introduced coast-to-coast Canadian broadcasting of Maple Leaf games. From 1964 the Maple Leaf Gardens awarded the Conn Smythe Trophy annually for the best player in the Stanley Cup playoffs. When the NHL was expanded, the Conn Smythe Division was named in his honour.

Smythe commanded an antiaircraft battalion in World War II. After retirement from hockey, Smythe built a Thoroughbred breeding and racing operation; his horses won the Queen's Plate and the Canadian Oaks three times each.

Smythe, Sir Thomas, Smythe also spelled SMITH (b. 1558?, Ostenhanger, now Westenhanger, Kent, Eng.—d. Sept. 4, 1625, Sutton-at-Hone, Kent), English entrepreneur in the Virginia Company that founded the Virginia colony. He also financed numerous trade ventures and voyages of exploration during the early 17th century.

A member of the London Haberdashers' and Skinners' companies from 1580, he accumulated a considerable fortune from commerce. Besides holding official posts, he was also organizer (1600) and, except for the period 1606–07, governor of the East India Company until 1621. He was knighted in 1603 and served as governor of the Muscovy and French companies and special ambassador to the tsar of Russia (1604–05). Smythe obtained the charter of the Virginia Company in 1609 and was treasurer until 1618, when charges of embezzlement, later proved to be false, forced his resignation. His labour, perseverance, and money were largely responsible for the success of the Virginia colony.

As governor of the Somers Islands (Bermuda) Company, organized in 1615, Smythe developed the Bermuda Islands with close economic and political ties to Virginia. He also was a major promoter of voyages to find a Northwest Passage to the Orient; Smith Sound (between Ellesmere Island and Greenland) was named in his honour by its discoverer, William Baffin.

snail, a gastropod (*q.v.*), especially one having an enclosing shell, into which it may retract completely for protection. A gastropod lacking a shell is commonly called a slug or sea slug.

snailfish, also called SEA SNAIL, any of about 115 species of marine fish often placed with the lumpsuckers in the family Cyclopteridae, but sometimes separated as a distinct family, Liparidae (order Scorpaeniformes). Snailfish are small, growing to a maximum length of about 30 centimetres (12 inches). They are elongated, soft, tadpole-shaped fish with loose and scaleless, though sometimes prickly, skins. There is a long dorsal fin on the back and usually a sucking disk below the head. The disk is formed from the pelvic fins and is used for attachment to the bottom.

Snailfish are found in cold water—in the North Atlantic and North Pacific and the Arctic and Antarctic seas. Some, such as the sea snail (*Liparis liparis*) of the North Atlantic, live in shore waters; others, such as the pink-coloured species of the genus *Careproctus,* inhabit the deep sea.

snake, also called SERPENT, a reptile (suborder Serpentes) whose most distinctive features—lack of limbs (vestiges are present in a few snakes), reduction or absence of one lung, and elongation of internal organs—are associated with the long, slender body shape.

A brief treatment of snakes follows. For full treatment, *see* MACROPAEDIA: Reptiles.

Snakes are closely related to lizards (suborder Sauria), with which they constitute the order Squamata and from which they are believed to have evolved. Certain lizards, in fact, closely resemble snakes, being long, slender, and limbless, but they are easily distinguished from snakes by the possession of eyelids and external ear openings.

Snakes range in size from about 12 centimetres (5 inches) to about 9.5 metres (31 feet). The size limits are difficult to ascertain with accuracy because the smallest species, the thread snakes of the Middle East, are secretive, poorly known burrowers, and the largest, the reticulated python (*Python reticulatus*) of Asia and the anaconda (*Eunectes murinus*) of South America, rarely survive to reach maximum size. Snakes grow continuously, though at decreasing rates, throughout their lives. Snakes inhabit all continents, but few species are found in regions with long winters, and the greatest diversity occurs in the tropics. They do not, however, occupy many of the world's islands.

snake eel, any of numerous marine fishes in the family Ophichthidae (order Anguilliformes). Representatives of the more than 200 species are found throughout the world, mostly in tropical or temperate waters. These snakelike creatures are more benign than their aggressive relatives, the morays. The tail of the snake eel is pointed and sharp compared with the flattened tail of the moray. The snake eel uses its tail to burrow backward into the sea bottom, creating a protective burrow. The spotted snake eel (*Ophichthus ophis*) of the southern Atlantic and Caribbean attains a length of 120 centimetres (4 feet).

snake gourd, either of two rapid-growing vines (*Trichosanthes anguina* and *T. cucumeroides*), of the gourd family (Cucurbitaceae), native to southeastern Asia and Australia but cultivated throughout the world for its edible, oddly shaped fruits. A snake gourd plant has two- or three-forked tendrils, white flowers that have long fringes on the petals, and, in the former species, long, slightly ribbed green fruits, often 1.5 to 2 metres (5 to 6 feet) in length, that taper at each end. *T. cucumeroides* has ovoid fruit 5 to 8 centimetres (2 to 3 inches) long, which when dried can be used as a soap substitute.

snake-necked turtle, any member of the family Chelyidae. Snake-necked turtles, like side-necked turtles (Pelomedusidae), withdraw the head by bending the neck sideways, rather than retracting it backward into the shell as other turtles do. About 10 genera and 35 species of snake-necked turtles are found in South America, Australia, and New Guinea. Some members of the family have exceedingly long, snakelike necks. The species *Chelodina longicollis* is a docile, long-necked, brown or black turtle with a shell about 12 centimetres (5 inches) long. It is the best known of the snake-necked turtles native to the Australian region.

One of the most unusual of turtles is the matamata (*Chelus fimbriatus*), a South American member of the Chelyidae. The matamata grows to a shell length of about 30–40 cm, has webbed feet, a large but weak-jawed mouth, and a rough, bumpy shell. Its eyes are small and set far forward, and the snout extends as a proboscis. The flat head and the long, flat neck are covered with numerous fringelike projections of skin. The matamata is aquatic and feeds on fishes and crustaceans. It catches its food by opening its mouth suddenly and drawing the prey into its mouth in a rush of water. Other members of the family Chelyidae include *Emydura* of New Guinea and Australia and the long-necked *Hydromedusa* of South America.

Snake River, largest tributary of the Columbia River and one of the most important streams in the Pacific Northwest section of the United States. It rises in the mountains of the Continental Divide near the southeastern corner of Yellowstone National Park in Wyoming and flows south through Jackson Lake along the eastern base of the Teton Range in Grand Teton National Park. Swinging northwest near the mouth of Greys River, it enters Idaho through the Palisades Reservoir. Near Heise the river leaves the mountains and crosses the broad Snake River Plain of southern Idaho, an area covered by lava beds. On the western edge of the state, it is joined by the Boise River. Turning north, it forms the Oregon–Idaho boundary for 216 mi (348

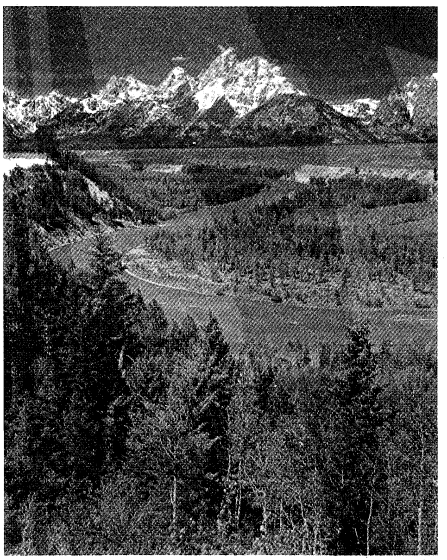
km). From the northeastern corner of Oregon it forms the Washington–Idaho boundary to Lewiston, Idaho, and then turns west to join the Columbia just south of Pasco, Wash., after a course of 1,038 miles (1,670 km).

Runoff from the states of Wyoming, Utah, Nevada, Idaho, Oregon, and Washington combines in the Snake, which has a drainage basin of 109,000 square miles (282,000 square km). From elevations of 10,000 feet (3,000 m), the river descends to 300 feet (90 m).

The Upper Snake River, above King Hill, Idaho, is used for irrigation and hydropower. The main stream is regulated by several dams and reservoirs, the most expansive being American Falls Dam and Reservoir. In 1976 the Teton Dam collapsed, causing disastrous flooding of the Upper Snake River valley. Principal tributaries below Heise are Henrys Fork (the largest), Blackfoot, Portneuf, Raft, and Big Wood rivers. Henrys Fork and Big Wood enter the Snake from the north. Other northern side streams sink into the Snake River plain and become part of an immense underground reservoir. Twin Falls and Shoshone Falls, with drops of 65 and 212 feet (20 and 65 m), respectively, are located near Twin Falls city, downstream from Milner Dam.

The Middle Snake River, from King Hill to Weiser, Idaho, is used primarily for hydroelectric generation. Most of the irrigation in this section is from tributary streams, principally the Payette, Owyhee, Malheur, and Boise rivers.

The Lower Snake River, from Weiser to the mouth, flows through a gorge 1 mile (1.6 km)



Snake River in Grand Teton National Park, Wyoming
R. Ruhoff—Shostal/EB Inc.

deep known as Hells Canyon (*q.v.*), the deepest river gorge in North America. The Salmon River, its largest tributary, joins the Snake near the downstream end of the canyon section.

snakebird, also called DARTER, or ANHINGA, any bird of the family Anhingidae (order Pelecaniformes), sometimes regarded as a single species, *Anhinga anhinga,* with geographical variants. A large (about 90 cm [35 inches] long), slender, long-necked water bird, it is mostly black, with silvery wing markings. Males, glossed with green, develop pale head plumes and a dark "mane" in breeding season; females are plainer, with brownish foreparts year-round. The snakebird is found in tropical to warm temperate regions except in Europe and lives in small colonies along lakes and rivers. It swims nearly submerged, with its head and neck showing above water and darting snakelike from side to side. The bird



Snakebird (*Anhinga anhinga*)
James R. Simmons—EB Inc.

spears fish, which it carries ashore in its serrated bill.

snakebite, a wound resulting from penetration of the flesh by the fangs of a snake, especially a snake secreting venom through or near the fangs. A bite by a snake known to be nonvenomous is treated as a puncture wound. A bite by a venomous snake may be serious, depending on the size of the victim, the location of the bite, the amount of venom injected, the speed of absorption of the venom into the victim's circulation, and the amount of time between the bite and the application of specific antivenin therapy.

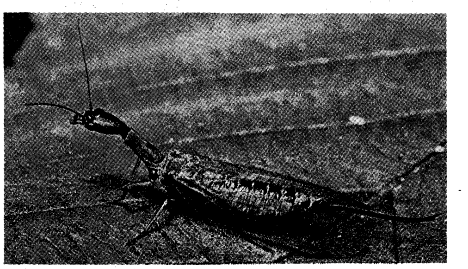
Snake venom contains a number of enzymes or proteinaceous substances, present in varying amounts according to the species of snake, which attack the blood, the nervous system, or other tissues. Some venoms produce direct toxic effects, but not all of them are lethal to human beings. Some are systemically lethal (*e.g.,* the venom of the rattlesnake), whereas some are destructive primarily to tissue in the vicinity of the bite but may cause the development of gangrene.

First aid in cases of snakebite on the extremities (by far the most commonly bitten areas) consists of the immediate immobilization of the limb in a horizontal position and the application of a broad, firm bandage on the bitten area and around the entire limb if possible; a splint is recommended. Cutting and suction of the wound and the application of arterial tourniquets are inadvisable. Exertion and excitement should be avoided to prevent an increase of the pulse rate and consequent increased circulation; for the same reason, stimulants should be avoided. The application to the wound of such substances as ice or potassium permanganate is likely to be harmful rather than helpful.

Most types of snake-venom poisoning can be treated with the use of antivenins. Prepared by the immunization of animals (especially horses) against the venoms, the effectiveness of the antivenin depends upon its specificity, its antibody content, and the degree of purification or concentration of the product. Although the use of a specific antivenin is preferable in the treatment of a particular snakebite, some antivenins may protect against the venom of various related snakes. For example, the antivenin for the tiger snake (*Notechis scutatus*) is also effective against the venoms of several other snakes. *See also* venom.

snakefly, any insect of the neuropteran order Raphidiodea of about 80 species, easily recognized by its small head and long, slender "neck," which is actually the elongated prothorax. The snakefly, about 15 mm (0.6 inch) long, has two pairs of similar, net-veined wings, long antennae, and chewing mouthparts. The female has a long ovipositor for laying eggs.

The life cycle includes egg, larva, pupa, and adult. The active and carnivorous larvae live beneath loose tree bark. The snakefly is found



Snakefly (*Raphidia adnixa*)
E.S. Ross

on every continent except Australia and is considered beneficial to humans because it destroys the larvae and pupae of insects.

snakehead, any of a number of species of freshwater fish of the family Channidae, found in Africa and Asia. Snakeheads, long-bodied and more or less cylindrical in cross section, have large mouths and long, single dorsal and anal fins; they range from about 10 to 90 cm (4 to 36 inches) long. Snakeheads are able to breathe atmospheric air with the aid of a pair of vascular cavities located near the gills. Carnivorous in habit, they can survive for extended periods out of water. In some areas, they are used as food.

snapdragon, any herbaceous plant of the genus *Antirrhinum* (family Scrophulariales; *q.v.*), of which there are about 40 species native to western North America and the western Mediterranean region. The flowers are tubular, bilaterally symmetrical, and usually large with a closed, liplike mouth that excludes most insects but can be forced open by strong bees, the main pollinators.



Common snapdragon (*Antirrhinum majus*)
Carlo Bevilacqua—SCALA from Art Resource/EB Inc.

Snapdragons are popular garden plants, and many horticultural varieties exist. *Galvezia speciosa,* a related plant, is also called snapdragon.

snapper, any of about 250 species of fishes of the family Lutjanidae (order Perciformes). Snappers are found, often in abundance, throughout the tropics. Active, schooling fishes with elongated bodies, large mouths, sharp canine teeth, and blunt or forked tails, snap-

pers are usually rather large, many attaining a length of 60–90 centimetres (2–3 feet). They are carnivores and prey on crustaceans and other fishes.



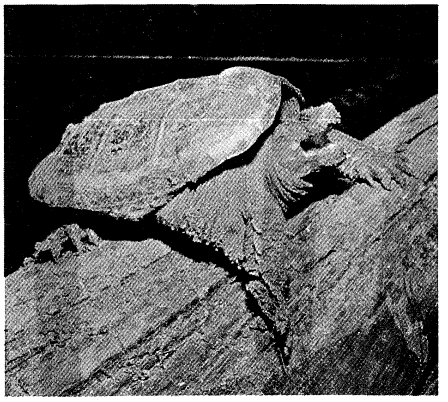
Red spot snapper (*Lethrinus variegatus*)
Douglas Faulkner

Snappers are valuable and well-regarded food fishes. Some, however, such as the dog snapper (*Lutjanus jocu*) of the Atlantic, may contain a toxic substance and cause ciguatera, a form of poisoning. The better known species of snapper include the emperor snapper (*L. sebae*), a red and white Indo-Pacific fish; the gray, or mangrove, snapper (*L. griseus*), a gray, reddish, or greenish Atlantic fish; the red spot snapper (*Lethrinus variegatus*);the yellowtail snapper (*Ocyurus chrysurus*), a swift-moving Atlantic species with a broad, yellow stripe from the nose to the wholly yellow tail; and the red snapper (*Lutjanus campechanus*), a bright-red fish (one of several red-coloured snappers) famed as food and found in rather deep Atlantic waters.

The bluefish (*q.v.*), of the family Pomotomidae, is also sometimes called a snapper.

snapping beetle: *see* click beetle.

snapping turtle, either of two species of edible freshwater turtles (family Chelydridae) named for their method of biting. Snapping turtles are found in North and Central America and are noted for their large size and aggressive nature. They are tan to black in colour and have a rough upper shell, a small, cross-shaped lower shell, a long tail, and a large head with hooked jaws. The female in both species lays clutches of 20 to 40 eggs; the young at hatching have shells about 2.5–4 centimetres (1–1.5 inches) long. Snapping turtles have long been valued as food.



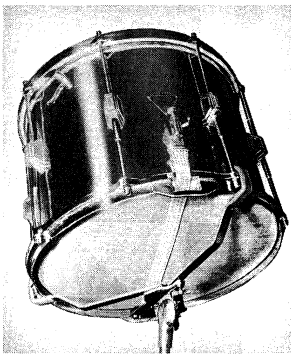
Snapping turtle (*Chelydra serpentina*)
Walter Dawn

The common snapping turtle (*Chelydra serpentina*) is widespread from Canada to Central America. It is distinguished by a saw-edged crest on the upper side of its tail and averages 20–30 cm (8–12 in.) in shell length and 4.5–16 kilograms (10–35 pounds) in weight. When young it has three longitudinal ridges on the upper shell; these become worn down with time. The common snapping turtle is often found buried in mud in shallow water. It is omnivorous and in the water is usually unaggressive; on land, it may lunge and snap.

The alligator snapping turtle, *Macrochelys* (or sometimes *Macroclemys*) *temmincki*, is the largest freshwater turtle in the United States. It is found in southern and central regions and is a sluggish turtle with three prominent longitudinal ridges on the upper shell. Shell length is about 40–70 cm (16–28 in.); weight ranges from about 18 to 70 kg (40 to 155 lb) with a record of about 100 kilograms. The alligator snapping turtle has a wormlike appendage on the floor of its mouth. It often lies quietly on the bottom, mouth open, and lures fishes within reach by means of this structure. It also eats plants. Fossil snapping turtles have been found in Miocene deposits in Europe and North America.

snaps (distilled liquor): *see* aquavit.

snare drum, also called SIDE DRUM, military and orchestral percussion instrument having several gut, nylon, wire, or wire-covered silk strings (snares) stretched across the lower, or snare, head; the snares vibrate sympathetically with the lower head (to which vibration is transmitted from the upper, or batter, head by air vibrations inside the drum), causing a snappy, penetrating, relatively high-pitched sound. The modern snare drum has a cylindrical shell of wood, plywood, or metal 5–12 inches (13–30 centimetres) high and 14–16 inches (35–40 centimetres) in diameter; deeper models, called field or guard's pattern drums, are used in many military bands. The heads, beaten with two tapered wooden sticks ending in small knobs, are of calfskin or plastic. They are held in place by a flesh hoop (around which the membrane is lapped) and a counterhoop. Membrane tensioning is by screws that act independently on each head, by metal rods, or, now chiefly in military bands, by rope lacings.



Modern side drum showing snares
From Anthony Baines (ed.), *Musical Instruments Through the Ages*, © Penguin Books Ltd., 1961

Snares were known in ancient Egypt and occur on many modern Middle Eastern tambourines. In medieval Europe they appeared on the upper head or sometimes both heads of the tabor drum. Large versions of the tabor developed into the side drum when two sticks, rather than one, were adopted and the snares were transferred to the lower head. It was suspended at the player's left side by a belt or a shoulder strap and was paired with the fife in Swiss infantry (*lansquenet*) regiments from the 14th century onward, subsequently spreading throughout Europe. The military role of the *lansquenet*'s drum was crucial: it kept the marching pace and beat signals to action.

Early forms of the side drum were equal to or slightly greater in height than in diameter. They utilized thicker membranes and sticks than modern instruments, producing a heavier, less brilliant sound. The drum changed most drastically in the 19th century, becoming shallow, and often gaining a brass shell and rod or screw tensioning. Although since the early 17th century the tension of the snares could be controlled by a screw or lever, only in the 20th was a mechanism developed to release them instantaneously (for special effects or to avoid unwanted sympathetic vibrations caused by other instruments). Before the 20th century the membranes of snares were usually of gut.

Military playing of the snare drum was learned by rote and oral tradition into the 19th century, and only with the drum's eventual orchestral use did players need musical notation. Certain drummers in Basel, Switz., maintain a particularly difficult traditional playing technique. Modern compositions and jazz playing may require special effects, such as those obtained by releasing the snares, striking the rim, or using fingers, nonstandard sticks, or wire brushes. The first conclusively documented orchestral use of the snare drum was by the French composer–viol virtuoso Marin Marais in a storm scene in his opera *Alcyone* (1706). It reappeared in Rossini's opera *La gazza ladra* (*The Thieving Magpie,* 1817) with a solo part but did not become a standard orchestral instrument until its use by Rimsky-Korsakov and other Russian composers of the late 19th century. A concerto, the *Geigy Festival Concerto* for Basel drum and orchestra (1958), was written by the Swiss composer Rolf Liebermann.

Snares Islands, outlying island group of New Zealand in the South Pacific Ocean, 65 mi (105 km) southwest of Stewart Island. Comprising one larger island and several rocky islets, the group is volcanic in origin and has a total land area of 0.8 sq mi (2 sq km). The larger island is bounded by coastal cliffs and rises to 620 ft (189 m). There is one good anchorage to the northeast. The climate is cool, windy, and wet; the vegetation is low forest and peat cover.

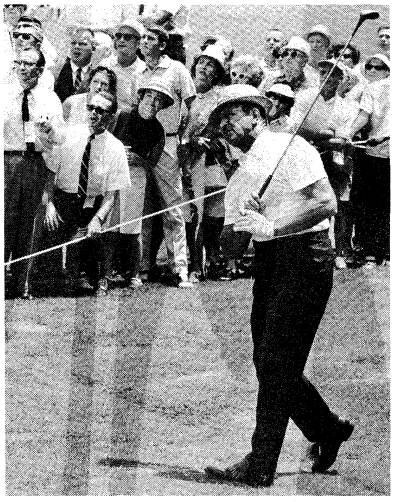
Discovered independently in 1791 (on the same day) by the British navigators George Vancouver and William Broughton, the group is without human habitation. Coastal fur seal herds that were decimated by hunters early in the 19th century are now breeding anew. The islands are important bird rookeries.

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SNCF: *see* Société Nationale des Chemins de Fer Français.

Snead, Sam, in full SAMUEL JACKSON SNEAD, byname SLAMMIN' SAM (b. May 27, 1912, near Hot Springs, Va., U.S.), U.S. professional golfer who won 84 Professional Golfers' Association (PGA) tournaments and, except for the U.S. Open in which he placed second four times, every major championship for which he was eligible.

Snead was noted for the longevity of his career, his perfect swing and his agility. He became a professional in 1933 and scored his first victory in the 1937 Oakland Open. He won the British Open (1946), the Canadian Open (1938, 1940, 1941), and in the United States the Masters Tournament (1949, 1952, 1954), the PGA championship (1942, 1949, 1951), and the Vardon Trophy (1938, 1949–50, 1955), for the best average number of strokes in PGA tournaments. He was a member of the U.S. Ryder Cup team seven times and a member of the winning World Cup teams in 1956, 1960, and 1961, also winning the individual title in 1961. He won the

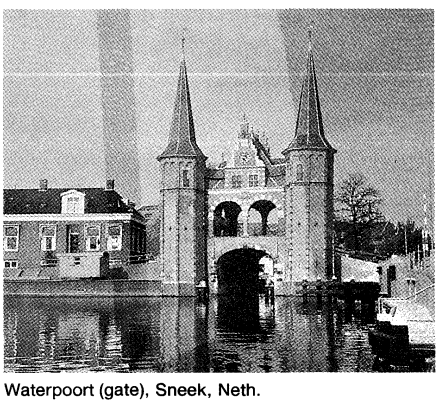


Snead
AP/Wide World Photos

PGA Seniors tournament in 1964, 1965, 1967, 1970, 1972, and 1973; the World Seniors Championship in 1964, 1965, 1970, 1972, and 1973; and the Legends of Golf tournament (with Gardner Dickinson) in 1978.

Known worldwide for his straw hat, Snead reportedly never had a golf lesson, and he sometimes employed unorthodox methods of putting in order to counteract problems caused by a twitch. He won more PGA tournaments than any other champion, however, and conservative estimates place his world tournament wins at 135. He was the oldest golfer to win a PGA event, at age 52, at the 1965 Greater Greensboro Open, and he tied for second place at the 1974 Los Angeles Open. He was elected in 1953 to the PGA Hall of Fame. Snead's autobiography, *The Education of a Golfer* (1962), was written in collaboration with Al Stump.

Sneek, Frisian SNITS, *gemeente* (commune), Friesland *provincie,* northern Netherlands, on the small Geeuw River. Founded in 1294 on the shores of the Middelzee (an arm of the sea that once covered the area, since drained), it was chartered in 1456. It has developed as the water-sports (especially yachting) centre for the Frisian lake district. Sneek is also an important market for cattle and dairy products and has some light industries. Landmarks



Waterpoort (gate), Sneek, Neth.
Fritz Henle—Photo Researchers/EB Inc.

include the Waterpoort (gate; 1613), the town hall (1760), and the Frisian Museum of Shipping. Pop. (1987 est.) 29,578.

Sneeuberg, mountain range in central Cape Province, South Africa, on the northeastern edge of the Great Karroo, stretching roughly east–west for 30 miles (48 km) with a slight curve southward at the eastern end. The highest point in the Sneeuberg ("snow mountain") range is Mount Kompas (8,215 feet [2,504 m]). The range forms a watershed between the Sundays River (south) and the Great Fish River (east).

Sneevliet, Hendricus (Josephus Franciscus Marie) (b. May 13, 1883, Rotterdam—d. April 13, 1942, Amersfoort, Neth.), Dutch communist politician, who founded the Indies Social Democratic Association in the Dutch East Indies and whose revolutionary oratory stimulated the nationalist movement there.

Sneevliet began working for the Dutch railroads and by 1909 was president of the Union of Rail and Tram Employees. He also was involved with the Social Democratic Workers Party, then anathema to the government. After a disagreement with other union leaders, he went to the East Indies (1912), where he wrote for the *Soerabajaasch Handelsblad* ("Surabaya Trade Journal") and served as secretary to a trade company in Semarang, then the centre of radicalism in the East Indies.

Sneevliet then devoted his life to the Indonesian nationalist movement. In 1914 he founded the Social Democratic Association, whose members were socialists of varying degrees of radicalism. After the party split in 1917, Sneevliet led its more revolutionary wing. His party gained a strong hold over the Semarang railway union, and its members worked their way into the Sarekat Islām (a powerful Muslim party with nationalist aims). An inflammatory orator, Sneevliet was deported in 1917 because of his revolutionary activities.

On returning to Europe, Sneevliet was employed by the Communist International. After 1924 he limited his activities to The Netherlands, where he founded the Revolutionary Socialist Party in 1929 and sat in Parliament as one of its representatives from 1933 to 1937. The Germans executed him in 1942.

sneezeweed, any of about 40 species of tall herbs comprising the genus *Helenium* of the family Asteraceae, native to North America.



Sneezeweed (*Helenium*)
A to Z Botanical Collection—EB Inc.

Most are perennials with flat-topped clusters of yellow, brown, or red flower heads and leaves that alternate along the stem.

Summer- or fall-blooming species are cultivated as border plants. The disk flowers are darker than the ray flowers, which may be turned back.

Snefru, also spelled SNEFERU (fl. 26th–25th century BC), first king of Egypt of the 4th dynasty (*c.* 2575–*c.* 2465 BC). He fostered the evolution of the highly centralized administration that marked the climax of the Old Kingdom.

Snefru came from a family in Middle Egypt, near Hermopolis, and probably ascended the throne by marrying the royal heiress, daughter of his predecessor. Although records of his reign are sparse, it is clear from the extensive cemeteries around his own and his son's pyramids that Snefru strongly supported the policy of appointing members of the royal family to the highest administrative offices. The office of vizier became especially important, and its holders were princes very close to the succession.

Royal annals of the Old Kingdom state that Snefru led an extensive raid into Nubia (above the First Cataract of the Nile), where he captured much booty. Later in his reign, a smaller raid was conducted against the Libyans and, according to later tradition, he also received credit for the conquest of Sinai. Two reliefs of the king attest his presence in the turquoise mines there. Excavations in the valley temple of the southern pyramid disclosed the earliest list of nomes (administrative and governmental divisions of Egypt), although the actual organization of the country probably occurred earlier. The list also shows that the king held extensive estates throughout Egypt.

Snefru built two large pyramids at Dahshur, southwest of Cairo. The first pyramid, called the Bent Pyramid, was begun with steep sides. When structural faults became evident, the angle was sharply reduced, producing the bent appearance of the structure. This monument was the first attempt to build a true pyramid. Some years later Snefru built a true pyramid north of the first, which perhaps became the king's burial place. Both monuments stand today.

After a 24-year reign, Snefru was succeeded by his son, Khufu, the renowned builder of the Great Pyramid, at Giza. Later Middle Kingdom tradition viewed Snefru's reign as a golden age. The king was pictured as a beneficent and kind ruler, and numerous places named for him kept their names long after his death. He also became the central or secondary figure of a number of popular tales.

Snell, George Davis (b. Dec. 19, 1903, Bradford, Mass., U.S.), American geneticist whose studies of histocompatability in mice resulted in the identification of the H-2 gene complex and subsequently to the recognition of the major histocompatability complex (MHC) as a feature that is common to the genetic makeup of all vertebrates. For his work Snell was awarded a share (with Jean Dausset and Baruj Benacerraf) of the 1980 Nobel Prize for Physiology or Medicine. He coauthored *Histocompatibility* with J. Dausset and S. Nathenson (1976).

Snell graduated from Dartmouth College in 1926 and took a Doctor of Science from Harvard University in 1930. During 1931–33 he studied under Hermann J. Muller at the University of Texas. In 1935 he joined the staff of the Jackson Laboratory in Bar Harbor, Maine, with which he remained associated, becoming senior staff scientist in 1957, until his retirement in 1969.

Snell, Peter (George) (b. Dec. 17, 1938, Opunake, N.Z.), New Zealand middle-distance runner who was a world-record holder in the 800-metre race (1962–68), the 1,000-metre race (1964–65), the mile (1962–65), the 880-yard race (1962–66), and, as a team member, in the 4 × 1 mile relay race (1961).

After graduating from Mount Albert Grammar School (Auckland), Snell trained under Arthur Lydiard, who stressed running long distances in training to establish endurance. In the 1960 Olympic Games at Rome, Snell won the gold medal in the 800-metre race. In 1961 and 1962 Snell competed internationally and in the latter year set his 800-metre world record (1 min 44.3 s), a world record for the 880-yard race (1 min 45.1 s), and a mile record (3 min 54.4 s, lowered in 1964 to 3 min 54.1 s). In the 1964 Olympic Games at Tokyo, he won the gold medals in both the 800- and 1,500-metre races.

In 1965 Snell retired from running; his autobiography, *No Bugles, No Drums,* was published, and he became director of a sports

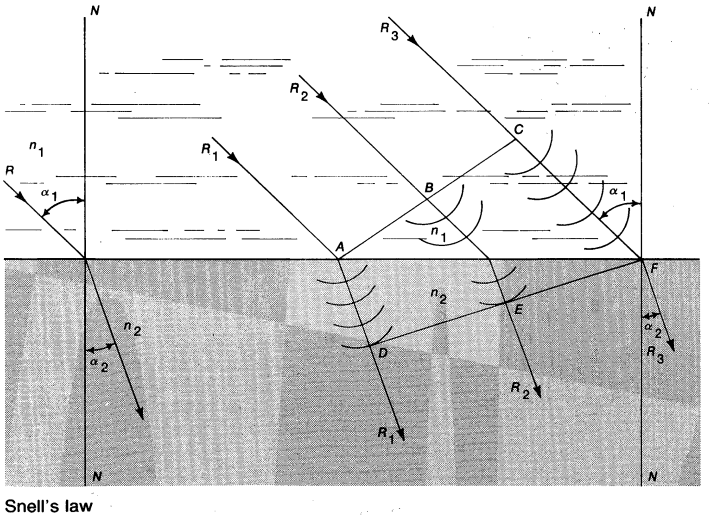
foundation set up by a tobacco company in New Zealand. In 1975, having studied exercise physiology in England in the previous year, he entered the University of California at Davis to continue his education in that field.

Snellman, Johan Vilhelm (b. May 12, 1806, Stockholm—d. July 4, 1881, Kirkkonummi, Fin.), Finnish nationalist philosopher and statesman who played a dominant role in establishing Finnish as a national language.

In 1835, when Snellman became a philosophy instructor at the University of Helsinki, Finland was a grand duchy of Russia (1809–1917), and Swedish was the language of cultivated people. That same year the Finnish national epic, the *Kalevala,* was published, thus initiating interest in establishing a national literature in Finnish. From the 1840s Snellman led the movement for the adoption of Finnish as the mother tongue and insisted that Finnish be allowed in government offices and schools.

In 1842 he published *Läran om staten* ("Political Science"), which was influenced deeply by the philosophy of Hegel, in which he advanced the idea that the essence of a state is a national spirit. He began his revolutionary influence as a stimulator of the national cultural life in 1844 with the publication in Finnish of *Maamiehen ystävä* ("Farmer's Friend") and a Swedish-language newspaper that was suppressed in 1846. Later, with Elias Lönnrot, the scholar and folklorist who compiled the *Kalevala,* he edited the *Litteraturblad för allmän medborgerlig bildning* ("Literary News for General Civic Culture"). He was appointed professor in 1856 and from 1863 to 1868 served as a senator. Snellman exerted a decisive influence on the promulgation of the 1863 statute extending the use of Finnish. He also helped to change the Finnish monetary standard from rubles to marks (1865). His *Kootut teokset* ("Collected Works") appeared in 1928–33.

Snell's law, in optics, a relationship between the path taken by a ray of light in crossing the boundary or surface of separation between two contacting substances and the refractive index



Snell's law

(*q.v.*) of each. This law was discovered in 1621 by the Dutch astronomer and mathematician Willebrord van Snel van Royen (1580–1626; also called Snellius). The account of Snell's law went unpublished until its mention by Christiaan Huygens in his treatise on light.

In the Figure, n_1 and n_2 represent the indices of refraction for the two media, and a_1 and a_2 are the angles of incidence and refraction that the ray R makes with the normal (perpendicular) line NN at the boundary. Snell's law asserts that $n_1/n_2 = \sin a_2/\sin a_1$.

Because the ratio n_1/n_2 is a constant for any given wavelength of light, the ratio of the two sines is also a constant for any angle. Thus, the path of a light ray is bent toward the normal when the ray enters a substance with an index of refraction higher than the one from which it emerges; and because the path of a ray of light is reversible, the ray is bent away from the normal when entering a substance of lower refractive index.

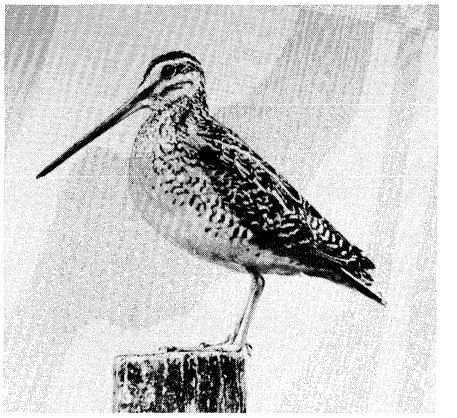
The reason light is refracted in going from one medium to another is shown in the Figure. According to Huygens' principle, each point on a wave front of light is a source of new wavelets. A parallel beam, consisting of the three rays R_1, R_2, and R_3, is incident on a boundary plane AF separating two media of indices n_1 and n_2, and it has a plane wave front ABC. In this example, the speed of light is greater in the first medium than in the second (n_1 is less than n_2). Consequently, according to Huygens' principle, the radius of the wavelets in the first medium is greater than the radius in the second. By the time a point C on the wave front ABC has moved from C to F on the plane, the point A of the wave front has moved a distance of only AD in the second medium. A plane DEF tangent to the new wavelets represents the new wave front, and lines perpendicular to it represent the paths taken by the rays in the second medium.

Snezhnoye, also spelled SNEZHNOE, SNEŽNOJE, coal-mining centre of Donetsk *oblast* (administrative region), Ukrainian Soviet Socialist Republic, in the Donets Basin coalfield. It was incorporated in 1938 and, in addition to mining, specializes in the manufacture of equipment for the chemical industry. Snezhnoye is also in the centre of a rich agricultural area, with numerous farms that specialize in cereal grains as well as cattle, pigs, and poultry. Pop. (1983 est.) 67,000.

Snijders, Frans, Snijders also spelled SNEYDERS (Baroque painter): *see* Snyders, Frans.

snipe, any of about 10 species belonging to the shorebird family Scolopacidae (order Charadriiformes), frequenting wet meadows and marshes. All occur in temperate and warm regions worldwide. They are short-legged, long-billed, chunky birds striped and barred in brown, black, and white. The wings are pointed and angular, the eyes rear-set. The bill is flexible and is used to probe mud for worms.

Snipes are solitary while breeding, but in migration several may appear together (a "wisp" of snipes) on mud flats, along with other shorebirds. In most species, the courting male


Common snipe (*Gallinago gallinago*)
Ingmar Holmasen

circles high and then dives toward the female on the ground while "drumming" or "bleating" the air with its tail feathers. Courtship commonly takes place at dusk, in moonlight, or on overcast days.

Bearing some resemblance to the related woodcock, the common snipe, *Gallinago* (sometimes *Capella*) *gallinago,* is about 30 centimetres (12 inches) long including the bill. It is a fair game bird, springing up with an unnerving squawk, flying a twisted course, and dropping suddenly to cover. This species, inhabiting temperate regions, includes Wilson's snipe of North America, the Eurasian snipe, and the South American snipe.

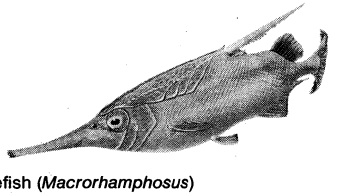
The great snipe (*G. media*) of northern Europe is of heavier build, with barred underparts. Other snipes include the pintail snipe (*G. stenura*) of India and the jacksnipe (*Lymnocryptes minima*) of Eurasia. *See also* painted snipe.

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snipe fly, any member of the family Rhagionidae (order Diptera), usually found in wooded areas. These dark-coloured flies, between 8 and 15 millimetres (0.3 and 0.6 inch) long, have a rounded head, posteriorly tapering abdomen, and long legs. The larvae are found in soil and water.

Most snipe flies do not bite. The females of the genus *Symphoromyia,* however, suck blood and are common pests on the Pacific coast of North America.

snipefish, also called BELLOWS FISH, any of about 12 species of marine deepwater fishes of the family Macrorhamphosidae (order Gasterosteiformes), found in warm and temperate regions. Snipefishes, small, usually deep-bodied fishes, grow at most about 25 to 30 centimetres (10 to 12 inches) long and are commonly silver, pink, or red. They have long, tubular snouts and often bear a partial coating of armour plates along the back. The dorsal fin contains several spines, one of which is usually very long; this spine, together with the tail, forms the handles of the bellows for which the fishes have been named.


Snipefish (*Macrorhamphosus*)
Painting by Gilbert Emerson

Snits (The Netherlands): *see* Sneek.

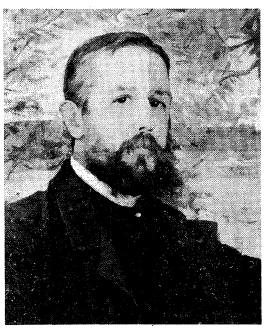
Snodgrass, W(illiam) D(e Witt) (b. Jan. 5, 1926, Wilkinsburg, Pa., U.S.), American poet whose early work is distinguished by a careful attention to form and by a relentless yet delicate examination of personal experiences.

Born into a Quaker family, Snodgrass was educated at Geneva College, Beaver Falls, Pa., and the University of Iowa. He taught at Cornell University (1955–57), the University of Rochester (1957–58), Wayne State University (1958–68), and Syracuse University (from 1968).

Snodgrass's first collection, *Heart's Needle* (1959), which won the Pulitzer Prize, is marked by careful formal control and a sensitive and solemn delineation of his experience of losing his daughter through divorce. The collection *After Experience* (1968) continues these formal and thematic concerns. His later work, including *Remains* (1970), *If Birds Build with Your Hair* (1979), and *D.D. Byrde Calling Jennie Wrenn* (1984), employed free verse. Other writing by Snodgrass includes several volumes of translations of European ballads and a volume of criticism. *The Führer Bunker: A Cycle of Poems in Progress* (1977) is a collection of poems written as dramatic monologues by various Nazis who shared Hitler's last days.

Snohallow (American Indian cult leader): *see* Smohalla.

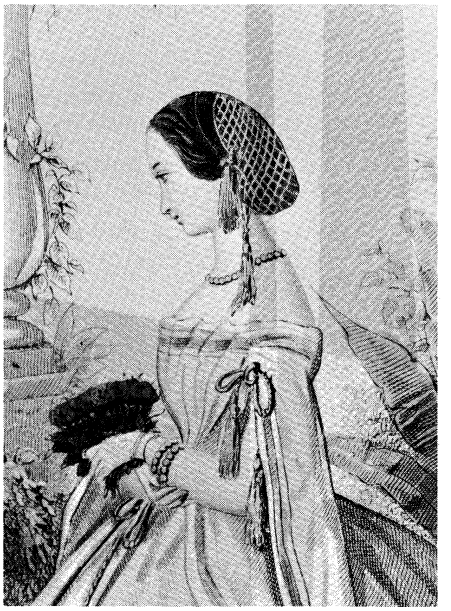
Snoilsky, Carl Johan Gustaf, Greve (Count) (b. Sept. 8, 1841, Stockholm, Swed.—d. May 19, 1903, Stockholm), Swedish poet who was the most notable of a group of early realist poets.



Snoilsky, oil painting by Anna Nordgren, 1885; in a private collection
By courtesy of the Svenska Portrattarkivet, Stockholm

While a student at the University of Uppsala, Snoilsky gained repute for his great poetic talent. His *Dikter* (1869; "Poems"), written during an extended tour of the European continent and including his *Italian Pictures* (1865), enchanted the Swedish public with its carefree and sensuous celebrations of the Mediterranean landscape. After its publication Snoilsky joined the diplomatic corps, married advantageously, stopped writing, and lived the life of a Swedish aristocrat. In 1879, however, he ran away from that life, remarried, settled on the continent, and started writing poetry again. Three volumes of his verse appeared, respectively, in 1881, 1883, and 1887. Snoilsky felt the need to write poetry reflecting the social problems he saw, and his later verse expresses his humane liberalism and his sympathy for the underprivileged. He returned to Stockholm in 1890 and remained there until his death. Snoilsky's poetry is clear, elegant, and polished, with a strong note of realism in spite of its rather traditional form.

snood, either of two types of hair ornament worn by women. The Scottish snood was a narrow circlet or ribbon fastened around the head and worn primarily by unmarried women, as a sign of chastity. During the Victorian era, hairnets worn for decoration were called snoods, and this term came to mean a netlike hat or part of a hat that caught the hair in the back. In the 1930s the name was

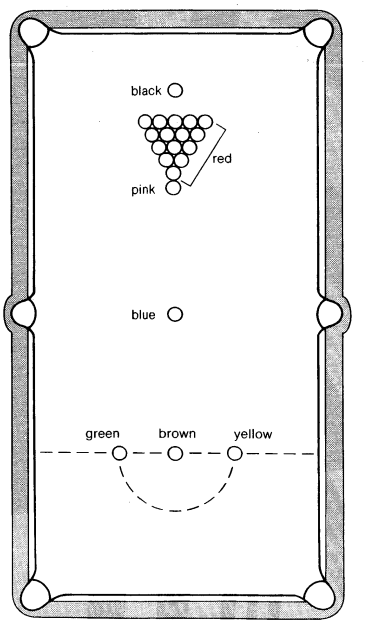


Woman wearing a snood, detail of a colour engraving from *Le Follet*, 1858–60; in the Victoria and Albert Museum, London
By courtesy of the Victoria and Albert Museum, London

given to a netlike bag worn at the back of a woman's head to hold the hair. During World War II snoods were immensely popular in factories, where they were worn to keep hair from being caught in machinery.

snook, also called ROBALO, any of about eight species of marine fishes constituting the genus *Centropomus* and the family Centropomidae (order Perciformes). Snooks are long, silvery, pikelike fishes with two dorsal fins, a long head, and a rather large mouth with a projecting lower jaw. Tropical fishes, they are found along the American Atlantic and Pacific coasts, often in estuaries and among mangroves and, sometimes, in fresh water. They range from 0.5 to 1.5 m (1.5 to 5 feet) long and are valued for food and sport.

snooker, popular billiards game of British origin, played on a table similar in size and markings to that used in English billiards. The game arose, presumably in India, as a game for soldiers in the 1870s. The game is played with 22 balls, made up of one white ball (the cue ball); 15 red balls, valued at 1 point each; one yellow, 2 points; one green, 3; one brown, 4; one blue, 5; one pink, 6; and one black, 7. Players try to pocket first the red and then the nonred balls, scoring one point for each red and the number value of the others.



American snooker table
By courtesy of Billiard Congress of America, Chicago

To begin, the balls are arranged as follows: all reds in a pyramid with its apex on the pyramid spot; black on the billiard spot near the foot of the table; pink touching the apex of the pyramid; blue at the centre spot; and green, brown, and yellow at the left, centre, and right of the straight line of the D, a semicircular area at the head of the table.

The first (break) shot must contact a red ball initially. A player shoots until he fails to pocket a ball or fouls, then yields play to an opponent. When playing at a nonred ball, the player must designate which ball is "on" (his target), although he need not specify where he intends to pocket the ball. Red balls remain pocketed, whether played legally or not, but the others are immediately replaced on their respective spots as long as any reds remain on the table. When all reds are pocketed, players attempt to pocket the other balls in numerical order. When the last ball is off the table, the game ends and the player with the highest score wins.

Penalties are assessed for fouls, *i.e.*, violations of certain rules, including pocketing the cue ball ("scratching"), failing to hit any ball with the cue ball, causing the cue ball to strike first a ball that is not on, and pocketing two balls (other than two reds) on the same stroke. Penalties usually consist of a forfeit of a certain number of points to all opponents, loss of any score made on the foul stroke, and loss of the turn at play. English and American versions of the game vary somewhat according to rules of the Billiards Association and Control Council and the Billiard Congress of America, respectively.

The term "snooker" denotes a position of the cue ball from which the player is unable to hit the ball that the rules require him to play. *Compare* pool; pyramids. *See also* Sporting Record: *Billiards.*

snoring, a rough, hoarse noise produced upon the intake of breath during sleep and caused by the vibration of the soft palate and vocal cords. It is often associated with obstruction of the nasal passages, which necessitates breathing through the mouth. Snoring is more common in the elderly because the loss of tone in the oropharyngeal musculature promotes vibration of the soft palate and pharynx. It is also more common in men than in women, and it occurs most often in obese persons. Children's snoring usually results from enlarged tonsils or adenoids. Whatever the cause, snoring is always associated with mouth breathing and can be corrected by removing obstructions to normal nasal breathing or by altering sleeping position so that the affected individual does not lie on his back.

snorkel, ventilating tube for submerged submarines, introduced in German U-boats during World War II. A basic problem of submarines powered by internal-combustion engines was that of recharging the batteries, which were used for propelling the boat when it was fully submerged. Because the generator (used for recharging the batteries) was powered by the internal-combustion engine, which required air, the submarine had to surface and so expose itself to detection if it wanted to recharge its batteries. The snorkel, raised while the submarine cruised just beneath the surface, permitted air intake and fume exhaust by the internal-combustion engine, so that the batteries could be recharged without the submarine having to surface.

Analogous tubes, also called snorkels, fitted

to face masks permit swimmers to breathe while just below the surface of the water.

Snorri Sturluson (b. 1179, Iceland—d. Sept. 22, 1241, Reykjaholt), Icelandic poet, historian, and chieftain, author of the *Prose Edda* and the *Heimskringla.*

A descendant of the great poet and hero of the *Egils saga,* Egill Skallagrímsson, Snorri was brought up at Oddi from the age of three in the home of Jón Loptsson, the most influential chieftain in Iceland. From him Snorri acquired both a deep knowledge of Icelandic tradition and a European breadth of outlook.

In 1199 Snorri married an heiress and began to acquire lands and power. In 1206 he settled at Reykjaholt, where most of his works were written between 1223 and 1235. During 1215–18 and 1222–32 he was "lawspeaker," or president, of the Icelandic high court. In 1218 he was invited to Norway by King Haakon IV.

Snorri became involved in politics while visiting the Norwegians. He persuaded Haakon that he could become king of Iceland, and he became Haakon's vassal. Snorri returned to Iceland in 1220, but in the ensuing years his relations with Haakon deteriorated, and, in 1241, by Haakon's order, Snorri was assassinated.

Snorri's writings are remarkable both for their scope and for their formal assurance. The *Prose Edda* is a handbook on poetics. In this work Snorri arranges and recounts the legends of Norse mythology in an entertaining way. He then explains the ornate diction of the ancient skaldic poets and explains the great variety of poetic metres used in skaldic and Eddic verse. Snorri also wrote a biography of St. Oláf of Norway, which he included in his *Heimskringla,* a history of the Norwegian kings from their legendary descent from the warrior-wizard god Odin down to Magnus Erlingsson (1184). A three-volume English translation by Samuel Laing (1844) has been frequently reprinted. Snorri based the *Heimskringla* on earlier histories, but he gathered much fresh material of his own. He particularly valued poems transmitted orally from the time of the original historical events they described, and he selected those poetic traditions that seemed to be both authoritative and reflective of contemporary politics and human nature. His genius lay in his power to present all that he perceived critically as a historian with the immediacy of drama.

The qualities of intelligence, warmth, and scholarly industry in Snorri's writings contrast sharply with the weak, shifty character that emerges in the account of his life by his nephew in the *Sturlunga saga. See also* Edda; Heimskringla.

Snouck Hurgronje, Christiaan (b. Feb. 8, 1857, Oosterhout, Neth.—d. June 26, 1936, Leiden), professor and Dutch colonial official, a pioneer in the scientific study of Islām.

While serving as a lecturer at the University of Leiden (1880–89), Snouck Hurgronje visited Arabia (1884–85), stopping at Mecca. His classic work *Mekka,* 2 vol. (1888–89), reconstructs the history of the holy city and sheds light on the origins of Islām, early traditions and practices, and the first Islāmic communities. The second volume, translated into English as *Mekka in the Latter Part of the 19th Century* (1931), contains many details of daily life in Islāmic culture and deals with the Indonesian Muslim colony at Mecca.

From 1890 to 1906 Snouck Hurgronje was professor of Arabic at Batavia, Java, and, as a government adviser, he originated and developed a Dutch colonial policy toward Islām that prevailed until the termination of Dutch rule in Indonesia in 1942. Though he was tolerant of Islāmic religious life, his policy as a colonial official was to repress Islāmic political agitation. His *De Atjèhers,* 2 vol. (1893–94; *The Achenese*), an ethnographic account of the people of northern Sumatra, became a standard reference work.

Though Snouck Hurgronje remained a colonial adviser until 1933, he returned in 1906 to The Netherlands, where he was professor of Arabic and Islāmic institutions at the University of Leiden until his death. He wrote extensively on a number of Islāmic topics. Georges-Henri Bosquet and J. Schacht edited *Selected Works of C. Snouck Hurgronje* (1957).

snout beetle: *see* weevil.

snow, the solid form of water that crystallizes in the atmosphere and, falling to the Earth, covers, permanently or temporarily, about 23 percent of the Earth's surface.

A brief treatment of snow follows. For full treatment, *see* MACROPAEDIA: Climate and Weather.

Snow falls at sea level poleward of latitude 35° N and 35° S, though on the west coast of continents it generally falls only at higher latitudes. Close to the equator, snowfall occurs exclusively in mountain regions—at elevations of about 4,900 m (16,000 feet) or higher.

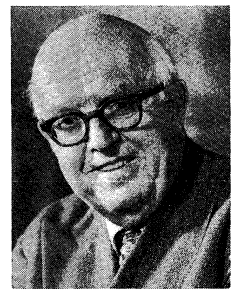
Snow cover has a significant effect on climate and on plant, animal, and human life. By increasing the reflection of solar radiation and interfering with the conduction of heat from the ground, it induces a cold climate. The low heat conduction protects small plants from the effects of the lowest winter temperatures; on the other hand, the late disappearance of snow in the spring delays the growth of plants. When snow melts in the spring, the resulting runoff feeds rivers and supplies water for irrigation and other human enterprises. Heavy snowfalls can severely hinder transporation in variable moderate climates but provides a firm surface for travel in remote Arctic, Antarctic, and mountainous areas, using traditional dogsleds or snowshoes or modern snowmobiles.

Snowflakes are formed by crystals of ice that generally have a hexagonal pattern, often beautifully intricate. The size and shape of the crystals depend mainly on the temperature and the amount of water vapour available as they develop. At temperatures above about −40° C (−40° F), ice crystals form around minute particles of dust or chemical substances that float in the air; at lower temperatures, crystals form directly from water vapour. If the air is humid, the crystals tend to grow rapidly, develop branches, and clump together to form snowflakes. In colder and drier air, the particles remain small and compact. Frozen precipitation has been classified into seven forms of snow crystals and three types of particles—graupel (granular snow pellets, also called soft hail), sleet (partly frozen ice pellets), and hail (hard spheres of ice).

The texture and density of fallen snow undergo constant change. Snow on the ground tends to become increasingly dense, and, where it survives spring and summer melting for years, it may turn into ice and form a glacier. On hillsides when temperature changes reduce the coherence of snow particles in the snow cover, gravity and viscosity may overcome friction, causing snow slides and avalanches.

Snow, C.P., in full CHARLES PERCY SNOW, BARON SNOW OF THE CITY OF LEICESTER (b. Oct. 15, 1905, Leicester, Leicestershire, Eng.—d. July 1, 1980, London), British novelist, scientist, and government administrator.

Snow was graduated from Leicester University and earned a doctorate in physics at the University of Cambridge, where, at the age of 25, he became a fellow of Christ's College. After working at Cambridge in molecular physics for some 20 years, he became a university administrator, and, with the outbreak of World War II, he became a scientific adviser to the British government. He was knighted in 1957 and made a life peer in 1964. In 1950 he married the British novelist Pamela Hansford Johnson.



C.P. Snow
Camera Press—Pictorial Parade/EB Inc.

In the 1930s Snow began the 11-volume novel sequence collectively called "Strangers and Brothers" (published 1940–70), about the academic, public, and private life of an Englishman named Lewis Eliot. The novels are a quiet (though not dull) and meticulous analysis of bureaucratic man and the corrupting influence of power. Several of Snow's novels were adapted for the stage. Later novels include *In Their Wisdom* (1974) and *Coat of Varnish* (1979).

As both a literary man and a scientist, Snow was particularly well equipped to write a book about science and literature; *The Two Cultures and the Scientific Revolution* (1959) and its sequel, *Second Look* (1964), constitute Snow's most widely known—and widely attacked—position. He argued that practitioners of either of the two disciplines know little, if anything, about the other and that communication is difficult, if not impossible, between them. Snow thus called attention to a breach in two of the major branches of Western culture, a breach long noted but rarely enunciated by a figure respected in both fields. Snow acknowledged the emergence of a third "culture" as well, the social sciences and arts concerned with "how human beings are living or have lived." Many of Snow's writings on science and culture are found in *Public Affairs* (1971). *Trollope: His Life and Art* (1975) exemplifies Snow's powers in literary criticism, as does *The Realists: Eight Portraits* (1979).

Snow, Edgar (Parks) (b. July 19, 1905, Kansas City, Mo., U.S.—d. Feb. 15, 1972, Eysins, Switz.), American journalist and author who produced the most important Western reporting on the Communist movement in China in the years before it achieved power.

Snow attended the University of Missouri and the Columbia School of Journalism before landing his first job as a newspaper reporter for the *Kansas City Star* in 1927. In 1928 his wanderings took him to China, which became his base for the next 12 years while he reported on East Asia for major American newspapers and magazines.

In 1936 Snow slipped through the Nationalists' blockade and reached the Chinese Communists' base at Yen-an in Shensi province, in north-central China. After spending several months in Yen-an with Mao Zedong (Mao Tse-tung) and other leaders, Snow returned to the outside world with the first accurate reporting of the Communist movement in China. Snow depicted Mao Zedong and his followers not as the opportunistic "Red bandits" described by the Nationalists but rather as dedicated revolutionaries who advocated sweeping domestic reforms and who were eager to resist Japanese aggression in China. Snow's book-length report on the Chinese Communists, *Red Star Over China* (1937), has remained a primary source on the early history of their movement.

Snow returned to the United States in 1941 and became a reporter for the *Saturday*

Evening Post. He covered the Soviet Union, among other countries, during World War II. He revisited China in 1960 and reported on the state of that country after 11 years of Communist rule in *The Other Side of the River: Red China Today* (1962).

BIBLIOGRAPHY. Snow's life and work are treated in John Maxwell Hamilton, *Edgar Snow: A Biography* (1988).

snow goose, any of several species of pure-white geese with black wingtips, pink legs, and pink bill with black gape ("grin"), belonging to the family Anatidae (order Anseriformes). Hunters call it wavey—from an Indian name. Two main forms are recognized. The lesser snow goose (long called *Chen hyperborea hyperborea*) breeds in the Arctic and migrates chiefly to California and Japan. The greater snow goose (long called *C.h. atlantica*) breeds in northwestern Greenland and nearby islands and winters on the east coast of the United States from Chesapeake Bay to North Carolina, especially at Pea Island.

The blue goose (long separated as *C. caerulescens*) has bluish gray body plumage, with white head and neck and, sometimes, white breast and belly. It breeds in the eastern part of the range of the lesser snow goose and winters on the U.S. Gulf Coast, chiefly in Louisiana. Most biologists believe the blue goose is actually a dark colour phase (colour morph) of the lesser snow goose—not a separate species. Some ornithologists believe that the white birds ("lesser snow geese") constitute a subspecies (*C.c. hyperborea*) of the blue. Adding to the confusion, many ornithologists (especially in Europe) classify all these birds in the so-called gray goose genus, *Anser,* considering *Chen* obsolete.

Snow Lake, town, western Manitoba, Canada, just northeast of Grass River Provincial Park. Originating as a gold-mining settlement in the late 1940s, the village is now a copper-producing centre; it is the base for intensive mineral surveys following the 1956 discovery of new copper and zinc ores in the vicinity. Snow Lake, which stands amid a cluster of small lakes, is linked to the larger provincial cities by road, rail, and air service and is administered from The Pas, 90 miles (140 km) southwest. Grass River Provincial Park (884 square miles [2,290 square km]) is to the southwest. Pop. (1986) 1,837.

snow leopard: *see* ounce.

snow line, the lower topographic limit of permanent snow cover. The snow line is an irregular line located along the ground surface where the accumulation of snowfall equals ablation (melting and evaporation). This line varies greatly in altitude and depends on several influences. On windward slopes and those facing the afternoon sun, the snow line may be as much as a kilometre higher than on opposite slopes. Over larger areas, summer temperatures and the amount of snowfall determine the position of the snow line. Where temperatures are low, as near the poles, the snow line is quite low in elevation; where temperatures are high, as near the equator, the snow line is very high. Average altitudes of the snow line taken over large areas can be used to derive a climatic snow line, which rises or falls in altitude in response to worldwide climatic change. During glacial periods, the climatic snow line was from 600 to 1,200 m (2,000 to 4,000 feet) lower than at present.

snow mold, plant disease that attacks cereals, forage grasses, and turf grasses in northern areas of North America, Europe, and Asia. It is caused by soil-borne fungi and is associated with melting snow or prolonged cold, drizzly weather. Snow mold is most damaging on golf courses and other turf areas. *Fusarium nivale,* which causes pink snow mold, or fusarium patch, appears as irregularly circular, tan to reddish brown patches up to 30 cm (1 foot) in diameter that may merge to cover large areas. When wet, leaves are covered with dense, whitish to pink threads (mycelium) of the fungus. *Typhula itoana* and *T. idahoensis* cause gray snow mold, or typhula blight, identified by roughly circular, bleached-tan areas up to about 60 cm (2 feet) in diameter and covered when moist with a fluffy, bluish gray to almost black mycelium. Minute, round, brown dots (sclerotia) form on diseased parts. Snow mold can be controlled by having good surface drainage; avoiding late-fall fertilization and thatch buildup (mats of dead grass at the soil line); and keeping grass cut in the fall. Where the condition is serious, a fungicide spray can be applied late during a wet autumn and repeated during midwinter thaws.

Snow Mountains (New Guinea): *see* Maoke Mountains.

snow-on-the-mountain (*Euphorbia marginata*), succulent plant of the spurge family (Euphorbiaceae), native to the central plains of the United States. The plants, which grow to a height of 60 cm (2 feet), have long, oval, light green foliage, with white-margined leaves near the top, where several white whorls of



Snow-on-the-mountain (*Euphorbia marginata*)
Constance Porter—Photo Researchers/EB Inc.

bracts (leaflike structures) are clustered. The plant has long been a favourite as a garden annual and in flower arrangements, but some people are allergic to its white latex sap.

snowberry, any of about 18 species of low shrubs belonging to the genus *Symphoricarpos* of the family Caprifoliaceae. All are native to North America except for one species in central China. All have bell-shaped, pinkish or white flowers and two-seeded berries.

The best-known ornamental species of *Symphoricarpos* snowberries are *S. albus,* a shrub, 1 m (3 feet) high, with delicate stems, oval leaves, and large, pulpy, white berries, and *S. rivularis,* slightly larger, with elliptic leaves, and a profusion of berries. The Chinese



Snowberry (*Symphoricarpos rivularis*)
Sven Samelius

species, *S. sinensis,* has bluish black berries. Wolfberry (*S. occidentalis*), about 1.5 m (5 feet) tall, bears white berries. Indian currant, or coralberry (*S. orbiculatus*), more than 2 m (6.5 feet) tall, bears purplish berries. Creeping snowberry is a plant of the genus *Gaultheria* (family Ericaceae).

snowbird, species of junco (*q.v.*).

Snowden (of Ickornshaw), Philip Snowden, Viscount (b. July 18, 1864, Ickornshaw, Yorkshire, Eng.—d. May 15, 1937, Tilford, Surrey), socialist politician and propagandist and chancellor of the Exchequer in the first two Labour Party governments of Great Britain (1924; 1929–31).

The son of a weaver, Snowden worked for the government as a clerk until he became crippled by a spinal disease. In about 1893, after partially recovering, he became a lecturer and writer for the Independent Labour Party (ILP), and from 1903 to 1906 he was national chairman of ILP. In the House of Commons (1906–18, 1922–31) he excelled in debates on social and economic questions. In 1921 he repudiated the ILP because of its increasing militancy.

Snowden served as chancellor of the Exchequer in Ramsay MacDonald's first Labour ministry (Jan. 22–Nov. 4, 1924). He returned to office in 1929 in MacDonald's second government and faced a series of difficult government budgets owing to the deepening effects of the Great Depression. In 1931 he established Sir George May's economy committee, which, by its recommendation that benefits for depression-induced unemployment be decreased, brought about the fall of the Labour ministry that year.

Continuing as chancellor of the Exchequer in MacDonald's coalition National Government, Snowden carried through an emergency budget in September 1931 and secured Great Britain's abandonment of the gold standard that same month. After leaving office in October, he was created a viscount and made lord privy seal, but he left that office in 1932. His two-volume *Autobiography* appeared in 1934.

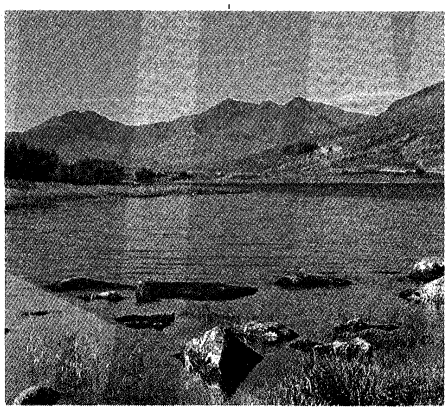
Snowden had no children, and the viscountcy became extinct upon his death.

Snowdon, mountain in northern Wales that is the highest point in England and Wales. Snowdon is located in the county of Gwynedd (until 1974 in the former county of Caernarvonshire). It is the main peak in the Snowdonia mountains. Snowdon's massif consists of about five main peaks that are connected by sharp ridges and between which lie cirques (scooped-out basins). The highest of the peaks is Y Wyddfa, which rises to a height of 3,560 feet (1,085 m). Intense glaciation has affected the entire locality, producing the ridges, cirques, and numerous small lakes that nestle in the lower valleys radiating out from Snowdon. Snowdon is composed mainly of slates and porphyries that date from the Ordovician period (505 to 438 million years ago). The mountain is ascended by a rack-and-pinion railway that runs from Llanberis to the summit of Y Wyddfa. Snowdon is the chief attraction of Snowdonia National Park.

Snowdonia National Park, Welsh PARC CENEDLAETHOL ERYRI, national park in Clwyd and (principally) Gwynedd counties, northern Wales, designated in 1951, with an area of 838 sq mi (2,170 sq km). It is best known for its mountains, composed largely of volcanic rock and cut by valleys that show the influence of Ice Age glaciers. Snowdon (Welsh: Y Wyddfa; 3,560 ft [1,085 m]), in the northwestern part of the park, is the highest peak in England and Wales; a rack-and-pinion railway (opened 1896) runs from Llanberis to the summit. Farther south, Cader Idris (Chair of Idris), a long

mountain ridge, reaches a height of 2,927 ft (892 m) at Pen-y-Gader.

Tourism thrives, stimulated by the possibilities for climbing, hill walking, fishing, and sight-seeing. Tourist centres in and near the park include Bala, with recreational facilities on Bala Lake; Betws-y-Coed, noted for its waterfalls, wooded gorges, and picturesque bridges; Blaenau Ffestiniog, where the defunct Llechwedd Slate Caverns are open to visitors; Dinas Mawddwy, with a textile mill and craft shop oriented toward touring shoppers; Dolgellau, overlooked by Cader Idris; the old village of Ffestiniog, on a bluff above the wooded Vale of Ffestiniog; Llanberis at the foot of Snowdon, facing the massive Dinorwic



Snowdon from Llyn (lake) Mymbyr, Gwynedd
G.F. Allen—Bruce Coleman Inc.

slate quarries; and the Cardigan Bay resorts of Harlech, Barmouth, and Aberdovey.

snowdrop, any of the white-flowered Eurasian plants comprising the genus *Galanthus* of the family Amaryllidaceae. There are about



Snowdrop (*Galanthus*)
Derek Fell

12 species and many variations of the spring-blooming, bulbous herbs.

Several species, including common snowdrop (*G. nivalis*) and giant snowdrop (*G. elwesii*), are cultivated as ornamentals for their nodding, sometimes fragrant flowers. They are the earliest garden flower to blossom in the spring.

snowflake, flowering plant of the family Amaryllidaceae (*q.v.*).

snowman porcelain, class of porcelain figures made at Longton Hall, Staffordshire, Eng., from *c.* 1750 to 1752. Called snowmen because of their thick white enveloping glaze, they include figures of human beings and animals sometimes inspired by Meissen originals.



Longton Hall snowman porcelain figurine of Ceres and Cupid, *c.* 1750; in the Victoria and Albert Museum, London
By courtesy of the Victoria and Albert Museum, London; photograph, EB Inc.

Stylistically they are more robust than some of their later, coloured counterparts.

snowmobile, a one- or two-passenger motorized vehicle with one or two skis in front and an engine-driven single or double continuous track to propel it. Snowmobiles almost all follow the basic design of skis, fuel tank, engine, and seating for driver. They are steered by handlebars that control the skis and by shifting the position of the driver. Acceleration and braking are controlled by hand-squeeze throttle and brake controls on the handlebars.

In the 1920s a prototype snowmobile was a sled steered by skis and powered by an airplane propeller. Early vehicles, because of the weight of the engines available at that time, had to be large to spread the weight over the snow. In the early 1950s the advent of smaller, lighter weight engines enabled Joseph-Armand Bombardier, a Canadian, to develop a small snowmobile. In 1959 a commercially successful one- or two-passenger snowmobile was manufactured and marketed. The snowmobile soon became a popular recreational vehicle in North America.

The machines have gained wide acceptance and popularity among outdoorsmen for winter fishing or hunting purposes. Snowmobile safaris are made into previously inaccessible areas of national and state parks, although by the 1980s authorities sought to restrict such activity because of noise and harm to plant and animal wildlife. Racing snow machines became a popular winter sport in North America and Europe. By the mid-1970s professional racing was established. Speeds of more than 160 kilometres (100 miles) per hour have been achieved.

Snowmobiles are also used for utilitarian purposes, such as winter rescue work, checking forest land, repairing power and telephone lines, and providing winter transportation for



Snowmobile
Steve & Dolores McCutcheon

professional conservationists. Royal Canadian Mounted Police and Eskimos found them useful for work done previously by dogsled. Laplanders sometimes use the machines for herding reindeer. They have been tested for possible military use.

By the 1980s the number of one- and two-passenger snowmobiles in use in North America surpassed 3,000,000. Damage and accidents resulting from unskilled and reckless use of the machines, together with their effect of frightening game animals, prompted many calls for increased governmental control of snowmobile operation.

snowshoe, a light, oval wooden frame that is usually strengthened by two or more crosspieces, strung with thongs, and attached to the foot and that is used to enable a person to walk or run on soft snow without sinking. Snowshoes were used by Indians and Eskimos in the wintry northern areas of North America. They are now used principally by hunters, trappers, farmers, lumberjacks, and sports enthusiasts.

The sport of snowshoeing probably orginated in northern Asia several thousand years ago. For North American Indians and early settlers, snowshoes were a principal means of winter travel. They are still used by hunters, trappers, and other workers in areas where snowmobiles and other vehicles cannot manoeuvre.

The two basic types of snowshoes are the short, broad, tailless bear-paw and the long, narrow shoe with a tail variously named Maine, Michigan, Alaskan, etc. The bear-paw is best for rough or heavily wooded terrain, where manoeuvrability is most important; the longer shoe is better for more open country or for racing. Snowshoes are usually made of wood with leather lacing, although by the 1980s lightweight metal, synthetic lacing, and plastic were in use.

Snowshoeing as an organized sport pursued only locally probably began with the founding of the Montreal Snowshoe Club in 1840. Snowshoe racers, moving with a characteristic bent-knee, shuffling gait, can cover a 100-yard (about 90-metre) course in just over 12 seconds and a mile (1.6 kilometres) in about 5 minutes.

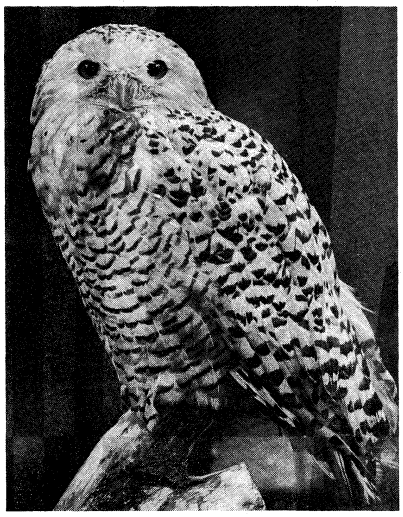
Snowy Mountains, range in the Australian Alps, southeastern New South Wales, including several peaks that exceed 7,000 ft (2,100 m), notably Mt. Kosciusko, the highest in Australia. On their slopes rise the Murray,



Mt. Kosciusko, in the Snowy Mountains, New South Wales
By courtesy of the Australian National Travel Association

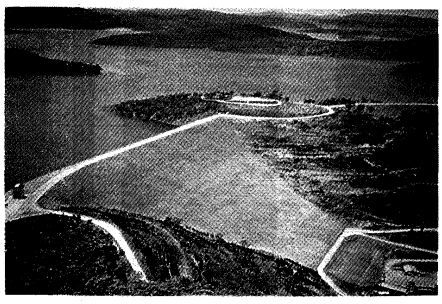
Murrumbidgee, and Tumut rivers, which flow inland, and the Snowy River, which flows southward to Bass Strait. Waters are diverted by aqueducts and tunnels and stored for power and irrigation by the Snowy Mountains Hydroelectric Authority (established 1949); the hydroelectric project includes 16 dams and several reservoirs (notably Lake Eucumbene) and has a capacity of 3,740 megawatts. Snow-covered for three to six months, the range is a winter sports area and site of the Kosciusko National Park, which extends northward for 100 mi (160 km) from the Victoria border. Explored in 1840 by Paul Strzelecki, the mountains were originally called Muniong (Munyang), a name now applied to their northeastern extremity.

snowy owl (*Nyctea scandiaca*), a white or barred, brown-and-white bird of prey of the family Strigidae (order Strigiformes). It inhabits the Arctic tundra and sometimes wanders southward in Europe, Asia, and North America. Snowy owls are about 60 centimetres (about 2 feet) long and have broad wings and a round head without ear tufts. They eat small mammals (such as hares and lemmings) and birds and nest on the ground in the open.



Snowy owl (*Nyctea scandiaca*)
W. Suschitzky

Snowy River, river, southeastern New South Wales and eastern Victoria, Australia, rising on the eastern slopes of the Snowy Mountains near Mt. Kosciusko and flowing about 270 mi (435 km) southeast, then west and south to Bass Strait at Marlo. Its chief tributaries are the Eucumbene, Thredbo, and Bombala rivers in New South Wales and the Buchan in Victoria.



Eucumbene dam and lake on the Snowy River, New South Wales
G.R. Roberts

Fed by melting snows, the river plays a major role in the Snowy Mountains Hydroelectric Scheme, one of the world's largest power and irrigation projects. Its waters are impounded at a high elevation, diverted through tunnels under the Australian Alps to generate electricity, then discharged into the Murray and Murrumbidgee rivers. The stream was explored in 1839 by Angus McMillan.

SNP: *see* Scottish National Party.

snubber: *see* shock absorber.

snuff, powdered preparation of tobacco used by inhalation or by dipping—that is, rubbing on the teeth and gums. Manufacture involves grinding the tobacco and subjecting it to repeated fermentations. Snuffs may be scented with attar of roses, lavender, cloves, jasmine, etc.

The practice of inhaling snuff became popular in England around the 17th century; during the 18th century it was widespread throughout the world. At first, each quantity was freshly grated. Rappee (French *râpé*, "grated") is the name later given to a coarse, pungent snuff made from dark tobacco. Snuff takers carried graters with them; early 18th-century graters made of ivory and other materials still exist, as do elaborate snuffboxes.

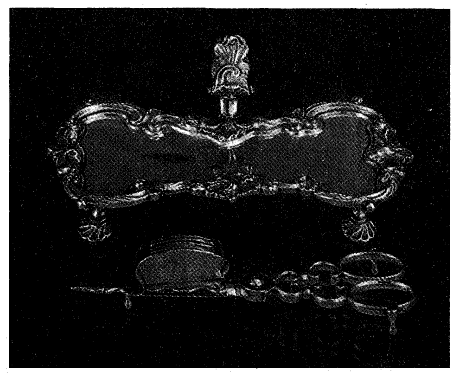
snuffbox, small, usually ornamented box for holding snuff (a scented, powdered tobacco). The practice of sniffing or inhaling a pinch of snuff was common in England around the 17th century; and when, in the 18th century, it became widespread in other countries as well, the demand for decorated snuffboxes, considered valuable gifts, increased. Some were small enough to fit in a waistcoat pocket, and others were larger; all gave 18th-century craftsmen an opportunity to execute rich and elaborate designs.

Snuffboxes reflected the art and craft of the painter of miniatures, the enameller, the jeweller, and the goldsmith and silversmith. Lids often were decorated with typical 18th-century subject matter such as allegories and flowers. Sometimes they were ornamented with cameos or encrusted with precious jewels in arms and crest. Less expensive snuffboxes were constructed of silver, copper, brass, horn, tortoiseshell, or wood. The mull, a silver-mounted ram's head, is a large table snuffbox. Some snuffboxes were worn as articles of jewelry during the 18th century.



Snuffbox, gold and enamel, French, *c.* 1770; in the Victoria and Albert Museum, London
By courtesy of the Victoria and Albert Museum, London

snuffer, metal implement used to extinguish the flame of a candle, generally in a form of a scissors (to snuff the flame and cut off the wick) or a hollow cone at the end of a long handle. The earliest surviving example is a silver-gilt snuffer in the Victoria and Albert Museum, London, dated about 1550; but inventories mention snuffers as early as mid-15th century in England. Other surviving examples show that brass and steel were the most common metals used, but precious metals were also used. The decoration on snuffers usually consists of roughly cast ornament, but some 18th-century continental examples of steel are finely pierced and chiselled. The introduction of candles with self-consuming wicks in the latter half of the 19th century and the development of alternative methods of lighting brought about a consequent decline in the use of snuffers.



American silver snuffer and stand by Myer Myers, *c.* 1755–70; in the Yale University Art Gallery
By courtesy of the Yale University Art Gallery, Mabel Brady Garvan Collection; photograph, Joseph Szaszfai

Snyder, Gary (Sherman) (b. May 8, 1930, San Francisco), U.S. poet early identified with the Beat movement (*q.v.*) and, from the late 1960s, an important spokesman for the concerns of communal living and ecological activism. Snyder received the Pulitzer Prize for Poetry in 1975.

Educated at Reed College, Portland, Ore., where he received his B.A. in 1951, and at Indiana University, Bloomington, and the University of California, Berkeley, Snyder worked as a forest ranger, logger, and seaman. From 1956 he also studied Zen Buddhism in Japan.

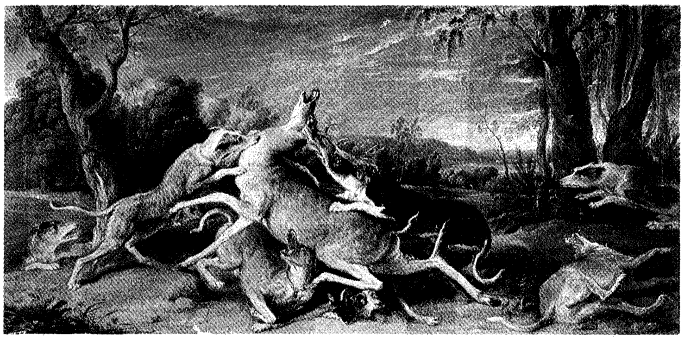
Snyder's poetry draws on the mythic and religious experience of his own daily life in his verse. His free verse style exhibits a variety of influences from Walt Whitman to Ezra Pound to Japanese haiku. Prominent in his first two books of poems, *Riprap* (1959) and *Myths and Texts* (1960), are images and experiences drawn from his work as a logger and ranger in the U.S. Pacific Northwest. In *Six Sections from Mountains and Rivers Without End, Plus One* (excerpts from an ongoing cycle of poems, 1965), *The Back Country* (1967), and *Regarding Wave* (1969), the fusion of religion into everyday life reflects the author's increasing interest in Eastern philosophies. Later volumes include *Turtle Island* (1974), for which Snyder won the Pulitzer Prize, and *Axe Handles* (1983). His alternatives to routinized city life are presented in *Earth House Hold* (1969), a book of journal fragments and essays, and *The Real Work: Interviews and Talks 1964–1979* (1980).

Snyder's later publications include *The Old Ways* (1977), a selection of essays on aspects of tribal life; *He Who Hunted Birds in His Father's Village*, an examination of Haida Indian myth, published in 1979 but written as an academic paper more than 25 years earlier; and *Passage through India* (1984), an account of an Asian pilgrimage.

Among the other awards Snyder received was the 1966 Poetry Prize from the National Institute of Arts and Letters.

Snyders, Frans, Snyders also spelled SNIJDERS, SNEYDERS, SNYERS, or SNEIS (baptized Nov. 11, 1579, Antwerp—d. Aug. 19, 1657, Antwerp), Baroque artist who was the most noted 17th-century painter of hunting scenes and animals in combat. He studied under Pieter Brueghel the Younger, and afterward under Hendrik van Balen. He visited Italy in 1608. In 1611 he married Margaretha de Vos, the sister of the Flemish painters Cornelis and Paul de Vos.

Snyders originally devoted himself to painting flowers, fruit, and still life subjects, later turning to his lively depictions of animals. The compositions of these scenes of hunting and animals fighting are rich and varied. His drawing is accurate and vigorous, and his touch bold and thoroughly expressive of the different textures of furs and skins. Rubens frequently employed him to paint animals, fruit, and still life objects in his own pictures. In the lion and boar hunts that are traditionally attributed to Snyders, the hand of Rubens is sometimes apparent. Snyders was appointed principal painter to the archduke Albert, governor of the Low Countries, for whom he executed some of his finest works. One of these, a "Stag Hunt," was presented to Philip III, who commissioned the artist to paint several subjects of the chase.



"Stag Hunt," oil painting by Frans Snyders; in the Prado, Madrid
By courtesy of the Museo del Prado, Madrid

so-na, Pinyin SUONA, double-reed woodwind instrument of China, having a conical body and a metallic horn. It has eight finger holes and typically covers a range of about two octaves. There are many kinds of *so-na,* differing in range and size; the lowest pitches of the four most common sizes are B, e, a, and g′, respectively. The instrument is characterized by its shrill sound and the frequent use of tonguing in performance.

Soai Rieng (Kampuchea): *see* Svay Riĕng.

Sōami, also called SHINSŌ (b. 1472, Japan—d. 1525, Japan), Japanese painter, art critic, poet, landscape gardener, and master of the tea ceremony, incense ceremony, and flower arrangement who is an outstanding figure in the history of Japanese aesthetics.

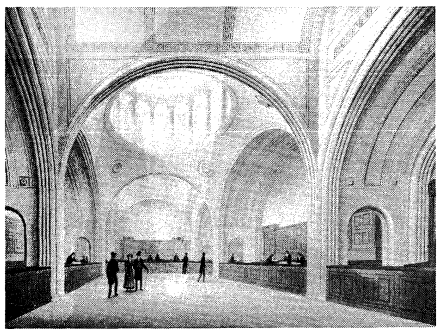
Sōami was the grandson and son of the painters and art connoisseurs Nōami and Geiami, respectively, and like them was in charge of the art collection of the Ashikaga shoguns (military dictators of the Ashikaga clan that ruled Japan from 1338 to 1573).

Sōami's work was strongly influenced by the philosophy of Zen, the meditative sect of Buddhism that taught that secular art forms can serve as a means of attaining spiritual enlightenment. As a painter, he preferred the soft ink-wash style of Mu-ch'i Fa-ch'ang, a 13th-century Chinese Zen painter greatly admired in Japan, and he painted a fine set of landscape *fusuma-e* (paintings done on sliding doors) in the Daisen-in, a monastery within the Zen Buddhist Daitoku-ji in Kyōto. As a critic, in 1511 he revised Nōami's famous catalog of Chinese paintings, the *Kundaikan sayū chōki* (compiled in 1476). As a landscape gardener, he designed two of the most celebrated Zen temple gardens in Japan: the Ryōan-ji garden, in Kyōto, an outstanding example of *kare sansui,* a dry landscape technique in which combinations of stones and sand are used to suggest mountains and water; and the Daisei-in garden, a miniature reproduction of a natural landscape, also in the *kare sansui* style. It is believed that he also planned the garden of the famed Silver Pavilion (Ginkaku-ji) in Kyoto, the villa built by his major patron, Ashikaga Yoshimasa.

Soane, Sir John (b. Sept. 10, 1753, Goring-on-Thames, Oxfordshire, Eng.—d. Jan. 20, 1837, London), British architect notable for his original, highly personal interpretations of the Neoclassical style.

In 1768 he entered the office of George Dance the Younger, surveyor to the City of London, whom in later life he referred to as his "revered master"; in 1772 he went to Henry Holland as an assistant; and from 1772 he attended Royal Academy schools. Granted a travelling scholarship by King George III, he went to Italy in 1778.

As a country house architect, Soane had modest success until he was appointed architect to the Bank of England in 1788. Various government appointments followed, and in 1806 he succeeded Dance as professor of architecture at the Royal Academy; he was knighted in 1831. The list of his works is a long one; some of the finest, which helped to establish his reputation, included his rebuilding of the Bank of England (built 1792–1833, since rebuilt), his own house at 13 Lincoln's Inn Fields, London (1812–14), and Dulwich College Picture Gallery, London (1811–14). His style is characterized by a tendency to reduce classical elements of design to their structural essentials, the substitution of linear for modelled ornamentation, frequent use of shallow domes and top lighting, and ingenious handling of interior space.



The Colonial Office in the Bank of England, unsigned watercolour by one of Soane's draftsmen, *c.* 1818; in the Sir John Soane Museum, London
By courtesy of the trustees of the Sir John Soane Museum, London; photograph, R.B. Fleming

Pierre de la Ruffiniere du Prey's book *John Sloan's Architectural Education* was published in 1978.

soap, water-dispersible salt of a fatty acid, commonly used for cleaning. Although the terms soap and detergent are sometimes used interchangeably, the latter usually denotes a synthetic substance.

A brief treatment of soaps follows. For full treatment, *see* MACROPAEDIA: Industries, Chemical Process.

The action of soaps can be broken down into four distinct steps. After the surface being cleaned has become wet, it absorbs the soap. This is followed by dispersion of the soil from the surface into the water, where it is held in suspension and prevented from being redeposited onto the clean surface.

Soaps made from animal fat and wood ashes seem to have been used only for medical purposes in antiquity; not until the 2nd century AD were they recognized as cleaning agents. Although soap was made at home for laundry purposes in the Middle Ages and early modern times, cake soap was a luxury product that came into common use only in the 19th century.

Early soapmakers dispersed wood or plant ashes in water, added fat to the solution, then boiled it, adding ashes as the water evaporated. During the process the neutral fat underwent a chemical reaction with the ash, a process called saponification. The transformation of soapmaking from a handicraft to an industry was aided by the introduction of the Leblanc process for manufacturing soda ash from brine (about 1790).

Several different techniques are employed in modern soapmaking. The fat boiling process is still used by small producers, but takes 4 to 11 days for saponification, the removal of glycerin from the soap, and the elimination of impurities. Soap is produced in quantity by a continuous process that takes only a few hours. Fat is split into fatty acids and glycerin, then the fatty acids are purified by distillation and neutralized with an alkali. Two other methods are used by small factories: in the cold method a fat and oil mixture is agitated with an alkali solution in an open pan until it thickens; in the semiboiled method, the ingredients are heated in a kettle but not boiled.

Soap is finished by pouring into frames or cooling presses, then cutting and stamping. For flakes, the soap mass is extruded into ribbons, dried, and cut. To produce toilet soap, the mass is treated with perfumes or superfatting agents, then vacuum-dried and cooled. Medicated soaps are made with additives to enhance their deodorant and disinfectant effect. *Compare* detergent.

soap opera, broadcast dramatic serial program, so called in the United States because most of its major sponsors for many years were manufacturers of soap and detergents. The soap opera is characterized by a permanent cast of actors, a continuing story, emphasis on dialogue instead of action, and a slower-than-life pace.

The soap opera began in the early 1930s with 15-minute daytime radio episodes and was inherited by television in the early 1950s and expanded to 30 minutes. By the mid-1950s had dominated morning and early afternoon weekday television programming as it had dominated a similar time frame in radio programming during the previous decade.

Although the most popular programs continued to use the classical formula, during the 1970s many of them admitted the open discussion of such matters as abortion, drug abuse, and venereal disease and introduced racial and ethnic characters into a previously all-white, Anglo-Saxon population, as well as an occasional blue collar worker and an employed married woman. A few of the programs expanded to 60 minutes.

A program called "Mary Hartman, Mary Hartman" was created and produced by Norman Lear in the late 1970s. Its subject matter was unrestricted, and it was described by some as a satire on soap opera. By the 1980s several prime-time evening shows used the soap opera formula.

soapberry, any member of the genus *Sapindus,* of the soapberry family (Sapindaceae),



Soapberry (*Sapindus saponaria*)
W.H. Hodge

comprising about 12 species of shrubs and trees native to tropical and subtropical regions of Asia, the Americas, and islands of the Pacific.

The leaves are divided into leaflets, which are arranged along an axis. The flowers are greenish or whitish and borne in large terminal clusters. The fruit is a somewhat leathery berry containing as much as 37 percent saponin, which lathers with water and is used as soap in some tropical regions.

soapfish, any of about 24 species of marine fishes constituting the family Grammistidae (order Perciformes), occurring from the Atlantic to the Indo-Pacific region. In appearance, they are characterized by a slightly protruding lower jaw and downturned mouth. The name soapfish refers to their ability, when agitated, to produce a toxic body mucus that forms a slimy, soapsudslike froth upon its secretion into the water. The toxic mucus serves as a deterrent to predators. All soapfishes are small, the largest attaining lengths of about 30 centimetres (1 foot).

The greater soapfish (*Rypticus saponaceus*), the best known member of the group, is found in the Atlantic from the southern United States and northern South America to West Africa. The species is characterized by three distinct dorsal spines and is sometimes called the three-spined soapfish.

soapwort, any of several plants of the genus *Saponaria*, in the pink family (Caryophyllaceae), the sap of which can produce a lather with water. While most are weedy, a few are cultivated, especially the trailing species *S. ocymoides*, with several varieties having pink to deep-red flower clusters. Bouncing Bet (*S. officinalis*), reaching to a height of 1 metre (3 feet), is widely naturalized in eastern North America. Its roots have been used medicinally, and its sap is a substitute for soap.

Consult the INDEX *first*

Soares, Mário (Alberto Nobre Lopes) (b. Dec. 7, 1924, Lisbon), Socialist politician and lawyer, who became president of Portugal in 1986, becoming the country's first elected civilian head of state in 60 years.

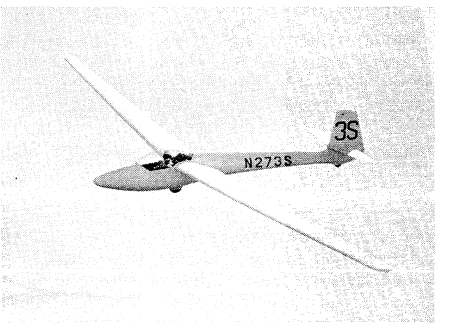
His father, João Lopes Soares (d. 1970), had been a liberal republican, often jailed or exiled during the dictatorship of António Oliveira Salazar. The young Soares studied at the University of Lisbon and at the Faculty of Law, Sorbonne, Paris, becoming a student activist and thereafter taking up a law practice defending political dissidents. By the time that the Army-imposed, right-wing dictatorship fell in 1974, Soares had been jailed 12 times and twice experienced exile, in São Tomé (1968) and Paris (1970–74). In 1964 he and others founded a clandestine society, the Portuguese Socialist Action, which by 1974 had transformed into the Portuguese Socialist Party (Partido Socialista Portuguesa).

From 1974 to 1975 Soares was foreign minister in the new but still military-controlled government and oversaw the negotiations for freeing Portugal's overseas colonies. In 1976 he became the first constitutionally elected prime minister since the 1974 revolution (serving 1976, 1976–78, and 1983–85) and in 1986 became the first civilian head of state (president) since 1926, ending 60 years of Army overlordship.

Soares authored a number of books on philosophy and politics, including a partly autobiographical work, first published in Paris, *Le Portugal baillonné: un témoignage* (1972; "Portugal Muzzled: A Testament"; Eng. trans. *Portugal's Struggle for Liberty*).

soaring, also called GLIDING, flight in an unpowered heavier-than-air craft, using upward motion of the air to maintain or gain altitude. (*See also* hang gliding.) Two main types of aircraft are used, the glider and the sailplane, although the latter is often also called a glider. There are differences, however. A glider, after its launch and release from tow, will make a controlled descent to a landing. The sailplane is designed with greater wing area and greater lift, so as to descend more slowly; it is capable of achieving considerable altitude when soaring in rising air.

Glider and sailplane controls are similar to those in small airplanes: the rudder is operated by pedals, and the ailerons—controlling roll—and the elevators—controlling ascent and descent—are operated by a control stick or wheel. Sailplanes usually have a single landing wheel beneath the forward part of the fuselage.



Sailplane
Linn Emrich

Pioneers in glider flight and development include the German Otto Lilienthal (1848–96), who was the first to attain predictable and controlled glider flight; the British pilot Percy Pilcher (1869–99); and the Americans Octave Chanute and the Wright brothers. The sailplane was first developed in Germany after World War I, when airplane manufacturing was forbidden by the Treaty of Versailles. Gliders were used by U.S., British, and German airborne troops during World War II. Soaring for sport originated in Germany in 1910, and international competition began in 1922, becoming commonplace during the 1930s. In 1937 the Fédération Aéronautique Internationale (FAI; International Aeronautical Federation) became the governing body of the sport, which became popular throughout Europe and the United States. After World War II it became worldwide, extending to Australia and South Africa.

Soaring, which means gaining altitude without using power, is accomplished by launching—the most common method being by towing the glider behind a powered airplane at a speed of about 60 miles per hour (100 kilometres per hour) until an altitude of about 2,000 feet (610 metres) is reached. The sailplane glider pilot, who has stayed directly behind and slightly above the towplane in order to avoid turbulence created by the propellers, then releases the towline by pulling a knob on the instrument panel.

The basic method of soaring, called thermaling, is to find and use rising currents of warm air, such as those above a sunlit field of ripened grain, to lift the glider. Thermals can rise very rapidly, allowing the sailplane, if deftly piloted, to attain substantial increases in altitude. Slope soaring occurs when moving air is forced up by a ridge. By following the ridge the sailplane can glide for great distances. In wave soaring, the glider comes upon vertical waves of wind (*e.g.*, on the lee side of a mountain range), and riding such waves allows extreme altitude to be gained rapidly. To facilitate all such maneuvers as well as navigation, a glider can be equipped with such standard airplane instruments as the altimeter, airspeed indicator, compass, and turn-and-bank indicator. The most important instrument is the variometer, which shows when the glider is moving up or down even when that movement is too minute to be noticed by the pilot.

National contests are held annually, and world championships, begun in 1937, have been held every other year from 1950. National and international championships include events for altitude, speed on a triangular course, straightaway distance, and accuracy in returning to a starting point. The overall champion is determined by point total. Many persons soar purely for recreation.

Sobaek Mountains, Korean SOBAEK-SANMAEK, largest range of mountains in southern South Korea. The range, 220 mi (350 km) long, stretches southwest from north of T'aebaek Mountain (5,121 ft [1,561 m]) in Kangwŏn Province to the Kohŭng Peninsula near Yŏsu. Its high mountains, Sobaek (4,760 ft), Munju (2,437 ft), Songni (3,468 ft), Dŏkyu (5,276 ft), and Baegun (4,190 ft), are watersheds for southern South Korea. Chiri-san (6,283 ft), on its southwestern branch, is a national park.

Sobat River, major tributary of the Nile, joining the Baḥr al-Jabal ("Mountain Nile") above Malakāl, The Sudan, to form the White Nile. The Sobat is formed by the confluence of its two main headstreams—the Baro and Pibor—on the Ethiopian border, southeast of Nāṣir, The Sudan. Other Ethiopian headstreams include the Jokau, Gilo, and Akobo. From the Baro–Pibor confluence, the river flows about 220 mi (354 km) west-northwest in a series of meanders to its mouth on the Baḥr al-Jabal, receiving two streams, the Khawr Nyanding and Khawr Ful Lus, from the south.

Approaching the Nile, the Sobat deepens to 18–30 ft (5½–9 m) and narrows to 400 ft. Its enormous discharge when in flood (November–December) carries a whitish sediment that gives the White Nile its name. The Sobat and Baro rivers are navigable by steamer (June–December) upstream to Gambela, Eth., and the Sobat–Pibor waterway carries small craft during the same period to Pibor Post, about 130 mi up the Pibor from its junction with the Baro. A ferry crosses the Sobat below the mouth of Khawr Ful Lus. During the dry season, the fall in river level uncovers land used for grazing, thus providing pasturage for the cattle-owning peoples of the region.

Sobekneferu (queen of Egypt): *see* Sebeknefru.

Sobers, Sir Garfield (St. Auburn), byname SIR GARRY SOBERS (b. July 28, 1936, Bridgetown, Barbados), West Indian cricketer, considered by many authorities the most gifted all-around player of all time. As a batsman he established a record for Test (international) matches by scoring 365 runs, not out, in a single innings (West Indies versus Pakistan, 1957–58 season). He was also exceptional in bowling and in close-to-the-wicket fielding.

Sobers was educated at Bay St. School, Barbados and became a left-hand batsman and a left-hand bowler in cricket. He entered first-class cricket at the age of 16 and bowled for the West Indies team against England during the 1953–54 season. In 1965 he succeeded Sir Frank Worrell as captain of the West Indies. His team defeated Australia and then, in 1966, won over England three matches to one. He also captained Nottinghamshire (1968–74). He retired in 1974 and was knighted in 1975. His batting 8,032 runs in Test matches (1953–74) is a record, as are his 365, not out, and 26 centuries (100 runs in a single innings). Sobers wrote several books on cricket, including a novel, *Bonaventure and the Flashing Blade* (1967), and, with J.S. Barker, a history of cricket in the West Indies (1967).

A biography, *Sir Gary,* by Trevor Bailey was published in 1976.

Sobhuza, also spelled SOPHUZA, name of Swazi kings grouped below chronologically and indicated by the symbol •.

• **Sobhuza I** (d. 1836, near Manzini, Swaziland), South African king (reigned from *c.* 1815) who founded the Swazi nation (now Swaziland). A contemporary of the great Zulu kings Shaka and Zwide, Sobhuza was forced by them to flee north with his Ngwane and Dhlamini people from their original home on the Pongola River in South Africa. The migration of the Ngwane and Dhlamini is regarded as the commencement of the Mfecane, a period of war and migration among the peoples of southern Africa.

Sobhuza began his migration about 1815, following a dispute with Zwide over agricultural lands on the Pongola. By 1818 he had established himself in what is now Swaziland, despite a serious defeat by Zwide. To secure his position he married a daughter of Zwide and made a diplomatic visit to Shaka. In 1828 Sobhuza was again threatened, this time by Dingane, Shaka's successor, but he avoided pitched battles with the Zulu forces and in 1839 was finally able to defeat Dingane. Sobhuza allowed conquered Nguni and Sotho chiefdoms to be governed by their traditional leaders, giving the new Swazi nation the popularity and support it needed to survive.

• **Sobhuza II,** byname NGWENYAMA (siSwati language: "Lion") (b. July 22, 1899, Swaziland—d. Aug. 21, 1982, Lobzilla Palace, near Mbabane, Swaziland), king of the Swazi from 1921 and of the Kingdom of Swaziland from 1967 to 1982.

His father, King Ngwane V, died when Sobhuza was an infant, and a queen regent ruled during his minority, while he was being educated in Swaziland and at the Lovedale Institute in Cape Province, S.Af. He finally was installed as constitutional ruler of the Swazi on Dec. 22, 1921. At the time, Swaziland was one of Great Britain's High Commission territories in southern Africa, and not until 1967 did Swaziland become an autonomous kingdom, with the British retaining control over external affairs and national security. The following year the country achieved full independence, with a limited monarchy and an elected legislature. Less than five years later (in April 1973), however, using a private army that he had secretly raised and equipped, Sobhuza suspended the constitution, dissolved the legislature, outlawed political parties, and assumed supreme power to rule. Although a new parliament (Libandla) was established in 1979, it was elected without political parties, and its role was merely advisory.

Sobhuza also prospered by the use of political and family alliances. His many marriages (at least 70) helped to bind the nation together by tying all important families to his own clan, the Dlamini, who constituted about one-quarter of the population. One history of the Swazi listed 67 sons of the king; some estimates suggest as many as 500 children.

Upon Sobhuza's death, Swaziland was ruled by a regency for one of his sons, Makhosetive, who became King Mswati III in 1986.

Sobibor, Polish SOBIBÓR, German Nazi extermination camp in a forest near the village of Sobibór in Lublin province, Poland. Built in March 1942, it operated from May 1942 until October 1943, and its five gas chambers killed a total of about 250,000 Jews, mostly from Poland and occupied areas of the Soviet Union. On Oct. 14, 1943, the Jewish labourers at the camp rose in revolt and killed several SS supervisors and Ukrainian guards before being captured, shot down, or decimated in the surrounding minefields or farmlands. Only about 30 ultimately escaped. Immediately after the revolt, all survivors were killed, the installations erased, and the area planted over with trees.

Sobieski, Jan: *see* John III Sobieski *under* John (Poland).

Sobk (Egyptian god): *see* Sebek.

Sobral, city, northwestern Ceará *estado* (state), northeastern Brazil, on the Acaraú River. It was given town rank in 1773 and raised to city status in 1841. The city is a commercial, cotton-milling, and agricultural-processing centre; chemicals are also produced there. Railroads and highways link Sobral to coastal Fortaleza, the state capital, and to communities in Ceará and Piauí states. Pop. (1980) 69,208.

Sobrāon, Battle of (Feb. 10, 1846), the fourth, last, and decisive battle of the First Sikh War (1845–46). The Sikhs were entrenched on the eastern British-held bank of the Sutlej River, their retreat secured by a bridge of boats. After a severe artillery duel, the Sikh entrenchments were stormed. The collapse of the bridge of boats turned the retreat into a rout; more than 10,000 Sikhs were killed trying to cross the river.

The British also suffered severely, with 2,383 killed or wounded. Further resistance was impossible, and the Sikh state in northwestern India came under British domination.

socage, in feudal English property law, form of land tenure in which the tenant lived on his lord's land and in return rendered to the lord a certain agricultural service or money rent. At the death of a tenant in socage (or socager), the land went to his heir after a payment to the lord of a sum of money (known as a relief), which in time became fixed at an amount equal to a year's rent on the land. Socage is to be distinguished from tenure by knight service, in which the service rendered was of a military nature, although, by statute in 1660, all knight-service tenure became socage tenure. In time, most of the land in England came to be held in socage tenure. In the United States, lands in the early colonies were given in socage, particularly in Pennsylvania, where the royal charter given to William Penn created a socage tenure with an annual rent of two beaver skins for the land. After the American Revolution, lands held in socage tenure from the crown were deemed to be held by the state as sovereign, and several states passed statutes or enacted constitutional provisions abolishing tenure.

soccer: *see* association football.

Socé, Ousmane (Diop) (b. Oct. 31, 1911, Rufisque, Senegal—d. May 1974, Dakar), Senegalese writer and politician who was one of the first novelists of his country.

After attending Qur'ānic school Socé entered the colonial school system and became one of the first African students to obtain a scholarship to study at a French university.

While studying veterinary medicine he wrote two novels—*Karim* (1935) and *Mirages de Paris* (1937)—that were published in Paris. The former anticipated Socé's later concern with the problems that young Africans face when moving from rural to urban areas. For the latter, Socé availed himself of his French experience and provided the first "been-to" novel in French, focusing on a tragic love story of a Senegalese student and his French girlfriend.

Socé also wrote down a number of animal tales and historical legends from the oral tradition of Senegal in *Contes et légendes d'Afrique noire* (1942; "Stories and Legends of Black Africa"), edited *Le Phare du Sénégal* (1952–57) and founded the magazine *Bingo* (1953); produced a volume of poetry, *Rythmes du Khalam* (1956); and offered a succinct view of his political ideas in *L'Afrique à l'heure de l'indépendance* (1960; "Africa at the Time of Independence"). He was always active in the politics of his country and served as Senegal's ambassador to the United States and delegate to the United Nations until increasing blindness compelled him to retire in 1968.

Soch'i (Korean artist): *see* Ho Ryong.

Sochi, also spelled SOČI, city and resort of Krasnodar *kray* (region), southwestern Russian Soviet Federated Socialist Republic. It stretches for 22 miles (35 km) along the Black Sea coast and at the foot of the western part of the main Caucasus mountain range. The city was established in 1896 on the site of the former Navaginskoye fort and began developing as a resort area in 1902. The presence of mineral springs, the attractive coastal and mountain scenery, long beaches, and the warm climate have made Sochi a large and popular holiday and health resort for Soviet and eastern European vacationers. Sochi has many hotels, tourist centres, and campsites and more than 50 sanatoriums. Its streets and gardens are filled with exotic subtropical trees and shrubs. Greater Sochi, created in 1961, includes resorts stretching for 87 miles (140 km) along the coast. The Kavkaz State Reserve, established in 1924 and occupying 651,100 acres (263,500 hectares), lies approximately 45 miles (72 km) east of the city. Pop. (1987 est.) 317,000.

Sōchō, also called SŌKAN, or SAIOKUKEN (b. 1448, Japan—d. April 11, 1532, Japan), Japanese *renga* ("linked-verse") poet and chronicler of the late Muromachi period (1338–1573) who, along with two other *renga* poets, wrote *Minase sangin hyakuin* (1488; *Minase Sangin Hyakuin: A Poem of One Hundred Links Composed by Three Poets at Minase,* 1956).

Little is known of Sōchō's early years, but he spent many of his adult years as a disciple of the Buddhist monk and *renga* master Iio Sōgi. In early 1488 Sōchō, Sōgi, and another student, Shōhaku, met at the village of Minase, between Kyōto and Ōsaka, and composed *Minase sangin.* The poem is considered to be one of the best examples of linked-verse poetry, which was at its peak during that time.

After the death of Sōgi in 1502, Sōchō wrote the narrative *Sōgi shūen ki* ("An Account of the Last Moments of Sōgi") to commemorate his master. Later works included *Sōchō shuki* (1522–27; "Memoirs of Sōchō"), in which he used *renga* and *haikai* (comic *renga*) to describe his travels during that period, and *Sōchō ɳikki* (1530–31; "Sōchō Diary").

Social and Liberal Democratic Party, liberal-centrist political party in Great Britain that was founded on March 3, 1988, through a merger of the Liberal Party and the Social Democratic Party (*qq.v.*). The two parties had been allied with each other almost since the founding of the Social Democratic Party in 1981, and they decided to merge to increase their share of the electorate and thus better challenge the dominance of Britain's largest parties, the Conservative and Labour parties.

social change, in sociology, the alteration of mechanisms within the social structure, characterized by changes in cultural symbols, rules of behaviour, or value systems.

A brief treatment of social change follows. For full treatment, *see* MACROPAEDIA: Social Structure and Change.

Throughout its historical development, sociology has borrowed models of social change from other fields. In the late 19th century, when evolution became the predominant model for understanding biological change, ideas of social change took on an evolutionary cast, and, though other models have refined modern notions of social change, evolution remains often an underlying principle.

Other sociological models created analogies between social change and the West's technological progress; these models were used to justify colonialism and the enforced assimilation of Western culture by so-called "less advanced" societies. In the mid-20th century, anthropologists borrowed from the theory of structuralism to elaborate an approach to social change called structural functionalism. This theory postulated the existence of certain basic institutions (including kinship relations and division of labour) that determine social behaviour. Change in one institution affects other institutions because they function interdependently.

Marxist economic theory concluded that social change is the result of various subgroups within a culture vying for power. This conflict theory and the structural-functional theory represent two sides of the same coin. Although both agree that social change and structure are mutually interdependent, the conflict model stresses the process of change while the structural-functional model focuses on the elements of stability.

Social change can evolve from a number of different sources, including changes in the ecosystem (which can cause the loss of natural resources or widespread disease); technological change (epitomized by the Industrial Revolution, which created a new social group, the urban proletariat); population growth and other demographic variables; and ideological, economic, and political movements.

social class, an aggregate of persons, within a society, possessing about the same status.

A brief treatment of social class follows. For full treatment, *see* MACROPAEDIA: Social Differentiation.

Although philosophers have long been aware of divisions within their societies, class was not a subject of systematic analysis until political philosophers such as Thomas Hobbes, John Locke, and Jean-Jacques Rousseau, inspired by the struggle of the bourgeoisie to end aristocratic rule, began to study the new social order in the 17th and 18th centuries. Other philosophers and economists later spoke of conflicting economic interests and class conflicts.

For Karl Marx the organization of economic life determined social structure, and class relations, in his view, were the key to all social relations. In capitalism, capitalists dominated the society, served by the workers (proletariat) who are the actual creators of wealth. The capitalists also dominated the political life of the state and the production of ideas, art, and religion, reflecting their dominance of economic life. To Marx the struggle between workers and capitalists over wealth defined capitalist society; he thought it inevitable that the workers would revolt and establish a classless society.

Max Weber, a German sociologist, criticized Marx's emphasis on economic factors, arguing that Protestantism, nationalism, and the search for prestige were primarily responsible for the development of modern society. Finding little hostility between classes, Weber imagined that bureaucracies would increasingly regulate social life.

Other writers have emphasized the rise and fall of various elites in the shaping of societies, a fluid process that will never end. Functionalism, a view popular in the United States, holds that classes are a harmonious system of interdependent occupational roles that produce a harmonious social hierarchy—not class-conscious, hostile groups.

In a general way, sociologists posit three classes in the Western world: upper, working (or lower), and middle. While the upper classes (usually having inherited wealth) strongly influence government, business, education, and the arts, many writers claim they are not truly a ruling class because they must accommodate themselves to the other, numerically larger classes in society.

The socialist countries of eastern Europe and the Third World also have class elites, usually consisting of party members, managers, and government planners. In most developing countries, small farmers and agricultural labourers are the largest class; the size of the urban working class varies with the level of industrialization. Most class conflicts in these countries are still over issues of land allocation and agricultural prices. The upper classes are usually diverse, consisting of a combination of landowners, revolutionary leaders, military officers, industrialists, or Western-educated administrators.

The degree of social mobility varies among cultures. The United States is usually seen as more mobile than Europe; this may be responsible for the comparative lack of class-consciousness among the American working class. Because industrial societies depend on skilled labour, efficiency demands some social mobility, competence being valued more highly than social origin.

social contract, in political philosophy, actual or hypothetical compact, or agreement, between the ruled and their rulers, defining the rights and duties of each. In primeval times, according to the theory, the individual was born into an anarchic state of nature, which was happy or unhappy according to the particular version. He then, by exercising natural reason, formed a society (and a government) by means of a contract with other individuals. Theories of the social contract differed according to their purpose: some were designed to justify the power of the sovereign; some to safeguard the individual from oppression by an all-too-powerful sovereign.

Although similar ideas can be traced back as far as the Greek Sophists, social-contract theories had their greatest currency in the 17th and 18th centuries and are associated with such names as Thomas Hobbes, John Locke, and Jean-Jacques Rousseau. What distinguished these theories of political obligation from other doctrines of the period was their attempt to justify political authority on grounds of individual self-interest and rational consent. They attempted to demonstrate the value and purposes of organized government by comparing the advantages of civil society with the disadvantages of the state of nature, a hypothetical condition characterized by a complete absence of governmental authority. The purpose of this comparison was to show why and under what conditions government is useful and ought therefore to be accepted by all reasonable men as a voluntary obligation. These conclusions were then reduced to the form of a social contract, from which it was supposed that all the essential rights and duties of citizens could be logically deduced.

According to Hobbes (*Leviathan,* 1651), the state of nature was one in which there were no enforceable criteria of right and wrong. Each person took for himself all that he could; man's life was "solitary, poor, nasty, brutish and short." The state of nature was therefore a state of war, which could be ended only if men agreed (in a social contract) to give their liberty into the hands of a sovereign, who was thenceforward absolute, on the sole condition that their lives were safeguarded by sovereign power.

Locke (in the second of *Two Treatises of Government,* 1690) differed from Hobbes insofar as he described the state of nature as one in which the rights of life and property were generally recognized under natural law, the inconveniences of the situation arising from insecurity in the enforcement of those rights. He therefore argued that the obligation to obey civil government under the social contract was conditional upon the protection not only of the person but also of private property. If a sovereign violated these terms, he could be justifiably overthrown.

Rousseau (in *Du contrat social,* 1762) held that in the state of nature man was unwarlike and somewhat undeveloped in his reasoning powers and sense of morality and responsibility. When, however, men agreed for mutual protection to surrender individual freedom of action and establish laws and government, they then acquired a sense of moral and civic obligation. In order to retain its essentially moral character, government must thus rest on the consent of the governed, the *volonté générale* ("general will").

The more perceptive social contract theorists, including Hobbes, always recognized that their concepts of the social contract and the state of nature were unhistorical and could be justified only as hypotheses useful for the clarification of timeless political problems.

Social Credit Party, French PARTI DU CRÉDIT SOCIAL, minor Canadian political party founded in 1935 by William Aberhart in Alberta and based on the Social Credit theory of Clifford Hugh Douglas (1879–1952), a British economist.

Douglas' theory, first promoted in 1919 in the British socialist publication *The New Age,* sought to remedy the chronic deficiency of purchasing power by issuing additional money to consumers and rendering subsidies to producers in order to liberate production from the price system, without altering private enterprise and profit. The Social Credit movement had a short-lived following in Britain in the 1920s and reached western Canada in the 1930s. In 1935 Aberhart's newly established party won 56 of 63 contested seats in the Alberta Assembly, thus forming the world's first Social Credit government, which remained in power for 36 years (until 1971). The movement later spread to other provinces; it governed British Columbia from 1952, except for the years 1958–62 and 1972–75; and it held seats in the Parliament at Ottawa from 1935 to 1980, when it lost all six of its seats.

By the late 1930s the party had virtually abandoned Douglas' theories, and, it now advocates such policies as employee participation in profits and in shareholding.

social Darwinism, the theory that persons, groups, and races are subject to the same laws of natural selection as Charles Darwin had perceived in plants and animals in nature. According to the theory, which was popular in the late 19th and early 20th centuries, the weak were diminished and their cultures de-

limited, while the strong grew in power and in cultural influence over the weak. Social Darwinists held that the life of man in society was a struggle for existence ruled by "survival of the fittest," a phrase proposed by the British philosopher and scientist Herbert Spencer.

The social Darwinists—notably Spencer and Walter Bagehot in England and William Graham Sumner in the United States—believed that the process of natural selection acting on variations in the population would result in the survival of the best competitors and in continuing improvement in the population. Societies, like individuals, were viewed as organisms that evolve in this manner.

The theory was used to support laissez-faire capitalism and political conservatism. Class stratification was justified on the basis of "natural" inequalities among individuals, for the control of property was said to be a correlate of superior and inherent moral attributes such as industriousness, temperance, and frugality. Attempts to reform society through state intervention or other means would, therefore, interfere with natural processes; unrestricted competition and defense of the status quo were in accord with biological selection. The poor were the "unfit" and should not be aided; in the struggle for existence, wealth was a sign of success. At the societal level, social Darwinism was used as a philosophical rationalization for imperialist, colonialist, and racist policies, sustaining belief in Anglo-Saxon or Aryan cultural and biological superiority.

Social Darwinism declined during the 20th century as an expanded knowledge of biological, social, and cultural phenomena undermined, rather than supported, its basic tenets.

social democracy, political ideology that advocates a peaceful, evolutionary transition of society from capitalism to socialism using established political processes. Based on 19th-century socialism and the tenets of Karl Marx and Friedrich Engels, social democracy shares common ideological roots with communism but eschews its militancy and totalitarianism. Social democracy was originally known as revisionism because it represented a change in basic Marxist doctrine, primarily in the former's repudiation of the use of revolution to establish a socialist society.

The social democratic movement grew out of the efforts of August Bebel, who with Wilhelm Liebknecht cofounded the German Social Democratic Workers' Party in 1869 and then effected the merger of their party with the German General Workers' Union in 1875 to form the Social Democratic Party (Sozialdemokratische Partei). Bebel imbued social democracy with the belief that socialism must be installed through lawful means rather than by force. Beginning with the election of two Social Democrats to the Reichstag in 1871, the party grew in political strength until in 1912 it became the largest single party in voting strength, with 110 out of 397 seats in the Reichstag. The success of the Social Democratic Party in Germany encouraged the spread of social democracy to other countries in Europe.

The growth of German social democracy owed much to the influence of the German political theorist Eduard Bernstein. In his *Die Voraussetzungen des Sozialismus und die Aufgaben der Sozialdemokratie* (1899; "The Preconditions of Socialism and the Tasks of Social Democracy"; Eng. trans. *Evolutionary Socialism*), Bernstein challenged the Marxist orthodoxy that capitalism was doomed, pointing out that capitalism was overcoming many of its weaknesses, such as unemployment, overproduction, and the inequitable distribution of wealth. Ownership of industry was becoming more widely diffused, rather than more concentrated in the hands of a few. Whereas Marx had declared that the subjugation of the working class would inevitably culminate in socialist revolution, Bernstein argued that success for socialism depended not on the continued and intensifying misery of the working class but rather on eliminating that misery. He further noted that social conditions were improving and that with universal suffrage the working class could establish socialism by electing socialist representatives. The violence of the Russian Revolution in 1917 and its aftermath precipitated the final schism between the social democratic parties and the communist parties.

After World War II, social democratic parties came to power in several nations of western Europe—including West Germany, Sweden, and Great Britain (in the Labour Party)—and laid the foundations for modern European social welfare programs. With its ascendancy, social democracy changed gradually, most notably in West Germany. These changes generally reflected a moderation of the 19th-century socialist doctrine of wholesale nationalization of business and industry. Although the principles of the various social democratic parties began to diverge somewhat, certain common fundamental principles emerged. In addition to abandoning violence and revolution as tools of social change, social democracy took a stand in opposition to totalitarianism. The Marxist view of democracy as a "bourgeois" facade for class rule was abandoned, and democracy was proclaimed essential for socialist ideals. Increasingly, social democracy adopted the goal of state regulation, but not state ownership, of business and industry as sufficient to further economic growth and equitable income.

Social Democratic Party (SDP), in Great Britain, former political party founded on March 26, 1981, by four former Labour Party cabinet ministers (Roy Jenkins, David Owen, William Rodgers, and Shirley Williams) who had broken away from the Labour Party, charging it with extreme leftist tendencies and excessive control by the trades unions. The Social Democrats claimed to represent a centrist position and hoped to end what they conceived as a tendency for British public policy to lurch from far-left to far-right as the governments changed. The Social Democratic Party was the first new major party in Great Britain in 80 years.

The party began with 14 members of the House of Commons (all former Labour members but one, who had been a Conservative) and about 20 members of the House of Lords. By the end of 1981 several SDP candidates, including Jenkins and Williams, had won parliamentary seats in by-elections held in 1981 and 1982.

In subsequent general elections and by-elections, the Social Democrats formed an alliance with the Liberal Party. The Alliance, as it was sometimes called, won as much as 25 percent of the vote and a number of seats in the House of Commons. The SDP suffered setbacks in the general elections of 1983 and 1987, however. In 1988 most members of the SDP acceded to a merger with the Liberal Party to form the Social and Liberal Democratic Party (*q.v.*). The remaining Social Democrats, led by David Owen, disbanded their much-diminished party in 1990.

Social Democratic Party of Germany, German SOZIALDEMOKRATISCHE PARTEI DEUTSCHLANDS (SPD), German political party that calls for government control or regulation of large industry; it is Germany's oldest and largest single party.

The SPD was formed by the merger of the General German Workers' Union of Ferdinand Lassalle and the Social Democratic Workers' Party of the Marxists August Bebel and Wilhelm Liebknecht. The merger took place in Gotha in 1875 and resulted in the Socialist Workers' Party, which after 1890 was renamed the Social Democratic Party of Germany (SPD). Though banned in 1878 by the Prussian government of Otto von Bismarck, the party flourished, even helping to found the Second International in 1889. When legalized in 1890, it received 19.7 percent of the vote in the Reichstag elections; this grew to 34.8 percent of the vote and 110 of the 397 Reichstag seats in 1912. But its vote for war credits in 1914 and the disaster of World War I led the party to split, the centrists under Karl Kautsky forming the Independent Social Democratic Party and the left under Rosa Luxemburg and Karl Liebknecht forming the Spartacus League, which in December 1918 became the Communist Party of Germany (KPD).

The right wing of the SPD under Friedrich Ebert joined with liberals and conservatives to crush the Soviet-style uprisings in Germany in 1918–20. In the 1919 elections the SPD received 37.9 percent of the vote (while the Independent Social Democrats received another 7.6 percent), but the party's failure to win favourable terms from the Allies at the Paris Peace Conference in 1919 (terms embodied in the Treaty of Versailles) and the nation's severe economic problems led to a drop in support. Even after reuniting with the Independents, the Social Democrats in 1924 secured only 20.5 percent of the vote. Though the party recovered some ground, the Great Depression caused them to lose it again to the Nazis on the right and the Communists on the left. By 1933 it held only 120 of 647 seats in the Reichstag to the Nazis' 288 and the Communists' 81.

Outlawed by the Nazis in 1933, the SPD revived after World War II. In West Germany its vote steadily rose from 1953 (28.8 percent) to 1972 (45.9 percent). The SPD joined a coalition government with the Christian Democrats in 1966 and then in 1969 became senior partners in a coalition government with the Free Democrats. This coalition governed until 1982, when the Free Democrats broke away and formed a new government with the Christian Democrats.

In East Germany after World War II, the SPD was forcibly merged with the Soviet-dominated Communist Party of Germany to form the communist-led Socialist Unity Party of Germany. Soon after the anticommunist revolution of 1989, an independent SPD reemerged, holding its first party conference at Leipzig in February 1990. It developed close ties with the West German SPD and even chose the same honorary chairman, Willy Brandt.

Social-Democratic Workers' Party (Soviet Union): *see* Russian Social-Democratic Workers' Party.

Social Gospel, in American history, a religious social-reform movement that was prominent from about 1870 to 1920, especially among liberal Protestant groups dedicated to the betterment of industrialized society through application of the biblical principles of charity and justice. Especially persuasive of the movement's views were the works of Charles Monroe Sheldon (*e.g., In His Steps; "What Would Jesus Do?";* 1897) and Walter Rauschenbusch (*e.g., Christianity and the Social Crisis;* 1907). Labour reforms—including abolition of child labour, a shorter work week, a living wage, and factory regulation—constituted the Social Gospel's most prominent concerns. During the 1930s many of these ideals were realized through the rise of organized labour and the legislation of the New Deal.

social group, any set of human beings who either are, recently have been, or anticipate being in some kind of interrelation. The term group, or social group, has been used to designate many kinds of aggregations of humans. Aggregations of two members and aggrega-

tions that include the total population of a large nation-state have been called groups.

One of the earliest and best-known classifications of groups was the American sociologist C.H. Cooley's distinction between primary and secondary groups, set forth in his *Human Nature and the Social Order* (1902). "Primary group" refers to those personal relations that are direct, face-to-face, relatively permanent, and intimate, such as the relations in a family, a group of close friends, and the like. "Secondary group" (an expression that Cooley himself did not actually use but that emerged later) refers to all other person-to-person relations, but especially to those groups or associations, such as work groups, in which the individual is related to others through formal, often legalistic or contractual ties. Cooley felt that primary groups were the fundamental agencies through which the individual's character or personality was formed. American sociologist Talcott Parsons distinguished five factors that distinguish primary groups from secondary groups; relations among members of primary groups, as contrasted with secondary groups, tend to be (1) diffuse, rather than specific or delimited, (2) particularistic, rather than universalistic, (3) ascription based (*i.e.,* who or what you are), rather than achievement based (*i.e.,* what you do or have done), (4) other oriented or group oriented, rather than self-oriented, (5) affective or emotion laden, rather than emotionally neutral. Secondary groups are those in which relations between members tend to fit the opposite poles of the five factors.

Historically, many other pairs of terms have been used to classify groups. The German sociologist Ferdinand Tönnies coined the now-famous distinction between *Gemeinschaft* ("community") and *Gesellschaft* ("society," or "association"), which for all practical purposes reflect the same distinction between primary and secondary. The American anthropologist Robert Redfield distinguished between folk society and urban society. The English jurist Sir Henry Maine talked of societies of status and societies of contract. All of these categories are virtually coterminous with the primary-group–secondary-group distinction. There is also a close correspondence between these pairs of terms and the distinction between mechanical solidarity and organic solidarity, which was emphasized by the French sociologist Émile Durkheim.

Still other sets of terms are used, not as bases for distinguishing types of groups but as bases for describing the individual's relationship to different groups. Thus, the terms we-group and they-group, as well as the terms in-group and out-group, are used in order to contrast a group of which the referent, or focal person, is a member (often, a primary-type group) and some other group—not necessarily different in kind—of which the focal person (and other members of his in-group, or we-group) is not a member and toward which he feels some degree of animosity or negative affect.

Another set of distinctions based on the individual's relationship to the group are the terms membership group and reference group. The former has the obvious meaning of a group of which the individual is a member, here and now, by reason of one characteristic or another (such as being a member of a particular family or a member of the sixth-grade class in Jefferson School). The term reference group has been used in two ways, to mean either a group for which the individual aspires to membership or a group whose values, norms, and attitudes serve as points of reference for the individual. In either case, the crucial feature is that the individual adapts his attitudes and behaviour to model those of the members of the reference group. Obviously, membership groups and reference groups are not mutually exclusive.

The term group, or social group, has been used to refer to very divergent kinds of aggregations of people. Indeed, the term has been used so broadly as to threaten its fruitfulness as a focal concept. For one thing, the word group has sometimes been used to designate the members of a social category based on possession of a common attribute, even when the members have no meaningful degree of interrelation. Thus, it has been used to refer to such collections as persons of a particular age, all persons having similar incomes or occupations, or all persons with similar reading habits. These are what might be called statistical groups, as distinct from actual groups, the latter being characterized by interrelatedness among the members.

Virtually all efforts to classify social groups result in a certain degree of artificiality. Because of these and other problems of definition and classification, sociologists have attempted to distinguish among various kinds of social aggregates, some to be considered groups and others to be identified by other terms—audiences, publics, and the like; there is, however, no generally accepted classification at this time.

social insect, any of numerous species of insects that live in colonies and manifest group integration and division of labour. Social insects are best exemplified by termites (Isoptera) and by various ants, bees, and wasps (Hymenoptera).

Social insects are differentiated in structure, function, and behaviour into castes, the major ones being the reproductives (*e.g.,* the queen) and the steriles (workers and soldiers). Besides carrying out the basic function of reproduction, the members of the reproductive caste generally select the site for a new colony and excavate the first galleries. The workers care for the eggs and larvae, collect food for other members of the community, and construct and repair the nest, while the soldiers defend the colony against predators.

social insurance, public insurance program that provides protection against various economic risks (*e.g.,* loss of income due to sickness, old age, or unemployment) and in which participation is compulsory. Social insurance is considered to be a type of social security (*q.v.*), and in fact the two terms are sometimes used interchangeably.

The first compulsory social insurance programs on a national scale were established in Germany under Chancellor Otto von Bismarck; he succeeded in the legislating of health insurance in 1883, workmen's compensation in 1884, and old-age and invalidity pensions in 1889. Germany's example was soon followed by Austria and Hungary. The issue of social insurance elsewhere in Europe was dominated by a debate between those who preferred voluntary, subsidized insurance and those who advocated a compulsory system. Great Britain adopted national compulsory health insurance in 1911 and greatly expanded it in 1948. After 1920, social insurance on a compulsory basis was rapidly adopted throughout Europe and in the Western Hemisphere. The United States lagged behind Europe; until 1935, with the passage of the Social Security Act, government insurance programs providing old-age, disability, and survivor benefits were exclusively the responsibility of state or local governments. The three federal insurance programs adopted in the United States since 1935 provide retirement and survivor benefits, health care for persons over 65, and insurance against disability.

Social insurance programs differ from private insurance in several ways. Contributions are normally compulsory and may be made by the insured's employer and the state, as well as by the insured himself. Also, benefits are not as strictly tied to contributions as in private insurance. For example, to make the programs serve certain social purposes, some groups are included among beneficiaries even though they have not contributed for the required periods of time. Benefits may be raised in response to increases in the cost of living, again weakening the link between contributions and benefits.

Social insurance, however, differs significantly from other forms of public aid. Social insurance systems tend to be self-financing, with contributions placed in specific funds for that purpose. Because the payment of benefits is based generally on contributions made and not on need, the necessity for a means test is removed. Benefits become a right, and any stigma attached to receiving public funds is reduced. In certain countries, social insurance programs resemble private insurance in that the required contribution levels reflect varying degrees of risk. For example, contributions to unemployment insurance programs for employers with low discharge and layoff rates may be less than for those with higher rates.

There are considerable variations among countries in the financing of social insurance programs. Australia, Sweden, and Denmark are among those in which the state bears a high proportion of the costs. The distribution of costs also varies within each country according to the particular program in question. For instance, it is common for employers to bear the full cost of workmen's injury insurance. *See also* social welfare program.

social learning, in psychological theory, learning behaviour that is controlled by environmental influences rather than by innate or internal forces. The leading exponent of the concept of social learning, often called modeling, is the American psychologist Albert Bandura, who has undertaken innumerable studies showing that when children watch others they learn many forms of behaviour, such as sharing, aggression, cooperation, social interaction, and delay of gratification. In Bandura's classic study of imitation learning, children who saw a model punished for aggressive behaviour tended to exhibit fewer aggressive responses than children who saw the model rewarded for such behaviour, or than those who saw the model neither rewarded nor punished. However, Bandura asserted that children in all groups learned aggression eventually. His research has led some psychologists to question the potential "learning experiences" offered children by popular television shows and motion pictures, particularly those shows in which antisocial or violent behaviour is presented. Subsequent research on the effects of violence in the media has been controversial. Two opposing theories have been propagated; one claims that the viewing of violence will allow such drives to be sublimated (experienced vicariously, thereby lessening the drive), while the other claims that such viewing merely increases the drive. Evidence appears to favour the latter theory.

Psychologists following Bandura have stated that social learning based on observation is a complex process that involves three stages: exposure to the responses of others; acquisition of what an individual sees; and subsequent acceptance of the modeled acts as a guide for one's own behaviour.

social mobility, movement of individuals, families, or groups either through space (physical or geographical mobility) or through a system of social hierarchy or stratification. If the latter type involves a change in role, especially in occupation, but no change in social class, it is called "horizontal mobility." (An instance would be the movement from a managerial position in one company to a similar position in another.) If a change in role does involve a change in social-class position, it is called "vertical mobility" and involves either

"upward mobility" or "downward mobility." (An industrial worker who becomes a wealthy businessman moves upward in the class system; a landed aristocrat who loses everything in a revolution moves downward in the system.)

In revolution an entire class structure is altered. Yet once the society has been radically reorganized, further social mobility may be minimal. Social mobility, however, may be effected by slower, more subtle changes, such as the movement of individuals or groups from a poor, agrarian region to a richer, urban one. Throughout history international migration has been an important factor in upward mobility. One instance may be seen in the 19th-century migration of members of the working and peasant classes from Europe to the United States. On the other hand, Western European colonial expansion, while benefitting some, served to enslave others.

The social results of mobility, particularly the vertical type, are difficult to measure. Some believe that large-scale mobility, both upward and downward, has the effect of breaking down class structure, rendering a culture more uniform. Yet others argue that those attempting to rise or maintain a position actually strengthen the class system, for they are likely to be concerned with enforcing class differences. Thus some sociologists have suggested that class distinctions might be reduced, not by individual mobility, but by achieving social and economic equality for all.

One positive consequence of mobility has been a better use of individual aptitude. This has been aided by the expansion of educational opportunities in modern industrial nations. On the negative side, a high rate of vertical mobility has been known to produce individual and societal anomie (a term coined by the French sociologist Émile Durkheim). The individual experiencing anomie feels socially isolated and anxious; in a larger, societal context, generally accepted beliefs and standards of conduct are weakened or disappear.

It is believed by many that the class system of Western industrial nations has changed dramatically since the provision of extensive welfare services, beginning in 1945. Greater social mobility has been another result, thanks to a higher standard of living. This increased mobility, it is argued, has minimized class differences, so that Western nations are moving toward a relatively classless (or predominantly middle-class) society. Yet other observers contend that a new upper class is in the process of formation, comprised of production organizers and managers in both the public and private arenas. This theory seems to be generally applicable worldwide—to such disparate nations as the United States and the Soviet Union.

social movement, loosely organized but sustained campaign in support of a social goal, typically either the implementation or the prevention of a change in society's structure or values. Although social movements differ in size, they are all, essentially, collective. That is, they result from the more or less spontaneous coming together of people whose relationships are not defined by rules and procedures but who merely share a common outlook on society.

A brief treatment of social movements follows. For full treatment, *see* MACROPAEDIA: Collective Behaviour.

Social movements have existed throughout history, but those of the last several centuries are best understood. In the 18th century, Methodism swept across England and America in one of the many examples of a religious social movement. In the 19th century, the international Socialist movement grew out of smaller political struggles in individual European countries. The issue of slavery spawned several social movements in the United States, most notably Abolitionism in the North and Secessionism in the South. The 20th century has seen fascistic movements in Europe and the continued movement for civil rights in America. Recently, many countries have seen a revival of the movement against nuclear arms.

As noted, social movements are directed toward a social goal. In most cases, movements exist to promote changes in the existing social order, but sometimes they hope to preserve the status quo in the face of threatened changes. Thus, social movements are testimony to the belief that people can effectively shape their societies to fit a desired pattern.

Two areas are looked to for the causes of social movements. First, researchers examine the conditions within the given society. Apparently, discontent—due, perhaps, to poverty or a conflict in values—is alone not sufficient for generating a movement. The people who are dissatisfied must also have hope. That is, they must believe they have a genuine chance to change society—say, because they feel that the authorities are vulnerable or they themselves are well organized. Second, researchers consider the psychological factors that lead individuals to join social movements. The satisfaction gained from participation in a group seems particularly important, especially for people who lack significant attachments in their daily lives.

Because social movements are goal-directed, they are held together primarily by their members' shared possession of the goal, not by a framework of codified agreements. Thus, movements do not operate according to fixed procedures; instead, they are fluid in structure, and their operations are guided by standards that appear at a given moment to serve their long-range goals. For this reason, social movements usually lack formal leaders. An individual rises to power by persuading the members that he or she best comprehends the goals of the movement and has the most effective plan for achieving them.

In keeping with the informality of social movements, membership is determined merely by a person's belief in the goal of the movement. Members of a movement, however, typically share a sense of group identity, which manifests itself in a number of ways. For example, members often behave differently with other members than they do with nonmembers, and they tend to espouse uncritically the ideological positions sanctioned by the movement.

There is wide variation in the duration of social movements, though a lower limit can be fixed at several weeks. Within their life span, social movements commonly undergo certain shifts. First, leadership tends to shift among charismatic visionaries who inspire the membership, intellectuals who formulate ideology, and organizers who handle practical affairs. Second, membership tends to grow, causing a shift from a small core of highly dedicated people to a more varied group whose commitment is less absolute. Third, the movement's goals themselves can shift, generally becoming wider in scope than when the movement began.

Corresponding to their causes, social movements have two sorts of effects. At the psychological level, participation in a movement can have profound effects on a person's life. But whereas a person might experience satisfaction in belonging to a group, an observer might think that the member has surrendered his or her freedom of thought. Activity within a movement can, however, prepare a person for activity outside it; in particular, social movements can provide trained leaders for the society at large. Also at the social level, movements sometimes achieve specific social changes. But even short of the implementation of a given social policy, a social movement can be successful if it convinces society to adopt its moral values.

social norm: *see* norm.

social psychology, the scientific study of human behaviour in its social and cultural setting.

A brief treatment of social psychology follows. For full treatment, *see* MACROPAEDIA: Social Sciences, The.

It was in the 1920s that empirical methods first came to be used to provide data on the relation between social forces and individual behaviour. The pioneering work in social psychology was done in the United States. Although social psychology has since become an international discipline, U.S. researchers have continued to have a major influence in the field.

Social psychology includes a wide range of studies. Among these is the relation between social factors and perception. Social psychologists, for example, examine how a person judges the social status of other people on the basis of perceptual cues and how a person's own social circumstances—such as membership in certain groups—affects his or her perceptions in general. A related area of study involves the influence of social factors on a person's attitudes and beliefs.

One of the principal concerns of social psychologists is the functioning of groups. Studies of small groups—*e.g.,* families, committees, or groups of workers in a factory—gather data on such matters as the relative effectiveness of groups and individuals at accomplishing certain tasks, the different forms of group leadership, and conformity to standards set by the group. Researchers examine the dynamics of large social organizations—*e.g.,* an army or the labour force at a factory—to determine such matters as the procedures for communicating within the organization, the distribution of decision making and other forms of power, and the interaction of different influences on members' behaviour. Contemporary research, especially in industrial relations, has considered how the structure of an organization can be changed and what the effects of such changes are likely to be.

Social psychologists frequently investigate socialization, *i.e.,* the ways in which social factors shape an individual's personality and the ways in which an individual's behaviour varies according to changes in the social setting. A variety of influences on personality formation have been studied, many having to do with childhood. Sigmund Freud's views on children's psychological development, for example, have led some social psychologists to consider how social forces act on children at each stage of growth.

There are two principal sources of the data used in social psychology—experiments and fieldwork. Researchers devise experiments to be performed on subjects in a laboratory setting. This procedure has been criticized as being artificial, since such experiments lack the richness of actual social interactions and can be strongly affected by the subjects' awareness of being observed. Fieldwork, in which researchers collect observations of social interactions in their actual setting, also has limitations, however. Researchers are not always welcome in certain settings, and, as in the laboratory, the presence of observers may influence those being observed.

As the discipline has grown, social psychology has found numerous applications, particularly in the many areas of social work. Mental health agencies, for example, often employ social psychologists to investigate the social aspects of psychiatric problems and to devise effective programs of treatment. Social psychology also has proved useful in business, particularly in employee relations. Social psy-

chologists may be used to advise companies how to choose, train, and reward workers and how to organize production processes to lessen worker dissatisfaction. Social psychologists' research on consumer attitudes is often used to help design advertising campaigns.

Social Realism, trend in American art originating in about 1930 and referring in its narrow sense to paintings treating themes of social protest in a naturalistic or quasi-expressionist manner. In a broader sense, the term is sometimes taken to include the more general renderings of American life usually categorized as American Scene painting and Regionalism, which may or may not manifest socially critical comment.

The origins of Social Realism lie in the Ashcan School painters, who in the first decades of the 20th century depicted the commonplace, gritty, and unglamorous realities of city life. John Sloan, Robert Henri, George Bellows, and George Luks were prominent members of this diverse group who painted scenes from everyday life. Later, Reginald Marsh, though not a member of the Ashcan School, continued this tradition, taking lower Manhattan and the Bowery as his themes.

The advent of the Great Depression in 1929 and the enactment of the New Deal's programs beginning in 1933 stimulated a broad trend toward sociopolitical commentary in American painting. The vast expansion of job patronage by the federal government spilled over into the arts; with the support of the Works Progress (later Projects) Administration (WPA), the Public Works of Art Project (PWAP), and the Treasury Department, many artists in the 1930s were commissioned to decorate public buildings with murals dealing with American subject matter. Many American artists during the 1930s were also influenced by the politically conscious and sometimes overtly propagandistic works of the Mexican muralists Diego Rivera, David Alfaro Siqueiros, and José Clemente Orozco. George Biddle's "Sweatshop" (*c.* 1935), a study for a fresco in the Justice Department Building, Washington, D.C., is a notable example of such American public decorations, and one of the few to have survived intact.

In the Depression era American painters began to grapple more openly with such themes as joblessness and poverty, political corruption and injustice, labour–management conflict, and the excesses of American materialism. Works in this vein by Ben Shahn, Philip Evergood, William Gropper, and Jack Levine, all of whom worked for the WPA, are notable for their overt and sometimes scathing pictorial criticisms of American society. Shahn's painting "The Passion of Sacco and Vanzetti" (1931–32; Whitney Museum of American Art) is a bitter comment on the outcome of the famous case in which two Italian anarchists were condemned to death in a politically motivated trial. A good example of William Gropper's powerfully simplified caricatures of American public life is "The Senate" (1935; Museum of Modern Art, New York City). Jack Levine evolved a more sophisticated expressionist technique for portraying what he viewed as the degradation of certain aspects of the national scene, a technique exemplified in "The Feast of Pure Reason" (1937; Museum of Modern Art).

Thomas Hart Benton, Grant Wood, John Steuart Curry, Edward Hopper, and other Regionalist painters all dealt with everyday life in their works, but in a romanticized way that was basically incompatible with explicit social protest or criticism.

Social Register, annually published directory purporting to list the socially prestigious members of society in 13 selected U.S. cities. It is administered and published in New York City by the Social Register Association, which refuses any interviews about its publication and which will not disclose the prerequisites to inclusion. The Social Register's subjects are mostly white, Christian, well-connected, sponsored and endorsed by other listed persons, and found ultimately acceptable by the association's advisory committee.

The Social Register was founded in 1887 by Louis Keller, a former gossip-sheet publisher; it was priced at $1.75 and contained 3,600 names. Ownership stayed among three families related to Keller until 1976, when control reportedly passed to a business publishing house, the Forbes Corporation. The publication continues to guard its reputation for secrecy.

social science, any discipline or branch of science that deals with the social and cultural aspects of human behaviour. The social sciences generally include economics, political science, sociology, and social psychology. In the later 20th century, the term behavioral sciences has become more and more commonly used for the disciplines cited as social sciences. Those who favour the term do so in part because these disciplines are thus brought closer to some of the sciences, such as physical anthropology and linguistics, which also deal with human behaviour.

A brief treatment of the social sciences follows. For full treatment, *see* MACROPAEDIA: Social Sciences, The.

Economics is concerned chiefly with the description and analysis of the production, distribution, and consumption of goods and services. One major branch of the field is microeconomics, which deals with the behaviour of individual areas or units of activity, such as individual farmers, business firms, and traders. Macroeconomics, on the other hand, studies whole systems, especially with regard to general levels of output and income and to the interrelations between different sectors of an economy.

Political science is most generally understood to mean the systematic study of government processes by the application of scientific methods of analysis. More narrowly and traditionally, the field has been thought of as the study of the state and of the organs and institutions through which the state functions. International relations is a branch of political science that is concerned with the relations between nations and with such nations' foreign policies.

Sociology comprises the scientific study of society, social institutions, and social relationships; the field may be specifically defined as the systematic study of the development, structure, interaction, and collective behaviour of organized groups of human beings. A related field, social psychology, deals with the manner in which the personality, attitudes, motivations, and behaviour of the individual are influenced by social groups.

Cultural anthropology deals with human culture, especially with respect to social structure, language, law, politics, religion, magic, art, and technology. In particular, cultural anthropology is concerned with generalizing about patterns in human behaviour and with achieving a total description of social and cultural phenomena.

Comparative law may also be regarded as a part of the social sciences. This field involves the systematic comparative study of the legal principles, institutions, and procedures of different nations and cultures.

social security, the principle or practice of public provision for the economic security and social welfare of the individual and his or her family. Social security programs are designed to protect individuals and their families from income losses due to unemployment, old age, sickness, or death and to improve their welfare through public services (*e.g.,* medical care) and economic assistance in the task of raising a family. The term may include social insurance programs, health and welfare services, and various income maintenance programs.

A brief treatment of social security programs follows. For full treatment, *see* MACROPAEDIA: Social Welfare.

In the past, protection of economic security was the responsibility of the individual and the family, although assistance was often provided by the local community or church. Gradually, more organized methods of provision developed: the first were instituted by workingmen's associations, mutual benefit societies, and trade unions; later they were established by law.

Almost all of the developed nations of the world have full-fledged social security programs. These programs vary from country to country, but usually they have three major characteristics in common: (1) they are established by law; (2) they provide some form of cash payment to individuals to replace at least part of the loss of income that occurs because of old age, invalidity, death, sickness, maternity, work injury, or unemployment; and (3) the benefits or services are provided through several major approaches, including social insurance and social assistance.

Social insurance programs are financed entirely or in large part from contributions paid by employees, employers, and in some cases from the government, rather than from ordinary government revenues. The contributions are usually set aside in special funds, and all benefits are paid from those funds. The right to benefits grows out of the individual's contributions or work in employment covered by the program, and benefit amounts are determined by law without regard to an examination of the individual's needs. The majority of social security programs in force throughout the world today are social insurance programs.

Social assistance programs limit the payment of benefits to those earning low incomes or to the needy, and an investigation of need is involved; the payments are financed from the general revenues of the government.

For international statistical data about national social security systems, *see* BRITANNICA WORLD DATA ANNUAL.

Social Security Act (Aug. 14, 1935), original U.S. legislation establishing a permanent national old-age pension system through employer and employee contributions; the system was later extended to include dependents, the disabled, and other groups. Responding to the economic impact of the Great Depression, 5,000,000 old people in the early 1930s joined nationwide Townsend clubs, promoted by Francis E. Townsend to support his program demanding a $200 monthly pension for everyone over the age of 60. In 1934 Pres. Franklin D. Roosevelt set up a committee on economic security to consider the matter; after studying its recommendations, Congress in 1935 enacted the Social Security Act, providing old-age benefits to be financed by a payroll tax on employers and employees. Railroad employees were covered separately under the Railroad Retirement Act of 1934. The Social Security Act has been periodically amended, expanding the types of coverage, bringing progressively more workers into the system, and adjusting both taxes and benefits in an attempt to keep pace with inflation.

social service, also called WELFARE SERVICE, or SOCIAL WORK, any of numerous publicly or privately provided services intended to aid disadvantaged, distressed, or vulnerable persons or groups. The term social service also denotes the profession engaged in rendering such services. The social services have flourished in the 20th century as ideas of social responsibility have developed and spread.

A brief treatment of social and wel-

fare services follows. For full treatment, *see* MACROPAEDIA: Social Welfare.

Efforts in Europe to organize private charity and place it on an institutional basis date at least to the Elizabethan Poor Law of 1601. Sustained and rationalized action to that end, however, developed only in the latter part of the 19th century, primarily in Great Britain, Germany, and the United States. In particular, the founding of Charity Organization societies in London, New York City, Boston, and elsewhere began a process of rapid development of purposes, institutional forms, techniques, and doctrine that has had far-reaching consequences. The training offered to volunteer workers by Charity Organization societies led directly to the founding of the first schools of social work or social service. The emergence of social work as an organized profession, and the adoption by the profession of social betterment and even social change as operational goals, were contemporaneous with the spread of interest in socialist reforms generally. Both movements were instrumental in prompting and guiding the assumption of increasing governmental responsibility for the welfare of groups and individuals that has occurred in most countries in the 20th century.

Among the great many forms that social and welfare services may take, the following are commonly encountered:

Family welfare. This includes such services as marriage counseling, maternal care, family planning, family-life and home economics education, home-help or homemaker services, and a number of services for the aged.

Child welfare. This is one of the largest and most widely implemented areas of social service. It includes such services as maternal and child health care, care and protection services for unwed mothers and their children, protective services for abused and neglected children, day care, and foster parent care.

Youth welfare. This includes a wide variety of services devoted to recreation, education, protection, counseling, rehabilitation, and other ends. The institutions employed range from neighbourhood social clubs and athletic teams to Boy Scouts and Girl Scouts, 4-H Clubs, Outward Bound programs, and, in the Soviet Union, for example, state-run political organizations.

Group welfare. This includes programs directed toward immigrants, migrants, transients, ethnic and minority groups, the handicapped, military personnel and veterans, and other groups with special needs.

In addition there are several other fields in which social services are supplied by various organizations. Disaster relief has long been the particular province of national Red Cross organizations. Medical and psychiatric social service have become recognized as valuable adjuncts to medical and psychiatric treatment. Personal and vocational counseling and rehabilitative services are provided to or by schools. Probation and parole supervision and guidance are widely relied on as alternatives to punitive incarceration in dealing with certain classes of offenders, especially the young.

social settlement, also called SETTLEMENT HOUSE, COMMUNITY CENTRE, or NEIGHBOURHOOD HOUSE, neighbourhood social welfare agency. The main purpose of a settlement is the development and improvement of a neighbourhood or cluster of neighbourhoods. It differs from other social agencies in being concerned with neighbourhood life as a whole rather than with providing selected services. The staff works with individuals and families and with groups. They do informal counseling and home visiting. They sponsor friendship clubs, classes, athletic teams, and interest or hobby groups. Where problems are such that specialized skill is needed, caseworkers, psychologists, psychiatrists, home economists, and vocational counselors may be employed.

The settlement movement began with the founding of Toynbee Hall (*q.v.*), in London in 1884. Samuel Augustus Barnett, then vicar of St. Jude's Parish, invited a number of university students to join him and his wife in "settling" in a deprived area of the city. The movement spread to the United States when Charles B. Stover and a U.S. lecturer at the West London Ethical Society, Stanton Coit, an early visitor to Toynbee Hall, established Neighborhood Guild, now University Settlement, on the Lower East Side of New York City, in 1886. In Chicago, in 1889, Jane Addams bought a residence on the West Side that came to be known as Hull House (*q.v.*). In the same year the educator Jane E. Robbins and Jean Fine (Mrs. Charles B. Spahr) opened the College Settlement, in New York City. Two years later Robert A. Woods, another resident of Toynbee Hall, and William J. Tucker established Andover House, later called South End House, in Boston. The movement then spread to most countries of western Europe and to Southeast Asia and Japan.

In the late 19th and early 20th centuries, American settlement houses were especially active among the masses of new immigrants and led in movements toward such reforms as legislation providing for juvenile courts, mothers' pensions, workmen's compensation, and the regulation of child labour.

Most countries have national organizations, such as the National Federation of Settlements and Neighborhood Centers in the United States, and the British Association of Settlements and Social Action Centres in Great Britain. The first international Conference of Settlement Workers, held in London in 1922, led to the organization in 1926 of the International Federation of Settlements and Neighbourhood Centres, which, with headquarters in Utrecht, Neth., is represented by observers at the United Nations.

social status, the social position that an individual holds, with attendant rights and duties. Status may be ascribed—that is, assigned to individuals at birth without reference to any innate abilities—or achieved, requiring special qualities and filled through competition and individual effort. Status is often ascribed on the basis of sex, age, family relationships, and birth, placing one into a particular social group. Achieved statuses may be based on education, occupation, marital status, and other factors.

A brief treatment of social status follows. For full treatment, *see* MACROPAEDIA: Social Differentiation.

The word status implies social stratification on a vertical scale. The spatial analogy covers several meanings. A person may be said to occupy a high position when he is able to control, by order or by influence, other people's conduct; or when he derives prestige from holding important office; or when his conduct has earned the esteem of his fellows. Relative status is a major factor determining the behaviour of people toward one another; and competition for status seems to be a prime pursuit.

One's status varies with social context. For example, the position of a man in his kin group helps determine his position in the community. Among the Hopi the lineage, although unnamed, contains the mechanism for transmitting rights to land, houses, and ceremonial knowledge and is thus vital for personal status. Among the Tallensi a mere lad who (having lost his father) is head of a household counts as an elder; a middle-aged man still under his father's roof is formally a child. Status may be governed by occupational considerations; thus in parts of black Africa blacksmiths commonly form a separate group of low status. In the Hindu caste system, sweepers are at the bottom of the scale because they handle human excrement.

Status is closely correlated with etiquette and morality and in many societies rises with the liberal use of wealth (*see* gift exchange; potlatch). Manipulation of the wealth-status system in such cases often demands great individual effort, aggression, and chicanery, as well as an excellent memory.

Social classes are groups arranged in a hierarchical status sytem; class members interact mainly within their own group and to a lesser degree with those of higher or lower status. Although classes are rare in primitive societies, some kind of stratification is common. Even an age-grade system (*see* age set), as in many traditional East African societies, may resemble a class structure. In some societies, clans or lineages may be ranked generally as aristocrats and commoners or graded from a royal clan to clans that are stigmatized for lowly occupation or slave origin. True class systems obtain in the former West African emirates, with urban capitals from which a ruling class, different in dress, speech, etiquette, and morality, dominated a semipagan peasantry. Most striking is the caste system of India. In Hindu villages there are usually members of a number of small endogamous groups (subcastes) based on traditional occupations, arranged from Brahmans to Untouchables, though the exact order of the subcastes is not always agreed on by all parties concerned. Contact with a person of lower caste (such as eating or drinking from his hands, bodily contact) pollutes one of a higher caste and necessitates ritual purification. Escape from caste is very difficult, though Western influences have tended to loosen some rules (*see* caste).

social structure, in sociology, the distinctive arrangement of institutions whereby human beings in a society interact and are able to live together. Social structure is often treated together with the concept of social change, which deals with the forces that change society and the social structure itself.

A brief treatment of social structure follows. For full treatment, *see* MACROPAEDIA: Social Structure and Change.

The term structure has been used with reference to human societies since the 19th century. Before that time the term had application in other fields, such as biology, as is evident in the work of some 19th- and early 20th-century sociologists. Among them was Herbert Spencer, who conceived of society as an organism, the parts of which are interdependent and thereby form a structure that is similar to the anatomy of a living body. The term is linked to building construction in Karl Marx's terminology: "the economic structure [*Struktur*] of society . . . on which is erected a legal and political superstructure." Spencer and Marx shared some ideas in common. Generally, they depicted social structure as having features that exhibit a certain permanence over time, are interrelated, and determine or condition to a large extent both the functioning of a social entity as a whole and the activities of its individual members. Structure implies, in other words, that human beings are not completely free but are constrained by society.

A number of theories concerning the nature of social structure have evolved in modern times. Some theorists, such as George P. Murdock, an American anthropologist, have tried to arrange the various aspects of social life into a type of scientific order. Murdock developed a descriptive taxonomic scheme for classifying, comparing, and correlating aspects of kinship systems. In other studies the concept of social structure is of more theoretical importance and is used to explain social life. Some of the more prominent of these theories are examined here.

Structural functionalism. A.R. Radcliffe-Brown, a British social anthropologist who was strongly influenced by Émile Durkheim, connected the concept of social structure with that of function. Unlike Murdock, who considered the societal aspects in his scheme to be independent, Radcliffe-Brown viewed the components of social structure as having an indispensable function for one another, the continued existence of one component being dependent on that of the other. While Radcliffe-Brown concentrated his studies on primitive societies, Talcott Parsons, an American sociologist, formulated a theory that would have application to large complex societies. Parsons identified two basic processes of social structure: socialization (through which members learn to conform) and social control (through which deviant behaviour is counteracted).

Theories of class and power. Some social theorists have proposed that inequalities of power, wealth, and other social rewards play a central role in the formation of social structure. Robert K. Merton, an American sociologist, and others determined that these distributional powers give members of a society widely different opportunities and alternatives. It is in complex societies that these inequalities define different strata, which form the class structure of society. Social structure is basically conceived as a power structure in which the interests of a class, particularly the owners of capital, have the power to transform their specific interests into law and accepted norms. The most influential theory of this type has been Marxism. From Marxism evolved the conflict model of society, which distinguishes two social classes: one that exerts power and one that is subjected to it.

Structuralism. The concept of social structure called structuralism is based on the underlying, unconscious regularities of human expression. This theory is closely associated with the French anthropologist Claude Lévi-Strauss, who drew his ideas from the field of structural linguistics. In the same way that language is built upon a structure that the speaker unknowingly observes, so, Lévi-Strauss formulated, is there an underlying social structure that relates to and explains social customs and habits.

The theories of social structure continue to be debated. Increasingly, they have come to view social life as being in continuous flux, a never-ending process in which it is difficult to find the bones, bricks, or girders suggested by the word structure. *See also* social change.

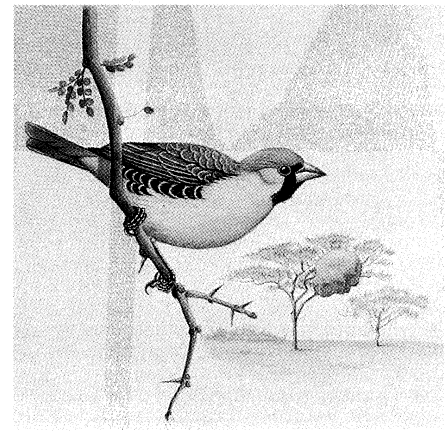
Social War, also called ITALIC WAR, or MARSIC WAR (90–89 BC), rebellion waged by ancient Rome's Italian allies (*socii*) who, denied the Roman franchise, fought for independence.

The allies in central and southern Italy had fought side by side with Rome in several wars and had grown restive under Roman autocratic rule, wanting instead Roman citizenship and the privileges it conferred. In 91 BC the Roman tribune Marcus Livius Drusus tried to solve the problem by proposing legislation that would have admitted all Italians to citizenship, but his program aroused heated opposition in the Senate, and Drusus was soon afterward assassinated. The frustrated Italian allies then rose in revolt.

The peoples of the hills of central Italy formed the heart of the uprising, the Marsi in the north and the Samnites in the south. Neither the Latin colonies nor Etruria and Umbria joined in. The Italians began organizing their own confederacy; they established their headquarters at Corfinium, which they renamed Italia, created a Senate and officers, and issued a special coinage; soon they had 100,000 men in the field. In 90 BC Roman armies were defeated in the northern sector, while in the south the Italians were equally successful and burst into southern Campania. Only by political concession could Rome hope to check the revolt: the consul Lucius Julius Caesar thus helped pass a law granting Roman citizenship to all Italians who had not participated in the revolt and probably also to all who had but were ready to immediately lay down their arms. This move pacified many of the Italians, who soon lost interest in further struggle against Rome. Roman forces under Gnaeus Pompeius Strabo in the north and Lucius Cornelius Sulla in the south soon inflicted decisive defeats on the remaining rebels and captured their strongholds.

The back of the revolt was now broken, although some resistance continued among the Samnites for a short time. Further legislation was soon passed that reinforced the allies' newly won rights; one law regulated the municipal organization of the communities that now entered the Roman state; and another dealt with Cisalpine Gaul (probably granting citizenship to all Latin colonies). Thus, the political unification of all Italy south of the Po River was achieved, and Romans and Italians, hitherto linked by alliance, could now become a single nation.

social weaver, any of a number of small African birds of the family Ploceidae (*q.v.*; order Passeriformes) that are extremely gregarious. This name is given particularly to *Philetairus socius,* which makes an "apartment house" in a tree: dozens of pairs of these little black-chinned birds cooperate year-round to maintain a thatchlike roof over the colony,



Social weaver (*Philetairus socius*)
Painting by Murrell Butler

which may contain 300 chambers (one per pair); the roof may be 7.5 metres (25 feet) wide and 1.5 m high. Each cluster of chambers has a common tunnel entrance from the "basement."

social welfare program, any of a variety of governmental programs designed to protect citizens from the economic risks and insecurities of life. The most common types of programs provide benefits to the elderly or retired, the sick or invalid, dependent survivors, mothers, the unemployed, the work-injured, and families. Methods of financing and administration and the scope of coverage and benefits vary widely among countries.

A brief treatment of welfare and security programs follows. For full treatment, *see* MACROPAEDIA: Social Welfare.

The earliest modern social welfare laws were enacted in Germany in the 1880s. As similar programs have been adopted in other countries, the trend has been toward more comprehensive coverage in terms of both eligibility requirements and the nature of the risks insured against. A floor of minimum protection has come to be viewed as one of government's general responsibilities with respect to specific risks, and in many countries the consensus holds that public responsibility extends to all those unable to care for themselves for whatever reason. In this view social welfare is extended and received as a matter of right rather than of need.

The chief characteristics of a welfare or security program are the risks to be protected against, the population covered, eligibility criteria, levels of benefits, manner of financing, and administrative procedures. All these criteria are subject to wide variation in practice. In particular, eligibility criteria often include a "time-lock," which requires participation in or coverage by a program for a specified time. Financing is generally accomplished by exacting contributions from covered persons, employers, or both, by the government out of general revenues, or by a combination of the two. The most common varieties of programs may be summarized as follows:

Old-age, invalidity, and survivor programs. These provide benefits to those who live beyond their ability or eligibility to engage in gainful employment, to those who become permanently disabled other than through work injuries and who are not covered under some other medical disability program, and to those who are left dependent by a deceased worker. Programs of this type usually provide for universal coverage; they are commonly funded as contributory insurance programs. Time-lock provisions apply to old-age benefits and, less stringently, to invalidity and survivor benefits. Benefits levels are typically 30 to 60 percent of base wages. The plans are administered nationally.

Medical care programs. These are the most complex and controversial of welfare and security programs. Benefits may include indemnification for lost wages in addition to medical treatment. Coverage ranges from universal down to only those employed by participating employers. Financing may be contributory or governmental, depending in particular upon the method of providing service in a given country. Medical care may be provided by private practitioners and suppliers or by departments of government organized to provide it; private practitioners may be paid directly by the government or by the patient, who is then reimbursed by the government. With varying degrees of public involvement in the actual provision of health care come degrees of choice by the patient, of permanence in patient–physician relations, of incentive to hold down costs, of regularity in physicians' incomes, and of ease of administration.

Unemployment benefit programs. These are common in industrialized countries, less so in developing countries. They usually provide 50 to 75 percent of base wages to workers who are normally employed and have become unemployed through no fault of their own and who are willing and able to work. Benefits are provided for limited periods and are financed typically from compulsory insurance payments made by employers or employees or both, sometimes supplemented by government funds.

Family allowance benefits. These are benefits provided by governments to families with a specified minimum number of children. The benefits may be open to all families, in which case the program is a step in the direction of a guaranteed family income, or they may be provided as supplements to other assistance, especially unemployment benefits.

Work-injury compensation. This is the oldest and most widespread social welfare program. Such programs usually cover all employees of firms above a specified size and are financed by employer contributions to some form of insurance plan. Benefits include medical payments, wage restoration (usually from 50 to 75 percent of actual wage), special in-

demnities for permanent bodily injury, and death benefits. Acceptance of work-injury or worker's compensation benefits precludes recovery of damages by suits at law.

Public assistance. This is a residual program designed to provide assistance to various classes of needy persons not covered by other programs. Typical classes of beneficiaries include the aged not covered by the employment-related programs mentioned above, the blind, the disabled not covered by work-injury or other employment-related programs, and impoverished families with dependent children.

For international data about national social welfare programs, *see* BRITANNICA WORLD DATA in the current *Britannica Book of the Year.*

socialism, a system of social organization in which private property and the distribution of income are subject to social control, rather than to determination by individuals pursuing their own interests or by the market forces of capitalism. The term is also applied to political movements whose aim is to put such a system into practice.

A brief treatment of socialism follows. For full treatment, *see* MACROPAEDIA: Socioeconomic Doctrines and Reform Movements, Modern.

There are many different forms of socialism, depending on what is meant by "social control" and on the extent to which, as well as by whom, this control is exercised over civil society. In some socialist doctrines all industries are to be nationalized, while in others only the largest or most important, such as banks or natural resources, should be owned by the state. Some socialist doctrines involve strictly centralized state control, while others allow for more decentralization, with a large measure of planning allocated to local government bodies; some call for an authoritarian command economy, while others envision a merely guided market economy. Often the word socialism is applied pejoratively to any policy by which the state would accrue more regulatory power. As a result, the different forms that socialism actually has taken vary dramatically. Socialism can be either statist or libertarian, Marxist or "liberal," revolutionary or gradualist, cosmopolitan or internationalist.

The word socialism was first used around 1830 to describe doctrines developed by F.-M.-C. Fourier and Comte Henri de Saint-Simon in France and of Robert Owen in England. Once the term was established, however, several earlier philosophers were found to have anticipated socialist ideas. These included Plato among the ancients (*The Republic*), Sir Thomas More (*Utopia,* 1516) and T. Campanella (*City of the Sun,* 1623) among Renaissance writers, as well as a number of 17th- and 18th-century social critics (Meslier, Winstanley, de Mably, Morelly) and some figures of the French Revolution (Brissot and Babeuf).

Fourier was the theorist of a type of small cooperative settlement called a *phalanstère,* which was at once an economic unit and a community of persons joined together noncoercively in both productive labour and joyful living. Saint-Simon's great contribution to socialist thought was his insistence on the duty of the state to plan and organize the use of the means of production so as to keep continually abreast of scientific discovery, and his insistence on the master function of industrial experts and organizers, as against politicians and mere "men of business." Neither Fourier nor Saint-Simon was a strict equalitarian, but their followers radicalized their doctrines. Owen, generally regarded as the father of British socialism, was a highly successful and model industrialist who advocated a cooperative and competition-free system devoted to the spiritual and physical well-being of all. Owen's views attracted a large working-class following, and several Owenite communities sprang up in the United States (notably at New Harmony, Ind.) and in Great Britain.

Up to the 1840s, socialism developed almost exclusively as a French and British movement. There were good reasons for this: industrial evolution was much more advanced in Great Britain than elsewhere, and France had been, from the 18th century, the principal seedbed of revolutionary political ideas. Soon, however, the tide began to shift to Germany, a country that was politically divided and economically backward. German socialism began with certain radical followers of G.W.F. Hegel, such as Ludwig Feuerbach, Bruno Bauer, Moses Hess, and Karl Grün.

The year 1848 was the high-water mark of socialist mass movements and marked the beginning of a new type of socialist theory and practice. In the beginning of that year the *Communist Manifesto* was written by Karl Marx and Friedrich Engels. Marx and Engels appropriated what they found valid in previous socialist movements, but they contrasted the romantic idealism of "utopian socialism," with their own "scientific socialism" which claimed to demonstrate that the victory of the working class (the proletariat) over the capitalist class, and thus the appropriation by society as a whole of the means of production, was historically inevitable. Following a few "birth pangs" the coercive structures of the bourgeois state would eventually "wither away."

Marx and Engels used the word "communist" to describe this classless society, and generally reserved the word "socialist" to refer to transitional phases and movements in which the proletariat had indeed acquired the means of production but in which the state had not yet vanished. The party they founded in 1847 was called the "Communist League" to distinguish it from the many socialist parties then in existence. The Communist Manifesto was so named, explained Engels in a footnote to the 1890 edition, only because the term "socialist" had come to be identified with "multifarious social quacks."

Even during Marx's lifetime and more markedly after his death, many different interpretations of Marxism began to develop. The German social democrats, for instance, under the leadership of Eduard Bernstein, doubted the imminent collapse of capitalism. They favoured a moderate socialism that was more liberal and reformist than revolutionary. Bernstein was bitterly opposed by Karl Kautsky, who represented a more orthodox interpretation of Marxism. Other forms of 19th-century socialism included Christian socialism, founded on Christian principles, and guild socialism, which stressed worker control.

Twentieth-century socialist practices were just as diverse, ranging from avowedly Communist nations with the strictly centralized socialism of the Soviet Union to the more decentralized Yugoslavian model, in which factory workers participated not only in the governing of the factory but also in profit sharing. Some, such as Hungary, even restored a measure of private control to agricultural workers. Non-Communist Socialism found its chief expression in the welfare state exemplified by Sweden, Denmark, and Great Britain, where Socialist parties won power by parliamentary means and constructed systems of taxation-based social services intended to guarantee certain minimal standards of living to all. The adoption of some national welfare ideas by strenuously nonsocialist systems such as the United States testified to both the strength of many socialist ideals and the protean adaptability of many socialist practices that made socialism itself so difficult to define.

Socialist International: *see* International, Second.

Socialist International (SI), association of national Socialist parties that advocates a democratic form of Socialism.

After World War II the reinstitution of an international federation of working-class parties took place in gradual stages. First, an information and liaison office was established at the first postwar international conference, held in England in 1946. The following year this office was transformed into a consultative committee that became a more representative body called the Committee of the International Socialist Conference, or Comisco. In 1951 it decided to reconstitute the International. (*See also* International, Second; International, Third.)

This reconstitution took place at a congress held in Frankfurt am Main in July 1951. The new organization assumed the name Socialist International and established its headquarters in London. Its statutes require the consent of all member parties for resolutions to be passed, and one vote is allocated to each member party, regardless of the size of its membership. Its supreme body is the congress, which meets every other year and proclaims the organization's principles and determines its statutes and membership. A smaller body, the council, which assembles yearly and is composed of representatives from each member party, formulates the attitude of the SI toward current political issues, elects the president and secretary, and fixes affiliation fees. Finally, the bureau, composed of delegates from 12 countries and meeting according to requirements, is charged with the supervision of the secretary's activities.

In its declaration of principles the SI put chief emphasis upon the political aspects of Socialism, notably democracy and civil liberty. SI policy has been anti-Communist and generally anti-Soviet. The SI not only rejected the Communist system as irreconcilable with Socialist principles but also supported the North Atlantic alliance against the Soviet Union. Yet it supported the policy of peaceful coexistence and détente with the Soviet Union and general disarmament under international supervision.

The SI supported the United Nations and demanded the admission of the People's Republic of China. It called for the cessation of hostilities in Vietnam and urged a settlement that would enable the peoples of both parts of the country to determine their future and ensure its neutrality. It affirmed the right of the state of Israel to exist and called for negotiations between the Arabs and Israelis to find a permanent solution of the existing problems on the basis of their independence and sovereignty. The SI denounced the Fascist regimes in Spain, Portugal, and Greece and the system of apartheid in South Africa. It declared its support of the colonial and dependent peoples' struggle for self-determination. Considering the economic plight of the industrially underdeveloped countries as a major humanitarian as well as a political problem, it adopted a detailed "World Plan for Mutual Aid" and pledged its member parties to arouse world opinion to induce the governments to carry it out through UN agencies.

The SI supports the economic unity of Europe, and the relevant European member parties participate in the activities of the European parliamentary assemblies: the Council of Europe, the Western European Union, and the European Coal and Steel Community.

In the late 20th century the SI consisted of more than 60 Socialist parties in Europe, Asia, Africa, Oceania, and the Western Hemisphere.

Socialist law: *see* Soviet law.

Socialist Party, also called (1905–69) FRENCH SECTION OF THE WORKERS' INTERNA-

TIONAL, French PARTI SOCIALISTE, OR SECTION FRANÇAISE DE L'INTERNATIONALE OUVRIÈRE (SFIO), French socialist party founded in 1905 that supported far-reaching nationalization of the economy.

Socialism in France dates back to such Revolutionary figures as Jacques René Hébert and François Noel Babeuf and had an illustrious history in the 19th century with such writers and theorists as the Count de Saint-Simon, Charles Fourier, Louis Auguste Blanqui, and Louis Blanc. The first Marxist party, the French Workers' Party (Parti Ouvrier Français), was founded in 1880 by Karl Marx's son-in-law Paul Lafargue; but in the course of the 1880s it split and resplit, so that by the 1890s there were at least five major parties or organizations in France. Despite this conflict, a first general congress of the various groups was held in Paris in 1899 and a second congress in 1900, out of which two parties developed: the ideologically uncompromising Socialist Party of France (led by Jules Guesde and Edouard Vaillant) and the French Socialist Party (led by Jean Jaurès), the latter supporting the participation of Socialists in a progressive capitalist government. The split lasted until 1905, when the rival parties merged to form the French Section of the Workers' International (SFIO)—*i.e.*, of the Second International. The party was always informally called the Socialist Party.

The party grew quickly in the early years of the 20th century. The Russian Revolution of 1917, however, produced a crisis for the party, and in 1920 its left wing separated to form the French Communist Party. In 1936 the SFIO, then France's strongest party, played the central role in Léon Blum's Popular Front government.

During the German occupation of France in World War II, the SFIO participated in the Resistance and cooperated with General Charles de Gaulle. The SFIO emerged from the war as the second largest party in France and won more than 20 percent of the vote in national elections that year. The SFIO subsequently took part in several coalition governments in the Fourth Republic, and in these years the government undertook several major nationalizations under Socialist auspices. The growth of other parties gradually cost the Socialists some support, however, and after 1946 the party usually won only about 15 percent of the vote.

The SFIO led a confused existence under de Gaulle's Fifth Republic, and dissent over whether to ally with parties to the left or to the right of the Socialists caused splits within the party. The party gradually declined, and in the presidential election of 1969 it won only 5 percent of the vote.

That same year the SFIO was formally renamed the Socialist Party, and in 1971 it gained a vigorous new leader in François Mitterrand. The party adopted a strategy of a grand alliance of the left and signed a common program with the Communists and the Left Radicals in 1972. Though often strained, the alliance led to the electoral victory of the left in 1981. That year the Socialists' candidate, Mitterrand, won the presidency. His new government nationalized most of France's largest banks and several giant industrial corporations, and it undertook a program of wage increases and other measures that were intended to redistribute wealth, stimulate growth, and lower unemployment. This program quickly had negative consequences for the French economy, however, and by the mid-1980s the Socialists had retreated from their original economic policies in favour of an austerity program. Further developments confirmed this trend, until by the early 1990s the Socialist Party seemed to have all but abandoned its emphasis on nationalization as a way of ensuring growth and redistributing income.

Socialist Party (Italy): *see* Italian Socialist Party.

Socialist Party (Japan): *see* Japan Socialist Party.

Socialist Party (Spain): *see* Spanish Socialist Workers' Party.

Socialist Realism, theory and method of literary composition established in the Soviet Union in 1932 as the sole criterion for measuring literary works. Defined and reinterpreted over years of polemics, it remains a vague term, as indicated by the numerous loyal Communist writers who often inadvertently fail to comply with its tenets.

Socialist Realism follows the great tradition of 19th-century Russian realism in that it purports to be a faithful and objective mirror of life. It differs from earlier realism, however, in several important respects. The realism of Leo Tolstoy and Anton Chekhov inevitably conveyed a critical picture of the society it portrayed (hence the term critical realism). The primary theme of Socialist Realism is the building of socialism and a classless society. In portraying this the writer must, while admitting imperfections, take a positive and optimistic view of his society, keeping in mind its larger historical relevance.

A requisite of Socialist Realism is the positive hero who perseveres against all odds or handicaps. Socialist Realism thus looks back to Romanticism in that it encourages a certain heightening and idealizing of heroes and events to mold the consciousness of the masses. Soviet writers have created hundreds of positive heroes, usually engineers, inventors, or scientists, all strikingly alike in their lack of lifelike credibility. At times, when the writer's deeply felt experiences coincide with the official doctrine, the works are successful, as with the Soviet classic *Kak zakalyalas stal* (1932–34; *How the Steel Was Tempered*), written by Nikolay Ostrovsky, an invalid who died at 32. His hero, Pavel Korchagin, wounded in the October Revolution, overcomes his health handicap to become a writer who inspires the workers of the Reconstruction. The young novelist's passionate sincerity and autobiographical involvement lends a poignant conviction to Pavel Korchagin that is lacking in most Soviet heroes.

Socialist Realism was also the officially sponsored Marxist aesthetic in the visual arts, which fulfilled the same propagandistic and ideological functions as did literature. Socialist Realist paintings and sculptures used naturalistic idealization to portray dauntless and positivistic workers and farmers. Socialist Realism remained the official aesthetic of the Soviet Union (and of its eastern European satellites) until the late 20th century, at which time the changes in Soviet society initiated by the Soviet leader Mikhail Gorbachev led to the aesthetic's partial abandonment.

Socialist Revolutionary Party, Russian SOTSIALISTY REVOLYUTSIONERY (SR, or ESERY), Russian political party that represented the principal alternative to the Social-Democratic Workers' Party during the last years of Romanov rule. Ideological heir to the Narodniki (Populists) of the 19th century, the party was founded in 1901 as a rallying point for agrarian socialists, whose appeal was principally to the peasantry. The party program called for the socialization of the land and a federal governmental structure. The SR Party carried out hundreds of political assassinations and never completely abandoned terrorist tactics (Lenin was wounded by an SR member in 1918).

In 1917 it was the largest socialist group in Russia. Between February and October 1917 its members held powerful political posts (*e.g.*, Aleksandr Kerensky was minister of justice and later prime minister; Viktor Chernov was minister of agriculture) and exercised considerable influence over the provisional governments. The party won 410 seats (compared to the Bolsheviks' 175) in the election for the Constituent Assembly (November 1917) but had divided over the Bolshevik Revolution (October 1917). Its radical wing (Left Socialist Revolutionaries) formed a splinter group that participated in the Bolshevik government until its representatives were expelled in July 1918 at the fifth Congress of the Soviets. The SR was suppressed by Lenin after the Bolshevik victory in the Civil War.

Société, Îles de la (French Polynesia): *see* Society Islands.

société, vers de (verse): *see* vers de société.

Société Générale, in full SOCIÉTÉ GÉNÉRALE POUR FAVORISER LE DÉVELOPMENT DU COMMERCE ET DE L'INDUSTRIE EN FRANCE, major French commercial bank operating a general-banking and foreign-exchange business worldwide. Headquarters are in Paris.

The bank was established in 1864 to provide general-banking and investment services. It was nationalized in 1946, when the state, acting on legislation passed the previous year, took over the central bank, the Banque de France, and the four leading commercial banks. These banks accounted for half of all the assets and liabilities among French banks.

Société Générale provides general banking, investment advising, securities underwriting, foreign-currency exchange, and computer services, with subsidiaries and branches throughout the world. In 1972 its New York branches were taken over by European American Bank and Trust Company.

Société Nationale des Chemins de Fer Français (SNCF), English FRENCH NATIONAL RAILWAYS, state-owned railroad system of France, formed in 1938. The first railroad in France, from Saint-Étienne to Andrézieux, opened in 1827. A line from Saint-Étienne to Lyon was completed in 1832. In 1840 France had about 300 miles (500 km) of railroad, and by 1870, 9,300 miles (15,500 km).

A highly centralized system developed with Paris as the hub, but several cross-country routes, such as Lyon–Nantes, Bordeaux–Lyon, and Calais–Basel, were also built. The system was effectively nationalized in 1938, when the Société Nationale des Chemins de Fer Français (SNCF) took over the operations of the privately owned Est, Midi, Nord, Paris-Lyons-Mediterranean, and Paris-Orleans railways, as well as the railways in western France. The state was given 51 percent control and has subsidized the system heavily.

In 1981 the SNCF began its "Train à grande vitesse" (TGV), or "high-speed train," service on the Paris–Lyon line. The new trains, with their sleek design and low profile, were able to make the 265-mile (426-kilometre) trip in just two hours, operating at cruising speeds of up to 168 miles per hour (270 kilometres per hour); the trains have a top speed of more than 235 mile/h (378 km/h).

Société Nationale Elf Aquitaine (French company): *see* Elf Aquitaine.

Society for ———: *see under* substantive word or words (*e.g.*, Propagation of the Faith, Society for the).

Society Islands, French ÎLES DE LA SOCIÉTÉ, archipelago (450 miles [725 km] long) within French Polynesia in the central South Pacific. It is divided into two island clusters, the Windward Group (*see* Vent, Îles du) and the Leeward Group (*see* Sous le Vent, Îles). The largest and best known of the Society Islands is Tahiti (*q.v.*).

Claimed for Britain by Capt. Samuel Wallis (1767) and for France by Louis de Bougainville

(1786), the islands were visited (1769) by Lieut. (later Capt.) James Cook with a scientific expedition of the Royal Society (whence their name). The islands became first a French protectorate (1842), then a colony (1881), and eventually a part of French Oceania (1903). In 1946 the Îles du Vent and the Îles Sous le Vent became administrative divisions of French Polynesia. Pop. (1981 est.) 127,000.

Society of ———: *see under* substantive word or words (*e.g.*, Cincinnati, Society of the).

Socinian, member of a religious group that arose in the 16th century, accepting Jesus as God's revelation but a mere man, divine by office rather than by nature; Socinians thus rejected the doctrine of the Trinity. The movement originated in Italy with the work of Laelius Socinus (Socini) and his nephew Faustus Socinus. The sect flourished principally in Poland, where in 1579 Faustus became a leader in the previously established Minor Reformed Church (Polish Brethren). This church, which became Socinian, had as many as 300 congregations. Its intellectual centre was in Raków, where the university published many Socinian works. In 1638 Roman Catholics forced the university and the press to close; in 1658 the Polish Diet offered Socinians the choice of exile or conformity to Catholic doctrine of orthodox Trinitarianism. Socinian groups survived in Europe until the 19th century, primarily in Transylvania, the Netherlands, and Germany. In England, Socinian ideas influenced, among others, John Biddle, the father of English Unitarianism.

Socinus, Faustus, Italian FAUSTO (PAOLO) SOCINI, SOZINI, or SOZZINI (b. Dec. 5, 1539, Siena, Kingdom of Siena—d. March 3, 1604, Luclawice, Pol.), theologian whose anti-Trinitarian teachings led to the founding of the



Faustus Socinus, engraving
By courtesy of the Library of Congress, Washington, D.C.

Socinian sect and were later influential in the development of Unitarian theology.

A nephew of the theologian Laelius Socinus, Faustus was brought up by his mother and grandmother and had no systematic education. Already denounced by the Inquisition in 1559, he sought refuge until 1562 in Zürich, where he acquired his uncle Laelius' papers, considered one source of his beliefs.

After a visit to Geneva he went to Lyon, where he composed his first work, an interpretation of the prologue of the Gospel According to John, in which he wrote of Christ as divine by office rather than by nature. In 1563 he returned to Italy and became secretary to Duke Paolo Giordano Orsini at the Florentine court, where he lived in outward conformity to the Catholic Church for 12 years. He later viewed this period as wasted, though he wrote *De sacrae scripturae auctoritate* there in 1570, in which he established the authority of Scripture on rational and historical grounds. After three more years, spent at Basel in the study of Scripture, he wrote *De Jesu Christo servatore* (completed 1578, published 1594), in which he denied the view that Christ appeased God's wrath by suffering the penalty that was the just due of man.

Travelling to Transylvania, Socinus tried unsuccessfully (1578–79) to dissuade the Unitarian bishop Ferenc Dávid from his controversial renunciation of the worship of Christ. He then settled at Cracow, Pol., where he attained a predominant influence in the Minor (or anti-Trinitarian) Church, centred at the colony of Raków. He became its leader and eventually set his stamp upon its theology, although his views on Baptism, a sacrament he regarded as applicable only to converts to Christianity, apparently excluded him from formal membership. Socinus also converted the Arians of Little Poland and at a provincial synod persuaded most of the Lithuanian Unitarians to accept his teaching that Christ might be invoked in prayer.

Central to Socinus' teaching was the attainment of eternal life through study of divinely revealed Scripture. He saw Christ as a real man, though without sin, who by his suffering taught men how to bear their own sufferings. In his view, faith is more than the belief that the teaching of Christ is true; it also results in repentance for sins and in an obedience that leads to eternal life. Socinus also supported the Anabaptist Rakovians in their refusal to bear arms but asserted that men must obey the civil government when to do so did not conflict with Christ's teachings.

To avoid persecution, in 1583 Socinus left Cracow for the nearby estate of a nobleman, whose daughter he married in 1586. Her death a year later and the loss of his property through action by the Inquisition in 1590 at Siena caused him severe distress. From 1587 to 1598 he lived in Cracow supported by his friends, but in 1598 enraged university students attempted to martyr him, and he took refuge at Luclawice, a neighbouring village. He soon began to collect and revise his writings for publication, but he died before he could finish the project. His incomplete *Christianae religionis institutio* is possibly the basis for the Rakovian catechism (1605), a thorough exposition of Socinian thought. Subsequent Unitarian theology, particularly in the doctrines of the person and work of Christ, was influenced considerably by the introduction of Socinian writings into England during the 17th century.

Socinus, Laelius, Italian LELIO (FRANCESCO MARIA) SOCINI, SOZINI, or SOZZINI (b. March 25, 1525, Siena, Kingdom of Siena—d. May 14, 1562, Zürich), Italian theologian whose anti-Trinitarian views were developed into the doctrine of Socinianism by his nephew Faustus Socinus.

Born of a distinguished family of jurists, Laelius was trained in law at Padua but turned to biblical research, which ultimately led him to doubt his church's dogmas, in an attempt to trace human law to its source in divine law.

At 21 he went to Venice, then the centre of the Reformist movement within the church, and afterward travelled in Switzerland, France, England, and Holland. In 1548 he settled in Zürich to study Greek and Hebrew. The following year he corresponded with Calvin on doctrinal matters and the year after was the guest of the German religious Reformer Philipp Melanchthon at Wittenberg. Wherever he went Socinus conducted his theological inquiries, with special concern for the sacraments, grace, predestination, resurrection of the body, repentance, and the doctrinal basis of the original gospel.

The burning of Michael Servetus at the stake for heresy by the Calvinists in 1553 directed his attention to the doctrine of the Trinity. Rumours began to spread that Socinus was a heretic, and after a warning from the Swiss Reformer Heinrich Bullinger he composed a confession of faith (July 1555) that seemed orthodox but that also left open the door to heretical views.

In 1556 the death of his father, who had disinherited him, and the sequestration of his share of his father's estate by the Inquisition, left Laelius in financial difficulties. Despite diplomatic support from the courts of Vienna and Cracow, he failed to recover his patrimony and spent his last years at Zürich. A highly speculative thinker, he reached few well-defined conclusions, and his only extant writings consist of his confession of faith, his letters, and two dissertations. His theological views survived, however, in the fully developed system of his nephew Faustus and in subsequent Unitarian thought.

sociolinguistics, the study of the sociological aspects of language. The discipline concerns itself with the part language plays in maintaining the social roles in a community. Sociolinguists attempt to isolate those linguistic features that are used in particular situations and that mark the various social relationships among the participants and the significant elements of the situation. Influences on the choice of sounds, grammatical elements, and vocabulary items may include such factors as age, sex, education, occupation, race, and peer-group identification, among others. For example, an American English speaker may use such forms as "He don't know nothing" or "He doesn't know anything," depending on such considerations as his level of education, race, social class or consciousness, or the effect he wishes to make on the person he is addressing. In some languages, such as Japanese, there is an intricate system of linguistic forms that indicate the social relationship of the speaker to the hearer.

Social dialects, which exhibit a number of socially significant language forms, serve to identify the status of speakers; this is especially evident in England, where social dialects transcend regional dialect boundaries.

Sociolinguists are also concerned with bilingual language situations. The influence of social considerations on language change has been investigated.

sociology, the human behavioral science that investigates the nature, causes, and effects of social relations among individuals and between individuals and groups. It also studies customs, structures, and institutions, as well as the effects on individuals of participation in groups and organizations.

A brief treatment of the discipline of sociology follows. For full treatment, *see* MACROPAEDIA: Social Sciences, The.

For a description of the place of sociology in the circle of learning and for a list of both MACROPAEDIA and MICROPAEDIA articles on the subject, *see* PROPAEDIA: Part Five, Division II.

Although analysis of society has been a part of Western thought since the ancient Greeks, the modern science did not develop until the 18th and 19th centuries. Along with other social sciences, it originally was an aspect of moral philosophy and was strongly influenced by theories of biology and evolution. Early sociologists, for example, sought parallels between social and biological organisms and tried to apply Darwin's theory of evolution to society. Although August Comte created the word *sociologie* in 1838, nearly 60 years passed before it gained the status of scientific specialization. In the late 1800s Émile Durkheim defined the boundaries of sociology in ways that differentiated it from fields such as psychology and biology. He proposed that certain distinctive qualities, or "social facts"—such as group feelings and beliefs, rituals, and institutions—result from social intercourse and are not found in individuals, and that these facts

exert control over individuals' actions and behaviour.

The first academic department of sociology was created by Albion Small at the University of Chicago in 1892, and by the late 1890s many educational institutions offered courses in the subject. International sociological associations and publications then appeared, and the science grew in professional and scientific status. Today sociology is a subject of study throughout the world, and it has come to have many applications in government, industry, education, and social services.

Modern sociology involves a variety of approaches that are often used in conjunction with one another. Robert Merton, Talcott Parsons, Pitirim A. Sorokin, and others were among the first to investigate the nature of social organizations and their effects on human behaviour (called functional-structural analysis). Parsons explored what social systems need to sustain themselves and also developed a classification of social structures by distinguishing their particular functions. The field of group dynamics derived from the work of Kurt Lewin, who studied small social units such as families and professional groups and drew connections between what he called the individual's "psychological life space" and "social space."

Symbolic interactionism, derived from the works of John Dewey, George H. Mead, and Charles Cooley, holds that an individual's concept of the self is an internalization of social processes. Economic determinism, derived from the thought of Karl Marx primarily by the sociologist C. Wright Mills, supports the idea of a "power elite" in society. An opposing view, that class conflicts are produced by differences in ideology, was developed largely by Karl Mannheim. A later development has been the attempt to use various types of mathematical analysis in the study of society.

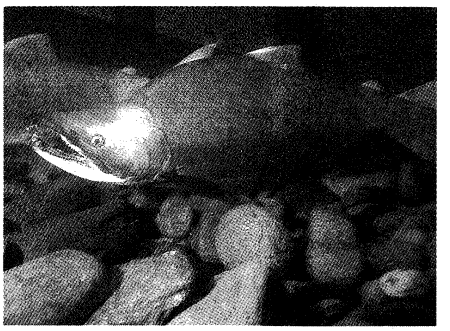
Among the principal concerns of modern sociology is that of developing more accurate and verifiable methodologies. Early sociologists tended to propose a theory first and then gather facts to prove it, or to rely on data that can be misleading. In the 1920s Robert E. Park evolved a more inductive approach in which theory grew out of a body of carefully assembled information. Modern sociologists use several methods, including controlled experimentation, direct and indirect observation, and statistical analysis.

sociometry, measurement techniques used in social psychology, in sociology, and sometimes in social anthropology and psychiatry, based on the assessment of social choice and interpersonal attractiveness. The term is closely associated with the work of the Austrian-born psychiatrist J.L. Moreno, who developed the method as a research and therapeutic technique. Sociometry has come to have several meanings; it is most commonly confined to the quantitative treatment of preferential interpersonal relations, but it is also used to mean the quantitative treatment of all kinds of interpersonal relations. The emphasis may be psychological or sociological.

A sociometric measure assesses the attractions (and sometimes the repulsions) within a given group, usually by having each member of the group specify other persons in the group with whom he would (or would not) like to participate in a given activity. Many variations on this technique exist for studying different aspects of social preference.

Much work has focussed on the concept of sociometric status. This includes studies of leadership; of social adjustment, ranging from the social isolate, or unchosen individual, to the sociometric star, or highly chosen; of the relationship between sociometric status and other personality variables, demographic variables, and intelligence; of minority-group prejudice; and of attitudes, beliefs, and values.

sockeye salmon, also called BLUEBACK, or RED, SALMON (*Oncorhynchus nerka*), North Pacific food fish of the family Salmonidae; it weighs about 3 kg (6.6 pounds) and lacks distinct spots on the body. It ranges from



Male sockeye salmon (*Oncorhynchus nerka*) in spawning phase
Jeff Foott—Bruce Coleman Inc.

the northern Bering Sea to Japan and from Alaska southward to California. The sockeye can migrate more than 1,600 km (1,000 miles) upriver to spawn in lakes or tributary streams, the young remaining in fresh water for as long as three years. In North America the sockeye is caught on the Columbia and Fraser rivers. The kokanee (*O. n. kennerlyi*) is a small, nonmigratory, freshwater form of sockeye. *See also* salmon.

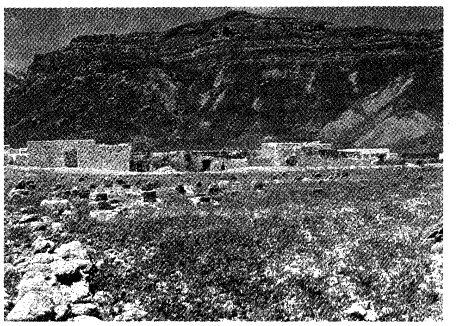
Soconusco, region, southwestern Chiapas state, southeastern Mexico, extending northwest from the border of Guatemala. Much of the area is occupied by the Sierra Madre de Chiapas (also called the Sierra de Soconusco), which parallels the coast and culminates in Tacaná volcano, 13,428 feet (4,093 m) above sea level; the coastal plain is narrow. The province of Chiapas was administered by the Captaincy General of Guatemala during the colonial era and was united with Mexico after independence from Spain was won. The Indians who lived in the Soconusco, however, refused to declare their loyalties to either Mexico or Guatemala and maintained their independence until 1842.

Socorro, city, seat (1852) of Socorro County, central New Mexico, U.S. It lies along the Rio Grande. The site, originally occupied by a Piro Indian village, was visited by a Spanish expedition led by Juan de Oñate. A mission was established there, named Nuestra Señora de Perpetuo Socorro (Our Lady of Perpetual Help), but it was abandoned during the Pueblo Revolt of 1680. The site was not resettled until 1817. The settlement's growth was encouraged by the discovery of silver in 1867, the arrival of the Santa Fe Railway in 1880 (at which time Socorro was the largest city in New Mexico), and the founding in 1889 of the New Mexico School of Mines (now Institute of Mining and Technology). Mining, ranching, and irrigated agriculture are basic to the economy. Socorro also serves as the supply point for the north end of the White Sands Missile Range. It has some light industries and is a tourist base for a scenic mountain region including part of the Cibola National Forest. Inc. 1894. Pop. (1984 est.) 8,100.

Socotra, also spelled SOKOTRA, Arabic SUQUṬRĀ, island in the Indian Ocean about 210 miles (340 km) southeast of Yemen (Aden), to which it belongs. The largest island in an archipelago, it is 1,400 square miles (3,600 square km) in area; the Hajhir (Haggier) Mountains occupy the interior, with narrow coastal plains in the north and a broader plain in the south. To the southwest and west are the smaller islands of Samḥah and Darzah al-Ikhwān (called The Brothers), and ʿAbd al-Kūrī, all of which also belong to Yemen (Aden). The islands stand on coral banks and may once have been connected with the African and Arabian mainlands. Socotra's flora includes several famous species, among them myrrh, frankincense, and the dragon's blood tree.

Socotra's name is traced to the Sanskrit *dvipa-sakhadara,* "island abode of bliss." The island is mentioned in various legends. The inhabitants long were Christians, but that religion disappeared from the island in the 17th century. Socotra was long ruled by the Mahri sultan, whose territory also included what is now eastern Yemen (Aden) on the Arabian mainland. His rule on Socotra was interrupted by Portuguese occupation between 1507 and 1511. In 1834 the British tried and failed to purchase the island; in the 1880s, however, the sultan accepted British protection for the entire sultanate. The sultanate came to an end in 1967, when Socotra became part of independent Yemen (Aden).

Socotra's sedentary inhabitants are engaged in fishing, pearl diving, and small-scale agri-



Hadīboh, principal settlement of Socotra island, at the foot of the Hajhir Mountains, Yemen (Aden)
Picturepoint, London

culture; in the interior, nomads keep cattle and other animals and raise some crops. The island's exports include ghee (clarified butter), fish, and frankincense. The capital and largest town is Hadīboh (Tamrida) on the northern coast. Pop. (1984 est.) Hadīboh town, 51,000.

Socrates (b. *c.* 470 BC, Athens—d. 399, Athens), ancient Athenian philosopher who directed philosophical thought toward analyses of the character and conduct of human life and who is remembered for his admonition to "know thyself."

A brief account of the life of Socrates follows; for a full biography, *see* MACROPAEDIA: Socrates.

Socrates lived during the chaos of the Peloponnesian War; he served as a hoplite (infantry soldier) during the war and was a conspicuous figure at Athens when Aristophanes and Ameipsias both made him the subject of their comedies in 423. He was married and had three sons. He spent much of his time speaking with young men of promise and also with politicians, poets, and artisans about their various callings and their notions of right and wrong. In 399 he was indicted for "impiety" on two counts, "corruption of the young" and "neglect of the gods whom the city worships and the practice of religious novelties." He was found guilty. Sentenced to death, he declined an opportunity to escape and drank the fatal hemlock. A full account of the episode is recounted in the *Phaedo* of Plato, who, though not present, knew most of those who were.

Socrates wrote nothing. Information about his personality and doctrine is found chiefly in the dialogues of Plato and the *Memorabilia* of Xenophon.

Socrates, also called SOCRATES SCHOLASTICUS (b. *c.* 380, Constantinople—d. *c.* 450),

Byzantine church historian whose annotated chronicles, *Historia ecclesiastica* ("Ecclesiastical History"), constitute an indispensable documentary source and plan for Christian history of the 4th- and 5th-century patristic period. Through excerpts in later collections they provided the medieval Latin Church with a major portion of its knowledge of early Christianity.

A legal consultant, Socrates was the first known layman to write church history. The *Historia ecclesiastica,* the second edition of which is still completely extant, encompasses religious and secular annals of the period in seven books. Each book corresponds to the reign of an Eastern Roman emperor, from Constantine I (AD 324–337) to Theodosius II (408–450), and includes the fundamental work of the 4th-century historian Eusebius of Caesarea. Incorporating earlier sources verbatim and integrating conciliar proceedings with available letters of emperors and bishops, Socrates compiled a relatively impartial and, in principle, critical account of events that he sometimes embellished with expanded anecdotes from eyewitnesses.

soda ash, sodium carbonate, a widely occurring white or transparent sodium salt of carbonic acid (*see* sodium).

soda lime, white or grayish-white granular mixture of calcium hydroxide with sodium hydroxide or potassium hydroxide. Soda lime absorbs carbon dioxide and water vapour and deteriorates rapidly unless kept in airtight containers. Medically, soda lime is used to absorb carbon dioxide in basal metabolism tests and in rebreathing anesthesia systems. In gas masks it is an absorbent for toxic gases. It is used in laboratories as a drying agent. A highly corrosive poison, soda lime severely damages the gastrointestinal tract if swallowed and may cause death.

soda-lime glass, most common form of glass produced. It is composed of about 70 percent silica (silicon dioxide), 15 percent soda (sodium oxide), and 9 percent lime (calcium oxide), with much smaller amounts of various other compounds. The soda serves as a flux to lower the temperature at which the silica melts, and the lime acts as a stabilizer for the silica. Soda-lime glass is inexpensive, chemically stable, reasonably hard, and extremely workable, because it is capable of being resoftened a number of times if necessary to finish an article. These qualities make it suitable for manufacturing a wide array of glass products, including light bulbs, windowpanes, bottles, and art objects.

Soda-lime glass was produced throughout much of Europe for hundreds of years. Silica, in the form of sand, and limestone were abundant nearly everywhere. Soda ash was readily obtained from hardwood forests, though Venetian glassmakers favoured potash produced by burning seaweed.

soda tremolite (mineral): *see* richterite.

sodalite, feldspathoid mineral, a chloride-containing sodium aluminosilicate that occurs with leucite and nepheline in such igneous rocks as nephelinesyenite, trachyte, and phonolite. For chemical formula and detailed physical properties, *see* feldspathoid (table).

The sodalite group also contains hydroxysodalite (hydroxide substitutes for chloride), noselite (containing sulfide and water), and haüynite (containing sulfide and having calcium partially replacing sodium). Noselite (nosean), found as gray, brown, or blue rounded grains containing inclusions, is a common constituent of volcanic ejecta. Haüynite (haüyne) varies in colour from white or gray to green or blue. The blue variety, lazurite, is



Sodalite from Canada

By courtesy of the Albert H. Waters collection; photograph, John H. Gerard—EB Inc.

the primary constituent of lapis lazuli (*q.v.*); its depth of colour seems to increase with additional sulfide substitution.

Soddy, Frederick (b. Sept. 2, 1877, Eastbourne, Sussex, Eng.—d. Sept. 22, 1956, Brighton, Sussex), English chemist who received the Nobel Prize for Chemistry in 1921 for investigating radioactive substances and for elaborating the theory of isotopes.

Educated in Wales and at the University of Oxford, he worked under the physicist Sir Ernest Rutherford at McGill University, Montreal (1900–02), then under the chemist Sir William Ramsay at University College, London. After teaching in Scotland, he was professor of chemistry at Oxford (1919–36).

Soddy did work with Rutherford on the disintegration of radioactive elements. He was among the first to conclude in 1912 that certain elements might exist in forms that differ in atomic weight while being indistinguishable and inseparable chemically. These, upon a suggestion by Margaret Todd, he called isotopes. In *Science and Life* (1920) he pointed out their value in determining geological age.

Soddy also wrote of the realtionship of science and society and was highly critical of the inability of the world's economic systems to make full use of scientific and technological advances.

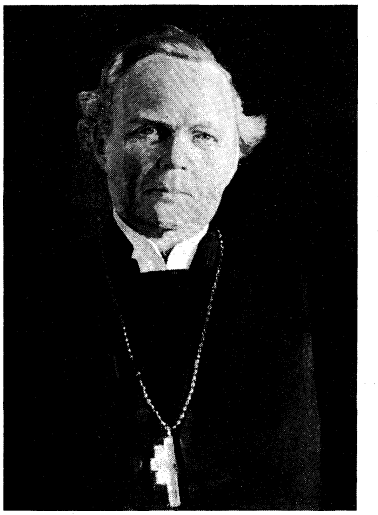
Söderberg, Hjalmar Erik Fredrik (b. July 2, 1849, Stockholm—d. Oct. 14, 1941, Copenhagen), novelist, critic, and primarily short-story writer.

Söderberg's novel *Martin Bircks ungdom* (1901; *Martin Birck's Youth*) has much of the disillusionment and melancholy of the 1890s, yet in a more restrained manner. It puts a sophisticated urban regionalism in the place of the provincial regionalism of the 1890s. Söderberg wrote about Stockholm and captured it in a way that had never been achieved before. His novel *Doktor Glas* (1905; *Doctor Glas*) caused a sensation because of its apparent justification of a deliberate ethical murder. In his four volumes of short stories, however, his terse, probing, witty style is at its best.

After 1910 Söderberg lived mainly in Copenhagen, later writing articles warning of the approaching threat of Fascism and Nazism.

Söderblom, Nathan (b. Jan. 15, 1866, Trönö, Swed.—d. July 12, 1931, Uppsala), Swedish Lutheran archbishop and student of comparative religion who in 1930 received the Nobel Prize for Peace for his international efforts on behalf of peace through church unity.

Ordained a minister in 1893, Söderblom served seven years as a chaplain to the Swedish legation in Paris before becoming professor of theology at his alma mater, the University of Uppsala (1901). He was appointed archbishop of Uppsala and primate of Sweden in 1914. Travel stimulated his interest in ecumenical activity; as a result of his organizational work the first Universal Conference on Life and Work met in Stockholm in 1925. The series of these conferences established a tradition that later merged with that of the World Council of Churches. Söderblom broke new ground in the field of comparative religion with his study of Persian religion, *La Vie future d'après le Mazdéisme* (1901; "The Afterlife According to Mazdaism"). More significant was *Gudstrons uppkomst,* his study emphasizing holiness rather than the idea of God as the basic notion in religious thought. Among his other works are *The Living God: Basal Forms of Personal Religion* (1933; Gifford Lectures, 1931); *Humor och melankoli och andra Lutherstudier* (1919; "Humour and



Söderblom, oil painting by E. Haag-Bolin, 1933; in the Svenska Porträttarkivet, Stockholm

By courtesy of the Svenska Portrattarkivet, Stockholm

Melancholy and Other Luther Studies"); and *Christian Fellowship* (1923).

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Södergran, Edith (Irene) (b. April 4, 1892, St. Petersburg, Russia—d. June 24, 1923, Raivola, Fin.), Swedish-Finnish poet whose expressionistic work influenced a generation of Finnish and Swedish writers.

Her family moved to Finnish Raivola when Södergran was three months old. Educated at a German school in St. Petersburg, where the family maintained a winter home, she contracted tuberculosis at 16 and never fully recovered her health. Her first book, *Dikter* (1916; "Poems"), expressed shifting moods of melancholy and joy in a free form that was indebted to the Symbolist poets. This collection inaugurated the Swedish-Finnish modernist movement, which looked to German Expressionism and Russian Futurism for inspiration.

Södergran wrote six volumes of poetry, including one that was published posthumously, and a volume of her letters was published in 1955.

Soderini, Piero di Tommaso (b. May 18, 1452, Florence—d. June 13, 1522, Rome), Florentine statesman during the late 15th and early 16th centuries.

Soderini was descended from an old Florentine family that had become famous in medicine. He became a prior in 1481 and later became a favourite of Piero di Lorenzo de' Medici, who made him ambassador to the French court in 1493. After the expulsion of Piero and the martyrdom of Savonarola, Soderini was elected (1502) gonfalonier for life by the Florentines, who wished to give greater stability to their republican institutions. His

rule proved moderate and wise, though he lacked the qualities of a great statesman. He introduced a system of national militia in the place of foreign mercenaries, and, during his government, the long war with Pisa was brought to a close with the capture of Pisa by the Florentines in 1509. Grateful to France, who had assisted him, he always took the French side in Italian politics.

In 1512 the Medici with the help of a Spanish army returned to Florence, deposed Soderini, and drove him into exile. He took refuge at Ragusa in Dalmatia, where he remained until the election of the Medici pope Leo X, who summoned him to Rome and conferred many favours on him. Soderini lived his remaining years in Rome, working for the good of Florence, to which he was never allowed to return.

Södermanland, *län* (county) of east-central Sweden. It lies along the Baltic Sea and is bounded by Lake Mälar and Lake Hjälmar. Its land area of 2,340 square miles (6,060 square km) consists of most of the traditional *landskap* (province) of Södermanland. It is a lowland region, nowhere rising more than about 400 feet (120 m) above sea level, and has many small lakes and fertile soils. Grain and fruit are grown, and there is some stock raising and dairying. Industries include iron mining, woodworking, and papermaking. The *län* gains importance from the Södertälje Canal in the east (and in Stockholm *län* to the east), which links Lake Mälar with the Baltic. Urban centres include Nyköping, the capital; Eskilstuna, known for its engineering industries; Katrineholm, a railway junction and industrial town; and the Baltic port of Oxelösund, which is the export harbour for Bergslagen iron and steel. Pop. (1987 est.) 249,479.

Consult the INDEX *first*

Södertälje, town, in the *län* (county) of Stockholm, east-central Sweden. It lies between a bay of Lake Mälar and the Baltic Sea, southwest of Stockholm. The town, formerly called simply Tälje, was founded in the 10th century and was damaged by fire in 1390, 1650, and 1719. In and around the town are St. Ragnhild's Church, dating from about 1200, Gripsholm Castle, and an open-air museum.

In the 19th century Södertälje was a well-known spa and bathing resort, but it is now a manufacturing centre and a rail and road junction on the routes from Stockholm to Malmö, Göteborg, and Oslo. Lake Mälar and the Baltic are connected at Södertälje by the 3-mile- (5-kilometre-) long Södertälje Canal (1819; enlarged 1917–24). Pop. (1987 est.) mun., 80,003.

sodium (Na), chemical element of Group Ia of the periodic table (the alkali metal group).

Properties, occurrence, and uses. Sodium is a very soft, silvery-white metal occurring abundantly in nature in compounds—especially common salt, sodium chloride (NaCl)—as in the mineral halite; and in seawater, to which sodium contributes about 31 percent of the dissolved constituents. Sir Humphry Davy first prepared sodium in its elemental form (1807) by electrolysis of fused sodium hydroxide (NaOH). Sodium is the commonest alkali metal and sixth most abundant element on Earth, comprising 2.8 percent of the Earth's crust; it also occurs in more than trace amounts in the stars and Sun. Lighter than water, it can be cut with a knife at room temperature and is brittle at low temperatures. It conducts heat and electricity easily and exhibits to a marked degree the photoelectric effect (emission of electrons when exposed to light). Sodium reacts vigorously with water to give hydrogen (which may ignite from the heat of the reaction) and sodium hydroxide. The metal is extremely active chemically, easily unites with oxygen of the air, and usually is kept immersed in inert liquids such as kerosene or naphtha. Sodium is commercially produced by electrolyzing sodium chloride. For specific information on sodium production, *see* MACROPAEDIA: Industries, Extraction and Processing.

Inexpensive and available in tank-car quantities, sodium is widely used in the manufacture of chemicals (particularly the lead alloy Na_4Pb, used in making tetraethyl lead) and pharmaceuticals, in metallurgy, as a heat exchanger in atomic reactors and certain types of engines, and in sodium vapour lamps.

Natural sodium is the stable isotope of mass 23. Of the six radioactive, artificial isotopes, sodium-22 (2.6-year half-life) is used as a radioactive tracer for natural sodium, sodium-24 (15-hour half-life) is limited in use by its short life, and the rest have half-lives of a minute or less. The yellow colour of the sodium vapour lamp and the sodium flame (basis of an analytical test for sodium) is identified with two prominent lines in the yellow portion of the light spectrum.

Principal compounds. Sodium is highly reactive, forming a wide variety of compounds with nearly all inorganic and organic anions. It has a valence of +1, and its single valence electron is lost with great ease, yielding the colourless sodium ion (Na^+).

Sodium hydroxide (NaOH) is a corrosive, white crystalline solid that readily absorbs moisture until it liquefies. Commonly called caustic soda or lye, sodium hydroxide is the most widely used industrial alkali. It has applications in the preparation of rayon and other textiles, petroleum refining, soap manufacture, pulp and paper production, reclaiming of rubber, food product manufacture, and various other industrial processes.

The most important and familiar sodium compound is sodium chloride, or common salt, NaCl. Most other sodium compounds are prepared either directly or indirectly from sodium chloride, which occurs in seawater, natural brines, and as rock salt. Other major commercial applications of sodium chloride include its use in the manufacture of chlorine and sodium hydroxide by electrolytic decomposition and in the production of sodium carbonate (Na_2CO_3) by the Solvay process. The electrolysis of sodium chloride produces sodium hypochlorite, NaOCl, a compound of sodium, oxygen, and chlorine used in large quantities in household chlorine bleach. Sodium hypochlorite is also utilized as an industrial bleach for paper pulp and textiles, for chlorination of water, and in certain medicinal preparations as an antiseptic and a fungicide. It is an unstable compound known only in aqueous solution.

Sodium nitrate, or soda nitre, $NaNO_3$, is commonly called Chile saltpetre after its mineral deposits in northern Chile, the principal source. Sodium nitrate is used as a nitrogenous fertilizer and as a component of dynamite.

Sodium sulfate, Na_2SO_4, is a white crystalline solid or powder employed in the manufacture of kraft paper, paperboard, glass, and detergents and as a raw material for the production of various chemicals. It is obtained either from deposits of the sodium sulfate minerals mirabilite and thenardite or synthetically by the treatment of sodium chloride with sulfuric acid. The crystallized product is a hydrate, $Na_2SO_4 \cdot 10H_2O$, commonly known as Glauber's salt.

Other familiar sodium compounds are the carbonates, which contain the carbonate ion (CO_3^{2-}). Sodium bicarbonate, also called sodium hydrogen carbonate or bicarbonate of soda, $NaHCO_3$, is a source of carbon dioxide and so is used as an ingredient in baking powders, effervescent salts and beverages, and as the main constituent of dry chemical fire extinguishers. Its slight alkalinity makes it useful in treating gastric or urinary hyperacidity and acidosis. It is also employed in certain industrial processes, as in tanning and the preparation of wool. Sodium carbonate, or soda ash, Na_2CO_3, is widely distributed in nature, occurring as constituents of mineral waters and as the solid minerals natron, trona (*qq.v.*), and thermonatrite. Large quantities of this alkaline salt are used in making glass, detergents, and cleansers. Sodium carbonate is treated with carbon dioxide to produce sodium bicarbonate. The monohydrate form of sodium carbonate, $Na_2CO_3 \cdot H_2O$, is employed extensively in photography as a constituent in developers. Washing soda (sal soda) consists of sodium carbonate decahydrate, $Na_2CO_3 \cdot 10H_2O$; it serves as a bleach for cotton and linen and as a household cleansing agent.

atomic number	11
atomic weight	22.9898
melting point	97.81° C
boiling point	892° C
specific gravity	0.971 (20° C)
valence	1
electronic config.	2-8-1 or $1s^2 2s^2 2p^6 3s^1$

sodium chloride (NaCl), common salt, a compound of sodium and chlorine consisting either of colourless, transparent crystals or a white crystalline powder. *See* salt; sodium.

sodium deficiency, condition in which an organism fails to receive an adequate supply of sodium, an element that functions with chloride and bicarbonate to maintain a balance of positive and negative ions (electrically charged particles) in body fluids and tissues. The body receives sodium primarily in the form of table salt (sodium chloride). Sodium, the principal extracellular ion, has the property of holding water in body tissues. In persons with circulatory problems, sodium is an undesirable factor because it may result in edema, or retention of water in the body. On the other hand, too little sodium in the diet disturbs the tissue–water and acid–base balance that is important to good nutritional status. Sodium mineral is readily absorbed from the small intestine, and normal storage is accomplished by muscle and cartilage tissue. Intake and output closely parallel one another, with activity dependent on a hormone that is released by the cortical layer of the adrenal glands.

The most frequently observed sodium deficiency occurs when excessive heat causes heavy perspiration, thus reducing body water and sodium to the extent that gross dehydration affects normal activity patterns. Symptoms may include feelings of weakness, apathy, and nausea as well as cramps in the muscles of the extremities. Taking additional salt in tablet form is a preventive measure, and persons may use increased amounts of table salt on their food to supplant sodium lost during dehydration and sweating.

sodium glutamate: *see* monosodium glutamate.

sodium pump, in cellular physiology, a mechanism that has been identified in many cells and probably occurs in all, which maintains the internal concentration of potassium ions [K^+] higher than that in the surrounding medium (blood, body fluid, water) and the internal concentration of sodium ions [Na^+] very much lower than that of the surrounding medium. The pump has been identified with an enzyme, an adenosine-triphosphatase (ATPase), bound to the cell membrane and activated by external [K^+] and internal [Na^+]. This enzyme uses metabolic energy to transport (pump) Na^+ outward and K^+ inward. Such pumps do not generally alter the distribution of electric charge across the membrane

and hence do not produce a current (*i.e.,* are not electrogenic). The resting potential of cells and related bioelectric phenomena such as the action potential depend on the steady state difference in concentrations of Na^+ and K^+ maintained by the pump. Other ion pumps, transporting different ions, are known for the cells of plant roots, vertebrate stomach, and vertebrate muscle.

sodium silicate: *see* water glass.

sodium-vapour lamp, electric discharge lamp using ionized sodium, used for street lighting and other illumination. A low-pressure sodium-vapour lamp consists of a glass shell with metal electrodes, filled with neon gas and a little sodium. When current passes between the electrodes, it ionizes the neon, giving a red glow, until the hot gas vaporizes the sodium. This ionizes and shines a nearly monochrome yellow. High-pressure sodium-vapour lamps, made with a mixture of mercury and sodium, give a whiter light and are used for extra-bright lighting in places such as road intersections and sports stadiums.

sodoku (disease): *see* rat-bite fever.

Sodom (Israel): *see* Sedom.

Sodom and Gomorrah, notoriously sinful cities in the Old Testament Book of Genesis. Possibly now covered by the shallow waters south of al-Lisān, a peninsula near the southern end of the Dead Sea in Israel, they constituted, along with the cities of Admah, Zeboiim, and Zoar (Bela), the five biblical "cities of the plain."

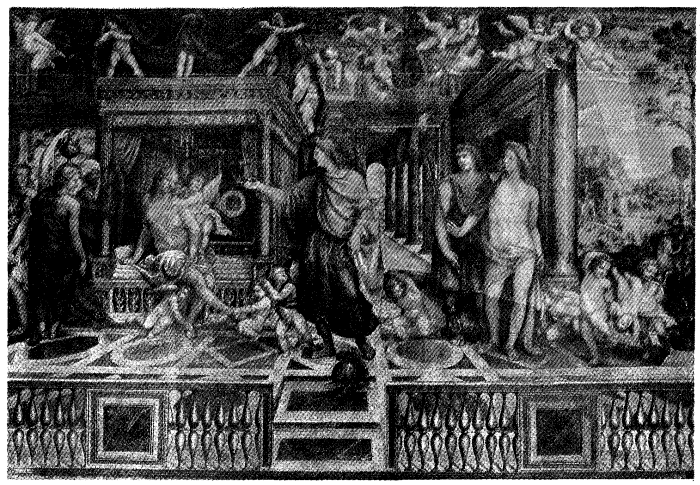
Destroyed by "brimstone and fire" because of their wickedness (Gen. 19:24), Sodom and Gomorrah presumably were devastated *c.* 1900 BC by an earthquake in the Dead Sea area of the Great Rift Valley, an extensive rift extending from the Jordan River Valley in Israel to the Zambezi River System in East Africa.

Archaeological evidence indicates that the area was once fertile in the Middle Bronze Age (*c.* 2000–1500 BC), with fresh water flowing into the Dead Sea in sufficient amounts to sustain agriculture. Because of the fertile land, the biblical Lot, the nephew of the Hebrew patriarch Abraham, selected the area of the cities of the Valley of Siddim (the Salt Sea, or the Dead Sea) to graze his flocks. When the catastrophic destruction occurred, the petroleum and gases existing in the area probably contributed to the imagery of "brimstone and fire" that accompanied the geological upheaval that destroyed the cities. Har Sedom (Arabic, Jabal Usdum), or Mt. Sodom, at the southwestern end of the sea, reflects Sodom's name.

An inspiration to writers, artists, and psychologists, Sodom and Gomorrah and their legendary wickedness have been the subject of numerous dramas (*e.g.*, the *History of Lot and Abraham,* a medieval mystery play; *Sodome et Gomorrhe,* by the French dramatist Jean Giraudoux, in 1943; and *Sodhome kye Ghomorra,* by the Greek writer Nikos Kazantzakis, in the 1950s, in which he draws parallels between the biblical and the modern human condition). In art the subjects involved in the biblical accounts of Sodom and Gomorrah have been portrayed in numerous medieval psalters, Renaissance frescoes, and paintings down to the present. Sexual acts attributed to the Sodomites gave the city's name to the contemporary term sodomy.

Sodoma, Il, byname of GIOVANNI ANTONIO BAZZI (b. 1477, Vercelli, Duchy of Savoy—d. Feb. 14/15, 1549, Siena, Republic of Siena), Italian painter whose works reflect the transition from High Renaissance to Manneristic style.

From 1490 to 1497 he was apprenticed to G.M. Spanzotti, a minor Piedmontese artist, but he was afterward much influenced by Leonardo da Vinci and later by Raphael, who



"Marriage of Alexander and Roxane," fresco by Sodoma, *c.* 1511–12; in the Villa Farnesina, Rome

SCALA—Art Resource/EB Inc.

was particularly decisive in determining his mature style. He was invited to Siena in 1501 and subsequently spent the bulk of his working life there.

In 1508 he was invited to Rome by the celebrated Sienese banker Agostino Chigi and was employed by Pope Julius II in the Stanza della Segnatura in the Vatican. Although he was superseded by Raphael in 1509, some of his ceiling decoration remains. One of his most successful frescoes, the "Marriage of Alexander and Roxane" (*c.* 1511–12) in the Villa Farnesina, Rome, is often considered a rival as a decorative achievement to the frescoes by the school of Raphael in the same villa.

Sodoma had a peculiar gift for suggesting the sensuous beauty of the human form and an exaggerated, almost mystical, emotionalism that anticipates one aspect of the Baroque.

Sodoma gained a wide reputation during his lifetime as a homosexual; and Vasari, who disliked him, makes the most of the sobriquet Il Sodoma (the Sodomite) by which he was known from 1512 onward. It has been claimed that the nickname is likely to have been the result of a joke, but it was adopted by the artist himself and is the name by which he is now generally known.

sodomy, noncoital carnal copulation. The term is understood in history, literature, and law in several senses: (1) as denoting any homosexual practices between men, in allusion to the story of Sodom in Genesis 18:19; (2) as denoting anal intercourse; (3) as synonymous with bestiality or zoophilia (*see* zoophilia), and (4) as comprehending a number of other sexual activities, ranging from sexual contacts with minors to mouth–genital contacts and oral intercourse between adults.

Anal intercourse has been observed in apes and is often accepted as normal between men and boys in some preliterate societies, notably during initiation rites. In modern societies it occurs between male homosexuals and also between men and women. It is believed that the (consenting) passive partner as well as the active one may experience pleasure probably because the genital and anal areas share common nerves.

Sodomy is a crime in some jurisdictions and is condemned as a mark of abnormality in most others. Some legal codes provide penalties as severe as life imprisonment for homosexual intercourse, even if the relations are voluntary and between legally consenting adults. So-called sodomy laws, actually proscribing a variety of sexual contacts, appear to apply even to married couples. No such regulations are found in the codes of Denmark, France, Italy, Sweden, or Switzerland, among others. The Wolfenden committee in England and the American Law Institute in the United States recommended abolition of criminal provisions in this area, except in cases involving violence, children, or public solicitation to commercial vice. This position was adopted in Illinois in 1961 (and later in several other U.S. states) and in England in 1967.

Soekaboemi (Indonesia): *see* Sukabumi.

Soekarno (Indonesian president): *see* Sukarno.

Soela Eilanden (Indonesia): *see* Sula.

Soemba (Indonesia): *see* Sumba.

Soembawa (Indonesia): *see* Sumbawa.

Soerabaja (Indonesia): *see* Surabaya.

Soerakarta (Indonesia): *see* Surakarta.

Soest, city, North Rhine-Westphalia *Land* (state), northwestern Germany, on the fertile plain in the Hellweg called Soester Börde, extending south of the Lippe River. Though excavations have shown there to have been a settlement on the site since Roman times, it was first mentioned in 836 (as Sosat); its 12th-century charter and municipal code (Soester Recht, Soester Schrae) served as models for many old German communities. Associated with the archbishopric of Cologne until 1449, it became an important Hanseatic town. Although the city was heavily damaged in World War II, many timbered houses, old buildings, and much of the old town walls survived, including the Osthofentor (gatehouse; 1526). The Cathedral of St. Patroclus (founded *c.* 955, extended 1166) adjoins the Baroque town hall (1713) with important Lutheran archives and an early Protestant theological library. The Gothic Wiesenkirche ("St. Mary of the Fields"; 1331–*c.* 1430) has a famous stained-glass window of the "Westphalian Last Supper" (1525). Several other notable medieval churches have been restored.

Soest is the agricultural and cattle market for the Börde; it also has light industry. Pop. (1989 est.) 40,775.

Soest, *gemeente* (municipality), Utrecht *provincie* (province), central Netherlands, in the wooded Gooi district. It includes the villages of Soestdijk, site of a royal residence; Soesterberg, with an air base and the Dutch Air Force Museum; and Soestduinen. Soest town, founded in 1029, has a Gothic church dating from *c.* 1400 and restored in 1959. For-

merly an agricultural centre, the town is now largely residential and has expanding light industries. Pop. (1987 est.) 40,931.

sofa: *see* settee.

Sofala, modern NOVA SOFALA, historic seaport situated at the mouth of the Sofala River on the coast of what was Portuguese East Africa, now Mozambique. Once the first town of the Portuguese possessions of eastern Africa, Sofala declined rapidly in importance after 1890, when Beira was established about 20 miles (30 km) north. Sofala's harbour, once capable of holding a hundred large ships, silted up and came to be obstructed by a bar.

Sofala's harbour was the oldest harbour in southern Africa. It was visited by Arabs beginning in 915 in order to trade the gold from the hinterland. Persian Muslims settled there in 1020, and during the 14th and 15th centuries Sofala was an important southern outpost of the Islāmic sultanate of Kilwa. During this time the Arabs maintained trade relations with the Karanga state, which centred on the Zimbabwe monuments in the southeastern region of what is now the modern state of Zimbabwe. In 1480 Sofala was visited by the Portuguese Pêro da Covilhã, seeking gold, and in 1505 the Portuguese Pedro (or Pêro) de Anaia occupied Sofala and built a fort and factory in the hope of capturing the gold trade held by the Arabs. The conquest of the town followed, the first governors of the Portuguese East African possessions being entitled captains general of Sofala. The Dominican friars established themselves in 1586 and directed from there their Roman Catholic missionary activities into the interior.

Tomé (or Thomé) Lopes, who accompanied Vasco da Gama to India in 1502 and left a narrative of the voyage, sought to identify Sofala with Solomon's Ophir and stated that it was the home of the queen of Sheba. The identification of Sofala with Ophir, to which the English poet John Milton alluded in *Paradise Lost* (11:399–401), is erroneous.

sofer, also spelled SOPHER (Hebrew: "scribe"), plural SOFERIM, or SOPHERIM, any of a group of Jewish scholars who interpreted and taught biblical law and ethics from about the 5th century BC to about 200 BC. Understood in this sense, the first of the *soferim* was the biblical prophet Ezra, even though the word previously designated an important administrator connected with the Temple but without religious status. Ezra and his disciples initiated a tradition of rabbinic scholarship that remains to this day a fundamental feature of Judaism.

With the decline of the *soferim,* their tradition of biblical scholarship was largely taken over by the Pharisees and, in later generations, by the *tannaim, amoraim,* and *geonim.* Despite the similarity of their functions, each of the groups had its own technical name.

The *soferim* disappeared about the 2nd century BC, and New Testament references to "scribes" (often in connection with the Pharisees) are to doctors of the law, or jurists (usually called *ḥakhamim*), who gave legal advice to judges entrusted with administration of the law. They found their way into the ranks of the Pharisees and the Sadducees and served in the great Sanhedrin of Jerusalem, the chief Jewish legislative and judicial body from about 200 BC to AD 70, when Roman legions destroyed the Temple of Jerusalem, the centre of Jewish religious life.

Historically, the *soferim* are of great importance, not only for having initiated rabbinic studies but also for having fixed the canon of Old Testament Scriptures and, as copyists and editors, for their energetic efforts to safeguard the purity of the original text. The Talmud (collection of traditions on Jewish religious laws) records 18 changes (*tiqqune soferim*) that they introduced to preclude misunderstanding of the Scriptures.

The *soferim* arose to meet a specific need of the Jewish people. Under foreign rule, the Jews enjoyed cultural autonomy and were allowed to govern themselves under the constitution of the Law of Moses. The *soferim* became experts in the Law, applying the idealistic aspirations of the Torah and oral tradition to the exigencies of daily life. Many of their ordinances were formulated to safeguard, or form a "fence" (*seyag*) around, the Torah.

As time passed, *sofer* came to mean one who taught the Bible to children, or a copyist or a notary or a calligrapher qualified to write Torah scrolls or other religious documents. The Babylonian Talmud (*c.* AD 500) has a *soferim* tractate that stipulates how such work is to be performed. Modern Hebrew translates *sofer* as a "man of letters."

Consult the INDEX *first*

Sofia, Bulgarian SOFIYA, capital of Bulgaria. It is situated near the geographical centre of the Balkans region, in the Sofia Basin, a troughlike valley in the western part of the country.

The Serdi (Sardi), a Thracian tribe, established a settlement in the region in the 8th century BC. This community was conquered soon after 29 BC by the Romans, who named it Serdica (Greek: Sardica). It flourished during the reign of the emperor Trajan (98–117) and reached its greatest height under the emperor Constantine I the Great; in 342 or 343 it was the site of an important meeting of Christian bishops, the Council of Sardica. From the late 4th century it was part of the Eastern Roman Empire, centred on Byzantium, and it was plundered by Attila and the Huns in 441–447. During the 6th century Byzantine influence increased under the emperor Justinian, and the restored Church of St. Sofia, which later gave the town its name, survives from this period. In 809 the Bulgarian khan Krum seized the town and incorporated it in the Bulgarian state; it was given the Slav name Sredets (Greek: Triaditsa). It was under Byzantine rule from 1018 until 1185, when the second Bulgarian Empire was established.

Sofia fell to the Turks in 1382; the Ottoman governor of Rumelia took up residence there, and the town gradually acquired a distinctive Oriental appearance. It was liberated from Ottoman rule by Russian troops on Jan. 4, 1878, and was designated the Bulgarian capital on April 3, 1879. The Germans occupied Sofia during World War II, but in 1944 Russian forces liberated the city.

Since the establishment of a communist government in Bulgaria in 1947, the city has been transformed. The chief industries are engineering, metallurgy, food processing, and the manufacture of textiles and clothing. Printing is important; the rubber, footwear, furniture and woodworking, and chemical industries are also well represented.

An agricultural zone characterized by fruit and vegetable growing and by dairy farming surrounds Sofia, and it is connected with neighbouring towns by roads. Sofia is also the centre of Bulgarian air and rail traffic. Local transport is served by tramways, trolleybuses, and buses, while several cable lifts ascend the neighbouring Vitosha Mountains.

Among the many educational institutions in Sofia are the Bulgarian Academy of Sciences, the Academy of Agricultural Sciences, and the University of Sofia (1888), the oldest establishment of higher learning in Bulgaria. The city also contains the Cyril and Methodius National Library, the Ivan Vazov National Theatre and Opera House, an astronomical observatory, and a number of museums. In addition to the restored St. George, Boyana, and St. Sofia churches, historical monuments include two mosques, one housing a fine archaeological collection, and the Alexander Nevsky Cathedral, erected to commemorate the gratitude of the Bulgarian people to the Russian liberators of 1878. The headquarters of the Bulgarian Communist Party and the mausoleum of the statesman Georgi Dimitrov are also noteworthy. Pop. (1987 est.) city, 1,119,152.

soft coal, in the United States, bituminous coal (*q.v.*), as opposed to hard coal, or anthracite. In Europe the designation soft coal is reserved for lignite and brown coal (*qq.v.*), whereas hard coal means bituminous coal.

soft drink, nonalcoholic beverage, either carbonated or noncarbonated, usually containing a sweetening agent, edible acids, and natural or artificial flavours. Soft drinks are so designated to distinguish them from hard liquor, or "spirits." Coffee, tea, milk, cocoa, and undiluted fruit and vegetable juices are not considered soft drinks.

A brief treatment of soft drinks follows. For full treatment, *see* MACROPAEDIA: Beverage Production.

The first attempts to make carbonated soft drinks were the result of a desire to duplicate the naturally effervescent, mineral-rich waters that flowed from the springs at well-known European spas. Early experimenters believed that the effervescence was a significant source of the reputed healthful properties of the waters, and they therefore concentrated on the gaseous nature of the waters.

By the late 1700s numerous reports of such experiments and investigations were published in the *Philosophical Transactions* journal of the Royal Society of London. Among the authors was Joseph Priestley, who received the society's Copley Medal for his reports on "fixed air" (carbon dioxide) and the mixture of waters with it. Scientists throughout Europe and the United States engaged in experiments to produce carbonation. In 1775 John Mervin Nooth described a special apparatus for preparing small quantities of effervescent waters. Many other devices followed; in the years 1789–1821 factories and bottling plants opened in cities throughout Europe. In the United States bottled soda water was available as early as 1807.

The manufacture of soft drinks requires special attention to the purity and uniformity of ingredients. Water, usually taken from municipal sources, undergoes further processing both to ensure uniformity and to remove solid matter, colour, chlorine, and any other tastes or odours that may be present. The introduction of carbon dioxide protects the carbonated beverage against spoilage, at the same time endowing it with the characteristic effervescence and tangy taste. Sugar or other sweeteners are dissolved or diluted with processed water and then combined with flavouring substances, edible acids, colouring, and sometimes preservatives.

soft maple: *see* silver maple.

soft water, water that is free from dissolved salts of such metals as calcium, iron, or magnesium, which form insoluble deposits such as appear as scale in boilers or soap curds in bathtubs and laundry equipment. *See also* hard water.

softball, a variant of baseball and a popular participant sport, particularly in the United States. It is generally agreed that softball developed from a game called indoor baseball, first played in Chicago in 1887. It became known in the United States by various names, such as kitten ball, mush ball, diamond ball, indoor–outdoor, and playground ball. There

were wide variances in playing rules, size and type of playing equipment, and dimensions of the playing field.

In 1923 a rules committee was appointed to publish and circulate a standard set of rules.

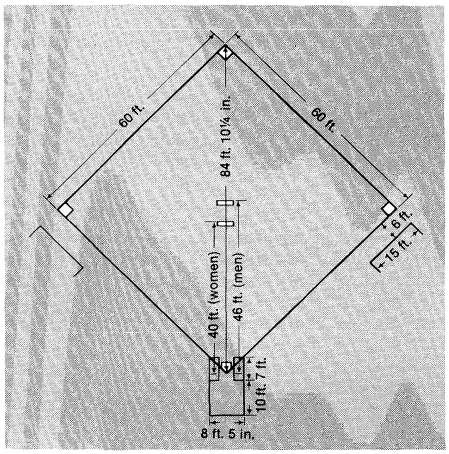


Diagram of a softball diamond, indicating pitching distances for men and women

The committee was later enlarged to form the International Joint Rules Committee on Softball, which came to include representatives of a number of organizations that promote and sponsor softball. The Amateur Softball Association of America, organized in 1933, came to be the recognized governing agency for promotion and control of organized national competition.

The International Softball Federation, formed in 1952, acts as liaison between more than 40 softball organizations of several countries. Headquarters are in Oklahoma City, Okla., U.S. The federation coordinates international competition and regular regional and world championship tournaments for men and women.

The fundamentals of softball are the same as those of baseball. Batting and fielding strategy are similar, but softball is played on a much smaller area, and a game is only seven innings long.

The regulation playing field for softball includes a diamond-shaped area with 60-foot (18.28-metre) base lines. The pitching distance for men is 46 feet and for women 40 feet. Bats must be round, not more than 34 inches (86 centimetres) long, and not more than 2½ inches (6.4 centimetres) in diameter at the largest part. The official softball is a smooth-seam ball 12 inches in circumference, weighing between 6¼ and 7 ounces (177–198 grams).

In softball the ball is delivered by an underhand motion, whereas in baseball the pitch is overhand or sidearm. Base stealing is permitted in both games, but in softball the runner must keep contact with the base until the pitcher releases the ball on delivery to the batter.

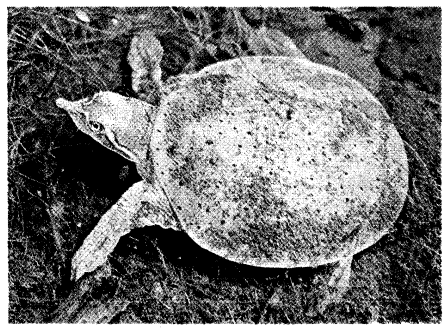
A popular variation of softball called slow-pitch may be played with regulation equipment. The major differences from softball (fast-pitch) are that there are 10 members on a team, that the pitching distance for both men and women is 46 feet, and that a pitched ball must be delivered at moderate speed with an arch of at least three feet in its flight toward the batter. Speed and height of the pitch are left to the judgment of an umpire, who may eject a pitcher for repeatedly throwing the ball too fast. Base stealing is not permitted in slow-pitch.

Another variation, popular especially in Chicago and other midwestern U.S. cities, is played with a ball that is 16 inches in circumference (weighing 9–10 ounces) on a diamond whose basepaths are 55 (for men) or 50 (for women) feet long. The ball is delivered as in slow-pitch.

softly-softly (primate): *see* potto.

softshell turtle, any of the soft-shelled, aquatic turtles of the family Trionychidae. Softshell turtles are found in North America, Africa, and Asia in rivers or other bodies of fresh water with soft, muddy bottoms. They are distinctive in appearance, having flat, leathery, rounded shells that are commonly described as "pancake-like." In addition these turtles have webbed feet, long necks, and elongated, proboscis-like snouts bearing the nostrils at the tip. Female softshells are substantially larger than the males. Softshell turtles are swift-moving, carnivorous reptiles. They often lie buried in mud or sand and occasionally emerge to bask in the sun. Specialized tissues in the pharynx of these turtles enable them to extract oxygen for respiration from the water. Softshell turtles are valued as food. They are aggressive when captured and are capable of delivering rapid, vicious bites.

There are six genera and more than 20 species of softshell turtles. Most of the species are of the genus *Trionyx* (or *Amyda*), which



Softshell turtle (*Trionyx*)
E.R. Degginger—EB Inc.

is represented in North America, Asia, and Africa. The North American forms are the spiny softshell (*T. ferox*), of which there are a number of races, and the smooth softshell (*T. mutica*). Both species are found mainly in the United States. Maximum length of the grayish or brown shell is about 35 centimetres (14 inches) in the smooth softshell and 45 cm (18 in.) in the spiny softshell. The Old World softshell turtles include two large forms, the African *T. triunguis* and the Malayan *Pelochelys bibroni*, both of which may attain shell lengths of 60 cm (24 in.) or more. Lissemys, from India and Burma, and some related African genera are usually placed in a separate subfamily Lissemyinae.

softwood, timber obtained from coniferous (cone-bearing) trees (primarily of the pine and fir families) usually from the Baltic, Scandinavian, and North American areas. Softwood is the source of about 80 percent of the world's production of lumber. The term softwood is a classification of material, known originally from soft European woods, but including both soft and hard woods. Softwood trees are evergreen, except bald cypress, tamarack, and larch. Softwoods of longleaf pine, Douglas fir, or yew are much harder in the mechanical sense than several hardwoods.

Sofya (Russian personal name): *see under* Sophia.

Soga, an Interlacustrine Bantu-speaking people inhabiting the area east of the Nile between Lakes Victoria and Kyoga. They are the fourth largest ethnic group in Uganda. Culturally, they are very similar to the Ganda, who inhabit the region immediately to the west. Prosperous by national standards, the Soga are primarily agriculturalists, growing bananas and millet and cash crops such as coffee and cotton. Animal husbandry is important, cattle being the chief stock.

The Soga were traditionally organized into a number of small chiefdoms. The constituent clans of these chiefdoms have remained important. These clans, patrilineal in descent, number in the hundreds. The Soga were recognized as a separate administrative district in the Uganda Protectorate.

Today, most Soga are Christian. Their traditional beliefs centred on spirits associated with ancestors or nature.

Soga, Tiyo (b. 1829, Tyume, Cape Colony—d. Aug. 12, 1871, Tutura Mission, near Butterworth, South African Republic), Xhosa journalist, minister, translator, composer of hymns, and collector of black South African fables, legends, proverbs, history, praises, and customs; his translation of John Bunyan's *Pilgrim's Progress* (*U-Hambo lom-Hambi,* 1866) had almost as great an influence upon the Xhosa language as the Authorized Version of the Bible had upon the English.

He was a part of the first truly literate generation of Xhosa speakers and the first African minister ordained in Great Britain (Glasgow, 1856). During the 1860s Soga was a contributor to *Indaba* ("The News"), published in Lovedale, S.Af. He addressed himself primarily to a Christian audience on such topics as "Amakholwa nama-Qaba" ("The Believers and the Pagans"), "U-Tywala" ("Beer"), and "Amakristu Neenkosi" ("The Christians and the Chiefs"), reflecting social changes of the time and the widening gulf between pagan and convert.

The many hymns Soga composed were very popular in the 19th century and are still sung in South African churches today. His literary influence upon the subsequent generation of Xhosa writers was notable.

Soga Chokuan (d. 1614, Sakai?, Japan), Japanese painter who specialized in bird-and-



"Flowers and Birds," painting by Soga Chokuan, colour on paper mounted on an eight-panel *byōbu* screen, late 16th century; in the ōbai-in, Kyōto
By courtesy of the Obai-in, Kyoto

flower pictures and founded the Soga family of artists. He is especially noted as a painter of fowl (as his son Chokuan II was noted as a painter of falcons). His brightly coloured, realistic bird-and-flower screen paintings are in the Hōki-in on Mt. Kōya, the Daitoku-ji in Kyōto, and the Tokyo National Museum. A rather conventional artist, he also did Chinese-style, or *suiboku* ("water-ink"), paintings executed rapidly with a stiff brush on screens, such as "The Three Laughers" (Henjōkō-in, Mt. Kōya).

Soga Emishi (d. July 11, 645, Yamato, Japan), a leader of the great Soga family of Japan, whose assumption of Imperial prerogatives provoked a coup-d'état that destroyed the power of the Soga house.

Under Emishi's father, Soga Umako, the Soga family had begun to dominate the Imperial court. Umako had been content to remain unobtrusive in exercising power, but Emishi built a giant tomb for himself, gave a purple crown to his son Iruka, and assumed many of the privileges formerly reserved for the emperor. In 643 Iruka murdered Prince Yamashiro Ōe, the heir apparent to the throne, and it became obvious that he intended to usurp the Imperial office. Two years later he was assassinated by the Imperial prince Nakano Ōe (later the emperor Tenji) and Nakatomi Kamatari, head of the Nakatomi family.

Emishi then gathered his followers in an attempt to destroy his rivals, but dissident members of the Soga family joined the conspiracy, and Emishi's forces were soon dispersed. Emishi committed suicide in his house after first setting it on fire. Many valuable papers were destroyed, including the only copies of the first history of Japan.

Soga Iruka (d. July 10, 645, Yamato, Japan), a leader of the powerful Soga family of Japan, whose murder resulted in the return of governmental power to the emperor and the promulgation of a series of far-reaching reforms.

In 587, after defeating the rival Mononobe clan, the Soga family completely dominated the Imperial court. Soga Umako, Iruka's grandfather, was content to remain in the background while wielding power, but when Soga Emishi, Iruka's father, became head of the family in 626, he assumed many Imperial prerogatives. To his son Iruka he gave a purple crown and had him named an Imperial minister. Extremely high-handed, Iruka flouted the interests not only of other clans but also those of junior branches of his own family as well. In 643 he assassinated Prince Yamashiro Ōe, one of the most popular figures in the court and the heir apparent to the throne.

When it became obvious that Iruka intended to succeed to the throne, the Imperial prince Nakano Ōe, in conjunction with Nakatomi Kamatari, the head of the powerful Nakatomi family, murdered Iruka while he was receiving a Korean embassy at court, the only place in which he was not surrounded by his large personal bodyguard. Dissident members of the Soga family joined in the plot, and Iruka's followers were quickly dispersed. Prince Nakano Ōe later became the emperor Tenji, who instituted the famous Taika reforms, which greatly strengthened the Imperial office.

Soga Shōhaku, original name SOGA KŌYŪ (b. 1730, Ise Province, Japan—d. Jan. 30, 1781, Kyōto), Japanese painter of the mid-Edo period (1603–1867) who tried to revive the brush-style drawing of the great masters of the Muromachi period (1338–1573).

As a young man he studied painting under the guidance of Takada Keiho of the Kanō school (school of painting based on Chinese subject matter and techniques) in Kyōto, but his disillusionment in contemporary art led him to look into the past. He came particularly to appreciate the works of the Muromachi painter Soga Jasoku and called himself Jasoku *ken*, or Jasoku *jussei* ("the tenth"). He excelled in ink monochrome portraits, which he made with powerful brushwork using broad strokes. The two-scroll painting "Kanzan Jittoku zu" ("Kanzan and Jittoku"—two Chinese monks of the T'ang dynasty), is a good example. He also drew pictures of weird and demoniac quality, and, being of a haughty disposition and eccentric, was regarded by many as either a madman or an anachronism. He had no successors to carry on his style.

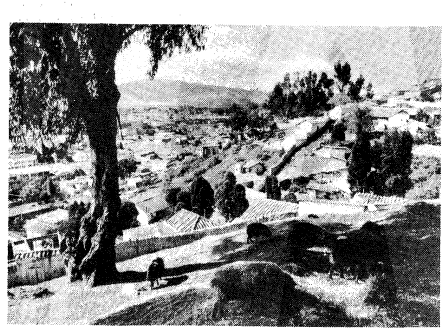
Soga Umako (d. June 19, 626, Yamato, Japan), a leader of the Soga family of Japan, who was responsible for the destruction of the powerful Mononobe and Nakatomi clans and the ascendancy of the Soga to a position of supreme power. Umako was instrumental in introducing Buddhism into Japan. His influence helped spur the introduction of Chinese cultural, bureaucratic, and administrative methods.

In the 6th and 7th centuries, the introduction of Buddhism into Japan was opposed by the dominant Mononobe and Nakatomi clans. The religion was supported by the Soga clan, who believed that a new religious system would break the power of the great clans and return authority to the Imperial family, with whom the Soga house was interrelated. This struggle had been going on for almost 50 years when Umako, in 570, succeeded to the position of great minister and head of the Soga family.

Umako obtained the Emperor's permission to build a small chapel where he could place a Buddhist icon and conduct private Buddhist services. But an epidemic occurred at this time, and the image of Buddha in Umako's temple was blamed as the cause of the disease. A religious war erupted. Meanwhile, the Emperor died, and the Mononobe clan attempted to put a prince of their choice on the throne, while Umako manoeuvred to have an Imperial prince whose mother was a Soga named as ruler. The civil and religious strife became one, and in a decisive battle in 587 the Soga family annihilated the Mononobe clan. The naming of the emperor Sushun, Umako's choice for the throne, marked the beginning of the rise of Buddhism in Japan.

But Umako soon fell out with the Emperor, whom he then had murdered and replaced with Umako's own niece, the empress Suiko, widow of a former emperor. The accession of a ruling empress to the throne was a great break with tradition. As regent to the empress Suiko, Umako selected another of his nephews, the crown prince Shōtoku, of half Soga blood and married to a Soga. With Umako's approval, Shōtoku introduced Chinese monks, scholars, artists, and craftsmen into Japan and restructured the government along Chinese bureaucratic lines, giving Japan a well-defined central administrative system and a rich cultural legacy.

Sogamoso, city, Boyacá department, east central Colombia, on the Río Chicamocha in the Andean Cordillera (mountains) Oriental, at an elevation of 8,428 ft (2,569 m) above sea level. Once a sacred city of the pre-Columbian Chibcha Indians, Sogamoso is a commercial and manufacturing centre for the surrounding agricultural and pastoral lands. Flour and textile milling and the manufacture of shoes are the chief industries. There is a substantial amount of coal mining in the vicinity. Sogamoso is near the Pan-American Highway and on a railroad linking Bogotá and Paz de Río, site of Colombia's first integrated iron and steel plant. Pop. (1973) 50,536.



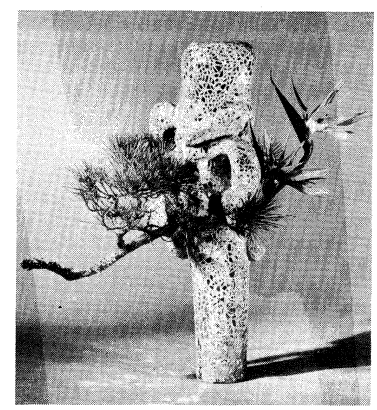
Sogamoso, Colom.
Carl Frank

Sogdian art, rich body of pre-Muslim Central Asian visual arts (created between roughly the 5th and 9th centuries), represented most notably by finds at Pendzhikent and Varakhsha, town principalities in Sogdiana. Many cultural streams united there: the remains of Sāsānian culture, of post-Gupta India, and of China of the Sui and T'ang periods. Wall painting and carved wood were favoured types of decoration for dwellings. While the paintings seem to draw heavily on Iranian tradition in the use of flat expanses of bright colour, hieratic poses, and simplified compositions, the remains of wood sculptures of swaying figures in flowing drapery are more suggestive of Indian sources.

The wall paintings, aside from their beauty and vigour, tell much of the life of these urban dwellers. They carefully reproduce details of costume, harness, gaming equipment, and so on; and their depictions of favourite stories and epic themes—drawing on Iranian (Zoroastrian), Near Eastern (Manichaean, Nestorian), and Indian (Hindu, Buddhist) sources for themes—testify to the varied cultural background of the period. This art, which helped to preserve much of the traditions and knowledge of Sāsānian Persia, died in the 10th century by the sword of Islām. *See also* Sogdiana.

Sogdiana, ancient country of Central Asia centring on the fertile valley of the Zeravshan, in the modern Uzbek Soviet Socialist Republic. Excavations have shown that Sogdiana was probably settled between 1000 and 500 BC and that it then passed under Achaemenian rule. It was later attacked by Alexander the Great and may have been included in the Bactrian Greek kingdom until the invasions of Śaka and Yüeh-chih peoples in the 2nd century BC. Sogdiana remained a prosperous centre until the Mongol invasions. Under the Sāmānid dynasty (9th–10th century AD) it was an eastern focal point of Islāmic civilization.

Sōgetsu, 20th-century Japanese school of floral art that introduced the *zen'ei* ("avant-garde") *ikebana* style in which freedom of expression is preeminent. Founded by Teshigahara Sōfū in 1927, the school rose to promi-

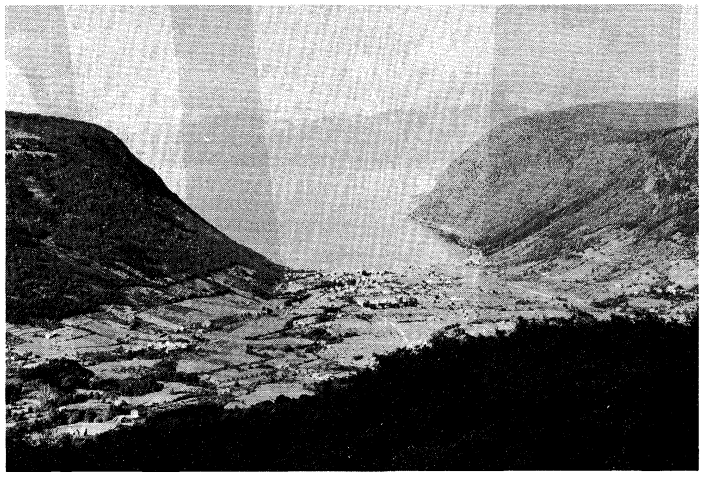


Sōgetsu school *zen'ei ikebana* arrangement using pine and bird of paradise
By courtesy of the International Society for Educational Information, Tokyo

nence after World War II. It appeals to contemporary tastes by largely disregarding the classic formal rules; containers of any shape and material are used, and man-made materials are incorporated into the arrangements together with the flowers or plants.

Sōgi (Japanese poet): *see* Iio Sōgi.

Sogn Fjord, fjord, Sogn og Fjordane *fylke* (county), western Norway. It is the longest and deepest fjord in Norway, and its mouth is located 45 miles (72 km) north of Bergen.



The town of Vik on the southern shore of Sogn Fjord, Norway
A.F. Kersting

Its length, from Solund on the offshore island of Sula in the North Sea to Skjolden, at the head of its longest branch, Lustra Fjord, is 127 miles (204 km). The fjord's maximum depth is 4,291 feet (1,308 m), and its main axis is east–west. Its narrow, deep tributary channels extend almost to the Jotunheim Mountains on the east and to the Jostedals Glacier on the north. On the south, Aurlands Fjord extends almost to Halling Mountain. Sogn Fjord and its branches include some of the most picturesque scenery in Norway and form an important tourist area. There is some farming at the fjord heads, where alluvial-soil deposits have built up. There are numerous waterfalls along the fjord, many of which have been harnessed to provide electrical power for industries; the large aluminum-processing plant at Årdal is particularly important.

Sogn og Fjordane, *fylke* (county), western Norway, bordering the North Sea. Its inland extension includes the Jostedals Glacier and part of the Jotunheim Mountains. Its total area is 7,195 square miles (18,634 square km). In the northern part of the *fylke* is Nord Fjord, which penetrates 55 miles (90 km) inland, and in the south is Norway's longest fjord, Sogn Fjord (*q.v.*). Centrally located on the northern bank of Sogn Fjord is the village of Hermansverk (*q.v.*), administrative centre of the *fylke*. There are many small offshore islands where fishing is the principal occupation. Along the fjord banks, especially in the interior, agriculture (grains and fruits) is important. Because of its rugged and picturesque scenery, Sogn og Fjordane has become one of Norway's chief tourist areas. Hydroelectric power has enabled industry to develop; aluminum production, centred at Årdal, is significant. Nearby, in the Jotunheim Mountains, is Vettisfossen, Norway's second highest waterfall, with a vertical drop of 902 feet (275 m). Pop. (1989 est.) 106,408.

Sohāg (Egypt): *see* Sawhāj.

Sŏhak (Korean: "Western Learning"), in Korean history, the study of Western culture, introduced into Korea from the Chinese Ming and Ch'ing dynasties in the 17th and 18th centuries. In a broad sense, the term Sŏhak refers to the study of Western thought, religion, ethics, science, and technology. In a narrow sense, it sometimes refers only to the study of Western religion and ethics during this period. In the latter case the term is also used to refer to Roman Catholicism, or Ch'ŏnhak ("Heavenly Learning"), which was introduced to Korea in the same era.

Many of the scholars interested in Sŏhak were those identified with the Silhak (*q.v.*) school, a branch of Confucianism dedicated to a realistic empirical approach to problems of statecraft. Although interest in Western religion and technology continued to grow, the Sŏhak school met with severe government repression in the late 18th and 19th centuries.

Sohlman, (Per) August (Ferdinand) (b. May 24, 1824, Närke, Swed.—d. July 5, 1874, Stockholm), journalist and publicist who was a leading figure in the mid-19th-century Pan-Scandinavian movement and a champion of the cultural and linguistic integrity of the Swedish minority in Russian-ruled Finland.

As a journalist, Sohlman wrote for many of the leading newspapers of Sweden and was editor of the influential Stockholm daily *Aftonbladet* from 1857 until the year of his death. He supported the Pan-Scandinavian movement that arose in the 1840s with the struggle between the Danish and the German nationalists in the duchies of Schleswig and Holstein, and he did so not only in his writings but also as a Swedish volunteer in the Schleswig War (1848–50) against the German separatists. The movement gained in intensity, especially among the Swedes, during the Crimean War (1854–56), when it seemed likely that Russia might be forced to return Finland to Sweden as part of an international settlement. Sohlman countered a growing Finnish nationalist movement in favour of a Finnish language and literature by stressing the cultural and racial superiority of the Swedes and their language. He argued that it was not in the interests of Finland as a whole for the Swedish-speaking leaders of the Finnish nationalist movement to foster the development of Finnish over Swedish or to favour the maintenance of the Russian affiliation. His arguments inspired many of the Swede–Finn nationalist ideologists of later decades.

Soho, neighbourhood in the City of Westminster, Greater London, bounded by Oxford Street (north), Charing Cross Road (east), Coventry Street (south), and Regent Street (west), and Piccadilly Circus. The name of Soho derives from an old hunting cry. The community's development stems from the activities of the 17th-century speculator Gregory King. Many immigrants settled in Soho; there are still French and Italian restaurants and continental food shops, and Gerrard Street is a Chinese section. Famous residents of Soho have included William Blake, William Hazlitt, and Karl Marx. Wardour Street is a centre for film companies, while Carnaby Street typifies "Swinging London" for tourists. Soho is still one of London's prostitution districts; and street markets, advertising agencies, clothing firms, and music publishing houses are interspersed among less-salubrious activities in this animated quarter.

Sohr, Martin: *see* Agricola, Martin.

Sōhyō, in full NIHON RŌDŌ KUMIAI SŌ HYŌGIKAI, English GENERAL COUNCIL OF TRADE UNIONS, trade-union federation that was the largest in Japan. Sōhyō was founded in 1950 as a democratic trade-union movement in opposition to the communist leadership of its predecessor organization. It rapidly became the most powerful labour organization in postwar Japan and formed close ties with the Japan Socialist Party. The major affiliates of Sōhyō included unions of government workers, teachers, national railway workers, communications workers, and metal-industry workers. Under Japanese labour law, workers employed in local or national government did not have formal bargaining power or the right to strike; workers employed in public corporations had bargaining rights but not the right to strike. Because the majority of Sōhyō membership was made up of such workers, the union often used political action in place of economic action. Sōhyō leaders also justified their reliance on political activity by the fact that the dominant enterprise unionism (a separate union for each enterprise) tended to isolate workers from one another and prevent solution of broad labour problems. Sōhyō's best-known political tactic, begun in 1955, was the annual spring struggle, an intensive campaign of street demonstrations, mass meetings, and other pressure tactics.

In 1989 Sōhyō dissolved itself, and the bulk of its membership was absorbed in the recently formed Shin Rengo, or Japanese Trade Union Confederation, a move that effectively unified the noncommunist segments of organized labour in Japan.

Soignies (French), Flemish ZINNIK, town (*commune*), Hainaut province, south-central Belgium. It lies along the Senne River, just northeast of Mons. There was a Roman castrum (fortress) at the site, and the town was said to have been founded in the 7th century by St. Vincent, who built a monastery there. A procession during Pentecost honours St. Vincent. The former conventual church (10th–13th century), one of Belgium's best-preserved Romanesque buildings, dominates the town; vestiges of the cloister (959) and Renaissance era choir stalls are noteworthy. The Old Cemetery serves as a public park and contains a Romanesque chapel, which now houses an archaeological and lapidary museum. Carboniferous limestone quarries are worked nearby, and there is a hollow-glass plant. Pop. (1983 est.) mun., 23,419.

soil, earthen material that covers land surfaces and is formed by the action of natural physical, chemical, and biotic forces on the unconsolidated residue (regolith) of rocks and minerals on the Earth's surface. Among its many important functions, soil serves as a substratum of plant and, thus, further up the food chain, of animal life.

A brief treatment of soil follows. For full treatment, *see* MACROPAEDIA: Soils.

The processes of soil formation create a soil profile that is composed of one to four biologically and chemically distinct master horizons (horizontal layers), conventionally designated from the surface down as A, B, and C and the

unconsolidated rock R, of variable depths. A horizons are the most weathered and leached and generally contain the most organic matter and plant nutrients; B horizons are moderately weathered and accumulate the products removed from A horizons; C horizons contain parent material from which the above horizons are formed; and R layers, not part of the soil proper, exhibit properties much different from the overlying C horizons.

The most fundamental process of soil formation and differentiation is weathering, which is the physical disintegration and chemical decomposition of rocks, minerals, and immature soils. Rates of weathering vary, depending on the material. Volcanic ash, for example, can support vegetation after only a few decades of weathering.

The most important constituent of soil, crystalline clay, is formed by weathering of feldspars and other silicates and leaching (draining away by percolation of water through the soil) of bases and some silica. The two basic kinds of clays formed are known as 1:1 clays (composed of a tetrahedral [silica] and an octahedral [alumina] layer), which result from rapid leaching, and 2:1 clays (composed of one octahedral layer between two tetrahedral layers), which are formed by gradual leaching.

The transformation of organic matter, the second most important soil constituent, into humus (chemically stable, finely divided organic matter), called humification, is a rapid process: organic matter can be doubled or reduced by half in 5 to 50 years.

Leaching has important effects on the soil profile. When there is no drainage it produces a soil profile stratified according to solubility of the dissolved substances, and when there is drainage it removes some substances from the soil profile. Dispersion mechanisms that affect soil formation include eluviation (transport of material out of a portion of the soil profile) and illuviation (transport of material into a portion of the soil profile), flooding, and podsolization (transport of alumina and iron with or without organic matter, resulting in the concentration of silica in the layer eluviated).

Environmental factors influence soil formation in a variety of ways. Climatic factors such as leaching rainfall (rainfall minus potential evaporation), which determines leaching intensity, and temperature, which influences the solubility of some substances, affect the kind of clay that is formed. Leaching is impossible without drainage, and topography influences drainage, erosion, and flooding. Vegetational characteristics largely determine the distribution and kind of humus formed, soil organisms contribute to the decay of organic matter, and parent material determines the ultimate nature of soil. Time is also an important factor; as rocks age, their profiles become more differentiated and their soil properties change. These factors are interdependent, and very different soils may be formed from the same parent material.

The question of soil classification is controversial since pedologists, engineers, agriculturalists, geologists, and others all have named and classified different kinds of soil, each group according to its own special knowledge and interests. Classification systems also must be manifold, recognizing that a soil may belong to more than one identifiable group. The 7th American Approximation System, introduced in 1960, is based on measurable soil properties (texture, chemical characteristics, colour, etc.) rather than on theories of soil formation. Soil groups are named by the aggregation of formative elements that denote special characteristics (horizons, source of parent material [river, lake, etc.], climatic regime). The system therefore provides precise definition of soil properties of groups and employs manifold classification.

Because environmental factors affect soil formation, major soil regions in which the distribution of soils follow a definite pattern can be identified. Principal regions include: polar; podsolic, distinguished by evergreen forest; brunsolic, characterized by deciduous forest and including the regions of western Europe, the eastern United States, Washington state, and the adjacent Canadian coast; chernozemic (black earth), characterized by grassland vegetation and including the regions of the Danube Basin and the southern Soviet Union, the Great Plains of the United States and the prairies of Canada, and the Pampas region of Argentina; cinnamonic, often found in areas having Mediterranean climates; desert; kaolinitic, marked by tropical climates; and montane. Transition from one region to another is gradual, and intermediate regions also can be identified.

Articles are alphabetized word by word, not letter by letter

soil chemistry, discipline embracing all chemical and mineralogical compounds and reactions occurring in soils and soil-forming processes. The goals of soil chemistry are: (1) to establish, through chemical analysis, compositional limits of natural soil types and optimal growth conditions for the various plant communities; (2) to derive principles governing development of soil profiles; and (3) to apply analytical and theoretical knowledge to the improvement of agricultural production. *See also* pedology.

soil mechanics, the study of the physical properties and utilization of soils, especially used in planning foundations for structures and subgrades for highways.

A brief treatment of soil mechanics follows. For full treatment, *see* MACROPAEDIA: Building Construction.

The first scientific study of soil mechanics was undertaken by French physicist Charles-Augustin de Coulomb, who published a theory of earth pressure in 1773. Coulomb's work and a theory of earth masses published by Scottish engineer William Rankine in 1857 are still primary tools used to quantify earth stresses. These theories have been amended in the 20th century to take into account the influence of cohesion, a more recently discovered property of soils that causes them to behave somewhat differently under stress than Rankine and Coulomb predicted.

Soil is a natural aggregate of mineral particles, sometimes including organic constituents; it has solid, liquid, and gaseous phases. How the soil of a given site will support the stresses put upon it by the weight of structures, or how it will respond to movement in the course of construction, depends upon six properties—internal friction (the resistance of a soil mass to sliding, inversely related to the amount of moisture in the soil and thus greater in sands and gravel than clays) and cohesion (molecular attraction between soil particles, much higher in clays than sands or silt), both of which lessen the tendency of soils to shear, or slide along planes; compressibility (the degree to which soil may be made denser by various means including tamping and vibration, and thus able to support greater loads); elasticity (the ability of soil to reexpand after being compressed); permeability (the degree to which a soil will conduct a flow of water); and capillarity (the degree to which water is drawn upward from the normal water table).

The thoroughness of soil surveys at a given site depends on the size of the project to be carried out. Visual examination of the surface may suffice in some cases. Soil characteristics generally vary more rapidly vertically (with depth) than horizontally. Subsurface examination techniques include trench-digging, boring (to test resistance as well as to obtain samples), and pumping subsurface matter to the surface with water. Seismic testing (measuring the speed with which shock waves generated by explosives are transmitted through the ground) and measurement of the electrical resistance of the soil also yield information helpful in the evaluation of soil. Grain size and plastic properties of samples taken from the site are measured in a laboratory. Occasionally data obtained from previous studies of soils near the site are useful.

Foundations are designed to convey the weight of a structure to the ground underneath and around it. Stress distribution that is not properly matched to the characteristics of the soil may result in structural failure through shearing of the soil or uneven settling. Spread foundations may be either of the spread footing (made with wide bases placed directly beneath the load-bearing beams or walls), mat (consisting of slabs, usually of reinforced concrete, which underlie the entire area of a building), or floating types. A floating foundation consists of boxlike rigid structures set at such a depth below ground that the weight of the soil removed to place it equals the weight of the building; thus, once the building is completed, the soil under it will bear the same weight it bore before excavation was begun. Deep foundations may be end-bearing piles (which convey all the weight put on them end-to-end, from the building above to the bedrock on which they are set), friction piles (which transfer some of the pressure put on them to the soil around them, through friction or adhesion along the surface where pile sides interface with soil), or caissons (extra-large piles cast in place in an excavation, rather than prefabricated and sunk).

Slopes stay in place because the downward pull of gravity is countered by forces of cohesion and friction between particles. Various changes may upset the balance between these forces, precipitating a slide; in particular, an increase in the amount of water borne in the soil of a slope may drastically reduce cohesion and friction. The stability of slopes is graded such that 1.0 indicates forces exactly balanced, 2.0 signifies that the forces of stability are twice as great as those tending toward movement, etc. A slope with a reading of less than 1.0 is collapsing. The banks of dams, highway cuts, and railway cuts are designed to certain standards of stability as measured by this scale. Stability may be increased by draining, gradient levelling, compacting, or reinforcing the slope with injections of cement. In dam construction an impermeable core is used to prevent excess seepage of water from lowering stability, while the slopes consist of permeable material that buffers the weight of water along the dam.

Soil mechanics, by examination of the subgrade of roads and highways, helps to determine which type of pavement (rigid or flexible) will last longer. The study of soil characteristics is also used to decide the most suitable method for excavating underground tunnels.

soil organism, any organism inhabiting the soil during part or all of its life. Soil organisms, which range in size from microscopic cells that digest decaying organic material to small mammals that live primarily on other soil organisms, play an important role in maintaining fertility, structure, drainage, and aeration of soil. They also break down plant and animal tissues, releasing stored nutrients and converting them into forms usable by plants.

A brief treatment of soil organisms follows. For full treatment, *see* MACROPAEDIA: Soil Organisms.

Since most of the functions of soil organisms

are beneficial, earth with large numbers of organisms in it tends to be fertile; one square metre of rich soil can harbour as many as 1,000,000,000 organisms.

Soil organisms are commonly divided into five arbitrary groups according to size, beginning with the protists, which include bacteria, actinomycetes, and algae. Next are the microfauna, which are less than 100 microns in length and generally feed upon other microorganisms. The microfauna include single-celled protozoans, some smaller flatworms, nematodes, rotifers, and tardigrades. The mesofauna are somewhat larger and quite heterogeneous, including creatures that feed on microorganisms, decaying matter, and living plants. They include nematodes, mites, springtails (wingless insects so called for the springing organ which enables them to leap), the insectlike proturans, which feed on fungi, and the pauropods, which feed on decaying plant material.

The fourth group, the macrofauna, are also quite diverse. The most common example is the potworm, a white, segmented worm that feeds on fungi, bacteria, and decaying plant material. The group also includes slugs, snails, and millipedes, which feed on plants, and centipedes, beetles and their larvae, and the larvae of flies, which feed on other organisms or on decaying matter.

Finally, there is the megafauna, made up of the largest soil organisms and including the largest earthworms, perhaps the most important creatures that live in the topsoil. Earthworms pass both soil and organic matter through their guts, in the process aerating the soil, breaking up the litter of organic material on its surface, and moving material vertically from the surface to the subsoil. This is extremely important to soil fertility, and it develops the structure of the soil as a matrix for plants and other organisms. It has been estimated that earthworms completely turn over the equivalent of all the soil on the planet to a depth one inch (2.5 centimetres) every 10 years.

The megafauna also includes all sorts of burrowing animals, such as snakes, lizards, gophers, badgers, rabbits, hares, mice, and moles.

One of the most important roles of soil organisms is breaking up the complex substances in decaying plants and animals so that they can be used again by living plants. This involves soil organisms as catalysts in a number of natural cycles, among the most prominent being the carbon, nitrogen, and sulfur cycles.

The carbon cycle begins in plants, which combine carbon dioxide from the atmosphere with water to make plant tissues such as leaves, stems, and fruits. Animals eat the plants and convert the tissues into animal tissues. The cycle is completed when the animals die and their decaying tissues are eaten by soil organisms, a process that releases carbon dioxide.

Proteins are the basic stuff of organic tissues, and nitrogen is an essential element of all proteins. The availability of nitrogen in forms that plants can use is a basic determinant of the fertility of soils; the role of soil organisms in facilitating the nitrogen cycle is therefore of great importance. When a plant or animal dies, soil organisms break up the complex proteins, polypeptides, and nucleic acids in their bodies and produce ammonium, ions, nitrates, and nitrites that plants then use to build their body tissues.

Both bacteria and blue-green algae can fix nitrogen directly from the atmosphere, but this is less vital to plant development than the symbiotic relationship between the bacteria *Rhizobium* and leguminous plants and certain trees and shrubs. In return for secretions from their host that encourage their growth and multiplication, *Rhizobia* fix nitrogen in nodules of the host plant's roots, providing nitrogen in a form usable by the plant.

Soil organisms also participate in the sulfur cycle, mostly by breaking up the naturally abundant sulfur compounds in the soil so that this vital element is available to plants. The smell of rotten eggs so common in swamps and marshes is due to the hydrogen sulfide produced by these microorganisms.

Though soil organisms have become less important in agriculture due to the development of synthetic fertilizers, they play a vital role in woodlands, especially in the creation of humus, a finely separated complex of organic materials composed of decaying leaves and other vegetable matter.

When a leaf falls it cannot be eaten by most animals. After the water-soluble components of the leaf are leached out, fungi and other microflora attack its structure, making it soft and pliable. Now the litter is palatable to a wide variety of invertebrates, which fragment it into a mulch. The multipedes, wood lice, fly larvae, springtails, and earthworms leave the litter relatively unchanged organically, but they create a suitable substrate for the growth of the primary decomposers that break it into simpler chemical compounds. There is also a group called secondary decomposers (some creatures, such as the springtails, are in both groups), which break it down even further.

So the organic matter of leaves is constantly being digested and redigested by waves of increasingly smaller organisms. Eventually the humic substance that remains may be as little as one-fourth of the original organic matter of the litter. Gradually this humus is mixed into the soil by burrowing animals (such as moles, rabbits, etc.) and by the action of the earthworms.

Though some soil organisms can become pests—especially when a single crop is grown repeatedly in the same field, encouraging the proliferation of organisms that prey on their roots—by and large they are essential elements in the process of life, death, and decay, which rejuvenates the environment.

soilless culture: *see* hydroponics.

Soissons, city, Aisne *département*, Picardie region, northern France. The city is situated along the Aisne River in a rich agricultural valley surrounded by wooded hills. Although the city was severely damaged during World War I, and to a lesser extent in World War II, most of the old buildings for which it is famous have been restored.

Soissons derives its name from the Suessiones, a Gaulish tribe that made the town its capital in the 3rd century. A garrison town under the Romans, it was evangelized and became a bishopric in the 3rd century. Clovis, the Frankish king, seized the town in AD 486; and it became the capital of his descendants, the kings of Neustria (the west part of the Frankish kingdom). The last king of the Merovingian dynasty, Childeric III, was deposed there in 752; and Pepin the Short, his successor, was crowned in Saint-Médard abbey. Battles fought around Soissons in the 10th century led ultimately to the accession of Hugh Capet to the French crown (987). Under the Capetian dynasty (ruled 987–1328), the town was held by the hereditary counts of Soissons. It suffered in the Hundred Years' War (1337–1453) and also in the Wars of Religion in the later 16th century. During most of World War I it was just behind the Franco-British lines and was heavily bombarded before being captured by the Germans in May 1918. It was recaptured in August of the same year.

The facade of the 12th–13th-century Gothic cathedral of Saint-Gervais-et-Saint-Protais was modified in the 18th century; but the choir has fine 13th- and 14th-century stained-glass windows. The abbey of Saint-Jean-des-Vignes (founded 11th century) was one of the richest in medieval France. The great abbatial church was largely destroyed under Napoleon I, but the magnificent facade (13th–16th century) was spared. Its two unequal towers, surmounted by stone spires (the higher is more than 230 ft [70 m]), can be seen from afar, dominating the city. Other parts of the abbey still standing include remains of two cloisters and a 13th-century refectory. The remaining buildings of Saint-Léger abbey and its 13th-century church house a museum with collections of paintings and sculpture. The buildings include vestiges from Saint-Médard (founded *c.* 560), one of the most important medieval French abbeys; only a 9th-century crypt remains.

Soissons is a market town for produce from the surrounding area. Its industries include iron and copper foundries and plants manufacturing mechanical equipment, glass, and rubber goods. Pop. (1982) 29,871.

Soissons, Charles de Bourbon, comte de (count of), byname MONSIEUR LE COMTE (b. 1566, Nogent-le-Rotrou, Fr.—d. Nov. 1, 1612, Blandy-en-Brie), major figure in France's Wars of Religion and in the ultimate succession of Henry IV of Bourbon.

Louis I de Bourbon, the first prince de Condé, had acquired the countship of Soissons in 1557, and upon his death in 1569 it passed to his youngest son, Charles. This count fought for Henry of Bourbon (the future Henry IV) against Henry III of France at Coutras (1587), for Henry III against the Holy League (led by the House of Guise) in Brittany (1589), and finally for Henry IV against the League in Normandy (1590–92) and against Savoy (1600). His desire to marry Henry IV's sister Catherine was frustrated. Governor of Dauphiné from 1601, he protested when, on Henry IV's death in 1610, the Queen Mother, Marie de Médicis, was named regent; but he was appeased with the governorship of Normandy. He died two and a half years later.

Soissons, Louis de Bourbon, comte de (count of), byname MONSIEUR LE COMTE (b. 1604, Paris—d. July 6, 1641, La Marfée, near Sedan), courtier and soldier in the intrigues between Marie de Médicis, Louis XIII, and Cardinal de Richelieu.

The only son of Charles de Bourbon, he inherited his father's Soissons title in 1612. After taking the side of Marie de Médicis, the Queen Mother, in 1620, he served Louis XIII against the Huguenots in 1622. Later involved in intrigues against Cardinal de Richelieu, he is alleged to have plotted to assassinate him at Amiens in 1636, after a campaign against the Spanish Habsburgs in Picardy.

In 1637 he fled to Sedan, a principality just across France's eastern frontier; other malcontents joined him; and in 1641 he published a manifesto against Richelieu and invaded France with a Habsburg army. He defeated the Marshal de Chatillon (Gaspard III de Coligny) at La Marfée on July 6, 1641, but was killed by a mysterious shot at the moment of his victory.

He had only one child, a bastard son, Louis-Henry, known as the Chevalier de Soissons (1646–1703). The count's surviving sister, Marie, had married Thomas of Savoy, prince of Carignano, in 1625; and thus their youngest son, Eugène-Maurice de Savoie-Carignan (1633–73), assumed the title comte de Soissons.

soja bean: *see* soybean.

Sōka, city, Saitama *ken* (prefecture), Honshu, Japan, on the Ayase-gawa (Ayase River), north of Tokyo. During the Tokugawa era (1603–1867) it was a post station, producing leather and dyes. The Tōbu Line (railway) arrived in 1899. Because of its proximity to Tokyo and available water and land, the city developed

as an extension of the Keihin Industrial Zone after World War II. Major products are pulp, leather, metal, and machinery. Pop. (1987 est.) 197,139.

Sōka-gakkai (Japanese: "Value Creation Society"), a lay religious group associated with the Japanese Buddhist sect Nichiren-shō-shū. Sōka-gakkai has had rapid growth since the 1950s and is the most successful of the new religious movements that have sprung up in the 20th century in Japan; but in following the teachings of the saint Nichiren, it belongs to a tradition dating from the 13th century.

The Sōka-gakkai follows an intensive policy of conversion (*shakubuku,* literally, "break and subdue"), which increased its membership within a seven-year period (1951–57) from 3,000 to 765,000 families. In the late 20th century the group claimed a membership of more than 6,000,000. Groups paralleling Sōka-gakkai have been started in other countries, including the United States, where the equivalent organization is called Nichiren-shō-shū of America.

Sōka-gakkai conducts educational and cultural activities and publishes extensively. In 1964 it established its own political party, Kōmeitō (Clean Government Party), which by the 1980s had become the third largest political party in Japan.

The association was founded in 1930 by Makiguchi Tsunesaburō, a former elementary school principal, under the name Sōka-kyōiku-gakkai ("Value Creation Educational Society"). Makiguchi stressed the pragmatic benefit of religion and set as his goal three values: *bi* ("beauty"), *ri* ("gain"), and *zen* ("goodness"). The society suffered from the government's repressive policies toward religious sects during World War II and for a time was disbanded. Makiguchi died in detention during this period. His chief disciple, Toda Jōsei, revived the organization in 1946, renaming it Sōka-gakkai.

In common with other Nichiren movements (*see* Nichiren Buddhism), Sōka-gakkai places great emphasis on the benefits effected by the chanting of the phrase *Namu Myoho Renge-kyō* ("Salutation to the *Lotus Sūtra*"), an invocation of its chief scripture, the *Lotus Sūtra.*

Sōkan: *see* Sōchō.

Sokch'o, city, Kangwŏn *do* (province), northeastern South Korea, on the Sea of Japan (East Sea). Ch'ŏngch'o Lagoon is in the southern part of the city. The coastal waters provide good fishing grounds for cuttlefish, pollack, and mackerel. Linked with Seoul (100 mi [160 km] to the southwest) by air and road, the city became a mineral transfer port in 1937. Since the Korean War armistice (1953), it has been a part of South Korea. Pop. (1985 prelim.) 69,595.

Sokile (people): *see* Nyakyusa.

Sokodé, town, central Togo, western Africa. A historically important trading centre, because of its location in a gap of the Togo Mountains, it is Togo's second largest town and a major centre for commercial trade among the country's northern regions. Industrial activities there include cotton ginning and sugar processing. Sokodé has road links with Kara to the north, and Lomé, the national capital, to the south. The Tem (Cotocoli) people inhabit the town and surrounding area. Pop. (1981) 48,098.

Sokol, river port, centre of Sokol *rayon* (sector), Vologda *oblast* (province), northwestern Russian Soviet Federated Socialist Republic, on the Sukhona River. Before the October Revolution (1917) it was the site of only two small factories, but it grew rapidly in the early Soviet period and was incorporated in 1932. Today it is a centre of paper, woodworking, and food industries and has a preschool-teacher-training college. Pop. (1970) 48,000.

Sokol (Czech: "Hawk," or "Falcon"), gymnastic society, originating in Prague in 1862 to develop strength, litheness, alertness, and courage. Originally patterned after the German turnvereins, the Sokol traditionally emphasized mass calisthenics as a means of promoting communal spirit and physical fitness. Offshoots of the original society formed by emigrés—such as the American Sokol (founded 1865), later known as the American Sokol Educational and Physical Culture Organization (Czech), and Sokol U.S.A. (Slovak)—combine gymnastics and physical education with social, educational, and communal activities.

Sokollu, Mehmed Paşa (b. 1505, Sokol, Bosnia [now in Yugoslavia]—d. Oct. 11/12, 1579, Constantinople [now Istanbul]), Ottoman grand vizier (chief minister) from June 1565, under the sultans Süleyman the Magnificent and Selim II, and perhaps the real ruler of the empire until the death of Selim in 1574. During his tenure, a war with Venice occurred (1570–73), in which the Ottoman navy was defeated in the famous Battle of Lepanto (Oct. 7, 1571), but ultimately the empire secured its war aim—the acquisition of Cyprus from the Venetians.

Recruited into Ottoman service through the child-tribute (*devşirme*) levied in the Balkans, Mehmed Paşa rose to the rank of high admiral of the fleet (1546) and later was governor general (*beylerbeyi*) of Rumelia. He commanded the forces of Selim during the conflict (1559–61) between Selim and Bayezid, sons of Süleyman, over the succession to the throne, and married (1562) a daughter of the victorious Selim. As grand vizier he favoured peace, opposing Ottoman entry into war with Venice and with Iran (1578). After Selim's death, Mehmed Paşa lost much of his power and, having made a number of enemies, was assassinated.

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Sokolow, Nahum (b. Feb. 3, 1861, Wyszogród, Pol., Russian Empire—d. May 17, 1936, London), Jewish writer and Zionist leader.

Descendant of an ancient Polish rabbinical family, he displayed remarkable gifts as a writer and scholar at an early age and was well-known for his contributions to the Jewish press in Hebrew and other languages. At 24 he became assistant editor of the Hebrew scientific weekly *ha-Zefirah* in Warsaw; later, as its editor, he transformed it into a modern daily newspaper with wide circulation. He also edited in Warsaw the literary and historical periodicals *ha-Asif* and *Sefer ha-Shanah* (1885–1902).

In 1897 Sokolow joined the Zionist Organization. In 1906 he became its secretary general and editor of its official organs *Die Welt* and the Hebrew weekly *Ha-Olam.* He traveled all over the world propagating Zionist ideas. After the outbreak of World War I he went to England, later becoming a naturalized British subject. He took a prominent part in Anglo-French negotiations leading to the Balfour Declaration of Nov. 2, 1917. Sokolow secured similar declarations in favour of a Jewish national home from France, Italy, Poland, South Africa, and other countries. In May 1917 Sokolow was received in the Vatican by Pope Benedict XV, who expressed his sympathy for the Zionist cause. At the Paris Peace Conference of 1919 Sokolow led the Zionist delegation and later was instrumental in obtaining minority rights for the Jews in some East European countries. He was president of the World Zionist Organization and of the Jewish Agency (1931–35) and chairman of the World Zionist Executive (1922–31). In 1960 his remains were transferred to Israel.

His numerous writings include *The History of Zionism, 1600–1918,* 2 vol. (1919); *Hibbath Zion* (1934; "Love of Zion"); *Baruch Spinoza u-Zemano* (1928–29; "Spinoza and his Time"); and *Yischim* (biographical essays), 3 vol. (1911–35).

Sokoto, state, northwestern Nigeria. Bordering on the Niger Republic to the north and the Republic of Benin to the west, it also shares boundaries with Kwara state to the southwest,



Muslim emirs in a holiday procession, Sokoto, Nigeria
Harrison Forman

Niger state to the south, Kaduna state to the southeast, and Katsina state to the east. The state occupies an area of 39,589 square miles (102,535 square km), with savanna vegetation in the south and thorn scrub in the north. A generally arid region that gradually merges into the desert across the border in Niger, it has rainfall from mid-May to mid-September and is subjected to the Sahara's harmattan (dust-laden wind) from November to March. It is drained by the Sokoto (Kebbi) River and its tributaries, the Sokoto being itself a major tributary of the Niger, which it joins in the southwest corner of the state.

Before 1804 and the jihad (holy war) conducted by the Fulani people, the region was ruled by the Hausa states of Gobir (north), Zamfara (east), Kebbi (west), and Yauri (south). After the Fulani victory in 1808 over the Hausa peoples of Gobir, Shehu (Sheikh) Usman dan Fodio, the jihad leader, split his vast domain (*see* Fulani empire), which then extended throughout most of what is now north-central Nigeria and parts of northeastern Benin, southwestern Niger, and northern Cameroon, into two spheres of influence. In 1809 he made his son, Muhammad Bello, emir of Sokoto and overlord of the eastern emirates and placed his brother, Abdullahi dan Fodio, in charge of the western and southern emirates. Upon Usman's death in 1817, Muhammad succeeded his father as *sarkin musulmi* (or *amīr al-mu' minīn,* "commander of the faithful") and became the first sultan of Sokoto and the spiritual and political leader of the Fulani empire.

During Muhammad's rule (1817–37), Sokoto successfully defended the empire from uprisings of the Hausa peoples. It was at Wurno (19 miles [31 km] north-northeast on the Rima River), an alternate imperial capital, rather than at Sokoto, that Heinrich Barth, a German geographer and explorer, signed a treaty of commerce for Britain's Queen Victoria in 1853. The British were allowed additional trade privileges after a treaty of 1885 with the National African (later Royal Niger) Company, but British colonial expansion was opposed.

Following the defeat of Sokoto's forces by the British in 1903, almost all of the emirate and most of the empire were incorporated into the Protectorate of Northern Nigeria. The British

approved the appointment of Muhammadu Attahiru II as sultan of Sokoto; the preceding sultan, Muhammadu Attahiru I, who had fled the British advance, was killed later in the year in a battle at Burmi (435 mi east-southeast).

The *sarkin musulmi,* who since 1933 has also held the title of *sardauna* ("sultan") of Sokoto, has retained his position as the spiritual ruler of the Fulani and the leading Muslim figure in Nigeria. The assassination in Kaduna (230 mi southeast) of Sir Ahmadu Bello, the *sardauna* of Sokoto and Northern premier, in a military coup (1966) led by Ibo tribesmen provoked massacres of Ibos in the north and was a factor leading to the Nigerian civil war (1967–70). What is now Sokoto State was part of the former Northern Region until 1967, when it became part of former North-Western State. Sokoto State presently contains Sokoto and Gwandu, the two most senior emirates of the former Fulani Empire, and the northern part of the former Kontagora emirate.

Agriculture is the mainstay of the economy, and the riverine floodplains produce cash crops of peanuts (groundnuts), cotton, tobacco, swamp rice, onions, sugarcane, and indigo; the upland areas are planted with sorghum, millet, rice, cowpeas, beans, and cassava. The three-mile-long Bakolori Dam, one of the world's longest, on the Sokoto River was completed in 1975 and provides year-round irrigation for 59,000 ac (24,000 ha) in the Sokoto-Rima Basin. Much of the land in the state is used for grazing; cattle hides, goatskins, sheepskins, and finished leather products are significant exports, as are cattle, goats, and fowl. Limestone and kaolin deposits are exploited. Sokoto town, the state capital, has a cement factory, tanneries, and a modern abattoir and refrigeration plant. Gusau, a commercial and industrial centre, has a modern textile industry, a seed-oil mill, and a soybean processing plant.

The state, the second largest in Nigeria, is sparsely settled. The Fulani and the Hausa are the dominant ethnic groups, followed by the Dakarki (Dakarawa) and Kamberi. The majority of the population is Muslim. Sokoto town is the site of the Federal University of Sokoto (founded 1975), and Birnin Kebbi has a polytechnic institute. Sokoto town is served by roads leading north to the Niger republic; east to Gusau, Zaria, and Kano towns, and south to Birnin Kebbi; it also has an airport. The Kwiambana Game Reserve in the northeast is a major tourist attraction. Pop. (1983 est.) 7,421,000.

Sokoto, capital and largest town of Sokoto State, northwestern Nigeria, on the Sokoto (Kebbi) River just east of its junction with the Rima. The town, some 50 mi (80 km) south of the Niger border, lies on a traditional caravan route that leads northward across the Sahara.

It was only a small village when selected to be the military headquarters (1804–05) of the Fulani *jihād* ("holy war") led by Shehu (Sheikh) Usman dan Fodio, the first *sarkin musulmi* (or *amīr al-mu' minīn,* "commander of the faithful"). It became a permanent capital of the Fulani Empire in 1809, when Usman divided the empire into two sectors and made his son Muhammad Bello overlord of the eastern emirates. Muhammad ruled from Sokoto, but it was not until the Shehu's move (1814) to the town and his death there in 1817 that it became the spiritual headquarters of the Fulani people. Usman's tomb and other holy shrines have made the place a pilgrimage centre.

Sokoto's first walls were built in 1809; the outer walls were constructed in 1818. By the 1820s Sokoto was known for its two large mosques, the Masallacin Shehu and the Masallacin Bello (both rebuilt in the 1960s), and for the palace of the sultan. Its leather products were famous (especially those made from skins of the Sokoto red goat, the source of the so-called morocco leather); but the town also had a sizable trade in cotton cloth, slaves, sorghum, civet, brass articles, spices, kola nuts, salt, and potash with the Nupe and Ashanti (Asante) kingdoms to the south, the Hausa states (under Fulani control) to the east, and the desert polities to the north.

Modern Sokoto is a major trade centre in leather crafts (a significant export), kola nuts, goatskins and sheepskins, cattle hides and camel hides, sorghum, millet, rice, fish, peanuts (groundnuts), cotton, onions, and tobacco. Donkeys, camels, mules, and horses are the chief means of transport. The Northern Nigerian Cement Company, 2 mi southwest, uses the limestone in which Sokoto State abounds. Leatherworking is still done mainly by craftsmen in traditional mud-walled compounds. Sokoto also has some organized tanneries (including a government-sponsored demonstration project) and a modern abattoir and refrigeration plant.

Although educational development in the surrounding region has long lagged behind that in other parts of Nigeria, Sokoto is now the site of the University of Sokoto, Sokoto State College of Arts and Science, colleges of education and nursing, and a craft institute. It also has a hospital and other health facilities and an international airport. Pop. (1983 est.) 148,000.

Sokoto River, also called KEBBI RIVER, river in northwestern Nigeria, West Africa, rising just south of Funtua on the northern plateau. It flows in a wide arc 200 mi (320 km) through a flat-bottomed, trenchlike valley and between steep escarpments leading up to the plateau on either side, to Sokoto, west of which the Rima River joins it in its lower course to its confluence with the Niger east of Illo. The alluvial valley and plains formed by the Sokoto River are extensively cultivated; peanuts (groundnuts), cotton, tobacco, swamp rice, onions, sugarcane, and indigo are grown. Several irrigation projects have been introduced to promote year-round farming along the river. The Sokoto River serves as an important waterway for the Hausa, Dakarki, and Zabarma people.

Sokotra (Yemen [Aden]): *see* Socotra.

sokutai, Japanese emperor's court dress, worn for coronations and other important ceremonies. The costume, which has many Chinese characteristics, has changed little since the 12th century. It consists of baggy white damask trousers (*ue-no-hakama*) and a voluminous yellow outer robe (*hō*) cut in the Chinese style but tucked in at the waist and patterned with the Chinese phoenix (*hōō*).

The outer and most important of three kimonos worn under the *hō* is the white damask *shitagasane,* which has a back panel forming a 12-foot (3.7-metre) train. The cap-shaped headdress (*kammuri*), of black lacquered silk, has an upright pennon decorated with the Imperial chrysanthemum crest. When wearing the *sokutai,* the emperor carries an ivory tablet (*shaku*), undoubtedly inspired by jade tablets carried by Chinese emperors as symbols of Imperial power.

Sol, in Roman religion, name of two distinct sun gods at Rome. The original Sol, or Sol Indiges, had a shrine on the Quirinal, an annual sacrifice on August 9, and another shrine, together with Luna, the moon goddess, in the Circus Maximus. Although the cult appears to have been native, the Roman poets equated him with the Greek sun god Helios.

The worship of Sol assumed an entirely different character with the later importation of various sun cults from Syria. The Roman emperor Elagabalus (reigned AD 218–222) built a temple to him as Sol Invictus on the Palatine and attempted to make his worship the principal religion at Rome. The emperor Aurelian (reigned 270–275) later reestablished the worship and erected a magnificent temple to Sol in the Campus Agrippae. The worship of Sol as special protector of the emperors and of the empire remained the chief imperial cult until it was replaced by Christianity.

sol, in physical chemistry, a colloid (aggregate of very fine particles dispersed in a continuous medium) in which the particles are solid and the dispersion medium is fluid. If the dispersion medium is water, the colloid may be called a hydrosol; and if air, an aerosol. Lyophobic (Greek: "liquid-hating") sols are characterized by particles that are not strongly attracted to molecules of the dispersion medium and that are relatively easily coagulated and precipitated. Lyophilic ("liquid-loving") sols are more stable and more closely resemble true solutions. Many sols are intermediate between lyophobic and lyophilic types. *Compare* gel.

Sol, Isla del, also called ISLA DE TITICACA, island in the Bolivian sector of Lake Titicaca, just northwest of the Copacabana peninsula. The island (area 5.5 sq mi [14.3 sq km]), whose name is Spanish for "island of the Sun," was an important centre of Pre-Columbian settlement in the eastern ranges of the Andes Mountain Ranges. The island takes its name from the Temple of the Sun (also called Chinkana, meaning "labyrinth"), traditionally the site where Manco Capac and Mama Ocllo, the founders of the Inca dynasty, were sent to Earth by the sun god. The temple was probably built by Topa Inca Yupanqui (reigned 1471–93), who reputedly occupied the best-preserved of the island's other major sites, the Inca's Palace (or Pilco Kayma), a two-story, 50- by 43-ft (15- by 13-m) building with galleries cut from the living stone surrounded by fountains and former gardens. Other remains on the island are less well-preserved, but all apparently postdate the Cyclopean period of Inca architecture represented just southeast of the lake at Tiahuanaco, near the modern Bolivian village of Tiahuanacu. Pop. (1976 prelim.) 1,806.

Solan, town, administrative headquarters of Solan district, Himāchal Pradesh state, northern India. Named after the Hindu goddess Saloni Devi, it is situated 28 mi (45 km) southwest of Simla town, on the Simla–Kālka narrow-gauge railway, and was formerly a part of Mahāsu district. It is located in the outer ranges of the Himalayas at an altitude of about 4,455 ft (1,360 m). A small cantonment was established by the British at Solan town in the 19th century. The hills are forested with pine, apricot, and walnut trees. Tourists visit the Karol Tibba (hills), Mateol Tibba, Saproon Spring, and Happy Valley. Industries produce alcoholic beverages, soft drinks, scientific apparatus, and plastic goods. It has the Sanskrit College of Education, the Himāchal Pradesh Agricultural University, and a research institute. The Mohan-Meakin brewery located in Solan town is well known for its beer and whiskey.

Solan district, with an area of 748 sq mi (1,937 sq km), is bounded by Bilāspur district on the north; Manāli, Sirmaur, and Simla districts on the southeast; and Haryāna state on the south. Agriculture and horticulture are the principal occupations; the crops grown are wheat, corn (maize), paddy rice, vegetables, ginger, plums, peaches, and apricots. Woollen fabrics, electric bulbs, transistors, microscopes, and electric motors are manufactured. There is a network of roads and a narrow-gauge railway in the eastern part of the district. Pop. (1981) town, 13,127; district, 303,280.

Solanaceae, the nightshade or potato family of flowering plants (order Scrophulariales), with about 90 genera and at least 2,300

species, many of considerable economic importance as food and drug plants. Among the most important of these are the potato (*q.v.*; *Solanum tuberosum*); eggplant (*q.v.*; *S. melongena*); tomato (*q.v.*; *Lycopersicon esculentum*); garden, or capsicum (*q.v.*), pepper (*Capsicum annuum* and *C. frutescens*); tobacco (*q.v.*; *Nicotiana tabacum*); deadly nightshade, source of belladonna (*q.v.*; *Atropa belladonna*); the poisonous jimsonweed (*q.v.*; *Datura stramonium*) and nightshades (*q.v.*; *Solanum nigrum, S. dulcamara,* and others); and many garden ornamentals, such as the genera *Petunia, Lycium, Solanum, Nicotiana, Datura, Salpiglossis, Browallia, Brunfelsia, Cestrum, Schizanthus, Solandra, Streptosolen,* and *Nierembergia.*

The family is characterized by solitary or clustered flowers with sepals and petals, five in number and fused; five stamens; and a superior ovary (*i.e.,* situated above the attachment point of the other flower parts), composed of two fused carpels (ovule bearing segments) and obliquely placed in the flower upon a basal disk of tissue. The style (upper end of the ovary) is simple and bears a two-lobed stigma, the pollen-receptive surface. The flowers are usually conspicuous and are visited by insects.

solar, in architecture, private room in a late medieval English manor house, located on the first floor above the great hall. The solar served as a kind of parlor to which the owner of the manor house or castle could retire with his family from the chaotic communal living of the hall below. In fact, by the late 14th century the solar was more often called the "retiring room." Up a flight of stairs from the dais, or platform, end of the hall, the solar usually had an adjacent chapel.

solar calendar, any dating system based on the seasonal year of approximately 365¼ days, the time it takes the Earth to revolve once around the Sun. The Egyptians appear to have been the first to develop a solar calendar, using as a fixed point the annual sunrise reappearance of the Dog Star—Sirius, or Sothis—in the eastern sky, which coincided with the annual flooding of the Nile. They constructed a calendar of 365 days, consisting of 12 months of 30 days each, with 5 days added at the year's end. The Egyptians' failure to account for the extra fraction of a day, however, caused their calendar to drift gradually into error.

Ptolemy III Euergetes of Egypt, in the Decree of Canopus (237 BC), introduced an extra day every four years to the basic 365-day calendar (this practice also having been introduced in the Seleucid calendar adopted in 312 BC). In the Roman Republic, Julius Caesar in 45 BC replaced the confused Roman republican calendar, which probably was based on the lunar calendar of the Greeks, with the Julian calendar. The Julian calendar assigned 30 or 31 days to 11 months but fewer to February; it allowed for a leap year every four years. The Julian calendar, however, made the solar year slightly too long by adding a full quarter of a day annually—the solar year actually runs 365.2422 days. By mid-16th century the extra time had resulted in an accumulated error of about 10 days. To correct this error, Pope Gregory XIII instituted the Gregorian calendar in 1582, dropping October 5–14 that year and omitting leap years when they fell on centurial years not divisible by 400—*e.g.*, 1700, 1800, 1900.

solar compass, also called SUN COMPASS, type of navigational instrument that uses the position of the Sun to establish bearing. The solar compass operates somewhat like a sundial. It indicates direction by employing the angle of the shadow cast by the Sun in conjunction with a compass card, a flat disk marked with points and degrees of direction. The solar compass is useful for navigation in the high latitudes, especially near the poles, where magnetic compasses become unreliable because of unpredictable fluctuations in the horizontal component of the Earth's magnetic field. A simple form of the solar compass seems to have been devised by the Syrian Arabs of Aleppo as early as the 14th century.

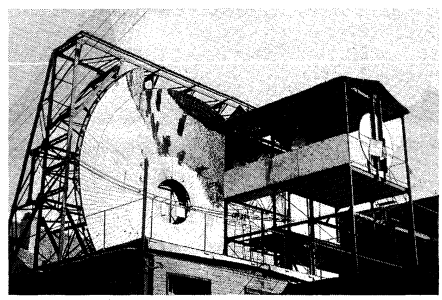
solar constant, the total radiation energy received from the Sun per unit of time per unit of area on a theoretical surface perpendicular to the Sun's rays and at the Earth's mean distance from the Sun. Measurements at the Earth's surface must be corrected for atmospheric effects and seasonal changes in distance from the Sun. The value of the constant is approximately 2 calories per minute per square centimetre, or about 1.8 horsepower per square metre; it may change very slightly with variations in solar activity. Any substantial change would have important implications for life on Earth.

solar cycle, period in which several important kinds of solar activity repeat themselves. The cycle, lasting about 22 years on the average, includes two 11-year cycles of sunspots, which display opposite magnetic polarities in alternate cycles, and two peaks and two declines in each of the various phenomena that vary in the same period as sunspots. These phenomena include fluctuations in the frequency of solar prominences and faculae (bright regions in the photosphere) and of magnetic effects, including the auroras and increased radio interference on Earth.

Discovery of the basic 11-year sunspot cycle, sometimes also called the solar cycle, was announced by the German amateur astronomer Samuel Heinrich Schwabe in 1843. Since that time, attempts have been made to connect the solar cycle to a variety of other phenomena, including possible slight variations in the diameter of the Sun, sequences of annual growth rings in trees, and even (by the English economist William Stanley Jevons) the rise and fall of the stock market.

solar deity, god or goddess conceived of as sovereign, steady, and all-seeing, often identified with the Supreme Deity of a culture or with the king or ruler. *See* sun worship.

solar energy, radiation from the Sun capable of producing heat, causing chemical reactions, or directly generating electricity. Because of its unique ability to heat materials for long periods without contamination, the solar furnace has become an important tool in high-temperature research. Solar steam generators have been built using arrangements of movable mirrors to concentrate large amounts of solar radiation upon blackened pipes through which water is circulated and turned to steam. Solar radiation may be converted directly into electricity by photovoltaic cells. When these solar cells, made from specially treated semiconductor materials such as silicon, are illuminated, a voltage is generated. Such electric generators have been used to provide power for weather and communications satellites, to operate radio and television equipment, and to heat houses. Biological systems are being developed to use sunlit algae for converting carbon dioxide and water into oxygen and protein-rich carbohydrates. In many countries, specially designed solar ovens are used for cooking, and solar energy is used to produce salt from seawater by evaporation.



Solar furnace at Mont Louis, Fr.
Laurent—H. Roger-Viollet

solar flare, sudden intense brightening of a small part of the Sun's chromosphere in the vicinity of a plage or facula and often near a sunspot group. The flare develops in a few minutes and may last several hours. Most of the energy consists of ultraviolet radiation; intense X-rays are also emitted, along with cosmic rays and less energetic particles. The particles travel much slower than the light of the flare and reach the vicinity of Earth a day or two later; they pose a potential radiation hazard to human beings in space. Flare-emitted radiation and particles, by their interaction with Earth's magnetic field and ionosphere, disrupt radio communications and cause auroras.

solar nebula, gaseous cloud from which, in the so-called nebular hypothesis of the origin of the solar system, the Sun and planets formed by condensation. The German philosopher Immanuel Kant in 1755 suggested that a nebula in slow rotation, gradually pulled together by its own gravitational force and flattened into a spinning disk, gave birth to the Sun and planets. A similar model, but with the planets being formed before the Sun, was proposed by the French astronomer and mathematician Pierre-Simon Laplace in 1796. During the late 19th century the Kant–Laplace views were criticized by the British physicist James Clerk Maxwell, who showed that, if all the matter contained in the known planets had once been distributed around the Sun in the form of a disk, the shearing forces of differential rotation would have prevented the condensation of individual planets. Another objection was that the Sun possesses less angular momentum (dependent on the total mass, its distribution, and the speed of rotation) than the theory seemed to require. For several decades most astronomers preferred the so-called collision theory, in which the planets were considered to have been formed as a result of a close approach to the Sun by some other star. Objections to the collision theory more convincing than those against the nebular hypothesis were raised, however, especially as the latter was modified in the 1940s. The mass of the original planet (*see* protoplanet) was assumed to be larger than in the earlier version of the theory, and the apparent discrepancy in angular momentum was attributed to magnetic forces connecting Sun and planets.

solar prominence, cloud of incandescent ionized gas extending sometimes hundreds of thousands of kilometres above the Sun's chromosphere and lasting sometimes for months. The causes are uncertain but probably involve magnetic forces.

Prominences vary widely in size, shape, and motion and can be active or quiescent. Active prominences are associated with sunspot groups and, like these, are correlated in numbers and activity with the solar cycle. They become visible as flame-coloured projections when the disk of the Sun is totally eclipsed.

Probably the first astronomer to describe prominences (1733) was Birger Vassenius of Göteborg, Swed. In 1868 P.J.C. Janssen and J.N. Lockyer independently announced a method of observing prominences by spectroscope without waiting for an eclipse.

solar radiation, electromagnetic energy, including X-rays, ultraviolet and infrared radiation, and radio emissions, as well as visible light, emanating from the Sun. Of the

3.8×10^{33} ergs emitted by the Sun every second, its attendant planets and their satellites receive about 1 part in 120,000,000. The small part of this energy intercepted by the Earth (on the average one kilowatt per square metre) is of enormous importance to life and to the maintenance of natural processes on the Earth's surface (*see also* solar constant). The energy output of the Sun has its peak at a wavelength of 0.47 micron, and the Sun radiates about eight kilowatts per square centimetre of its surface.

solar system, assemblage of planets, natural satellites, asteroids, comets, meteoroids, and interplanetary dust and gas under the gravitational control of the Sun. The Sun contains more than 99 percent of the mass of the entire solar system; most of the remaining mass is distributed among the system's nine major planets.

A brief treatment of the solar system follows. For full treatment, *see* MACROPAEDIA: Solar System.

According to the prevailing theory of the origin of the solar system, the Sun and the planets formed simultaneously from the gravitational collapse of a large cloud of dust and gas some 4,500,000,000 years ago. The centrally located Sun accreted most of the infalling gas, growing massive enough to trigger energy-producing fusion reactions in its hot, compressed core. The Sun thus developed into a star. None of its encircling companions gained sufficient mass to generate their own light and heat, and so became dark, comparatively cool planets.

The planets can be divided into two principal groups—terrestrial and giant. The terrestrial group is made up of the four innermost planets, Mercury, Venus, Earth, and Mars. The giants are the outer gassy bodies, Jupiter, Saturn, Uranus, and Neptune. The outermost planet of the solar system, Pluto, is distinct from the members of either group, having a makeup more characteristic of a satellite than a planet proper.

The terrestrial planets lie between 0.3 and 1.7 astronomical units (a.u.) from the Sun. (One astronomical unit equals 149,598,000 kilometres, or 92,750,760 miles, and represents the mean distance between the Earth and the Sun.) All four planets are small (less than 13,000 km in diameter), rocky, and have thin or negligible atmospheres. It is thought that the heat from the young Sun prevented these planets from accreting extensive gassy envelopes from the original "solar nebula," and so they remained bare, rocky cores whose atmospheres (if any) resulted from internal degassing.

Between 4.9 and 30.3 a.u., the gas in the solar nebula was cooler and slower moving, enabling the embryonic outer planets to surround their solid cores with huge atmospheres of light gases. Jupiter, Saturn, Uranus, and Neptune all appear to be similar in structure, and none of them has an accessible surface. Of the four gaseous giants, Jupiter is the largest with a diameter of nearly 143,000 km. Except for Neptune, each of these planets is surrounded by at least one full ring and by a complex satellite system.

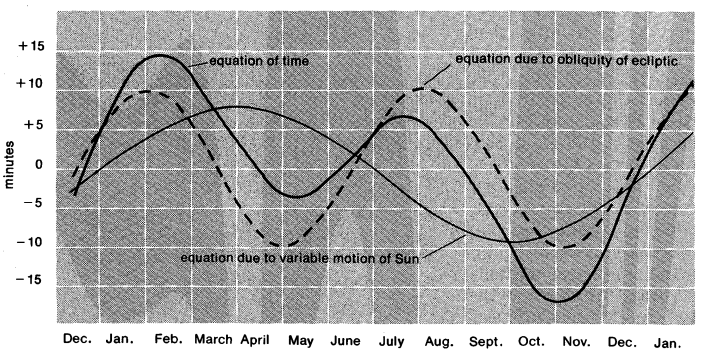
With a diameter of only about 3,500 km Pluto is by far the smallest major planet. Furthermore, its density suggests that it is composed primarily of ices. There may be planets beyond Pluto. The existence of such bodies may be responsible for the still unexplained deviations in the orbits of Uranus and Neptune.

The inner and outer planets are separated by a gap between 1.7 and 4.9 a.u., which is filled by tens of thousands of minor planets, commonly known as asteroids. Although some of them, such as Ceres and Pallas, are several hundred kilometres in diameter and spherical in shape, the majority are irregular chunks of rock or metal only a few metres across. The asteroids are probably fragments of a number of slightly larger bodies that failed to accrete into a single planet because of the influence of Jupiter's strong gravitational pull. Even so, the total amount of matter in the asteroid belt would be insufficient to make a planet the size of Pluto. Some asteroids have very elongated orbits that take them well outside the asteroid belt and close to the other planets. Asteroids or asteroidal fragments can thus collide with the Earth, and excessive bombardment by large objects of this type in the past has given rise to extensive cratering on the surfaces of the inner planets and their satellites. By now, however, most of the larger asteroidal bodies have disappeared; some of the smaller fragments enter the Earth's atmosphere to become bright meteors. If such an asteroidal fragment survives the fiery entry and reaches the surface, it is called a meteorite.

Most meteoroids are much smaller than those originating in the asteroid belt. They are fragile, low-density dust particles that come from comets worn down by repeated passes through the inner solar system. Comets are thought to originate in a huge swarm of cosmic debris known as the Oort Cloud, the outer boundary of which is estimated to be 50,000 a.u. or more from the Sun. When the orbit of one of these comet nuclei is disturbed by the gravity of a nearby star, the nucleus may travel out of the Oort Cloud and into the inner solar system in an elongated orbit. As the incipient comet approaches the Sun, its outer layer of icy matter melts and vaporizes, releasing gases and dust that form a round, diffuse cloud (the coma) around the nucleus. Eventually, some of the gas molecules and dust particles are ejected from the coma, forming one or, more commonly, two tails millions of kilometres in length.

Other components of the solar system include such phenomena as the solar wind, a stream of charged atomic particles that continually flows from the outermost region of the Sun. Protons and electrons in the solar wind have been detected by space probes out as far as the orbit of Neptune.

solar time, time measured by the Earth's rotation relative to the Sun. Apparent solar time is that measured by direct observation of the Sun or by a sundial. Mean solar time, kept by most clocks and watches, is the solar time that would be measured by observation if the Sun traveled at a uniform apparent speed throughout the year, rather than as it actually does, at a slightly varying apparent speed that depends on the seasons. The difference between mean and apparent solar time is called the equation of time (*see* figure). This is usually expressed as a correction, never exceeding about 16 minutes, which is added to or subtracted from one kind of solar time to determine the other. The real Sun and the imaginary "mean Sun," from which mean solar time is measured, may be as much as 16 minutes apart because during the course of the year the apparent motion of the real Sun against the background of the stars alternately slows down and speeds up. There are two reasons for this. First, the Earth's orbit is not exactly circular, and the Earth moves in it at slightly different speeds at different seasons. Second, because the plane of the Earth's orbit is tilted relative to the plane of the Earth's Equator, the apparent daily course of the Sun is shifted by varying amounts during the year from a straight east–west direction; and the rate of change of the Sun's celestial longitude, from which solar time is derived, varies accordingly. Since 1972 the time in common use has been based on a combination of solar and atomic times; it is called Coordinated Universal Time (*q.v.*). Its second is the second of atomic time, while its epoch is kept by periodic adjustment within 0.9 second of mean solar time. *See also* Universal Time.



Equation of time

From H. Russel, R. Dugan, and V. Stewart, *Astronomy;* Ginn and Company, a Xerox company

solar wind, flux of particles, chiefly protons and electrons plus nuclei of heavier elements in smaller numbers, that are accelerated by the high temperatures of the solar corona, or outer region of the Sun, to velocities large enough to allow them to escape from the Sun's gravitational field. The solar wind is responsible for deflecting both the tail of the Earth's magnetosphere and the tails of comets away from the Sun. At a distance of one astronomical unit (the mean distance between the Earth and the Sun, or about 150,000,000 kilometres), during a relatively quiet period, the wind contains approximately one to 10 protons per cubic centimetre moving outward from the Sun at velocities of 350 to 700 kilometres (about 220 to 440 miles) per second; this creates a positive ion flux of 10^8 to 10^9 ions per square centimetre per second, each ion having an energy equal to at least 15 electron volts. During solar flares, the proton velocity, flux, plasma temperature, and associated turbulence increase substantially.

When the solar wind encounters the Earth's magnetic field, a shock wave results, the nature of which is not fully understood. The portion of the solar wind that does not interact with the Earth or the other planets continues to travel to a distance of approximately 20 astronomical units, where it cools and eventually diffuses into galactic space.

Solari, Andrea, Solari also spelled SOLARIO, original name ANDREA DEL GOBBO (d. between Aug. 18 and Oct. 7, 1524), Renaissance painter of the Milanese school and one of the most important followers of Leonardo da Vinci.

Solari received his early training from his brother Cristofano, a distinguished sculptor and architect who was extensively employed on work at the cathedral at Milan and at the Certosa di Pavia. He probably accompanied his brother to Venice, where he seems to have been strongly influenced by Antonello da Messina, as can be seen in a fine por-

trait, "A Man with a Pink" (*c.* 1492; National Gallery, London), which displays Antonello's sculpture-like conception of form. Solari's earliest dated work is a "Madonna and Child with SS. Joseph and Jerome" (Brera, Milan), with



"Madonna with the Green Cushion," oil painting by Solari; in the Louvre, Paris
Giraudon—Art Resource/EB Inc.

a fine landscape background, executed for S. Pietro at Murano in 1495. The Leonardesque facial type of the Madonna suggests that after his return from Venice, Solari was strongly influenced by the great Florentine artist. The colouring and lush atmospheric effects of his well-known "Madonna with the Green Cushion" (Louvre, Paris) also reveal Leonardo's influence, but its animated composition displays Solari's own artistic temperament.

In 1507 Solari went to France and may have visited Flanders before returning to Italy. This would account for the Flemish character of his later work, such as the "Flight into Egypt" (1515; Poldi Pezzoli Museum, Milan), with its harmonious and detailed landscape background. To this period belong the "Woman Playing a Guitar" (Hertz Collection, Rome) and the portrait of Chancellor Morone (private collection, Milan), which vividly recalls the style of Hans Holbein the Younger.

solarium, in architecture, any room that is exposed to the sun. While the term may also be applied to the open sun porches or apartments on the roofs of ancient Greek or Roman houses, it is now used especially to designate a room that is enclosed in glass. In such a solarium, three or possibly four walls and sometimes even the ceiling may all be of glass. Often the solarium is a feature of a hospital or sanitarium, a room in which patients may be exposed to sunlight in a controlled environment as part of their therapy.

Solaro della Margarita, Clemente, Conte (count) (b. Nov. 21, 1792, Mondovì, Piedmont—d. Nov. 12, 1869, Turin, Italy), Piedmontese statesman who supported the old order against the Risorgimento.

Entering the Piedmontese diplomatic service in 1816, Solaro della Margarita rose to become foreign minister in 1835. He pursued a policy of cautious neutrality between France and Austria, while opposing constitutional reform at home. When agitation for such reform arose, however, King Charles Albert felt constrained to dismiss him (1847). Solaro della Margarita continued to oppose projects for Italian unification, and in the Piedmontese parliament (1854–60) he led the reactionary opposition to Premier Camillo Cavour, chief leader of the Risorgimento. Failing to be elected to the first parliament of united Italy in 1860, Solaro della Margarita retired from politics.

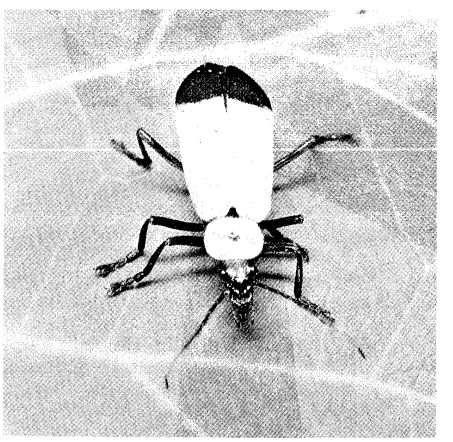
Solbad Hall, also called SOLBAD HALL IN TIROL, HALL IN TIROL, or HALL, town, *Bundesland* (federal province) Tirol, western Austria, on the Inn River just east of Innsbruck. A settlement grew up *c.* 1260 around the nearby salt mines. Chartered in 1303, the city in 1477 was granted a mint, which after 1567 was housed in the Münzerturm (Mint Tower). The town retains its late-medieval character, with narrow streets, quaint houses, and remains of the town walls and moats. Landmarks include the Gothic St. Nikolaus parish church (1281, extended 1436, rebuilt in the 18th century), the town hall (1447), the Stiftskirche (1507; the oldest Renaissance church in Tirol), the Damenstift (1566; a former nunnery), and the Fürstenhaus (1751). Solbad Hall is a spa with mineral springs. Its salt deposits are still worked, and tanning and brewing are carried on. Pop. (1981) 12,622.

soldering, process that uses low-melting-point metal alloys to join metallic surfaces without melting them. The basic operational steps are as follows: (1) thorough cleaning of the metal to be joined by abrasive or chemical means, (2) application of a flux to remove oxides on heating and promote spreading and wetting of the solder, (3) alignment of parts to produce a controlled gap of 0.001 to 0.005 in. (0.025 to 0.125 mm), (4) application of heat, (5) feeding solder to the joint, (6) cooling without movement, and (7) removal of corrosive flux residues.

Tin-lead solders are widely used in the electrical and plumbing industries. Such alloys also are utilized to solder brass and copper automobile radiators. Solders are supplied in wire, bar, or premixed-paste form, depending on the application.

Zinc chloride-based fluxes are used on copper alloys, with hydrochloric acid added for stainless steels. Electronic circuits require a noncorrosive flux; fluxes based on rosin using alcohol as a carrier are sufficiently active to produce a good bond. Soldering can be carried out using a torch, a soldering iron, a flame heater, or an induction heater. Dip soldering is used in the auto industry and wave-soldering devices are prominent in printed-circuit production. *See also* brazing; welding.

soldier beetle, any member of the approximately 3,500 species of the widely distributed insect family Cantharidae (order Coleoptera). These slender, soft-bodied beetles are brown



Common soldier beetle (*Chauliognathus*)
Walter Dawn

or black and trimmed like a soldier's uniform—with red, yellow, or orange. The adults range between 5 and 15 millimetres (1/5 and 3/5 inch) and are usually found on vegetation. Some soldier beetles have a pair of long fleshy filaments attached to the mouthparts; the filaments are used for feeding on pollen and nectar. Other species are carnivorous. Among the common soldier beetles in North America are *Chauliognathus marginatus,* which has an orange head and legs, and *C. pennsylvanicus,* which is yellow with black spots and is usually found on goldenrod. Common European genera are *Cantharis* and *Rhagonycha.*

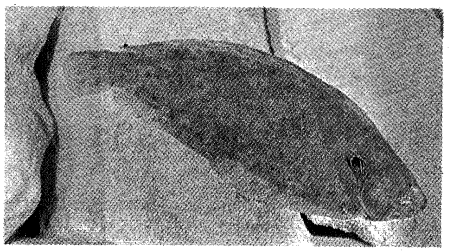
There has been some confusion concerning the family name. The beetles now placed in the blister beetle (*q.v.*) family Meloidae were, for many years known as the family Cantharidae.

soldier fly, any member of the insect family Stratiomyidae (order Diptera), recognizable by the pattern of veins on its wings. Soldier flies may have a broad, flattened abdomen (*Stratiomys*) or an elongated abdomen that narrows at the base (*Ptecticus*). Often brightly coloured with yellow, green, or black stripes, these flies resemble bees or wasps and are usually found around flowers.

The wormlike larvae are either carnivorous or herbivorous and live in a variety of habitats; *e.g.,* water, decaying organic matter, and vegetables. Pupation occurs in the larval skin.

soldierfish: *see* squirrelfish.

sole, any of a variety of flatfishes, but, more strictly, those of the family Soleidae (order Pleuronectiformes). Soles, in this restricted sense constitute more than 30 genera and 100



Sole (*Solea solea*)
Jacques Six

species of flatfishes found in temperate and tropical seas. Those occurring from Europe to Australia and Japan are marine, whereas many of the American species live in fresh water. Like many other flatfishes, soles are flattened, more or less elongated fishes, with both small eyes on the right side of the head.

The well-known Dover sole (*Solea solea*), of Europe is a commercially valuable food fish. The Dover sole reaches a length of about 50 centimetres (20 inches) and is brown in colour, with darker blotches and a black spot on each pectoral fin. It is found from estuaries to offshore waters in the eastern Atlantic and Mediterranean.

A common North American variety of sole is the hogchoker (*Trinectes maculatus*). This species is found in shallow coastal waters of the Atlantic from New England to Central America. Specimens are commonly found far inland in freshwater habitats associated with large rivers. Hogchokers are rounded in shape and seldom reach lengths above 25 cm.

Soledad, city, Atlántico department, northwestern Colombia, 18 mi (30 km) upstream from the mouth of the Río Magdalena. It was founded in 1640, and much of its development during the colonial era was due to its proximity to Barranquilla, 3 mi to the north. Soledad became a local commercial and manufacturing centre; in response to the growth of Barranquilla, it has also industrialized. The city is accessible by highway and contains the international jet airport that serves Barranquilla. Pop. (1973) 68,200.

Solemn League and Covenant (1643), agreement between the English and Scots by which the Scots agreed to support the English Parliamentarians in their disputes with the royalists, and both countries pledged to work for a civil and religious union of England, Scotland, and Ireland under a presbyterian-

parliamentary system; it was accepted by the Church of Scotland (Aug. 17, 1643) and by the English Parliament and the Westminster Assembly (Sept. 25, 1643). Written by Alexander Henderson, the covenant was considered primarily a civil agreement by the English Parliamentarians, who needed military allies, but the Scots considered it a guarantee of their religious system. It was signed throughout England and Scotland, and in January 1644 the Scots sent an army to England. King Charles I surrendered to them in 1646. When Oliver Cromwell and the Independents gained control of England, they had little sympathy for the Presbyterians and ignored the covenant. In 1647 Charles I accepted the covenant and was given Scottish military assistance but ultimately fell to the Independents and was executed in 1649. The future Charles II signed the covenant, along with the National Covenant (1638), in 1650 and 1651, but neither Cromwell's Commonwealth nor King Charles II, after the Restoration (1660), honoured the covenants, and they were never renewed.

Solemnis, Doctor: *see* Henry of Ghent.

solenodon, also called ALAMIQUI, either of the two surviving species of ratlike Caribbean mammals composing the family Solenodontidae, order Insectivora. Head and body length is about 28 centimetres (11 inches), and the



Cuban solenodon (*Atopogale cubana,* or *Solenodon cubanus*)
J.A. Hancock—Photo Researchers

naked tail is nearly as long. Solenodons have tapering, whiskery snouts and rather large, round ears. They feed mainly on invertebrates, which they dig up with their strong claws. Their saliva is toxic.

The Haitian solenodon (*Solenodon paradoxus*) lives in stony forests of northeastern Hispaniola; the species has become endangered as a result of land development and deforestation. The rare Cuban solenodon (*Atopogale cubana,* sometimes *S. cubanus*) occurs only in Holguín Province and is protected by law.

solenogaster, any small, wormlike, marine mollusk of the class Aplacophora. Unlike most mollusks, solenogasters have no shell. They are covered instead by a spiny cuticle. Most are 2.5 centimetres (1 inch) or less in length. The largest is 30 centimetres long. The animals occur at ocean depths of 30 to 1,800 metres (100 to 5,900 feet). About 150 species are known.

solenoid, a uniformly wound coil of wire in the form of a cylinder having a length much greater than its diameter. Passage of direct electric current through the wire creates a magnetic field that draws a core or plunger, usually of iron, into the solenoid; the motion of the plunger often is used to actuate switches, relays, or other devices.

Solent, The, strait of the English Channel, between the mainland coast of Hampshire, England, and the northwestern coast of the Isle of Wight. It extends eastward for 15 mi (24 km) from The Needles, a group of rocks west of the Isle of Wight, to Southampton Water, an inlet serving the port of Southampton; its breadth is between 1¾ and 4 mi (3 and 6 km). The strait is the submerged valley of a former eastward-flowing river of which the present Frome was headstream and the Itchen and Test were tributaries. East of The Solent, Spithead, the drowned eastern portion of the same valley, affords a safer approach to Southampton for large vessels. The mainland low coast is broken by the estuaries of the Beaulieu and Lym rivers; the coast of Wight, which rises more steeply, is cut by the Medina, Newton, and Yar estuaries.

Opposite The Needles there extends from the mainland a pebbly bank, nearly 2 mi in length, on the end of which stands Hurst Castle, dating from the 16th century. At the mouth of Southampton Water, another spit also bears a Tudor fortress, Calshot Castle. The Solent is the scene of yacht races, especially from the port of Cowes, and is famous for the naval reviews off Spithead.

Soler, Antonio (b. Dec. 3, 1729, Olot de Porrera, Spain—d. Dec. 20, 1783, Escorial Monastery, near Madrid), most important composer of instrumental and church music in Spain in the late 18th century.

Soler was educated at the choir school of Montserrat and at an early age was made chapelmaster at Lérida Cathedral. In 1752 he joined the Order of St. Jerome (Hieronymites) and became organist at the Escorial Monastery. As one of the most notable keyboard performers of his time, he taught both organ and harpsichord to members of the royal family. He was himself a student of Domenico Scarlatti, whose influence may be perceived in the lively keyboard technique, the form, and the frequently unexpected harmonic progressions of Soler's numerous harpsichord sonatas, and also in some of his organ works. He wrote much church music, in which he often indulged a taste for intricate canons; incidental music for plays by Calderón and others; six quintets for organ and strings; and six concerti for two organs. He also wrote a work on musical theory, *Llave de la Modulación* (1762), which was much discussed by his contemporaries. His experiments with microtones led him to invent, for the purpose, a keyboard instrument called the *afinador.*

Soleri, Paolo (b. June 21, 1919, Turin, Italy), Italian-born U.S. architect, designer, and city planner, who coined the term arcology (from "architecture" and "ecology") to describe his ideal construction, which would exist in but not disturb nature.

Soleri entered the Turin Polytechnic in 1941 and, after military service, received a doctorate in architecture in 1946. From 1947 to 1949 he worked under Frank Lloyd Wright in Arizona. He returned to Italy for a time and then in 1955 settled permanently in the United States, near Scottsdale, Ariz. His two best known buildings are the Domed Desert House at Cave Creek, Ariz., and the Solimene ceramics factory on the Amalfi coast of Italy. The former building, designed by Soleri and Mark Mills, is noted for its glass-domed roof that can be opened, closed, or rotated to conform to the weather and the movements of the Sun. In the Solimene factory, Soleri's imaginative use of polychrome ceramic tile and glass, natural forms, and subtle, indirect lighting of interiors is reminiscent of the work of Antonio Gaudí.

While constructing his home and workshops in Arizona, Soleri developed the novel technique of beginning with the concrete roof, molded in desert silt. Many students and craftsmen were attracted to his home in the desert, and in 1961 he established the Cosanti Foundation (from the Italian words *cosa,* "thing"; *ante,* "before") as a school. Between 1959 and 1964 he drew designs for Mesa City, a gigantic ideal urban centre to be built in the desert as an integrated, total environment for 2,000,000 people. While respecting the natural surroundings, Mesa City would provide for all the needs of rational, aesthetic human beings. The architectural world was electrified in 1970 when many of his arcologies (in model form) and drawings were exhibited.

In 1970 Soleri began to build a version of Mesa City, though not in the ambitious terms of the original drawings. In Arizona, between Phoenix and Flagstaff, he began the construction of a single structure called Arcosanti, which would provide housing and all other needs for a population of 5,000. A 25-story double row of massive concrete trusses was planned to enclose a mall a third of a mile long and more than 300 feet wide. Floors were to be constructed across the rows of trusses, with living quarters on the outer surfaces and space for commercial, educational, and cultural enterprises in the interior. The structure was designed to make maximum use of solar energy. The work, by unpaid students, proceeded slowly because it was being carried out with no aid from the government or foundations; it was partially financed by the sale of Soleri's ceramic wind bells. Soleri expressed his ideas in *Arcology: The City in the Image of Man* (1969).

Soleure (Switzerland): *see* Solothurn.

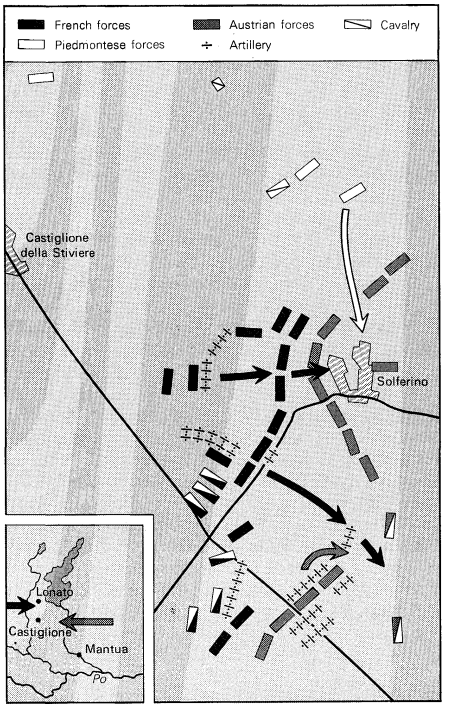
soleus muscle, a flat, broad muscle of the calf of the leg lying just beneath the gastrocnemius muscle. It arises from the upper portions of the tibia and fibula, the bones of the lower leg, and then joins with the gastrocnemius to attach via the Achilles tendon at the heel. Its major action is flexion of the ankle joint, particularly when the leg is bent at the knee, thereby extending the foot downward.

solfatara (Italian: "sulfur place"), a fumarole (*q.v.*), or natural steam vent, in which sulfur gases are the dominant constituent with the hot vapour.

solfeggio, French SOLFÈGE, vocal exercises sung to the solmization syllables (do, re, mi, etc.) and, by extension, vocalizes, or exercises sung to a single vowel, often florid and difficult to master. Solfeggio collections survive from the 17th century onward, with examples by leading composers of 18th-century opera, such as Nicola Porpora (also a singer and famed singing teacher) and Alessandro Scarlatti and, reaching into the 19th century, Luigi Cherubini. Later composers of such exercises include Maurice Ravel, Gabriel Fauré, Vincent d'Indy, Ralph Vaughan Williams, Heitor Villa-Lobos, and Sergey Rachmaninoff. The word solfège sometimes refers to an intensive course in the knowledge of musical intervals and their notation.

Solferino, Battle of (June 24, 1859), major engagement of the second War of Italian Independence, fought in Lombardy between an Austrian army and a Franco-Piedmontese army, resulting in the annexation of most of Lombardy by Sardinia-Piedmont, thus contributing to the unification of Italy. After its defeat at the Battle of Magenta on June 4, the Austrian army of about 120,000 men had retreated eastward and Emperor Francis Joseph I had arrived to dismiss Gen. Count Franz von Gyulai and take personal command. The Franco-Piedmontese army, of approximately equal size, under the command of Napoleon III and Victor Emmanuel II of Sardinia-Piedmont, pursued the Austrians. Neither commander had accurate information about the other's troop movements, and on June 24 they unexpectedly clashed, in and around Solferino, four miles southeast of Castiglione della Stiviere, in Lombardy, at a time when the French expected to engage only the Austrian rear guard and the Austrians expected

to engage only the French advance units. The battle developed in a confused and piecemeal fashion until midday. After extremely costly fighting, the French broke the Austrian centre



The Battle of Solferino, June 24, 1859

From David Chandler (ed.), *A Guide to the Battlefields of Europe*, vol. 2; copyright 1965 by Hugh Evelyn, Ltd.; published by Dimension Books, Denville, N.J.

in midafternoon. Smaller actions, including a vigorous delaying action by the Austrian general Ludwig von Benedek, continued until dark, leaving the French and Piedmontese too exhausted to pursue the defeated Austrians. The Austrians lost 14,000 men killed and wounded and more than 8,000 missing or prisoners; the Franco-Piedmontese lost 15,000 killed and wounded and more than 2,000 missing or prisoners. These heavy casualties contributed to Napoleon III's decision to seek a truce with Austria (*see* Villafranca, Conference of) and also led to the movement to establish the International Red Cross.

Soli, ancient Anatolian seaport located west of modern Mersin, in south-central Turkey. It was founded by colonists from Rhodes and was so prosperous when taken by Alexander the Great in 333 BC that he was able to exact from it a fine of 200 talents for its attachment to Persia. Soli was destroyed and depopulated by Tigranes II of Armenia (reigned 95–55 BC) but was later revived by the Roman general Pompey, who settled defeated Cilician pirates there and renamed it Pompeiopolis. The bad Greek spoken there gave origin to the term solecism (Greek *soloikismos*). Remains of the port's artificial harbour can be traced in the form of two parallel moles with curving ends, but the most striking remains are the relics of a long colonnade that flanked Soli's main highway, leading to the harbour.

Soli, Greek SOLOI, ancient Greek city on Cyprus, located west of modern Karavostasi on Morphou Bay. Soli traditionally was founded after the Trojan War by the Attic hero Acamas, perhaps reflecting the Sea Peoples' occupation of Cyprus (*c.* 1193 BC). According to another legend, however, the city was named for the Athenian lawgiver Solon (flourished 6th century BC), who was supposed to have visited Cyprus. Soli was probably an ally of Assyria in the 7th century BC. In Hellenic times the city had little political importance, though its copper mines were famous. Excavated monuments include a theatre, a temple of Aphrodite and Isis, and a 5th-century palace situated 5 miles (8 km) west of the town at Vouni.

solicitation, in criminal law, request, encouragement, or direction of one person by another to commit a serious criminal offense. It is often linked with the crime of incitement. An inciter is usually one present at the scene of the offense who encourages the principal offender to commit an act that he is already inclined to commit on his own. A solicitor need not be present at the scene but is responsible for procuring and directing the act itself. Solicitation is a crime in itself regardless of whether the act solicited is eventually committed. Incitement is often punished only with regard to an act that is committed.

Solicitation is a step toward the commission of a crime. If the person solicited is not legally liable, as in the case of a child, the solicitor may be guilty of an attempt to solicit. If the solicited party accomplishes the contemplated act, the solicitor may be punished as an accessory. *See also* accomplice.

solicitor, one of the two types of practicing lawyers in England, the other being the barrister, who pleads cases before the court. The solicitors carry on most of the office work in law. In general, a barrister undertakes no work except through a solicitor, who prepares and delivers the client's instructions to a barrister. Solicitors confer with clients, give advice, draft documents, conduct negotiations, prepare cases for trial, and retain barristers for advice on special matters or for advocacy before the higher courts. They have a right to act in all courts as the agents for litigation or representatives of their clients, and they are deemed officers of the court, but they may appear as advocates only in the lower courts. Since their activities make up the greater part of the work of lawyers, solicitors are many times more numerous than practicing barristers.

The education required of a solicitor includes a law school course. A most important feature, however, is service under articles (apprenticeship) with a practicing solicitor for a period of five years (three years for university graduates). Solicitors must be British Commonwealth citizens, although there is no such requirement for the barrister.

The official organization of solicitors is the Law Society, a voluntary group, incorporated by Parliament. The Law Society has extensive authority in setting and enforcing standards for solicitors. Its rules prescribe how money held for a client or in trust is to be kept and to be shown on books of account, which must be certified each year. The society maintains a client-compensation fund to reduce and relieve losses sustained from dishonesty by solicitors. A solicitor, unlike a barrister, may sue for his fees. *See also* barrister; Inns of Court.

solid, one of the three basic states of matter, the others being liquid and gas. A solid forms from either of these two states because the energy of atoms decreases when the atoms take up a relatively ordered, three-dimensional structure.

A brief treatment of solids follows. For full treatment, *see* MACROPAEDIA: Matter: Its Properties, States, Varieties, and Behaviour.

Solids exhibit certain characteristic properties that distinguish them from liquids and gases. All solids have, for example, the ability to support loads applied either perpendicular or parallel to a surface (*i.e.,* normal or shear loads, respectively). Such properties depend on the properties of the atoms that form the solid, on the way those atoms are arranged, and on the forces between them.

Solids are generally divided into two broad classes—crystalline and noncrystalline (amorphous). Crystalline solids have a very high degree of order in atomic arrangement. Practically all metals and many other minerals belong to this class. Noncrystalline solids are those in which atoms and molecules are not organized in a definite lattice pattern. They include glasses, plastics, and gels.

Four distinct types of crystalline solids are recognized: (1) metals and alloys; (2) ionic crystals; (3) covalent crystals; and (4) molecular crystals. Metals and alloys are characterized principally by their high electrical and thermal conductivity, which arises from the migration of free electrons. Ionic crystals may be viewed as aggregates of charged ions. These salts commonly exhibit ionic conductivity, which increases with temperature. Covalent crystals are hard, often brittle, materials such as diamond, germanium, silicon, and silicon carbide. In the simpler monatomic types (*e.g.,* diamond), each atom is surrounded by a number of atoms equal to its valence. Unlike salts, they are not ionic conductors in the pure state and cannot be formed by aqueous precipitation. Molecular crystals are substances such as Dry Ice (solidified carbon dioxide), solid forms of the rare gases (*e.g.,* argon, krypton, and xenon), and crystals of many organic compounds. They have relatively high vapour pressure at ordinary temperature, and their sublimation products, as for example CO_2 gas in the case of Dry Ice, are usually stable molecules.

Various alloys, salts, covalent crystals, and molecular crystals that are good electrical insulators at low temperature become conductors at elevated temperatures, conductivity increasing rapidly with temperature. Materials of this type are called semiconductors. Their electrical conductivity is generally low when compared with that of such metals as copper, silver, or aluminum (*see* semiconductor).

solid solution, solid analogue of liquid solutions. As with liquid phases, a tendency for mutual solubility exists between any two coexisting solid phases; depending on the chemical similarities of the solid phases, mutual solubility of two mineral species may be 100 percent, just as between water and alcohol, or it may be near zero, as between water and kerosene. The higher the temperature of equilibration, the greater the mutual solubility.

A solid-solution series is the continuous sequence of substances with compositions intermediate between two distinct mineral phases, called end members. In a solid-solution series, the components may be thought to substitute for one another on a molecular level in the crystal structure; the intermediate members have properties that vary continuously with composition from those of one end member to those of another. Solid-solution series are said to be complete if examples of complete variation exist in nature or have been synthesized in the laboratory; partial solid-solution series exhibit a compositional range that is theoretically possible but that has not been observed.

An example of a continuous solid-solution series is the forsterite–fayalite series of olivine minerals. In this series the members vary chemically from forsterite, a magnesium silicate (Mg_2SiO_4), to fayalite, an iron silicate (Fe_2SiO_4); the structure of the intermediate members is the same as that of the end members, and the physical properties show complete gradation from those of forsterite to those of fayalite.

solid-state detector, also called SEMICONDUCTOR RADIATION DETECTOR, radiation detector in which a semiconductor material such as a silicon or germanium crystal constitutes the detecting medium. One such device consists of a *p-n* junction across which a pulse of current develops when a particle of ionizing

radiation traverses it. In a different device, the absorption of ionizing radiation generates pairs of charge carriers (electrons and electron-deficient sites called holes) in a block of semiconducting material; the migration of these carriers under the influence of a voltage maintained between the opposite faces of the block constitutes a pulse of current. The sensitivity of these detectors is increased by operating them at low temperatures (commonly that of liquid nitrogen, −164° C [−263° F]) to suppress the random formation of charge carriers by thermal vibration. Such pulses are amplified, recorded, and analyzed to determine the energy, number, or identity of the incident charged particles.

Solidarity, Polish SOLIDARNOŚĆ, Polish trade union that in the early 1980s became the first independent labour union in a country belonging to the Soviet bloc. Solidarity was founded in September 1980, was forcibly suppressed by the Polish government in December 1981, and reemerged in 1989 to become the first opposition movement to participate in free elections in a Soviet-bloc nation since the 1940s. Solidarity subsequently formed a coalition government with Poland's United Workers' (communist) Party (PUWP).

The origin of Solidarity traces back to 1976, when a Workers' Defense Committee (Komitet Obrony Robotnikow; KOR) was founded by a group of dissident intellectuals after several thousand striking workers had been attacked and jailed by authorities in various cities. The KOR supported families of imprisoned workers, offered legal and medical aid, and disseminated news through an underground network. In 1979 it published a Charter of Workers' Rights.

During a growing wave of new strikes in 1980 protesting rising food prices, Gdańsk became a hotbed of resistance to government decrees. Some 17,000 workers at the Lenin Shipyards there staged a strike and barricaded themselves within the plant under the leadership of Lech Wałęsa, an electrician by trade. In mid-August 1980 an Interfactory Strike Committee was established in Gdańsk to coordinate rapidly spreading strikes there and elsewhere; within a week it presented the government with a list of demands that were based largely on KOR's Charter of Workers' Rights. On August 30, accords reached between the government and the Gdańsk strikers sanctioned free and independent unions with the right to strike, together with greater freedom of religious and political expression.

Solidarity formally was founded on Sept. 22, 1980, when delegates of 36 regional trade unions met in Gdańsk and united under the name Solidarność. The KOR subsequently disbanded, its activists becoming members of the union, and Wałęsa was elected chairman of Solidarity. A separate agricultural union composed of private farmers, named Rural Solidarity (Wiejska Solidarność), was founded in Warsaw on Dec. 14, 1980. By early 1981 Solidarity had a membership of about 10 million people and represented most of the work force of Poland.

Throughout 1981 the government (led by General Wojciech Jaruzelski) was confronted by an ever stronger and more demanding Solidarity, which inflicted a series of controlled strikes to back up its appeals for economic reforms, for free elections, and for the involvement of trade unions in decision making at the highest levels. Solidarity's positions hardened as the moderate Wałęsa came to be pressured by more militant unionists. Jaruzelski's government, meanwhile, was subjected to severe pressure from the Soviet Union to suppress Solidarity.

On Dec. 13, 1981, Jaruzelski imposed martial law in Poland in a bid to crush the Solidarity movement. Solidarity was declared illegal, and its leaders were arrested. The union was formally dissolved by the Sejm (Parliament) on Oct. 8, 1982, but it nevertheless continued as an underground organization.

In 1988 a new wave of strikes and labour unrest spread across Poland, and prominent among the strikers' demands was government recognition of Solidarity. Jaruzelski authorized talks between the government and Solidarity's leaders, and the extended negotiations that followed resulted in April 1989 in a far-reaching agreement whereby Solidarity was legalized and allowed to participate in free elections to a bicameral Polish parliament. In the elections, held in June of that year, candidates endorsed by Solidarity won 99 of 100 seats in the newly formed Senate (upper house) and all 161 seats (of 460 total) that opposition candidates were entitled to contest in the Sejm (lower house). The PUWP then found itself unable to muster a voting majority in the new Parliament, and in August Solidarity agreed to form a coalition government with the PUWP, with the latter serving in the unaccustomed role of junior partner. Jaruzelski nominated a longtime Solidarity adviser, Tadeusz Mazowiecki, to be premier in a Cabinet dominated by Solidarity members and supporters. Mazowiecki became premier on August 24 and was the first non-communist premier to govern Poland since the late 1940s.

Soligorsk, city, administrative centre of Soligorsk *rayon* (sector), Minsk *oblast* (province), Belorussian Soviet Socialist Republic. The city was established as a consequence of the discovery in 1949 of the potash reserves of the Starobin basin, a geological formation about 5,400 square miles (14,000 square km) in area, containing some 50,000,000,000 metric tons of the potassium salts. Three processing plants were built to exploit these deposits; they were later unified as the Beloruskaly combine. Other industry includes the manufacture of precast concrete products. There is a technical college for chemical engineering and mining. Pop. (1987 est.) 92,000.

Solihull, district (borough), county of West Midlands, England, between Birmingham and Coventry. It began to expand as a residential area for Birmingham in the 19th century, and after 1930 it grew rapidly. The borough's historic buildings include St. Alphege's Church, with its 13th-century chancel, and the 15th-century Packwood House. Although mainly a residential area, Solihull has automobile (Rover cars) and other light industries. The National Exhibition Centre (1976) is near the airport. The district has an area of 70 square miles (180 square km). Pop. (1986 est.) 202,-200.

Solikamsk, city, Perm *oblast* (province), northwestern Russian Soviet Federated Socialist Republic. The city lies along the Usolka River, just above its confluence with the Kama. Founded in the early 15th century, it has always been a major salt- and potassium-mining centre. It has a varied chemical industry, including one of the Soviet Union's largest magnesium works. The city is also one of the Soviet Union's largest newsprint producers. Pop. (1989 prelim.) 110,000.

soliloquy, also called MONOLOGUE, or MONOLOG, passage in a drama in which a character directly addresses an audience or speaks his thoughts aloud, either alone upon the stage or with the other actors keeping silent. This device was long an accepted dramatic convention, especially in the theatre of the 16th, 17th, and 18th centuries. Long, ranting monologues were popular in the revenge tragedies of Elizabethan times, such as Thomas Kyd's *Spanish Tragedy* and in the works of Christopher Marlowe, usually substituting the outpouring of one character's thoughts for normal dramatic writing. William Shakespeare used the device more artfully, as a true indicator of the mind of his characters, as in the famous "To be or not to be" soliloquy in *Hamlet.* Among the French playwrights, Pierre Corneille made use of the lyrical quality of the form, often producing soliloquies that are actually odes or cantatas, whereas Jean Racine, like Shakespeare, used the soliloquy more for dramatic effect. The soliloquy fell into disfavour after much exaggeration and overuse in the plays of the English Restoration (1660–85), but it remains useful for revealing the inner life of characters.

Twentieth-century playwrights have experimented with various substitutes for the set speech of the soliloquy. The Russian dramatist Nikolay Yevreinov's one-act play *The Theatre of the Soul* (1915) employed different characters to represent different aspects of one person—*i.e.,* his rational side or his emotional side. Eugene O'Neill in *The Great God Brown* (performed 1926) had the characters wear masks when they were presenting themselves to the world, but they were maskless when expressing what they really felt or thought. In O'Neill's *Strange Interlude* (1928), the characters spoke a double dialogue—one to each other, concealing the truth, and one to the audience, revealing it. In Samuel Beckett's *Krapp's Last Tape* (1958), interior monologue was presented through the device of having an old man replay tape recordings made in his youth.

Soliman (Turkish or Arabic personal name): *see under* Süleyman.

Solimões River, Portuguese RIO SOLIMÕES, the section of the Upper Amazon River in Amazonas state, northwestern Brazil, flowing from the Brazilian-Peruvian border on the west to its confluence with the Negro River near Manaus. The junction is known as the "meeting of waters," where the light blue Solimões waters meet the black Negro waters to form the Amazon River. Islands covered with tropical rain forest separate the maze of channels that constitute the river. It meanders for about 1,000 miles (1,600 km) through a floodplain about 50 miles (80 km) wide.

Solingen, city, North Rhine-Westphalia *Land* (state), northwestern Germany. It lies along the Wupper River east of Düsseldorf. First mentioned in 965, it was chartered in 1374; in 1929 Solingen incorporated the equally old towns of Ohligs, Wald, Grafrath, and Hohscheid. The craft of sword making was established there in the Middle Ages, and Solingen shares with Thiers (France) and Sheffield (England) an international reputation as a cutlery centre. Severely damaged during World War II, the city centre has been rebuilt. The German Museum of Blades illustrates the historical development of cutting implements. A metallurgical industry also dominates the economy. Other products range from chemicals to sweets. Pop. (1989 est.) 160,824.

solipsism, in philosophy, formerly, moral egoism (as used in the writings of Immanuel Kant), but now, in an epistemological sense, the extreme form of subjective idealism that denies that the human mind has any valid ground for believing in the existence of anything but itself. The British Idealist F.H. Bradley, in *Appearance and Reality* (1897), characterized the solipsistic view as follows:

> "I cannot transcend experience, and experience is *my* experience. From this it follows that nothing beyond myself exists; for what is experience is its (the self's) states."

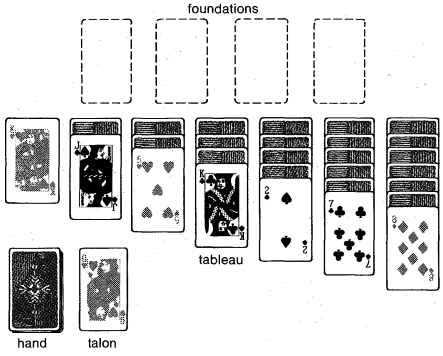
Presented as a solution of the problem of explaining man's knowledge of the external world, it is generally regarded as a reductio ad absurdum. The only scholar who seems to have been a coherent radical solipsist is Claude Brunet, a 17th-century French physician.

Solís, Juan Díaz de: *see* Díaz de Solís, Juan.

solitaire, either of two species of extinct flightless birds related to the dodo (*q.v.*).

Solitaire, also called PATIENCE, a family of card games played by one person. Solitaire, the most widely played kind of card game, has more forms than all other card games put together.

Most games are played with one or two 52-card packs: the cards usually ranking king (high), queen, jack, 10, 9, 8, 7, 6, 5, 4, 3, 2, ace. In some games the ace ranks above the king, *e.g.,* Klondike, wherein cards from a seven-column tableau may only be played



Layout of cards for klondike

on the foundation of an ace. In Canfield, probably the most popular solitaire, the ace may be played onto a king on the foundation and is followed with 2, 3, etc. The following terms describe features common to all Solitaire games:

1. The layout—the cards dealt on the table.
2. The tableau—the distinctive arrangement of the cards that may be played, or built, upon (excluding the foundations).
3. The foundations—cards of designated rank on which other cards build sequentially.
4. The stock—a pile of cards that is part of the layout in some games.
5. The hand—cards not used in the layout.
6. The talon—a discard pile of cards turned up from the hand that cannot be built upon the tableau or foundations.
7. Available cards—cards of the tableau, stock, etc., transferred to other parts of the layout. Usually, certain cards of the tableau are not available until uncovered by transferring cards above them.
8. A space—a gap in the tableau created when all the cards of one pile have been transferred elsewhere.
9. Rows—horizontal lines of cards.
10. Columns—vertical lines of cards.

Solitario, El (pseudonym): *see* Estébanez Calderón, Serafín.

solitary bee: *see* mining bee.

Sollentuna, city in the *län* (county) of Stockholm, east central Sweden, composed of several northern suburbs of Stockholm, including Helenelund, Tureberg, Häggvik, Norrviken, Gillbo, and Viby. It consists of low-lying areas, as well as more or less rolling, wooded heights that reach up to 230 ft (70 m). Beginning in 1600, when the nobility in Stockholm started building manor houses in the area, Sollentuna's growth was tied to that of the capital. Since 1900 Sollentuna has changed from an agricultural community to a modern urban district as a result of both industrial and suburban development. The coming of bus links with Stockholm accelerated its growth. Although largely residential, it has some important industries, including the manufacture of yeast, tools, and cement. Among notable buildings are a 12th-century church and, in Tureberg, St. Eriks Church (1927–30). Pop. (1984 est.) mun., 46,747.

solmization, system of designating musical notes by syllable names. A well-developed solmization system exists in the music of India, using the syllables *ṣa, ṛi, ga, ma, pa, dha, ni;* and similar systems occur, for example, in Chinese, Southeast Asian, and ancient Greek music.

The system that predominates in European music was introduced by an 11th-century Italian monk, Guido of Arezzo, who derived it from a Latin hymn, "Ut queant laxis," the first six lines of which begin on successively higher notes of the scale. Taking the syllables sung on the first note of each line, he arrived at the series ut, re, mi, fa, sol, la. This six-note series, or hexachord (*q.v.*), facilitated the sight reading of music by allowing the singer always to associate a given musical interval with any two syllables. For example, mi–fa was always a semitone, no matter how high or low the two pitches were sung. By mutating, or switching from one hexachord (say, beginning on C) to an overlapping one (say, beginning on F), the singer could always place the syllables mi–fa on any half step in the music.

Changing musical styles at the end of the 16th century made mutation necessary too often to be practical. During the 17th century, an adaptation of the system to the seven-note major and minor scales was introduced in France, the syllable si (later ti in some countries) being added for the seventh note. During that century also, the syllable ut was replaced by do, considered more singable.

Two modern uses of the solmization syllables subsequently developed. In France, Italy, and Spain the syllables became attached to fixed pitches (fixed-do system): do meaning C; re, D; mi, E; fa, F; sol, G; la, A; and si, B. Elsewhere a movable-do system prevailed, in which do always represented the first pitch of the major scale (thus allowing the singer to associate syllable names with given intervals, as in the old hexachord system).

Various systems of teaching singing and sight reading based on the movable-do system were devised, the most prominent being tonic sol-fa, developed about 1850 in England by John Curwen. Tonic sol-fa emphasizes the relation of the notes to one another and to the tonic, or key note (do in major scales, la in minor scales). If the key changes, do (or la) shifts to a new pitch (similar to the old practice of mutation). A special notation using the initial letters of each syllable is utilized.

In England and America in the 18th century, a four-syllable system was common, in which the major scale was sung fa–sol–la–fa–sol–la–mi–(fa). Often called fasola, it survives in some areas of the United States. *See* shapenote hymnals.

Solna, city, in the *län* (county) of Stockholm, east central Sweden, just northwest of the city of Stockholm. An ancient settlement, it has runic stones and several burial sites dating from the time of the Vikings. Notable buildings include a 12th-century church; the Karlberg Palace, a military academy since the 18th century; Ulriksdal Palace, which sometimes serves as a royal residence; and a sports stadium seating about 52,000 persons. In the early 1960s Solna Centrum (centre) was built as a combined administrative, cultural, and shopping district. Formerly part of Solna Commune, Solna became a city in 1948 and is governed by a city council. It is a rail junction and a manufacturing centre. It is also a medical centre, with two large hospitals and a variety of medical teaching and research institutes. Pop. (1984 est.) mun., 49,080.

Solnhofen Limestone, division of Upper Jurassic rocks in the region of Solnhofen, W. Ger. (The Jurassic Period began about 190,000,000 years ago and lasted about 54,000,000 years.) The Upper Jurassic rocks of the region consist of fossilized reefs (often bow shaped) of corals and sponges within which lagoons existed during Jurassic times. In them, limy sediments slowly accumulated and formed very fine-grained limestones now used for the production of lithographic prints. The fine-grained texture of the Solnhofen Limestone has helped ensure remarkable preservation of Upper Jurassic fossils. Even impressions of soft parts and internal organs are preserved. Among the fossil animals found in the Solnhofen Limestone, perhaps the most important is that of *Archaeopteryx*, the earliest known bird, very reptilian in appearance. Other animals include pterosaurs, or winged reptiles, and more than 100 species of insects, including such rarely preserved forms as moths and flies. In all, the Solnhofen Limestone has yielded more than 450 species of Jurassic animals; remarkably, 8 species of jellyfish, consisting entirely of soft parts, have also been preserved.

Solo (Indonesia): *see* Surakarta.

Solo man, prehistoric human known from 11 fossil skulls (without facial skeletons) and 2 leg-bone fragments that were recovered from terraces of the Solo River at Ngandong, Java, in 1931–32. Cranial capacity (1,150–1,300 cubic centimetres) overlaps that of modern man (average 1,350 cu cm). The skulls are flattened in profile, with thick bones and heavy browridges forming a torus, and the limb bones are indistinguishable from those of modern man. Skull bases were broken, indicating that the heads may have been taken as trophies and the brains eaten. Solo man has been thought to date to the upper Pleistocene—possibly during the last glaciation (about 15,000 to 20,000 years ago)—but his age remains uncertain. Solo man's resemblance to Java man and Peking man has led some scholars to consider him a late example of *Homo erectus* in Asia, *H.e. soloensis.* Others believe Solo man is a regional variant of widespread early *Homo sapiens* populations, also including the Neanderthal peoples of Europe and the Rhodesioid peoples of Africa. The Solo fossils were originally given the genus name *Javanthropus.*

Solo River, Bahasa Indonesia BENGAWAN SOLO, river, the longest in Java, Indonesia. It rises on the slope of Gunung (mount) Lawu volcano (10,712 ft [3,265 m]) and the southern limestone range (Pegunungan Sewu) and flows north, then east to discharge opposite Madura, northwest of Surabaya. Its longest tributary, the Madiun, joins it near Ngawi, where it begins its 20-mi passage through the Gunung Kendeng (the central limestone range) and emerges into the Solo Valley, where the river has little gradient and meanders over the lowland.

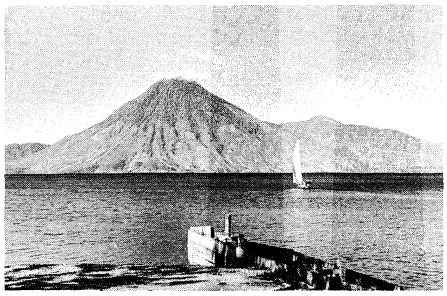
The marshy delta is used for fish ponds. To reduce silting of the strait between Madura and Java (the northern approach to Surabaya), the main mouth of the Solo was diverted north. In the dry season much of the riverbed is dry; in the wet season (November–April) the average volume (in the Solo Valley) is 15,500 cu ft (440 cu m), the maximum 100,000 cu ft. Remains of a very early hominid, Solo Man, were found in the region.

Sologne, district, north central France, occupying a flat alluvial plain of about 200 sq mi (520 sq km), bounded to the north by a great northward arc of the Loire River below Orléans, and to the south by the Cher River, flowing westward. Watered by several tributaries of the Loire and the Cher, Sologne extends over parts of the Loir-et-Cher, the Loiret, and the Cher *départements.* Covered with ponds, stagnant waters, and marshlands, which were extensively drained during the second half of the 19th century, the district produces cereals, vegetables, and vines. Fish are

raised intensively in many of the remaining lakes and ponds. Cattle are also reared, poultry is raised, and considerable stretches have been planted with trees. Sologne is reputed for its game. The chief town of the region is Romorantin.

Soloi (Cyprus): *see* Soli.

Sololá, department, southwestern Guatemala. Located entirely in the central highlands, it has an area of only 410 sq mi (1,061 sq km), of which 128 sq km are covered by spectacular Lake Atitlán (*see* Atitlán, Lake). The lake and the town of Santiago Atitlán, a favourite tourist area, occupy a valley dammed by volcanic ash at an altitude of about 5,125 ft (1,562 m). Maya Indians, who comprise the greater part of the population, grow corn (maize), wheat, and beans. On the southern shore of the lake are coffee plantations, and much land is used for the feeding of beef cattle and hogs. Sololá (*q.v.*), the departmental capital, is linked to the Pan-American Highway. Pop. (1982 est.) 173,401.



Lake Atitlán, Sololá, Guatemala
By courtesy of National Tourist Board, Guatemala City

Sololá, capital, Sololá department, southwestern Guatemala, in the central highlands at 6,932 ft (2,113 m) above sea level. Sololá overlooks spectacular Lake Atitlán, a few miles to the south. It is known for its Friday markets, for which hundreds of Indians come in from surrounding villages to trade or to worship at the 16th-century church, which was rebuilt after the 1902 earthquake. Coffee, grains, onions, and garlic are the principal products of the area; there is flour milling in the vicinity. Sololá lies on the Pan-American Highway, 75 mi (120 km) from Guatemala City. Pop. (1981 prelim.) mun., 29,226.

Solomon, Hebrew SHLOMO (fl. mid-10th century BC), son and successor of David and traditionally regarded as the greatest king of Israel. He maintained his dominions with military strength and established Israelite colonies to handle military, administrative, and commercial matters. The crowning achievement of his vast building program was the famous temple at his capital, Jerusalem. Solomon achieved fame as both sage and poet. He was traditionally regarded as the author of the Song of Solomon, and the Book of Proverbs contains collections of aphorisms and other teachings attributed to him.

Background. Nearly all that is factually known of Solomon comes from the Bible (especially I Kings 1–11 and II Chronicles 1–9). While the latter already contains some legendary material, it is, in the main, a wealth of historical facts of the most prosaic and reliable nature.

Solomon's background is both well known and colourful. His father, David, was a self-made king, who, against great odds, founded the Judaean dynasty and carved out an empire from the border of Egypt to the Euphrates River. His first and greatest enemies were the Philistines, who controlled Palestine and kept the Tyrians and Sidonians from prospering on the sea. By training the Israelite infantry, especially the bowmen, he proved more than a match for Philistine and other foes who employed horses and chariots. In addition, David made common cause with King Hiram of Tyre, forming a land and sea alliance that endured into Solomon's reign. Solomon, accordingly, inherited a considerable empire, along with a Phoenician ally of prime importance for naval and merchant marine operations.

Solomon's mother was Bathsheba, formerly the wife of David's Hittite general, Uriah. Bathsheba proved to be adept at court intrigue, and it is possible that she had exposed herself to David's susceptible eye with a view to rising from general's wife to queen.

David seems to have been senile toward the close of his reign, and one of his wives, Haggith, tried to execute a plot in which her son, Adonijah, would be appointed as David's successor. Adonijah enlisted the aid of powerful allies: David's senior general, Joab, Abiathar the priest, and several other court figures. It was only through the efforts of Bathsheba, in concert with the prophet Nathan, that Solomon, who was younger than several of his brothers, was anointed king while David was still alive.

Empire builder. As soon as he acceded to the throne, Solomon consolidated his position by liquidating his opponents ruthlessly, one by one. Once rid of his foes, he established his friends in the key posts of the military, governmental, and religious institutions. In an ancient Middle Eastern empire, this was almost the only means of establishing stable government.

Solomon also strengthened his position through marital alliances. Although the astonishing harem of Solomon—700 wives and 300 concubines—recorded in I Kings is no doubt an exaggeration of popular tradition, the figures do indicate his position as a grand monarch. Such a ménage brought prestige as well as pleasure, and the marriages were a form of diplomacy. He wed the sisters and daughters of kings from far and wide, cementing alliances of arms and trade to facilitate his establishment of a huge commercial empire. One of his brides was the daughter of an Egyptian pharaoh; the pharaoh captured and burned down the Canaanite city of Gezer and gave it to his son-in-law Solomon.

Like all empire builders, Solomon maintained his dominions with military strength. In addition to infantry, he had at his disposal impressive chariotry and cavalry. II Chron. 8 recounts Solomon's successful military operations in Syria, where his targets included Tadmor-Palmyra, a caravan oasis city in the desert, midway between Syria and Mesopotamia. His aim was the control of a great overland trading route. To consolidate his interests in the province, he planted Israelite colonies to look after military, administrative, and commercial matters. Such colonies, often including cities in which chariots and provisions were kept, were in the long tradition of combining mercantile and military personnel to take care of their sovereign's trading interests far from home. Megiddo, a town located at the pass through the Carmel range connecting the coastal plain with the Plain of Esdraelon, is the best preserved example of one of Solomon's cities. The remains of stalls for 450 horses discovered in Megiddo show that the figures of 1,400 chariots and 12,000 horses given for Solomon's forces in I Kings are scarcely exaggerated. (Some scholars question whether these are horse stalls or shop stalls.) The network of Solomon's far-flung trading posts eventually formed the nucleus of the first great Jewish Diaspora.

Palestine was destined to be an important centre because of its strategic location for trade by land and sea. By land, it alone connects Asia and Africa, and, along with Egypt, it is the only area with ports on the Atlantic–Mediterranean and Red Sea–Indian Ocean waterways. It was Solomon who fulfilled the commercial destiny of Palestine and brought it to its greatest heights.

The nature of his empire was predominantly commercial—it served him and friendly rulers to increase trade by land and sea. Hiram of Tyre, for example, needed the port of Ezion-geber, near Elath on the Gulf of Aqaba, which leads into the Red Sea and thence into the Indian Ocean. The joint merchant marine expeditions of Hiram and Solomon sailed practically to the ends of the known world. Some of the scheduled voyages took three years for the round trip.

A celebrated episode in the reign of Solomon is the visit of the Queen of Sheba. Her southern Arabian kingdom lay along the Red Sea route into the Indian Ocean, and her terrain was rich in gold, frankincense, and myrrh. Solomon needed her products and her trade routes for maintaining his commercial network; she needed Solomon's cooperation for marketing her goods in the Mediterranean via his Palestinian ports. Legend makes much of a romance between the Queen of Sheba and Solomon, for his granting her "all that she desired, whatever she asked" (I Kings 10:13) has been interpreted to include an offspring.

Solomon's Temple. The demand for fortresses and garrison cities throughout his homeland and empire made it necessary for Solomon to embark on a vast building program; the prosperity of the nation made such a program possible. He was especially lavish with his capital, Jerusalem, where he erected a city wall, a construction called the Millo, the royal palace, and the famous Temple. Around Jerusalem (but not in the Holy City itself), he built facilities, including shrines, for the main groups of foreigners on trading missions in Israel. Later generations, in less secure and less prosperous times, destroyed those shrines around Jerusalem in a parochial spirit that could not accommodate itself to Solomon's ecumenical outlook. Solomon's Temple was to assume an importance far beyond what its dimensions might suggest, for its site became the only central shrine for Judaism and early Christianity.

The prayer ascribed to Solomon in I Kings 8 when he dedicated the Temple is of far-reaching significance. In it the God of Jerusalem is the one and only God of the universe. In addition to invoking blessings on God's people Israel, Solomon begs God to heed also the prayers of aliens who come from the ends of the earth, having heard of the fame of Jerusalem and the great God who dwells there, and he reminds God that helping such aliens will further enhance the reputation of God and his Temple in every land. Solomon's involvement in international trade brought in its train intellectual and spiritual universalism, but it took a few centuries of maturation for the universality of the Solomonic age to find its classical expression in the words of Israel's prophets. Practical universality gave rise to universal religion, and not vice versa. Furthermore, international trade taught men the lesson that international peace is necessary for prosperity. The requirements of the Solomonic age led to the first known formulation of international peace; *i.e.*, "nation shall not lift up sword against nation, neither shall they learn war anymore" (Isaiah 2, Micah 4).

The vigour of Solomon's building program made it oppressive. For example, men had to put in one month out of every three in forced labour. In theory, such labour was to be performed by the Canaanites—not by the noble Hebrew tribesmen, who were supposed to be the administrators, priests, and fighters. But Solomon's demands were such that there were not enough Canaanites to go around, so

that Israelites were forced to do menial labour for the crown.

Solomon was a vigorous administrator, and he realized that the old division of the nation into 12 tribes posed a threat to the unity of the realm because the tribal feeling that was retained was not for the good of the state. Accordingly, he redivided the realm into 12 administrative districts, deviating, for the most part, from the tribal boundaries. The figure of 12 was retained because each district was to "support the palace" (*i.e.,* shoulder federal obligations) for one of the 12 months in the year. Each district had its royally appointed governor, and a chief ruled over the 12 governors. Another important but unpopular appointee of the king was the chief of taxation; taxes were exacted most commonly in the form of forced labour and in kind.

His legendary wisdom. Solomon also became famous as a sage. When two harlots each claimed to be the mother of the same baby, he determined the real mother by observing each woman's reaction to the prospect of dividing the child into two halves. Solomon was deemed wiser than all the sages of Egypt and the Middle East—even wiser than some ancient paragons of wisdom. The Book of Proverbs contains collections of aphorisms and other wise teachings attributed to him. Solomon was also famed as a poet who composed 1,005 songs. The biblical Song of Solomon is (spuriously) attributed to him in the opening verse. His reputation as a great lover, reflected in the size of his harem, is appropriately a major theme in the Song of Solomon. Post-biblical tradition attributed later works to him: the apocryphal Wisdom of Solomon, on the one hand, and the *Odes of Solomon* and *Psalms of Solomon,* on the other, are tributes to him as sage and poet.

Solomon's legend also stresses another dimension of his prowess: his power over all creatures, natural and supernatural. It was he, according to *The Arabian Nights,* who imprisoned jinn (supernatural beings below the level of angels and demons) in sealed jars and cast them into the sea. Magic texts, such as the Aramaic *Incantation Bowls,* invoke the potent seal of Solomon son of David. When Jesus is called "the Son of David," it does not mean simply that he was of the royal Davidic line but that the wonder-working Christ, against whom no demon could stand, was a veritable "Solomon son of David," that master over men and jinn.

Decline of the kingdom. Solomon's personal prestige and genius were required to perpetuate the powerful nation he had acquired from his father and then further strengthened. It is suspected that the increase in Israel's wealth was matched by an increase in extravagance and that the wealth was not diffused to the people. It is also considered possible that Solomon's treatment of the northern tribes showed favouritism to his own tribe of Judah. When his son Rehoboam succeeded him, the northern tribes wanted to know his policy concerning the burdens borne by the people. Rehoboam ill-advisedly announced a harsher course, whereupon the northern tribes seceded and formed their own Kingdom of Israel, leaving the descendants of Solomon with the southern Kingdom of Judah. Thus Solomon's empire was lost beyond recall, and even the homeland was split into two, often hostile, kingdoms. (C.H.G.)

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Solomon, Aubrey: *see* Eban, Abba (Solomon).

Solomon, Psalms of, a pseudepigraphal work (not in any biblical canon) comprising 18 psalms that were originally written in Hebrew, although only Greek and Syriac translations survive. Like the canonical Psalms, the *Psalms of Solomon* contains hymns, poems of admonition and instruction, and songs of thanksgiving and lamentation. Some of these psalms also contain technical musical notations suggesting that they were used in Jewish cultic rites. Many of them express belief in resurrection and free will, and two reveal messianic expectations.

The psalms most difficult to date are those primarily concerned with moral exhortation. Some contain obvious references to the Roman general Pompey's conquest of Jerusalem in 63 BC and to the attendant demise of the Hasmonean dynasty of Judaean rulers.

Solomon, Song of, also called CANTICLE OF CANTICLES, or SONG OF SONGS, an Old Testament book that belongs to the third section of the biblical canon, known as the Ketuvim, or "Writings." In the Hebrew Bible the Song of Solomon stands with Ruth, Lamentations, Ecclesiastes, and Esther and with them makes up the Megillot, five scrolls that are read on various religious festivals of the Jewish year. This book is the festal scroll for Pesaḥ (Passover), which celebrates the Exodus of the Israelites from Egypt. The book in its present form postdates the Babylonian Exile (5th century BC onward), but the poems that it preserves date from about the 10th century BC, the period of the Davidic monarchy.

The book, whose author is unknown (Solomon's name is a later addition), is a collection of love poems spoken alternately by a man and a woman. There is no coherent story in the book. A number of the poems systematically describe the beauty and excellence of the beloved. The Song of Solomon has received various interpretations, the most common being allegorical, dramatic, cultic, or literal. Among Jews, the allegorical interpretation regards the book as an allegory of God's love for the Israelites, with whom he has made a sacred covenant. Among Christians, the book is interpreted as describing the covenantal love of Christ for his church. In medieval mysticism, the Song of Solomon was construed to apply to the love between Christ and the human soul.

Dramatic interpretations of the Song of Solomon are based on much of the book's being in dialogue form. According to this view, the speakers in it are enacting roles in a dramatic love story that varies in outline according to the particular interpretation. In view of the absence of drama in ancient Semitic literatures, however, such interpretations are not very probable. The cultic interpretation views the book as a collection of songs associated with the practice of sacred marriage as observed by the Sumerians and other ancient Mesopotamian peoples.

The fourth interpretation, and the one that has perhaps gained the most credence among modern scholars, is simply that the Song of Solomon is a collection of secular love poems without any religious implications. According to this interpretation, the songs celebrate the joy and goodness of human love between the sexes and the sense of inner fulfillment and harmony with God's creation that arise from such love.

Solomon, Wisdom of, an example of the "wisdom" genre of religious literature, which commends a life of introspection and reflection on human existence, especially from an ethical perspective. It is an apocryphal work (noncanonical for Jews and Protestants) but is included in the Septuagint (Greek translation of the Old Testament) and was accepted into the Roman canon.

In the book, Wisdom is depicted as a feminine personification of an attribute of God; she is "a breath of the power of God, and a clear effluence of the glory of the Almighty." (From this concept was developed the Logos theology of the Christian Church Fathers to explain Jesus Christ's relationship to God.) Written by a Jew in Alexandria sometime during the 1st century BC, the book was in effect a defense of Judaism, for, in describing Jewish doctrines in terms of Hellenistic philosophy, it showed that philosophical truths were applicable to the Jewish concept of God. Its argument was perhaps directed both to Jews who, responding to their non-Jewish environment, had apostatized and adopted pagan gods and to rigorist Jews who in the same environment advocated complete religious and social isolation.

The first of the book's three sections is written in poetic form and is concerned with fostering enthusiasm for religious belief and practice, with emphasis on the superiority of belief over impiety. The second, mixing poetry and prose, praises Wisdom. The third, likewise a mixture of poetic and prose styles, attempts to prove that Wisdom has guided all of Israelite history. This section also condemns idol worship.

The original text was most probably written in Greek; fragments were discovered in the Essene library, at Qumrān, in Palestine.

Solomon ben Yehuda ibn Gabirol (Hebrew poet): *see* Ibn Gabirol.

Solomon Islands, independent island nation in the southwestern Pacific Ocean, extending southeastward from the Northern Solomons (Buka and Bougainville islands) of Papua New Guinea and covering a total land area of 10,954 square miles (28,370 square km). The capital is Honiara on Guadalcanal Island. The population in 1988 was estimated at 302,000. *See also* Pacific Islands.

For current history and for statistics on society and economy, *see* BRITANNICA WORLD DATA ANNUAL.

The land. The group consists of eight large volcanic islands and island groups, arranged in two parallel chains—Vella Lavella, Kolombangara, New Georgia, and Guadalcanal in the western chain and Choiseul, Santa Isabel, and Malaita in the eastern chain. They form a continuation of the southeastern island arc of Papua New Guinea and converge in the southeast on Makira (San Cristóbal). There are also a number of small outlying islands and atolls. Two of the country's four active volcanoes and the highest mountain, Mount Makarakomburu (8,028 feet [2,447 m]) on Guadalcanal, are located on the heavily rainforested island chains. Of the outer islands, the Santa Cruz group and easternmost Anuta, Fataka, and Tikopia are volcanic, while the remainder are atolls; Rennell and Bellona are atolls elevated geologically to a few hundred feet above sea level.

The larger islands have short, swift-flowing rivers draining the mountains, which receive an average of 120–140 inches (3,000–3,500 mm) of rain annually. The climate is hot and humid, with a mean annual temperature of 80° F (27°C), peaking, together with rainfall, from November to April, when cyclones usually occur; there is no distinct dry season.

More than 90 percent of the land is forested, with only lower-lying coastal areas and valleys cleared for agriculture. Lumbering is an im-

portant industry, but public land that is harvested is replanted with fast-growing tree species.

Wildlife is akin to that of other Pacific Islands, with many bird species; but there are also crocodiles, phalangers, bush mice, and a skink with a prehensile tail (which is endemic to the Solomons).

Mineral deposits are limited but include substantial deposits of phosphates on Bellona atoll and bauxite on Vaghena (Wagina) and Rennell. Small deposits of gold, silver, and copper are found on Guadalcanal.

The people. The Solomons' population consists principally of Melanesians (93 percent); Polynesians (4 percent), found mainly on the outlying atolls; Micronesians (1 percent); and small minorities of Europeans and Chinese. The official language is English, but Pijin, an English-based pidgin, is widely used and understood, and there are more than 60 indigenous Melanesian languages. More than 95 percent of the islanders are Christian, with Church of Melanesians (Anglicans), Roman Catholics, and South Sea Evangelicals predominating. More than four-fifths of the population is rural. Tikopia is the most densely populated of the islands. Demographic rates generally are those of a developing country, with a high birth rate and average death rate by world standards. Almost half of the total population is less than 15 years of age. The largest town is Honiara.

The economy. The Solomons have a developing, free-enterprise economy based mainly on agriculture, fishing, and lumbering. The gross national product (GNP) per capita, which has not grown as rapidly as the population, is relatively low for the Pacific Ocean islands.

About 2 percent of the total land is cultivated. Copra (produced mostly by smallholders and cooperatives), coconuts, palm oil, and cacao are the main cash crops. Subsistence crops include sweet potatoes, taro, yams, rice, bananas, and vegetables. Pigs and cattle are raised to satisfy domestic demand.

Lumbering is a principal industry on the main islands, with roundwood the main product, and about half of the islands' total lumber production exported. Sawmills provide cut lumber for local demand, and there is a furniture industry. Fishing is another major industry, with skipjack tuna the main species caught. Canning and freezing plants process fish for export. Despite international interest in the atoll phosphate deposits, only gold on Guadalcanal is mined.

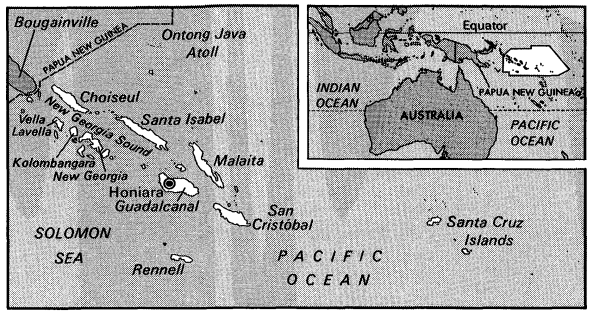
Manufacturing includes boatbuilding and the production of fibreglass goods, batteries, clothing, biscuits, tobacco, and soft drinks. Traditional handicrafts of woodwork, shell inlay, mats, baskets, and shell jewelry are made for the tourist market and for export. Electrical energy is produced by thermal power plants.

Tourism, centred on cruise ships and visits to World War II battlefields (mostly by Japanese tourists), has grown, and the islands have joined the Melanesian Tourist Federation to promote further growth.

The labour force suffers from a lack of skilled workers, and many unskilled workers are concentrated in subsistence agriculture or fishing activities. There are several trade unions, but joint consultation is encouraged to resolve labour disputes.

About one-eighth of the roads are paved. Of greater importance is interisland shipping operated both privately and by the government; it uses ports at Honiara, Yandina, Noro, and Gizo. Several airports handle international air traffic, and interisland service is provided by Solomon Islands Airways, Ltd.

Exports, consisting mainly of fish, copra, and lumber, have grown to exceed imports and go mainly to Japan, Thailand, and the United Kingdom. The main imports—machinery and transport equipment, fuels, manufactured goods, food and food products—come mostly from Australia, Japan, and Singapore. The Solomon Islands is a member of the United Nations, the Commonwealth, the Asian Development Bank, and the International Monetary Fund.



Solomon Islands

Government and social conditions. The Solomons are a constitutional monarchy with the British monarch, represented by a governor-general, as head of state. Internally they are a parliamentary state with a unicameral National Parliament having 38 members elected to four-year terms. The executive branch comprises the prime minister, who heads an appointed Cabinet. Political parties include the United Party, People's Alliance Party, and the National Democratic Party. The judiciary includes a high court, magistrates' court, and indigenous courts. Local government is through local councils elected by universal adult suffrage. Government-sponsored social security covers work-related accidents.

Health care is generally good, with hospitals or clinics available on all islands; both government- and church-supported hospitals provide care, but malaria and tuberculosis remain problems. Life expectancy is about 54 years.

Education is not compulsory; government- and church-operated schools provide formal education to about two-thirds of school-age children. There are also government and private secondary schools, a multifaculty college of higher education, and a branch of the University of the South Pacific (1971).

Newspapers include one government-owned and several private weekly newspapers, supplemented by daily news bulletins. The Solomon Islands Broadcasting Corporation, an independent statutory body, provides radio broadcasts in English and Pijin. Traditional culture, including crafts, music, and dance, are promoted by the Solomon Islands National Museum and Cultural Centre.

History. The Solomon Islands were initially settled by at least 2000 BC, and materials radiocarbon dated to *c.* 1000 BC have been excavated on Gawa, Guadalcanal, the Reef Islands, and Santa Ana. Pottery was in use in the islands by the first half of the 1st millennium AD. The first European to reach the islands (1568) was the Spanish explorer Alvaro de Mendaña de Neira, who, anticipating their natural riches, named them Islas de Solomon for the wealthy biblical king. Unsuccessful Spanish settlements between 1595 and 1606 led to a loss of interest in the islands. The Dutch, French, and British subsequently explored and charted the islands; two French ships, the *Boussole* and the *Astrolabe,* wrecked on Vanikoro's reef in 1788, were first found in 1826 and were further investigated in 1962. After Roman Catholic missionaries in the 1840s failed, the Anglicans began working with the islanders in the 1850s and finally settled in the area in the 1870s. Between 1870 and 1911 the indigenous inhabitants of the islands were exploited for labour to work the plantations of Fiji and other islands. A German protectorate was declared over the Northern Solomons with the Anglo-German treaty of 1886, but these claims, except for Buka and Bougainville, were transferred in 1898–99 to Britain in return for the recognition of German claims in Western Samoa. The British Solomon Islands Protectorate had been declared in 1893 over the southern islands, in response to abuses associated with labour recruitment. Large-scale plantations were started in 1905 by British commercial interests allowed into the islands. Shortly after the British evacuated the islands the Japanese, in 1942, invaded the protectorate, and Tulagi, then the administrative seat, was destroyed. Fighting in the Solomons in the next three years was among the most bitter in the Pacific, particularly the long struggle on Guadalcanal. Honiara was built on the north coast of Guadalcanal at the end of the war as the new capital. From 1946 to 1950 an independence movement, known as Marching Rule, developed. In 1970 a new constitution provided a governing council with some local representation. Another constitution in 1974 created a governor and legislative council and increased local representation.

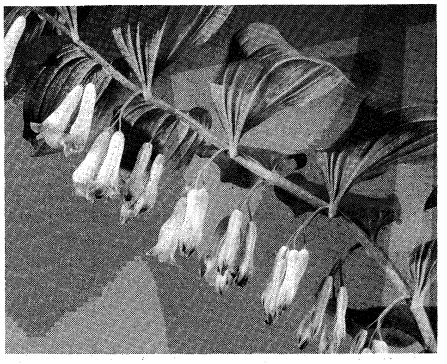
In 1975 the protectorate was renamed Solomon Islands and granted internal self-government, and it attained full independence in 1978.

Solomon Sea, portion of the western South Pacific Ocean, bounded on the west by New Guinea, on the north by New Britain, and on the east by the Solomon Islands. With an area of 280,000 square miles (720,000 square km), the sea contains the Louisiade Archipelago, New Georgia, and Guadalcanal Island. It opens to the Coral Sea (south), the Bismarck Sea (northwest), and the open ocean (northeast). The seafloor is divided into two principal basins. The New Britain Basin in the north has a general depth of more than 13,000 feet (4,000 m); deeper areas, including the New Britain Trench, plunge to a maximum depth of 29,988 feet (9,140 m) in the Planet Deep. The southerly Solomon Basin reaches depths of 23,000 feet (7,000 m). A less important seafloor feature is the Santa Isabel Trough, or The Slot, running between the islands of New Georgia and Santa Isabel. During winter (July–September), a stream of the Pacific South Equatorial Current flows into the sea from the north, then branches southeast and southwest. In the summer it reverses flow. First navigated by Polynesians, Arabs, and Chinese, the sea was not crossed by a European until Álvaro de Mendaña de Neira arrived in 1567. The Solomon Sea was the scene of major U.S.–Japanese naval encounters during World War II.

Solomonid DYNASTY, line of Ethiopian emperors who, according to tradition, were descended from Menelik I, the son of Solomon and the Queen of Sheba. Their rule, which ended when Haile Selassie I was deposed in 1974, was continous but for two periods, the reign of the Zague dynasty (11th–15th century) and the reign of Tewodros II (1855–68).

Solomon's Bay (Sinai, Egypt): *see* Ra's Naṣrānī.

Solomon's seal, any plant of the genus *Polygonatum* of the family Liliaceae, consisting of about 25 species of herbaceous perennials with thick, creeping underground stems and tall, drooping stems, distributed throughout the



Solomon's seal (*Polygonatum*)
Roche

Northern Hemisphere. In the leaf axils of the plants are clusters of white or greenish-white flowers, which are followed by red berries.

The leaves form two rows along the upper part of the stem. Similar plants of the genus *Smilacina,* known as false Solomon's seal, bear their flower clusters at the tips of the stems.

Solomós, Dhionísios, Komis (Count) (b. April 8, 1798, Zante, Ionion Islands—d. Nov. 21, 1857, Corfu), first poet of modern Greece to show the capabilities of Demotic Greek when inspired by wide culture and a first-rate lyrical fancy.

His earliest poems were written in Italian, but in 1822 he determined to write in the spoken tongue of Greece. His *Ímnos is tín elevtherían* ("Hymn to Liberty") was composed in 1823, and his poem on the death of Lord Byron in 1824–25. The unfinished *Lambros,* a romantic poem of the revolutionary times, was begun in 1826. To this period (1823–28) belong also some shorter lyrical pieces and some satires, of which the most notable is *I Ginaíka tís Zakínthou* ("The Woman of Zante").

His lyrical exuberance was curbed by a growing preoccupation with German theories of dramatic form and by an inhibiting dissatisfaction with the as yet meagre resources of his chosen linguistic medium. These impediments, together with a disastrous family quarrel, explain why his major poems of this period remain fragmentary. Nonetheless, *O kritikós* (1833; "The Cretan"), the second and third sketches of *Oi elévtheroi poliorkiménoi* ("The Free Besieged"; 1827–49)—which deals with the siege of Missolonghi—and *O pórfiras* (1849; "The Shark"), exhibit, even in their fragments, a sense of rhythm, a "curious felicity," and a melody of cadence not found in his juvenilia.

Solon (b. *c.* 630 BC—d. *c.* 560), Athenian statesman, known as one of the Seven Wise Men of Greece. He ended exclusive aristocratic control of the government, substituted a system of control by the wealthy, and introduced a new and more humane law code. He was also a noted poet.

Solon's era. In Solon's lifetime, the Greeks had not yet begun to write history or biography. It was not until the 5th century that accounts of his life and works began to be put together, on the evidence of his poems (of which the 300 or so lines preserved by quotation probably represent only a small proportion), his law code, oral tradition, and inference from existing institutions. Although certain details have a legendary ring, the main features of the story seem to be reliable.

Solon was of noble descent but moderate means. As the tradition states and his travels and economic measures suggest, he may have been a merchant. He first became prominent in about 600 BC, when the Athenians were disheartened by ill success in a war with their neighbours of Megara for possession of the island of Salamis. By publicly reciting a poem that made the issue a matter of national honour and that called on the Athenians to "arise and come to Salamis, to win that fair island and undo our shame," Solon induced them to resume the war, which they eventually won.

The early 6th century was a troubled time for the Athenians in other ways as well. Society was dominated by an aristocracy of birth, the eupatridae, who owned the best land, monopolized the government, and were themselves split into rival factions. The poorer farmers were easily driven into debt by them and when unable to pay were reduced to the condition of serfs on their own land and, in extreme cases, sold into slavery. The intermediate classes of middling farmers, craftsmen, and merchants resented their exclusion from the government. As Solon described it, no Athenian could escape these social, economic, and political evils:

> The public evil enters the house of each man, the gates of his courtyard cannot keep it out, it leaps over the high wall; let him flee to a corner of his bedchamber, it will certainly find him out.

The public evil might well have culminated in a revolution and subsequent tyranny (dictatorship), as it had in other Greek states, had it not been for Solon, to whom Athenians of all classes turned in the hope of a generally satisfactory solution of their problems. Because he believed in moderation and in an ordered society in which each class had its proper place and function, his solution was not revolution but reform.

Economic reforms. Solon had already held office as archon (annual chief ruler) *c.* 594 BC. It was probably about 20 years later that he was given full powers as reformer and legislator. His first concern was to relieve the immediate distress caused by debt. He redeemed all the forfeited land and freed all the enslaved citizens, probably by fiat. This measure, known popularly as the "shaking off of burdens," was described by Solon in one of his poems:

> These things the black earth . . . could best witness for the judgment of posterity; from whose surface I plucked up the marking-stones [probably signs of the farmers' indebtedness] planted all about, so that she who was enslaved is now free. And I brought back to Athens...many who had been sold, justly or unjustly, or who had fled under the constraint of debt, wandering far afield and no longer speaking the Attic tongue; and I freed those who suffered shameful slavery here and trembled at their masters' whims.

He also prohibited for the future all loans secured on the borrower's person. But he refused to go to the length demanded by the poor, which was to redistribute the land. Instead, he passed measures designed to increase the general prosperity and to provide alternative occupations for those unable to live by farming: *e.g.,* trades and professions were encouraged; the export of produce other than olive oil was forbidden (so much grain had been exported that not enough remained to feed the population of Attica); the circulation of coined money (invented in Solon's lifetime) was stimulated by the minting of a native Athenian coinage on a more suitable standard than that of the coins of neighbours, which had been used hitherto; and new weights and measures were introduced. The rapid spread of the new coinage and of Athenian products, particularly olive oil and pottery, throughout the commercial world of the times, attested by archaeology, shows that these measures were effective. Poverty, though not eliminated, was never again in Attica the crying evil that it had been before Solon's reforms.

Political reforms. Solon's new political constitution abolished the monopoly of the eupatridae and substituted for it government by the wealthy citizens. He instituted a census of annual income, reckoned primarily in measures of grain, oil, and wine, the principal products of the soil, and divided the citizens into four income groups, accordingly. (Those whose income was in other forms, including money, must have been rated on a system of equivalents.) Henceforth, political privilege was allotted on the basis of these divisions, without regard to birth. All citizens were entitled to attend the general Assembly (Ecclesia), which became, at least potentially, the sovereign body, entitled to pass laws and decrees, elect officials, and hear appeals from the most important decisions of the courts. All but those in the poorest group might serve, a year at a time, on a new Council of Four Hundred, which was to prepare business for the Assembly. The higher governmental posts were reserved for citizens of the top two income groups. Thus, the foundations of the future democracy were laid. But a strong conservative element remained in the ancient Council of the Hill of Ares (Areopagus), and the people themselves for a long time preferred to entrust the most important positions to members of the old aristocratic families.

Code of laws. Solon's third great contribution to the future good of Athens was his new code of laws. The first written code at Athens, that of Draco (*c.* 624 BC), was still in force. Draco's laws were shockingly severe (hence the term draconian)—so severe that they were said to have been written not in ink but in blood. On the civil side they permitted enslavement for debt, and death seems to have been the penalty for almost all criminal offenses. Solon revised every statute except that on homicide and made Athenian law altogether more humane. His code, though supplemented and modified, remained the foundation of Athenian statute law until the end of the 5th century, and parts of it were embodied in the new codification made at that time.

Response to Solon's reforms. When Solon had completed his task, complaints came in from all sides. In attempting to satisfy all, he had satisfied none. The nobles had hoped that he would make only marginal changes; the poor, that he would distribute all the land in equal shares and, if necessary, make himself tyrant in order to enforce the redistribution. But Solon, although concerned for freedom, justice, and humanity, was no egalitarian, nor had he any ambition for autocratic power. His poems make this clear:

> I gave the people as much privilege as sufficed, . . . and I took care that the rich and powerful should suffer nothing amiss; I stood holding a strong shield over both parties, and let neither side prevail unjustly.
>
> It does not please me to achieve anything by force as a tyrant, or to let the nobles and the meaner sort share equally in the rich land.

Though discontented, the Athenians stood by their promise to accept Solon's dispositions; they were given validity for 100 years and posted for all to see on revolving wooden tablets. To avoid having to defend and explain them further, he set off on a series of travels, undertaking not to return for 10 years.

Later years. Among the places he visited were Egypt and Cyprus. These visits are attested by his poems. Less credible (because of chronological difficulties) is the famous encounter with the fabulously rich Croesus, king of Lydia, who, so the story goes, learned from Solon that wealth and power were not happi-

ness and that, so long as he was alive, no man could be counted happy.

When Solon returned, he found the citizens divided into regional factions headed by prominent nobles. Of these, his friend Peisistratus, general in the final war for Salamis and leader of northeastern Attica, seemed to Solon to be planning to become tyrant. The old statesman's urgent warnings were disregarded, even dismissed as the ravings of a madman. His reply was that "A little time will show the citizens my madness, /Yes, will show, when truth comes in our midst." It was not long before he was proved right: Peisistratus did become tyrant (560 BC). Although on this occasion he was soon ejected, it seems that Solon did not live to see it.

Reputation. Solon embodied the cardinal Greek virtue of moderation. He put an end to the worst evils of poverty in Attica and provided his fellow countrymen with a balanced constitution and a humane code of laws. Standing, in time, midway between the epic poets Homer and Hesiod (fl. *c.* 800) and the 5th-century classical tragedians Aeschylus, Sophocles, and Euripides, Solon was also Athens' first poet—and a poet who truly belonged to Athens. As the medium through which he warned, challenged, counselled the people, and urged them to action, his poetry was the instrument of his statesmanship.

It was probably before the end of the 5th century that the Greeks first drew up a list of the Seven Wise Men who had been prominent intellectually and politically in the 6th century. The earliest list, accepted by the Greek philosopher Plato, did not satisfy later writers, who expanded it to 10 and even 17 to accommodate rival claimants. Every version, however, contained four names that were not challenged. One of them was that of Solon of Athens, a testimony to the abiding respect in which his memory was held. (T.J.C.)

BIBLIOGRAPHY. The principal ancient evidence for the life and work of Solon consists of the surviving fragments of his laws, edited, without translation, by E. Ruschenbusch, *Σόλωνος νόμοι* (1966); poems (discussion, text, translation, and commentary) in I.M. Linforth, *Solon the Athenian,* pp. 103–245 (1919); the discussion of his reforms in the Aristotelian *Constitution of Athens,* trans. by K. Von Fritz and E. Kapp, pp. 72–82 (1950); and the biography by Plutarch, written in the early 2nd century AD (translations in Everyman edition of the *Lives,* vol. 1, pp. 120–144; and by B. Perrin in the Loeb edition, vol. 1, pp. 405–499). There are separate modern accounts of Solon in English by Linforth (cited above); by K. Freeman, *The Work and Life of Solon* (1926); and by W.J. Woodhouse, *Solon the Liberator* (1938), dealing mainly with the agrarian reforms. There is an excellent short account by A. Andrewes in *The Greek Tyrants,* ch. 7 (1956).

Solor Islands, Bahasa Indonesia KEPULAUAN SOLOR, group of three major and several smaller islands, Nusa Tenggara Timur *propinsi* (Lesser Sunda Islands province), Indonesia, west of the Kepulauan (islands) Alor, with which they share population characteristics. The area of the group is 804 sq mi (2,082 sq km). The largest island is Pulau (island) Lomblen (499 sq mi), which has several active volcanoes, including Mount Api (Fire Mountain), and Indonesia's only whaling village, at Lamelerap. Pulau Adonara has a volcano; Pulau Solor is also hilly and contains the ruins of an old Portuguese fort. The people are Oceanic Negroids, speaking many languages, all belonging to the Austronesian (Malayo-Polynesian) family. Most local inhabitants are animists, with some Muslim and Christian communities along the coasts. Ceremonial occasions often involve an exchange of pigs, gongs, and *mokos* (highly prized cast-bronze drums of unknown origin). Pop. (latest est.) 14,761.

Solorese, also called SOLOR, or SOLOT, tribe inhabiting the Lesser Sunda Islands in Indonesia, specifically Solor, Adonara, Lomblen, and eastern Flores. The Solorese speak three Malayo-Polynesian dialects in the Ambon-Timor language group. They are divided into two opposing groups, Demon and Padzi, who have different political and religious beliefs. Solorese villages of 100–500 people are structured around clan lineages. A clan may be confined to one village, or scattered among many. Inheritance is patrilineal. Agricultural land is clan-owned and used for slash-and-burn cultivation of corn (maize) and dry rice. Although most Solorese originally inhabited mountain areas, the influx of Dutch drove some to the coast. These coastal Solorese fish and trade. The Solorese were also influenced by Islāmic and Christian missionaries as early as the 16th century. Today most are Muslim, except for the Roman Catholics on Flores. The indigenous religion honoured the high god Lera Wulan and his female counterpart, Tana Ekan, as well as lesser spirits. Local political decisions are made by the head of the original or land-owning clan and four other ritual leaders.

Solothurn (German), French SOLEURE, canton, northwestern Switzerland, bounded by the cantons of Bern to the north, west, and south; Jura to the west; and Basel-Landschaft and Aargau to the east. It is drained by the Aare River and its tributaries and has an area of 305 sq mi (791 sq km). Consisting of territories acquired by Solothurn (*q.v.*), its capital city, from which it took its name, it has an irregular shape, including two completely detached districts bordering on France in the north. It also includes the foothills of the Jura Mountains and a plain along the Aare Valley, part of which extends into Bern canton.

Part of the Helvetic Republic after 1798, it became in 1803 one of the 19 cantons of the Swiss Confederation as reconstituted by Napoleon's Act of Mediation. Although distinctly Roman Catholic, it did not join the Sonderbund (separatist league of Catholic cantons) in 1845, and it approved the federal constitutions of 1848 and 1874. The present cantonal constitution dates from 1887 but was substantially revised in 1895.

Until the 19th century, the cantonal economic activities were mainly agricultural and pastoral. Although these are still important, the population is largely engaged in the manufacture of a variety of goods, including watches, jewelry, shoes, cotton textiles, paper, cellulose, cement, auto parts, iron and steel products, and electrical-communications equipment. A nuclear power station began operation at Gösgen in 1979. The canton has excellent road and rail connections. Olten is a railway junction for direct lines from Geneva, Zürich, and Basel and the St. Gotthard Pass via Luzern. The population is almost entirely German speaking, with three-fifths Roman Catholics and two-fifths Protestants. Pop. (1983 est.) 217,964.

Solothurn (German), French SOLEURE, capital of Solothurn canton, northwestern Switzerland, on the Aare River, south of Basel. It originated as the Celtic and Roman stronghold of Salodurum, occupying a strategic position at the approach to the Rhine from the southwest. The medieval town grew around the remains of the Roman *castrum* (fort) and a house of secular canons, which was founded in the 8th century in honour of St. Ursus. The dukes of Zähringen acquired jurisdiction over the town in 1127, but with the extinction of that house in 1218 it became a free imperial city and took the canons under its protection. In 1295 it allied itself with Bern, through which it became associated with the Swiss Confederation. An unsuccessful Habsburg attack in 1382 drew Solothurn into the Battle of Sempach, and it was included in the treaty of 1394 by which the Habsburgs renounced their claims to all territories within the Confederation. In the 15th century the town acquired by purchase or conquest the main part of the territories of the present canton, and in 1481 it was admitted to full membership in the Confederation.

Dominating the town is the Cathedral of St. Ursus (1762–73, on an earlier foundation), since 1828 the cathedral church of the bishop of Basel. Other notable buildings are the Jesuit church (1680–88), the Clock Tower, or Zeitglockenturm (1250), the 15th-century town hall, and the Zeughaus, or Arsenal (1610–14), which houses Switzerland's finest collection of armour and old weapons. There are some fine 16th-century fountains, bulwarks, and gates that survive from the medieval fortifications, and a modern museum.

Industrial activity includes watchmaking, engineering, and the manufacture of machinery, electrical and technical equipment, textiles, and paper. Solothurn's position at the foot of the Jura and near the navigable portion of the Aare has always made it a junction of various routes; seven railway lines branch off there. The population is German speaking with a Roman Catholic majority. Pop. (1983 est.) 15,576.

Solouque, Faustin-Élie: *see* Soulouque, Faustin-Élie.

Solovets Islands, Russian SOLOVETSKIYE OSTROVA, group of islands, Arkhangelsk oblast (administrative region), Russian Soviet Federated Socialist Republic, in the White Sea at its junction with the Onega Bay. The archipelago consists of three large islands, Solovets, Bolshoy (Great) Muksalma, and Anzersky, as well as several smaller ones; it has a total area of 134 sq mi (347 sq km). The islands are largely rocky, consisting of granites and gneisses, with an irregular hilly surface covered with mixed forest and marshy in areas. The highest point on the islands, Mt. Golgofa on Anzersky, reaches 351 ft (107 m). The Solovets Monastery, one of the largest in Russia, was founded in the 15th century on Solovets Island. In 1974 the Solovets Islands were designated a state historic and nature preserve.

List of Abbreviations

A.B.	bachelor of arts (Latin *artium baccalaureus*)
ac	acre(s)
Ac	actinium
AC	alternating current
A.C.T.	Australian Capital Territory
AD	in the year of the Lord (Latin *anno Domini*)
Adm.	Admiral
Afg.	Afghanistan
Ag	silver (Latin *argentum*)
AG	Limited-liability Company (German *Aktiengesellschaft*)
AH	in the year of the hijrah (hegira), or Muslim era (Latin *anno Hegirae*)
Al	aluminum, aluminium
Ala.	Alabama
Alb.	Albania
Alg.	Algeria
Alta.	Alberta
Am	americium
AM	before noon (Latin *ante meridiem*)
AM	amplitude modulation
A.M.	master of arts (Latin *artium magister*)
Ar	argon
Arg.	Argentina
Ariz.	Arizona
Ark.	Arkansas
As	arsenic
A.S.S.R.	Autonomous Soviet Socialist Republic
At	astatine
Au	gold (Latin *aurum*)
Aug.	August
b.	born
B	boron
Ba	barium
B.A.	bachelor of arts
BC	before Christ
B.C.	British Columbia
BCE	before the Christian era, or Common Era
Be	beryllium
B.Ed.	bachelor of education
Belg.	Belgium
Bi	bismuth
Bk	berkelium
Bol.	Bolivia
BP	before the present
B.Ph.	bachelor of philosophy
Br	bromine
Braz.	Brazil
Brig.	Brigadier
Brit.	British
B.S.	bachelor of science
B.Sc.	bachelor of science
Bulg.	Bulgaria
c.	about, approximately (Latin *circa*)
C	carbon; Celsius
Ca	calcium
Calif.	California
Can.	Canada
Capt.	Captain
Cb	columbium
C.B.	Companion of the Order of the Bath
C.B.E.	Companion of the Order of the British Empire
Cd	cadmium
Ce	cerium
CE	Christian era, Common Era
cf.	compare (Latin *confer*)
Cf	californium
cg	centigram(s)
ch.	chapter
C.H.	Member of the Order of Companions of Honour
Chron.	Chronicles (Bible)
Cia.	Company (Italian *Compagnia;* Portuguese *Companhia;* Spanish *Compañia*)
Cie.	Company (French *Compagnie*)
cl	centilitre(s)
Cl	chlorine
cm	centimetre(s)
Cm	curium
C.M.G.	Companion of the Order of St. Michael and St. George
CMSA	consolidated metropolitan statistical area
Co	cobalt
Co.	Company
Col.	Colonel; Colossians (Bible)
Colo.	Colorado
Colom.	Colombia
Comdr.	Commander
Comdt.	Commandant
Commo.	Commodore
Conn.	Connecticut
Cor.	Corinthians (Bible)
Corp.	Corporation
cos	cosine
cot	cotangent
Cr	chromium
Cs	cesium
csc	cosecant
cu	cubic
Cu	copper (Latin *cuprum*)
C.V.O.	Commander of the Royal Victorian Order
Czech.	Czechoslovakia
d.	died
Dan.	Daniel (Bible)
D.B.E.	Dame Commander of the Order of the British Empire
DC	direct current
D.C.	District of Columbia
D.C.M.G.	Dame Commander of the Order of St. Michael and St. George
D.C.V.O.	Dame Commander of the Royal Victorian Order
D.D.	doctor of divinity
Dec.	December
Del.	Delaware
Den.	Denmark
Deut.	Deuteronomy (Bible)
D.F.	Federal District (Spanish *Distrito Federal*)
D.Litt.	doctor of letters (Latin *doctor litterarum*)
Dom.Rep.	Dominican Republic
Dr.	Doctor
Dy	dysprosium
E	east
Eccles.	Ecclesiastes (Bible)
ed.	edited; edition; editor
Ed.B.	bachelor of education
eds.	editors
e.g.	for example (Latin *exempli gratia*)
E.Ger.	East Germany
Eng.	England; English
Eph.	Ephesians (Bible)
Er	erbium
Es	einsteinium
est.	estimate; estimated
Esth.	Esther (Bible)
et al.	and others (Latin *et alii,* or *aliae*)
et seq.	and following page(s) (Latin *et sequens, sequentes,* or *sequentia*)
etc.	and so forth (Latin *et cetera*)
Eth.	Ethiopia
Eu	europium
Ex.	Exodus (Bible)
Ezek.	Ezekiel (Bible)
F	Fahrenheit; fluorine
Fe	iron (Latin *ferrum*)
Feb.	February
ff.	and following pages
Fig.	Figure
Fin.	Finland
fl.	flourished (Latin *floruit*)
Fla.	Florida
Fm	fermium
FM	frequency modulation
Fr	francium
Fr.	France
ft	foot, feet
Ft.	Fort
g	gram(s)
Ga	gallium
Ga.	Georgia
gal	gallon(s)
Gal.	Galatians (Bible)
G.B.E.	Knight (or Dame) Grand Cross of the Order of the British Empire
G.C.B.	Knight (or Dame) Grand Cross of the Order of the Bath
G.C.M.G.	Knight (or Dame) Grand Cross of the Order of St. Michael and St. George
G.C.V.O.	Knight (or Dame) Grand Cross of the Royal Victorian Order
Gd	gadolinium
Ge	germanium
Gen.	General; Genesis (Bible)
Ger.	Germany
GmbH	Company with Limited Liability (German *Gesellschaft mit beschränkter Haftung*)
Guat.	Guatemala
h	hour
H	hydrogen
ha	hectare(s)
Ha	hahnium
Hab.	Habakkuk (Bible)
Hag.	Haggai (Bible)
He	helium
Heb.	Hebrews (Bible)
Hf	hafnium
Hg	mercury (Latin *hydrargyrum*)
HMS	His, or Her, Majesty's Ship, or Service
HMSO	His, or Her, Majesty's Stationery Office
Ho	holmium
Hos.	Hosea (Bible)
hr	hour(s)
Hung.	Hungary
I	iodine
ibid.	in the same place (Latin *ibidem*)
Ice.	Iceland
i.e.	that is (Latin *id est*)
Ill.	Illinois
in.	inch(es)
In	indium
Inc.	Incorporated
Ind.	Indiana
Indon.	Indonesia
Ir	iridium
Ire.	Ireland
Isa.	Isaiah (Bible)
Jam.	Jamaica
Jan.	January
Jer.	Jeremiah (Bible)
Josh.	Joshua (Bible)
Jr.	Junior
Judg.	Judges (Bible)
K	Kelvin; potassium (Latin *kalium*); Köchel catalog number
Kan.	Kansas
K.B.E.	Knight Commander of the Order of the British Empire
K.C.B.	Knight Commander of the Order of the Bath
K.C.M.G.	Knight Commander of the Order of St. Michael and St. George
K.C.V.O.	Knight Commander of the Royal Victorian Order
kg	kilogram(s)
KG	Limited Partnership (German *Kommandit Gesellschaft*)
K.G.	Knight of the Order of the Garter
KK	Limited-liability Company (Japanese *Kabushiki Kaisha*)
kl	kilolitre(s)
km	kilometre(s)
kph	kilometre(s) per hour
Kr	krypton
K.T.	Knight of the Order of the Thistle
Ky.	Kentucky
l	litre(s)
La	lanthanum
La.	Louisiana
Lam.	Lamentations (Bible)
lb	pound(s)
Lev.	Leviticus (Bible)
Li	lithium
Liech.	Liechtenstein
Lieut.	Lieutenant
LL.B.	bachelor of laws (Latin *legum baccalaureus*)
LL.D.	doctor of laws (Latin *legum doctor*)
log	logarithm
Lr	lawrencium
Ltd.	Limited
Lu	lutetium
Luxem.	Luxembourg
m	metre(s)
M.A.	master of arts
Maj.	Major
Mal.	Malachi (Bible)
Man.	Manitoba
Mass.	Massachusetts
Matt.	Matthew (Bible)
M.B.E.	Member of the Order of the British Empire
mbH	Limited, with Limited Liability (German *mit beschränkter Haftung*)
Md	mendelevium
Md.	Maryland
M.D.	doctor of medicine (Latin *medicinae doctor*)
Mex.	Mexico
mg	milligram(s)
Mg	magnesium
mi	mile(s)
Mic.	Micah (Bible)
Mich.	Michigan
Mij	Company (Dutch *Maatschappij*)
min	minute(s)
Minn.	Minnesota
Miss.	Mississippi
ml	millilitre(s)
Mlle	Mademoiselle
mm	millimetre(s)
Mme	Madame
Mn	manganese
Mo	molybdenum
Mo.	Missouri
Mong.	Mongolia
Mont.	Montana
Mor.	Morocco
MP	member of Parliament
mph	mile(s) per hour
Mr.	Mister
Mrs.	"Missus"
MS.	manuscript
M.S.	master of science
MSA	metropolitan statistical area
M.Sc.	master of science

Msgr.	Monsignor
MSS.	manuscripts
Mt.	Mount; Mountain(s)
mun.	municipality
MV	Motor Vessel
M.V.O.	Member of the Royal Victorian Order
N	nitrogen; north
Na	sodium (Latin *natrium*)
NA	National Association
Nah.	Nahum (Bible)
Nb	niobium
N.B.	New Brunswick
N.C.	North Carolina
n.d.	no date
Nd	neodymium
N.D.	North Dakota
Ne	neon
NE	northeast
Neb.	Nebraska
Neh.	Nehemiah (Bible)
Neth.	The Netherlands
Nev.	Nevada
Nfd.	Newfoundland
N.H.	New Hampshire
Ni	nickel
Nic.	Nicaragua
N.Ire.	Northern Ireland
N.J.	New Jersey
N.Kor.	North Korea
N.M.	New Mexico
no.	number
No	nobelium
Nor.	Norway
Nov.	November
Np	neptunium
NS	Nuclear Ship
N.S.	New Style (calendar); Nova Scotia
N.S.W.	New South Wales
N.Terr.	Northern Territory
Num.	Numbers (Bible)
NV	Limited-liability Company (Dutch *Naamloze Vennootschap*)
NW	northwest
N.W.Terr.	Northwest Territories
N.Y.	New York
N.Z.	New Zealand
O	oxygen
Obad.	Obadiah (Bible)
O.B.E.	Officer of the Order of the British Empire
Oct.	October
Okla.	Oklahoma
Ont.	Ontario
op.	opus
op. cit.	in the work cited (Latin *opere citato*, or *opus citato*)
Ore.	Oregon
Os	osmium
O.S.	Old Style (calendar)
oz	ounce(s)
p.	page
P	phosphorus
pA	Limited (Italian *per Azioni*)
Pa	protactinium
Pa.	Pennsylvania
Pak.	Pakistan
Pan.	Panama
Pb	lead (Latin *plumbum*)
Pd	palladium
P.E.I.	Prince Edward Island
Pet.	Peter (Bible)
pH	potential of hydrogen (acidity–alkalinity factor)
Ph.B.	bachelor of philosophy (Latin *philosophiae baccalaureus*)
Ph.D.	doctor of philosophy (Latin *philosophiae doctor*)
Phil.	Philippians (Bible); Philippines
Philem.	Philemon (Bible)
PLC	Public Limited Company
Pm	promethium
PM	afternoon (Latin *post meridiem*)
PMSA	primary metropolitan statistical area
Po	polonium
Pol.	Poland
pop.	population
Port.	Portugal
pp.	pages
Pr	praseodymium
P.R.	Puerto Rico
prelim.	preliminary
Pres.	President
Prov.	Proverbs (Bible)
Ps.	Psalms (Bible)
Pt	platinum
Pu	plutonium
qq.v.	which see (plural; Latin *quae vide*)
Que.	Quebec
Queen.	Queensland
q.v.	which see (singular; Latin *quod vide*)
R	Rankine
Ra	radium
Rb	rubidium
Re	rhenium
rev.	revised; revision
Rev.	Revelations (Bible); Reverend
Rf	rutherfordium
Rh	rhodium
R.I.	Rhode Island
Rn	radon
Rom.	Romania; Romans (Bible)
rpm	revolutions per minute
Rt. Rev.	Right Reverend
Ru	ruthenium
s	second
S	south; sulfur
S.	Saint (*san, santo, santa, sant'*)
S. of Sol.	Song of Solomon (Bible)
SA	Limited-liability Company (French *Société Anonyme;* Italian *Società Anònima;* Portuguese *Sociedade Anónima;* Spanish *Sociedad Anónima*)
S.Af.	South Africa
Sam.	Samuel (Bible)
Sask.	Saskatchewan
S.Aus.	South Australia
Sb	antimony (Latin *stibium*)
Sc	scandium
S.C.	South Carolina
Scot.	Scotland
SCSA	standard consolidated statistical area
S.D.	South Dakota
Se	selenium
SE	southeast
sec	secant; second(s)
Sept.	September
S.F.S.R.	Soviet Federated Socialist Republic
Si	silicon
sin	sine
S.Kor.	South Korea
Sm	samarium
SMSA	standard metropolitan statistical area
Sn	tin (Latin *stannum*)
SpA	Limited-liability Company (Italian *Società per Azioni*)
sq	square
Sr	strontium
Sr.	Senior
SS	Steamship
SS.	Saints; Saintliest, or Holiest (Italian *Santissimo, Santissima*)
S.S.R.	Soviet Socialist Republic
St.	Saint (*Sankt, Sint*)
Sta.	Saint (*Santa*)
Ste.	Saint (*Sainte*)
SW	southwest
Swed.	Sweden
Switz.	Switzerland
Ta	tantalum
tan	tangent
Tanz.	Tanzania
Tas.	Tasmania
Tb	terbium
Tc	technetium
Te	tellurium
Tenn.	Tennessee
Th	thorium
Thai.	Thailand
Thess.	Thessalonians (Bible)
Ti	titanium
Tim.	Timothy (Bible)
Tit.	Titus (Bible)
Tl	thallium
Tm	thulium
trans.	translated; translation; translator(s)
Tun.	Tunisia
Tur.	Turkey
U	uranium
U.A.E.	United Arab Emirates
U.A.R.	United Arab Republic
U.K.	United Kingdom
UN	United Nations
U.S.	United States
USGPO	United States Government Printing Office
USS	United States Ship
U.S.S.R.	Union of Soviet Socialist Republics
v.	versus (law)
V	vanadium
Va.	Virginia
Venez.	Venezuela
Vic.	Victoria
Vir.Is.	Virgin Islands
vol.	volume(s)
Vt.	Vermont
W	tungsten (wolfram); west
Wash.	Washington
W.Aus.	Western Australia
W.Ger.	West Germany
Wis.	Wisconsin
W.Va.	West Virginia
Wyo.	Wyoming
Xe	Xenon
Y	yttrium
Yb	ytterbium
yd	yard(s)
Yugos.	Yugoslavia
Zech.	Zechariah (Bible)
Zeph.	Zephaniah (Bible)
Zimb.	Zimbabwe
Zn	zinc
Zr	zirconium

Table of Measurement Conversions

To convert	Into	Multiply by
acres	hectares	0.40468564
Celsius (centigrade)	Fahrenheit	(C° × 9/5) + 32
centimetres	inches	0.3937008
cubic feet	cubic metres	0.028316847
cubic metres	cubic feet	35.31467
Fahrenheit	Celsius (centigrade)	5/9(F° − 32)
feet	metres	0.3048
gallons (U.S. liquid)	litres	3.785412
grams	ounces (troy)	0.032150747
hectares	acres	2.471054
inches	centimetres	2.54
inches	millimetres	25.4
kilograms	pounds	2.2046226
kilometres	miles (nautical)	0.5399568
kilometres	miles (statute)	0.6213712
litres	gallons (U.S. liquid)	0.26417205
metres	feet	3.2808399
metres	yards	1.093613298
miles (nautical)	kilometres	1.852
miles (statute)	kilometres	1.609344
millilitres	ounces (U.S. fluid)	0.03381402
millimetres	inches	0.03937008
newtons	pounds (of force)	0.224809
ounces (troy)	grams	31.1034768
ounces (U.S. fluid)	millilitres	29.57353
pounds	kilograms	0.45359237
pounds (of force)	newtons	4.44822
square kilometres	square miles	0.38610216
square miles	square kilometres	2.58998811
yards	metres	0.9144